

Hawkesbury Hydro

Stations Inspections, IR Scanning and Oil Sampling at 44KV Tessier M.S. & 115KV Main St. W. T.S.

Hydro Ottawa July 15, 2022





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44KV Station (Tessier St.) - Q1/Q2 Inspections

Recommendations for Corrective Actions

- Ground connection on the fence can be repaired during next inspection/maintenance. (Refer to Q1/Q2 inspection reports attached)
- Further investigation required to determine the cause of fan failure.
 Parts may need to be ordered to make repairs. (Refer to Q1/Q2 inspection reports attached)
- Cleaning and tightening of equipment causing hot spots required.
 (Refer to IR inspection report attached)
- Re-Sample the oil from the 43T1 & 43T2 to verify the dielectric breakdown of the oil as recommended by Stark International. (Refer to the oil report attached)





TYPEM	IAINTENANCE	STATION	MS #2		ISSUE DATE	M 47, 0000
SUBSTATION ADDRESS	Tessier St.					May 17, 2022
FEEDER/NOMENCLATURE	A	MBIENT TEMPERATURE _		TESTED BY	BRAC	FRASER
WORK ORDER #	680819			ATUS		
Procedure						
FOLLOW WORK PRO	OCEDURES FOR THE LISTED	INDIVIDUAL INSPECTION	ONS AND CH	HECK APPRORIA	ATE BOX	
CHECK ALL ITEMS S	PECIFIC TO THIS STATION AND	COMPLETE ALL PAGES	S.			
CALL INTO SYSTEM	ANY TARGETS OR FLAGGING	AND RESET UPON	DEPARTURE			
CONDITION	INSPECTION ITEM	REMARKS				
V G ∏ P ∏ C ∏ I	YARD					
V G □ P □ C □ I	BUILDING EXTERIOR					
V G ∏ P ∏ C ∏ I	BUILDING INTERIOR					
√ G □ P □ C □ I	BASEMENT					
V G ∏ P ∏ C ∏ I	DC SYSTEMS					
V G ∏ P ∏ C ∏ I	STATION RTU					
V G ∏ P ∏ C ∏ I	PROTECTION RELAY PANELS					
V G ∏ P ∏ C ∏ I	OUTDOOR STRUCTURES					
V G ∏ P ∏ C ∏ I	STATION SERVICE TRANSFORMERS					
V G ∏ P ∏ C ∏ I	POWER TRANSFORMERS					
V G ∏ P ∏ C ∏ I	CIRCUIT BREAKERS / RECLOSERS					
V G ∏ P ∏ C ∏ I	VOLTAGE REGULATORS					
V G ∏ P ∏ C ∏ I	SWITCHGEAR ASSEMBLIES					
V G □ P □ C □ I	CIRCUIT SWITCHERS					
V G ∏ P ∏ C ∏ I	GROUND GRID					
V G □ P □ C □ I	STATION IDENTIFICATION SIGN					
V G ∏ P ∏ C ∏ I	PPE SIGN					
V G □ P □ C □ I	SITE SAFETY NOTICE SIGN					
GPPCI	CONTAINMENT PIT					
☐ G ☐ P ☐ C ☐ I	SUMPRIT OF WATER SEPARATOR	CLEAN WATER	OIL SHEE	:N		
GGPGCI	SMOKE DETECTOR VERIFICATION					
G P C I	KELMAN FILTER CLEANED		_			
□ G □ P □ C □ I	VERIFY ATS OPERATION					
G P C C I	VERIFY DC ALARMS & ANALOGS		_			
G = ITEMS FOUND IN SATIS	FACTORY CONDITION					
	R CONDITION AND REQUIRING FUTU					
	ORRECTED AND LEFT IN SATISFACT EDIATE CORRECTIVE ACTIONS	TORY CONDITION				
COMMENTS: 43T1 fans DEFICIENCIES:	not working					



															F	PAGE		
TRANSFORMER NAM	/IEPLA1	TE DA	TA															
MANUFACTURER				- Ferra	anti-Packa	ırd						SE	RIAL NO.		0308	40100	1	
YEAR 1985		KVA	10,00	00 / 1	13,300 /	16,7	00_	TYPE		43T1	_	CLA	ss <u>c</u>	NAN/ON	NAF/ONAF			
PHASE 3 TEMP	PERATUR	RE RISE		65 °	С	IMPI	EDANCE	6.96		%	B.I.L.	. RATI	NG	250	kV PRI.		95 kV	SEC.
COOLANT	OIL			_	CAPAC	CITY								TOTA	L WEIGHT		31397	
WINDING POLARITY				_	WINDI	NG MA	ATERIAL			Copper				K FAC	TOR		nan	
PRIMARY VOLTAGE 44	,000	/		_ ①	DELTA	\circ	WYE	ZIGZ	ZAG	RATE	D CURF	RENT		/	/		AMPERES	3
SECONDARY VOLTAGE 1	2,470	/	7,200	_ 0	DELTA	\odot	WYE	ZIGZ	ZAG	RATE	D CURF	RENT		/	/		AMPERES	3
TAP VOLTAGES 45,1	100		44,000		42,9	00	4	1,800		40	,700							
TAP CONNECTIONS 1			2		3													
TAP SETTING 3		42,900	Vo	olts	# FANS		6	_	TAF	P CHANGE	ER:	$lue{}$	INTERNAL	- 0	EXTERNA	L	DRY TYP	E 🔲
GAUGES	N	IOTE: T	RANS	ORME	R OIL LE\	/EL = 5	50% @ 25	С		VISUA	\L_							
WINDING TEMPERATURE	MIN		Max	75	AS F	OUND	35		ĮΓ	CONDITIO	ON			INSPE	CTION ITEM	1		
OIL TEMPERATURE	MIN		Max			OUND	100			V G Γ	Р	С	1	BUSHIN	NGS			
TRANSFORMER OIL LEVEL			100%			OUND	00		J	√ G Γ	РГ	С	1	SUPPO	RT INSULATO	ORS		
BUSHING OIL LEVEL	0%		100%			OUND			Į ŀ	. G Γ	Р	C		CONNE	CTIONS			
TRANSFORMER PRESSURE			√ KF	PA F	PSI AS F				Į ⊧				_		.0110110			
GAS RELAY					AS F	OUND			Į Ļ	√ G	P	C		PAINT				
TAP CHANGER	_									√ G	Р	С	1	RADIAT	TORS			
MANUFACTURER				MO						√ G [P _	С	_ I	FANS				
SERIAL NO.		_ YE	AR .		GAL	LONS				√ G Γ	Р	С		NO-LO	AD TAP CHAN	NGER		
TAP CHANGER OIL TEMP	MIN		Max		AS F	OUND			Ī	√ G [Р	С	_ i	OIL LEA	AKS			
TAP CHANGER OIL LEVEL	MIN		Max		_4	OUND			ı	V G Γ	Р	С		COOLIN	NG PUMP			
TAP POSITION	MIN		Max			OUND		4	F	✓ G F	P	С		HEATE	R CONDITION	v		
COUNTER						OUND		4	H			_					ITION	
DIVERTOR OIL LEVEL	MIN		Max		AS F	OUND		_4	ŀ	√ G	Р		_	CONTR	OL CABINET	CONL	ITION	
HEATER CONDITION									L	√ G	P	С	_ I	EXPLO:	SION VENT			
BANDWIDTH	MIN				Max					▽ G □	Р	С	1	SILICA	GEL BREATH	IER		
RELIEF VENT		G 🔲	Р	С	I					√ G [P 🗌	С	_ I	GROUN	ND CONDUCT	OR CO	ONDITION	
OIL FILTRATION PUMP PSI	: 0		FILTE	R TYPE	:					FILTER	R CHAN	GE D	ATE:		HOU	JRS:		



						PAGE	<u> </u>
TRANSFORMER NAM	MEPLATE DA	TA					
MANUFACTURER		Pioneer	Transformers		SERIAL N	O. <u>G16194</u> -	1
YEAR 2012	KVA	10,000 / 13	3,300 / 16,670 TYF	PE 43T2	CLASS	ONAN/ONAF/ONAF	
PHASE 3 TEMP	PERATURE RIS	E 65 °C	IMPEDANCE (6.91 %	B.I.L. RATING	kV PRI.	kV SEC.
COOLANT Mineral Oil, Nor	n-PCB, Class A,	Type 2	CAPACITY 800:5 c	t		TOTAL WEIGHT	28880 kg
WINDING POLARITY			WINDING MATERIAL	Copper		K FACTOR	nan
PRIMARY VOLTAGE 44	,000 /		DELTA O WYE 2	ZIGZAG RATE	CURRENT	/ /	AMPERES
SECONDARY VOLTAGE 1	2,470 /	7,200 C	DELTA WYE	ZIGZAG RATE	CURRENT	/ /	AMPERES
TAP VOLTAGES 48,4	102	46,938	45,474 44,3	76 44,	010 42,5	41,081	39,617
TAP CONNECTIONS 1				1		7 21	25
TAP SETTING 12	44,376	S Volts	# FANS 6	TAP CHANGE	R: O INTERN	IAL 🌀 EXTERNAL	DRY TYPE
GAUGES	NOTE:	TRANSFORMER	OIL LEVEL = 50% @ 25C	VISUA	<u>L</u>		
WINDING TEMPERATURE	MIN	Max 40	AS FOUND 20	CONDITIO	N	INSPECTION ITEM	
OIL TEMPERATURE	MIN	Max 40	AS FOUND 20	□ V G [PCCI	BUSHINGS	
TRANSFORMER OIL LEVEL	0%	100%	AS FOUND 45		РПСПІ	SUPPORT INSULATORS	
BUSHING OIL LEVEL	0%	100%	AS FOUND	☐ V G F	РГСГІ	CONNECTIONS	
TRANSFORMER PRESSURE		V KPA ∏ PS		IJ Ĕ			
GAS RELAY			AS FOUND	V G □	P C I	PAINT	
TAP CHANGER	_			√ G	P C I	RADIATORS	
MANUFACTURER	ABB	MOD	EL UZERT 250/300		P 🔲 C 🔲 I	FANS	
SERIAL NO. 1ZSC87149	910 YE	AR <u>2012</u>	GALLONS 580 L	_	P C I	NO-LOAD TAP CHANGER	
	MIN	Max	AS FOUND	√ G □	P C C I	OIL LEAKS	
	MIN	Max	AS FOUND 40	V G □	PCII	COOLING PUMP	
TAP POSITION COUNTER	MIN 12	Max 12	AS FOUND 12	⊽ G □	РГСГІ	HEATER CONDITION	
DIVERTOR OIL LEVEL	MIN	Max	AS FOUND AS FOUND		РГСГІ	CONTROL CABINET CON	DITION
HEATER CONDITION	IVIIIN	IVIAX	AS FOUND	V G		EXPLOSION VENT	
BANDWIDTH	MIN		Max		PCCI	SILICA GEL BREATHER	
RELIEF VENT	V G □	P C I		<u></u>	P C C I	GROUND CONDUCTOR C	ONDITION
OIL FILTRATION PUMP PSI	: 0	FILTER TYPE:		FILTER	CHANGE DATE:	HOURS:	



TYPE	MAIN	ITENANCE	STATIO	ON	MS	#2		ISSI	JE DATE	
SUBSTATION ADDRES	ss <u>Tes</u>	sier St.				_		COMPLETI		2022-06-27
FEEDER/NOMENCI AT	TURE	Hawkesbury Ar	/RIENT	TEMPERATURE		°C				STEWART
			/IDILIVI	TEIMI ENATORE					DRAL	O FRASER
WORK ORDER #		680819				TEST STA	TUS			
Procedure										
		EDURES FOR THE LISTED I				S AND CH	IECK APP	PRORIATE	BOX	
		CIFIC TO THIS STATION AND								
_	YSIEM A	NY TARGETS OR FLAGGING			DEF	PARTURE				
CONDITION		INSPECTION ITEM	REMA	RKS						
G P P C		YARD								
GPPC	_	BUILDING EXTERIOR								
G P C	_	BUILDING INTERIOR								
GPPC	_	BASEMENT								
G P C	•	DC SYSTEMS								
G P C		STATION RTU			_					
GPC		PROTECTION RELAY PANELS								
G P C		OUTDOOR STRUCTURES								
V G ∏ P ∏ C		STATION SERVICE TRANSFORMERS								
G P C	_	POWER TRANSFORMERS								
G P C		CIRCUIT BREAKERS / RECLOSERS								
G P C	_	VOLTAGE REGULATORS								
G P P C	,	SWITCHGEAR ASSEMBLIES								
GPC	_	CIRCUIT SWITCHERS								
G P C		GROUND GRID								
G P C		STATION IDENTIFICATION SIGN								
GPC		PPE SIGN								
G P C		SITE SAFETY NOTICE SIGN								
G P C		CONTAINMENT PIT			_					
G P C		SUMP PIT / OIL-WATER SEPARATOR	_	CLEAN WATER	<u> Ц</u>	OIL SHEEN	N			
☐ G ☐ P ☐ C		SMOKE DETECTOR VERIFICATION			_					
G P C	_	KELMAN FILTER CLEANED			_					
, ,	<u> </u>	VERIFY ATS OPERATION			_					
G P C		VERIFY DC ALARMS & ANALOGS								
		CTORY CONDITION	NE 00D	DEOTIVE ACTIO						
		ONDITION AND REQUIRING FUTUI RECTED AND LEFT IN SATISFACT			N					
		IATE CORRECTIVE ACTIONS	J. (1 O							
COMMENTS:										
DEFICIENCIES: St		und connection on fence requires rep			1					
		1 and stage 2 fans do not turn on, or ure guage unreadable, yellow film on								



						PAG	E
TRANSFORMER NAM	/IEPLATE DA	TA					
MANUFACTURER		Ferranti	i-Packard			0308401	001
YEAR 1985	KVA	10,000 / 13,	300 / 16,700 TYP	E 43T1	CLASS	ONAN/ONAF/ONAF	
PHASE 3 TEMP	PERATURE RIS	E 65 °C	IMPEDANCE 6	.96 %	B.I.L. RATING	250 kV PRI.	95 kV SEC.
COOLANT	OIL		CAPACITY			TOTAL WEIGHT	31397 kg
WINDING POLARITY			WINDING MATERIAL			K FACTOR	
PRIMARY VOLTAGE 44	,000 /		DELTA C WYE Z	IGZAG RATED	CURRENT	1 1	AMPERES
SECONDARY VOLTAGE 1	2,470 /	7,200 C	DELTA 🌀 WYE 🗌 Z	IGZAG RATED	CURRENT	1 1	AMPERES
TAP VOLTAGES 45,1	100	44,000	42,900 41,80	0 40,7	700		
TAP CONNECTIONS 1		2	3 4	5			
TAP SETTING 3	42,900	Volts #	FANS 6	TAP CHANGE	R: 🌑 INTERNA	AL C EXTERNAL	DRY TYPE
GAUGES	NOTE:	TRANSFORMER (OIL LEVEL = 50% @ 25C	VISUA	<u>L</u>		
WINDING TEMPERATURE	MIN	Max 75	AS FOUND 50	CONDITIO	N	INSPECTION ITEM	
OIL TEMPERATURE	MIN	Max 70	AS FOUND 50	☐ V G [РГСГІ	BUSHINGS	
TRANSFORMER OIL LEVEL	0%	100%	AS FOUND 60		РПсПі	SUPPORT INSULATORS	
BUSHING OIL LEVEL	0%	100%	AS FOUND		РГСГІ	CONNECTIONS	
TRANSFORMER PRESSURE		√ KPA ∏ PSI	·				
GAS RELAY			AS FOUND		P C I	PAINT	
TAP CHANGER	_			▽ G □	P C C I	RADIATORS	
MANUFACTURER		MODE	L	☐ G ▽	P C I	FANS	
SERIAL NO.	YE	EAR	GALLONS	_ V G □	PCCI	NO-LOAD TAP CHANGER	?
TAP CHANGER OIL TEMP	MIN	Max	AS FOUND	⊽ G □	РПСПІ	OIL LEAKS	
TAP CHANGER OIL LEVEL	MIN	Max	AS FOUND	ГбГ	РГСГІ	COOLING PUMP	
TAP POSITION	MIN	Max	AS FOUND		PCCI	HEATER CONDITION	
COUNTER			AS FOUND				
DIVERTOR OIL LEVEL	MIN	Max	AS FOUND	√ G	P C I	CONTROL CABINET CON	IDITION
HEATER CONDITION				☐ G ☐	P C I	EXPLOSION VENT	
BANDWIDTH	MIN	N	1ax	☐ G ☐	P C C I	SILICA GEL BREATHER	_
RELIEF VENT	G	P C I		▽ G □	P 🗌 C 🗌 I	GROUND CONDUCTOR	CONDITION
OIL FILTRATION PUMP PSI	: 0	FILTER TYPE:		FILTER	CHANGE DATE:	HOURS:	



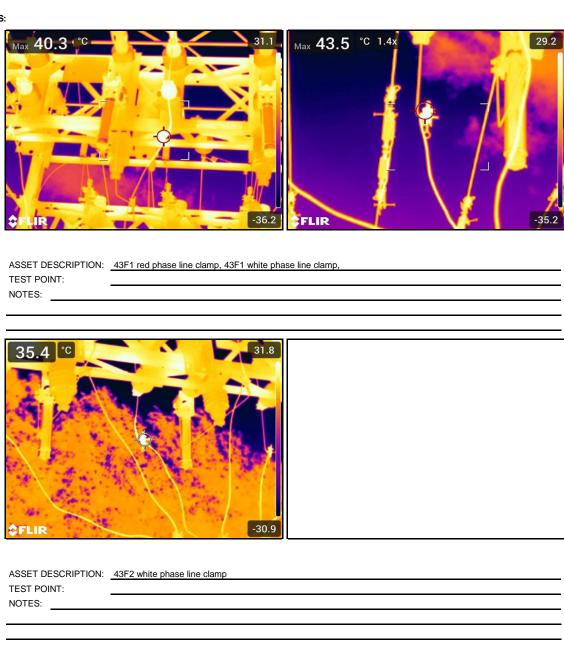
						PAG	E
TRANSFORMER NAM	MEPLATE DA	TA					
MANUFACTURER		Pioneer	Transfomers		SERIAL N	O. <u>G16194</u>	-1
YEAR 2012	KVA	10,000 / 13	3,330 / 16,670 TY	PE 43T2	CLASS	ONAN/ONAF/ONAF	
PHASE 3 TEMP	PERATURE RISI	E 65 °C	IMPEDANCE	6.91 %	B.I.L. RATING	kV PRI.	kV SEC.
COOLANT Mineral Oil, Non	n-PCB, Class A,	Type 2	CAPACITY 800:5 c	ot		TOTAL WEIGHT	28880 kg
WINDING POLARITY			WINDING MATERIAL	Copper		K FACTOR	nan
PRIMARY VOLTAGE 44,	,000 /	●	DELTA O WYE	ZIGZAG RATEI	CURRENT	/ /	AMPERES
SECONDARY VOLTAGE 12	2,470 /	7,200	DELTA WYE	ZIGZAG RATEI	CURRENT	/ /	AMPERES
TAP VOLTAGES 48,4	102	46,938	45,474 44,3	376 44,	010 42,5	545 41,081	39,617
TAP CONNECTIONS 1				2 1		7 21	25
TAP SETTING 12	44,376	Volts	# FANS 6	TAP CHANGE	R: O INTERN	NAL 🌀 EXTERNAL	DRY TYPE
GAUGES	NOTE: 1	TRANSFORMER .	OIL LEVEL = 50% @ 25C	VISUA	<u>L</u>		
WINDING TEMPERATURE	MIN	Max 40	AS FOUND 30	CONDITIO	N	INSPECTION ITEM	
	MIN	Max 40	AS FOUND 30	▽ G ▽	PCCI	BUSHINGS	
TRANSFORMER OIL LEVEL	0%	100%	AS FOUND 50		РПСПІ	SUPPORT INSULATORS	
	0%	100%	AS FOUND 50	₩ V G F	РГСГІ	CONNECTIONS	
TRANSFORMER PRESSURE		V KPA PS					
GAS RELAY			AS FOUND	✓ G	P C I	PAINT	
TAP CHANGER	_			√ G	P C I	RADIATORS	
MANUFACTURER	ABB	MOD	DEL UZERT 250/300	_	P C I	FANS	
SERIAL NO. 1ZSC 8714	910 YE	AR <u>2012</u>	GALLONS 580 L	_	P C C I	NO-LOAD TAP CHANGE	3
	MIN	Max	AS FOUND	√ G □	P C C I	OIL LEAKS	
	MIN	Max	AS FOUND 45	G	PCCI	COOLING PUMP	
TAP POSITION COUNTER	MIN 12	Max 12	AS FOUND 12 AS FOUND 2.586	⊽ G Γ	РПСПІ	HEATER CONDITION	
	MIN	Max	AS FOUND 2,586	 ▼ G	РГСГІ	CONTROL CABINET CON	NDITION
HEATER CONDITION	IVIIIV	IVIAX	NOT COND			EXPLOSION VENT	
	MIN		Max	ГбГ		SILICA GEL BREATHER	
RELIEF VENT		<u> </u>			РПСПІ	GROUND CONDUCTOR	CONDITION
OIL FILTRATION PUMP PSI:		FILTER TYPE:			CHANGE DATE:	HOURS	

Infrared Inspection



TYPE		MAINTENANCE	STATION	MS #2		ISSUE DATE		
_			_		cc	MPLETED DATE	2022-06-27	
SUBSTATION	ADDRESS _				TESTED BY	BRAD	FRASER	
FEEDER/NOM	IENCLATURE	43F1, 43F2	AMBIENT TEMPERATU	RE °C	TESTED BY		STEWART	_
						OOLIL C	JI L VV/ (I C I	_
WORK ORDER	R#	680827		TEST S	TATUS			

INFRARED IMAGES:



COMMENTS: DEFICIENCIES:



115KV Station (Main St. W.) - Q1/Q2 Inspections

Recommendations for Corrective Actions

- As mentioned in the reports equipment nameplates were impossible to read from the ground. May be possible to obtain more information during maintenance.
- Ground connection on fence behind P&C shed to be repaired during next inspection/maintenance. (Refer to Q1/Q2 inspection reports attached)
- P&C Room emergency lighting to be repaired during maintenance.
- Cleaning and tightening of equipment causing hot spots required.
 (Refer to IR inspection report attached)





TYPE MA	INTENANCE	STATION _				ISSUE DATE	
SUBSTATION ADDRESS Ma	ain St. West					COMPLETED DATE	May 17, 2022
		ADJENIT TENA	DEDATUDE	<u> </u>	TESTED BY	Y BEN	
FEEDER/NOMENCLATURE	MTS #1 AN	ABIENT LEM	PERATURE _				D FRASER
WORK ORDER #				TEST ST	TATUS		
Procedure							
FOLLOW WORK PRO	CEDURES FOR THE LISTED I	NDIVIDUAL	INSPECTIO	NS AND C	CHECK APPR	RORIATE BOX	
☐ CHECK ALL ITEMS SP	ECIFIC TO THIS STATION AND	COMPLETE	ALL PAGES				
CALL INTO SYSTEM	ANY TARGETS OR FLAGGING	AND RES	ET UPON D	EPARTURE	=		
CONDITION	INSPECTION ITEM	REMARKS					
V G ∏ P ∏ C ∏ I	YARD						
▽ G □ P □ C □ I	BUILDING EXTERIOR						
V G ∏ P ∏ C ∏ I	BUILDING INTERIOR						
V G P C C I	BASEMENT						
V G T P T C T I	DC SYSTEMS						
V G □ P □ C □ I	STATION RTU						
V G ∏ P ∏ C ∏ I	PROTECTION RELAY PANELS						
V G □ P □ C □ I	OUTDOOR STRUCTURES						
V G ∏ P ∏ C ∏ I	STATION SERVICE TRANSFORMERS						
V G □ P □ C □ I	POWER TRANSFORMERS						
V G ∏ P ∏ C ∏ I	CIRCUIT BREAKERS / RECLOSERS						
V G □ P □ C □ I	VOLTAGE REGULATORS						
V G ∏ P ∏ C ∏ I	SWITCHGEAR ASSEMBLIES						
V G □ P □ C □ I	CIRCUIT SWITCHERS						
V G ∏ P ∏ C ∏ I	GROUND GRID						
V G □ P □ C □ I	STATION IDENTIFICATION SIGN						
V G ∏ P ∏ C ∏ I	PPE SIGN						
▽ G □ P □ C □ I	SITE SAFETY NOTICE SIGN						
G G P G C G I	CONTAINMENT PIT						
GPPCI	SUMP PIT / OIL-WATER SEPARATOR	CLE	AN WATER	OIL SHE	EN		
☐ G ☐ P ☐ C ☐ I	SMOKE DETECTOR VERIFICATION			_			
GPPCI	KELMAN FILTER CLEANED	_					
GPCI	VERIFY ATS OPERATION			_			
G P C C I	VERIFY DC ALARMS & ANALOGS			_			
G = ITEMS FOUND IN SATISFA							
	CONDITION AND REQUIRING FUTUR RRECTED AND LEFT IN SATISFACT						
C = ITEMS REPAIRED OR COI = ITEMS REQUIRING IMMEI		OKT CONDI	IION				
COMMENTS:							
	megency light not working						



				PAGE
CIRCUIT SWITCHER				
NOMENCLATURE	RE:	55T2-L		
NAMEPLATE DATA				
MANUFACTURER	MODEL	NO	TYPE	
CATALOG NO.	AMPAC	ITY VOLTAGE		CONTROL VOLTAGE
SERIAL NUMBER	INTERR	UPT CAPACITY RMS MOMENTARY		Other
	INTERR	LUPT CAPACITY 1 SECOND		
VISUAL & MECHANICAL INSPECTION		CONDITION		
INSPECT PHYSICAL & MECHANICAL CONDITION				
INSPECT ANCHORAGE, ALIGNMENT & CLEARANCES		V G □ P □ C □ I		
INSPECT GROUNDING		V G M P M C M I		
VERIFY HEATER OPERATION		V G □ P □ C □ I		
POSITION INDICATORS		V G M P M C M I		
GAS PRESSURE SF6 ☑ KPA ☐		60		
COUNTER		16		
CIRCUIT SWITCHER		_		
NOMENCLATURE	RE:	55T3-L		
NAMEPLATE DATA				
MANUFACTURER	MODEL	NO	TYPE	
CATALOG NO.	AMPAC	ITY VOLTAGE		CONTROL VOLTAGE
SERIAL NUMBER	INTERR	UPT CAPACITY RMS MOMENTARY		Other
	INTERR	UPT CAPACITY 1 SECOND		
VISUAL & MECHANICAL INSPECTION		CONDITION		
INSPECT PHYSICAL & MECHANICAL CONDITION				
INSPECT ANCHORAGE, ALIGNMENT & CLEARANCES		V G □ P □ C □ I		
INSPECT GROUNDING		V G M P M C M I		
VERIFY HEATER OPERATION		V G □ P □ C □ I		
POSITION INDICATORS		V G □ P □ C □ I		
GAS PRESSURE SF6 🔽 KPA 🗌		70		
COUNTER		57		



TRANSFORMER NAM			EETO.			SERIAI N	NO	
MANUFACTURER		,			VDE		···	
YEAR		/				CLASS	kV PRI.	kV/SEC
PHASE 3 TEMP						_		
COOLANT			CAPACITY				TOTAL WEIGHT	
WINDING POLARITY			WINDING MA				K FACTOR	
PRIMARY VOLTAGE SECONDARY VOLTAGE							/ /	
TAP VOLTAGE	/		DELIA (VV YE L	ZIGZAG KATE	D CURRENT	1 1	AMPERES
TAP CONNECTIONS								
			# FANS	-	TAP CHANGI	R. O INTER	NAL C EXTERNAL	DRY TYPE
GAUGES							TALE O EXTENSION	D.K. 1112 [
WINDING TEMPERATURE		TRANSFORMER Max	AS FOUND				INCREATION ITEM	
OIL TEMPERATURE	MIN	Max	AS FOUND	25 25	CONDITIO		INSPECTION ITEM	
TRANSFORMER OIL LEVEL		100%	AS FOUND	50	₩ G L	PCCI	BUSHINGS	
BUSHING OIL LEVEL	0%	100%	AS FOUND	50	<u> </u>	P C I	SUPPORT INSULATORS	
TRANSFORMER PRESSURE			SI AS FOUND		₩ G G	PCCI	CONNECTIONS	
GAS RELAY			AS FOUND		V G Γ	РГСГІ	PAINT	
TAP CHANGER	#	<u>.</u>		-		РГСГІ	RADIATORS	
MANUFACTURER	_	МОІ)FI			PCCI	FANS	
SERIAL NO.		EAR						
	MIN I	Max	AS FOUND		7 	PCI	NO-LOAD TAP CHANGE	₹
TAP CHANGER OIL LEVEL	MIN	Max	AS FOUND			P C I	OIL LEAKS	
TAP POSITION	MIN 8	Max 15	AS FOUND		IV G □	PCCI	COOLING PUMP	
COUNTER	W 0	William 15	AS FOUND	12		P C I	HEATER CONDITION	
DIVERTOR OIL LEVEL	MIN	Max	AS FOUND		IV G I	РГСГІ	CONTROL CABINET CO	NDITION
HEATER CONDITION						РПСПІ	EXPLOSION VENT	
BANDWIDTH	MIN		Max			PCCI	SILICA GEL BREATHER	
DANDINDIII	IVIIIN							
RELIEF VENT		РГСГІ				PCCI	GROUND CONDUCTOR	CONDITION



															PAGE		
TRANSFORMER NAM	/IEPLA	TE DA	ГА														
MANUFACTURER					55T2						S	ERIAL NO.					
YEAR							1				CLA	ss					
PHASE 3 TEMP	PERATUR	RE RISE	:	°C	<u> </u>	IMP	EDANCE _		%	B	.I.L. RAT	ING		kV PRI.		k∖	SEC.
COOLANT				_	CAPAC	ITY							TOTA	L WEIGH	т		
WINDING POLARITY				_			ATERIAL						K FAC	CTOR _		nan	
PRIMARY VOLTAGE					DELTA	\circ	WYE _	ZIGZA	.G	RATED CI	JRRENT		/	/		AMPERE	S
SECONDARY VOLTAGE		/		_ O	DELTA	\circ	WYE	ZIGZA	G	RATED CI	JRRENT		/	/		AMPERE	S
									_								
TAP CONNECTIONS									_		_						
TAP SETTING			Vol	ts	# FANS			_ T	AP C	HANGER:	O	INTERNAL	- 0	EXTER	NAL	DRY TYP	E 🗌
GAUGES	N	NOTE: T	RANSF	ORMER	OIL LEV	EL = 5	50% @ 250	;		VISUAL	_						
WINDING TEMPERATURE	MIN		Max		AS FO	DUND	30		CC	NDITION			INSPE	CTION IT	EM		
OIL TEMPERATURE	MIN		Max		AS FO	DUND	38			G P	С		BUSHI	NGS			
TRANSFORMER OIL LEVEL	0%		100%		AS FO	DUND	50			G P	Пс		SUPPO	ORT INSULA	ATORS		
BUSHING OIL LEVEL	0%		100%		_	DUND					Гс		CONNI	ECTIONS			
TRANSFORMER PRESSURE			KP/	4 <u></u>	SI AS FO	DUND											
GAS RELAY					AS FO	DUND			-	G P	∐ с	<u> </u>	PAINT				
TAP CHANGER	_									G P	С		RADIA	TORS			
MANUFACTURER				MOD	EL			_		G P	С	_ I	FANS				
SERIAL NO.		_ YE	AR _		GALI	LONS			V	G P	С		NO-LO	AD TAP CH	IANGER		
TAP CHANGER OIL TEMP	MIN		Max		AS FO				V	G P	С	I	OIL LE	AKS			
TAP CHANGER OIL LEVEL	MIN		Max		AS FO		1			G P	Гс		COOLI	NG PUMP			
TAP POSITION	MIN 5	5	Max	10	AS FO					GP			HEATE	R CONDITI	ION		
COUNTER	_				_	DUND									_	NTION	
DIVERTOR OIL LEVEL	MIN		Max		AS FO	DUND		_4				<u> </u>	CONT	ROL CABIN	ET CONL	OTTION	
HEATER CONDITION										G 🔲 P	С		EXPLC	SION VEN	Γ		
BANDWIDTH	MIN				Max				7	G P	С		SILICA	GEL BREA	THER		
RELIEF VENT		G 🔲 I	P 🔲 C	; 🔲 ī					V	G 🔲 P	С		GROU	ND CONDU	CTOR C	NOITIDNC	
OIL FILTRATION PUMP PS	l: 0		FILTER	TYPE:						FILTER CH	IANGE [DATE:		Н	OURS:		



TYPE	MAIN	ITENANCE	STAT	ON	MS	#2		ISSUE DATE	
SUBSTATION ADDR	ress Mai	n St. West					COV	IPLETED DATE	2022-06-27
	<u></u>					_	_	JULIE	
FEEDER/NOMENCL	ATURE	Hawkesbury A	//BIENT	TEMPERATURE		<u>*C</u>	TESTED BY _	BRAD) FRASER
WORK ORDER #		680819				TEST STA	TUS		
Procedure									
▼ FOLLOW W	ORK PROC	EDURES FOR THE LISTED I	NDIVI	DUAL INSPECT	IONS	S AND CH	IECK APPROR	IATE BOX	
▼ CHECK ALL	ITEMS SPE	CIFIC TO THIS STATION AND	COMP	LETE ALL PAGE	S.				
▼ CALL INTO	SYSTEM A	NY TARGETS OR FLAGGING	AND	RESET UPON	DEI	PARTURE			
CONDITION		INSPECTION ITEM	REMA	RKS					
V G ∏ P ∏ (С 🔲 І	YARD							
☐ G ☐ P ☐ ·	СПІ	BUILDING EXTERIOR							
G P P	СПІ	BUILDING INTERIOR							
☐ G ☐ P ☐ 0	СПІ	BASEMENT							
G P P	СПІ	DC SYSTEMS							
☐ G ☐ P ☐ 0	СПІ	STATION RTU							
G P P	СПІ	PROTECTION RELAY PANELS							
√ G □ P □ 0	С 🔲 I	OUTDOOR STRUCTURES							
V G □ P □ (СГІ	STATION SERVICE TRANSFORMERS							
 G P D G G G D D G G	С 🔲 I	POWER TRANSFORMERS							
☐ G ☐ P ☐ (СГІ	CIRCUIT BREAKERS / RECLOSERS							
☐ G ☐ P ☐ (С 🔲 І	VOLTAGE REGULATORS							
\square G \square P \square (СПІ	SWITCHGEAR ASSEMBLIES							
☐ G ☐ P ☐ (C 🔲 I	CIRCUIT SWITCHERS							
V G □ P □ (СПІ	GROUND GRID							
☑ G □ P □ (СПІ	STATION IDENTIFICATION SIGN							
\square G \square P \square (СПІ	PPE SIGN							
☑ G □ P □ (СПІ	SITE SAFETY NOTICE SIGN							
▽ G □ P □ (C 🔲 I	CONTAINMENT PIT							
☐ G ☐ P ☐ (C 🔲 I	SUMP PIT / OIL-WATER SEPARATOR		CLEAN WATER		OIL SHEEL	N		
\square G \square P \square (СПІ	SMOKE DETECTOR VERIFICATION							
G P D	C 🔲 I	KELMAN FILTER CLEANED							
$\prod G \prod P \prod 0$	C 🔲 I	VERIFY ATS OPERATION							
G P D	C 🔲 I	VERIFY DC ALARMS & ANALOGS							
G = ITEMS FOUN	D IN SATISFA	CTORY CONDITION							
		ONDITION AND REQUIRING FUTUR			N				
		RECTED AND LEFT IN SATISFACT	ORY C	ONDITION					
•	IKING IMMED	IATE CORRECTIVE ACTIONS							
COMMENTS: DEFICIENCIES:	Station - Grou	and connection on fence requires rep	air on r	north side of station	1				
	43T1 - Stage	1 and stage 2 fans do not turn on, co	ontactor	picks up	•				
	43T1 - Pressu	ure guage unreadable, yellow film on	inside (of guage					



						PAGI	E
TRANSFORMER NAM	MEPLATE DA	TA					
MANUFACTURER		Ferranti	i-Packard			O03084010	001
YEAR 1985	KVA	10,000 / 13,	300 / 16,700 TYP	E 43T1	CLASS	ONAN/ONAF/ONAF	
PHASE 3 TEMP	PERATURE RIS	E 65 °C	IMPEDANCE 6	.96 %	B.I.L. RATING	250 kV PRI.	95 kV SEC.
COOLANT	OIL		CAPACITY			TOTAL WEIGHT	31397 kg
WINDING POLARITY			WINDING MATERIAL			K FACTOR	
PRIMARY VOLTAGE 44	,000 /		ELTA C WYE Z	IGZAG RATED	CURRENT	1 1	AMPERES
SECONDARY VOLTAGE 1	2,470 /	7,200 C	elta 🌀 wye 🗆 z	IGZAG RATED	CURRENT	1 1	AMPERES
TAP VOLTAGES 45,1	100	44,000	42,900 41,80	0 40,7	700		
TAP CONNECTIONS 1		2	3 4	5			
TAP SETTING 3	42,900	O Volts #	FANS 6	TAP CHANGE	R: 🌑 INTERNA	AL C EXTERNAL	DRY TYPE
GAUGES	NOTE:	TRANSFORMER (OIL LEVEL = 50% @ 25C	VISUA	<u>L</u>		
WINDING TEMPERATURE	MIN	Max 75	AS FOUND 50	CONDITIO	N	INSPECTION ITEM	
OIL TEMPERATURE	MIN	Max 70	AS FOUND 50	☐ V G [РГСГІ	BUSHINGS	
TRANSFORMER OIL LEVEL	0%	100%	AS FOUND 60		РПсПі	SUPPORT INSULATORS	
BUSHING OIL LEVEL	0%	100%	AS FOUND		РГСГІ	CONNECTIONS	
TRANSFORMER PRESSURE		√ KPA ∏ PSI					
GAS RELAY		<u> </u>	AS FOUND		P C I	PAINT	
TAP CHANGER	_			▽ G □	P C C I	RADIATORS	
MANUFACTURER		MODE	L	☐ G ▽	P C I	FANS	
SERIAL NO.	YI	EAR	GALLONS	_ \vec{\vec{\vec{\vec{\vec{\vec{\vec{	PCCI	NO-LOAD TAP CHANGER	?
TAP CHANGER OIL TEMP	MIN	Max	AS FOUND	⊽ G □	РПСПІ	OIL LEAKS	
TAP CHANGER OIL LEVEL	MIN	Max	AS FOUND	ГбГ	РГСГІ	COOLING PUMP	
TAP POSITION	MIN	Max	AS FOUND		PCCI	HEATER CONDITION	
COUNTER			AS FOUND				
DIVERTOR OIL LEVEL	MIN	Max	AS FOUND	√ G	P C I	CONTROL CABINET CON	IDITION
HEATER CONDITION				☐ G ☐	P C C I	EXPLOSION VENT	
BANDWIDTH	MIN	N	1ax	☐ G ☐	P C C I	SILICA GEL BREATHER	
RELIEF VENT	☐ G ☐	P 🔲 C 🔲 I		▽ G □	P 🗌 C 🗌 I	GROUND CONDUCTOR (CONDITION
OIL FILTRATION PUMP PSI	1: 0	FILTER TYPE:		FILTER	CHANGE DATE:	HOURS:	



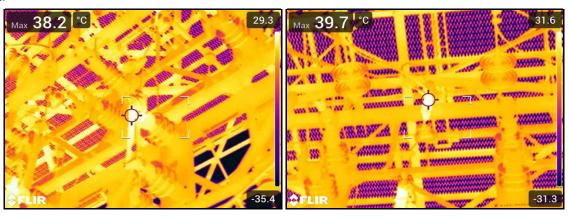
						PAG	E
TRANSFORMER NAM	MEPLATE DA	TA					
MANUFACTURER		Pioneer	Transfomers		SERIAL N	IO. G16194	-1
YEAR 2012	KVA	10,000 / 13	3,330 / 16,670 TY	PE 43T2	CLASS	ONAN/ONAF/ONAF	
PHASE 3 TEMP	PERATURE RIS	E 65 °C	IMPEDANCE	6.91 %	B.I.L. RATING	kV PRI.	kV SEC.
COOLANT Mineral Oil, Nor	n-PCB, Class A,	Type 2	CAPACITY 800:5 c	ot		TOTAL WEIGHT	28880 kg
WINDING POLARITY			WINDING MATERIAL	Copper		K FACTOR	nan
PRIMARY VOLTAGE 44	,000 /	●	DELTA O WYE	ZIGZAG RATEI	CURRENT	/ /	AMPERES
SECONDARY VOLTAGE 1	2,470 /	7,200	DELTA WYE	ZIGZAG RATEI	CURRENT	/ /	AMPERES
TAP VOLTAGES 48,4	102	46,938	45,474 44,3	376 44,	010 42,	545 41,081	39,617
TAP CONNECTIONS 1				2 1		7 21	25
TAP SETTING 12	44,376	Volts	# FANS 6	TAP CHANGE	R: O INTERN	NAL 🌀 EXTERNAL	DRY TYPE
GAUGES	NOTE:	TRANSFORMER .	OIL LEVEL = 50% @ 25C	VISUA	<u>L</u>		
WINDING TEMPERATURE	MIN	Max 40	AS FOUND 30	CONDITIO	N	INSPECTION ITEM	
OIL TEMPERATURE	MIN	Max 40	AS FOUND 30	√ G 	PCCI	BUSHINGS	
TRANSFORMER OIL LEVEL	0%	100%	AS FOUND 50	□ IZ G F	РПСПІ	SUPPORT INSULATORS	
BUSHING OIL LEVEL	0%	100%	AS FOUND 50	₩ V G F	РГСГІ	CONNECTIONS	
TRANSFORMER PRESSURE		V KPA PS					
GAS RELAY			AS FOUND	✓ G [P C C I	PAINT	
TAP CHANGER	_			√ G	P C I	RADIATORS	
MANUFACTURER	ABB	MOD	DEL UZERT 250/300	_	P C I	FANS	
SERIAL NO. 1ZSC 8714	910 YE	AR <u>2012</u>	GALLONS 580 L	_ G [P C C I	NO-LOAD TAP CHANGE	₹
	MIN	Max	AS FOUND	√ G □	P C C I	OIL LEAKS	
	MIN	Max	AS FOUND 45	G	PCCI	COOLING PUMP	
TAP POSITION COUNTER	MIN 12	Max 12	AS FOUND 12 AS FOUND 2 586	⊽ G Γ	РПСПІ	HEATER CONDITION	
DIVERTOR OIL LEVEL	MIN	Max	AS FOUND 2,586	 	РГСГІ	CONTROL CABINET CON	NDITION
HEATER CONDITION	IVIIIV	IVIUX	NOT COND			EXPLOSION VENT	
BANDWIDTH	MIN		Max	ГбГ		SILICA GEL BREATHER	
RELIEF VENT		P C C I			PCCI	GROUND CONDUCTOR	CONDITION
OIL FILTRATION PUMP PSI		FILTER TYPE:		FILTER	CHANGE DATE:	HOURS	:

Infrared Inspection



TYPE	PE MAINTENANCE		STATION MS #3		ISSUE DATE		
				cc	OMPLETED DATE	2022-06-29	
SUBSTATION ADDRESS				TESTED BY	JULIE S	STEWART	
FEEDER/NOMENCLATURE	Hawkesbury	AMBIENT TEMPERATUR	RE °C	TESTED BY		FRASER	
WORK ORDER #	680827	TEST STATUS					

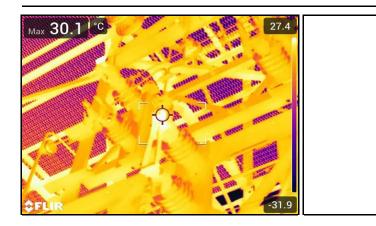
INFRARED IMAGES:



ASSET DESCRIPTION: 55F1-L white phase top of switch and line clamp, 55F1-X white phase line clamp

TEST POINT:

NOTES: ______



ASSET DESCRIPTION: 55F2-L red phase top of switch

TEST POINT:

NOTES:

COMMENTS: DEFICIENCIES:



June 8, 2022

Samantha Evelyn Hydro Ottawa 2711 Hunt Club Road Ottawa, ON K1G 3S4

RE: Transformer Assessment Report

Mr. Webster:

STARK has reviewed the laboratory analysis results for seven samples drawn on May 17, 2022, at the Hawkesbury facility. We are pleased to provide you with this assessment report containing our maintenance recommendations and brief diagnostic summary for each unit.

For your convenience, we present the following prioritized list of recommendations:

1. Re-sample to verify the reportedly low dielectric breakdown voltage:

43T1, SN: 0308401001 43T2, SN: G16194-1

2. Continue sampling the following units on an annual basis:

SST2 SST2 TC

SST3, SN: C-09062-5-1 SST3 TC, SN: C-09062-5-1 43T2 TC, SN: 1ZSC 8714 910



Oil Diagnostic Summaries

SST2

Moisture (25 ppm) and interfacial tension (29.7 dynes/cm) are questionable. All other oil quality properties and dissolved gas levels are within acceptable limits.

Recommendation

Continue sampling on an annual basis.

SST2 TC

All oil quality properties and dissolved gas levels are within acceptable limits.

Recommendation

Continue sampling on an annual basis.

SST3, SN: C-09062-5-1

Carbon monoxide (395 ppm) is slightly elevated.

Moisture (28 ppm) is questionable.

All other oil quality properties and dissolved gas levels are within acceptable limits.

Recommendation

Continue sampling on an annual basis.

SST3 TC, SN: C-09062-5-1

All oil quality properties and dissolved gas levels are within acceptable limits.

Recommendation

Continue sampling on an annual basis.



43T1, SN: 0308401001

Carbon monoxide (970 ppm) is slightly elevated.

Moisture (25 ppm) and dielectric breakdown voltage (20 kV) are questionable. All other oil quality properties and dissolved gas levels are within acceptable limits.

Recommendation

Gases are normal for the age of the unit.

However, we recommend resampling to verify the dielectric breakdown voltage.

43T2, SN: G16194-1

Dielectric breakdown voltage (17 kV) is unacceptable.

All other oil quality properties and dissolved gas levels are within acceptable limits.

Recommendation

We recommend resampling to verify dielectric breakdown voltage.

43T2 TC, SN: 1ZSC 8714 910

Dielectric breakdown voltage (19.5 kV) is questionable. All other oil quality properties and dissolved gas levels are within acceptable limits.

Recommendation

Continue sampling on an annual basis.



Please find the attached Oil Diagnostics Reports and Oil Data Charts provided for your ease in review of the testing results.

We trust this information will be of benefit to your transformer maintenance planning. If you have any questions or comments regarding this report, please do not hesitate to contact us.

My Regards,

Jody MacKenzie

Oil Diagnostics Technician



Samantha Evelyn Hydro Ottawa 2711 Hunt Club Road Ottawa, ON K1G 3S4

STARK International Inc. 113 Archimedes Street New Glasgow, Nova Scotia B2H 2T3

Toll Free: 1-877-875-2775 Fax: (902) 755-2949

8-Jun-22

SST2 Unit ID Power Rating (MVA) Serial Number 15 kV Voltage

Hawkesbury Fluid Volume Location

Year of Manufacture 1965 Preservation Conservator Sample Date Laboratory No. Container No. 189	Manufacture	r		Fluid Type	
Sample Date			1965		Conservator
Laboratory No. 189	1041 01 11441			T Test value	00.100.100.
Laboratory No. 189		Sample Date	17-May-2	22	
Temperature (°C) 25 H2		Laboratory No.			
H ₂		Container No.	3714	I 1	
CH ₄ Methane (ppm) 2 C ₃ H ₆ Elhane (ppm) 3 C ₄ H ₄ Elhylene (ppm) 4 C ₄ H ₄ Elhylene (ppm) 5 C ₅ H ₆ Acetylene (ppm) 4 C ₆ C ₄ C ₄ Acetylene (ppm) 5 C ₆ C ₆ C ₆ Carbon dioxide (ppm) 7 C ₇ C ₈ C ₈ C ₈ C ₈ C ₉ C ₈ C ₉ C ₉ C ₈ C ₉ C ₉ C ₈ C ₉ C ₉ C ₉ C ₈ C ₉ C ₉ C ₉ C ₈ C ₉		Temperature (°C)	2	25	
CH ₄ Methane (ppm) 2 C _H ₆ Eithane (ppm) <1	H ₂	Hydrogen (ppm)		6	
C ₂ H ₆ Ethane (ppm) <1	_			2	
C ₂ H ₄ Ethylene (ppm) 15 C ₃ H ₂ Acetylene (ppm) <1		**			
C.H2		**			
CO Carbon monoxide (ppm) 256 CO_ Carbon dioxide (ppm) 1920 N_ Nitrogen (ppm) 78870 O_ Oxygen (ppm) 333520 Total Gas (ppm) 114589 Total Combustible Gas (ppm) 279 D1533 Moisture (ppm) 25 D971 Interfacial Tension (dynes/cm) 29.7 D974 Acid Number (mg KOH/g) 0.020 D1500 Color Number 4.1.5 D1524 Visual Examination Clear & Bright D1816 Imm Dielectric BV (kV) D1816 Imm Dielectric BV (kV) 24 D924 Power Factor (% at 25 °C) 4.25 D2668 Oxidation Inhibitor (%) 5.26 D1298 Specific Gravity 0.856 D88 Viscosity (SUS) 5.27 D992 Flash Point (°C) 5.27 D992 Flash Point (°C) 5.27 D1877 Refractive Index D1275 Corrosive Sulfur Degree of Polymerization Estimated % Life Remaining	- '	* **		-	
CO2 Carbon dioxide (ppm) 1920 N2 Nitrogen (ppm) 78870 O2 Oxygen (ppm) 33520 D1533 Moisture (ppm) 279 D533 Moisture (ppm) 25 D971 Interfacial Tension (dynes/cm) 29.7 D974 Acid Number (mg KOH/g) 0.020 D1500 Color Number <1.5					
N2 Nitrogen (ppm) 78870 O2 Oxygen (ppm) 33520 D1533 Moisture (ppm) 279 D971 Interfacial Tension (dynes/cm) 29.7 D974 Acid Number (mg KOH/g) 0.020 D1500 Color Number <1.5					
O2 Oxygen (ppm) 33520 Total Gas (ppm) Total Combustible Gas (ppm) 114589 279 D1533 Moisture (ppm) 25 29.7 D971 Interfacial Tension (dynes/cm) 29.7 0.20 0.20 0.20 0.1500 0.010 Number 4.1.5 D1524 Visual Examination D1870 Clear & Bright D1816 lmm Dielectric BV (kV) D1816 lmm Dielectric BV (kV) D24 24 Power Factor (% at 25 °C) D254 0.015 D268 D268 Oxidation Inhibitor (%) D1298 D0.015 D268 0.856 D27 D29 D88 Viscosity (SUS) D29 0.856 D29 D88 Viscosity (SUS) D29 0.856 D29 D89 Point (°C) D1807 D89 D1275 Corrosive Sulfur D1275 Corrosive Sulfur D28 PCB Content (ppm) Degree of Polymerization Estimated % Life Remaining D8		~ ~ .	-		
Total Gas (ppm) Total Combustible Gas (ppm) 279	=				
Total Combustible Gas (ppm) 279	O_2	Oxygen (ppm)	3352	20	
Total Combustible Gas (ppm) 279		Total Gas (ppm)	11458	39	
D1533 Moisture (ppm) 25		4.1			
D971		····· (11 /			
D971 Interfacial Tension (dynes/cm) 29.7 D974 Acid Number (mg KOH/g) 0.020 D1500 Color Number <1.5	D1533	Moisture (ppm)	2	25	
D1500 Color Number Clear & Bright D1524 Visual Examination Clear & Bright D877 Dielectric BV (kV) 24 D924 Power Factor (% at 25 °C) D.015 D924 Power Factor (% at 100 °C) D2668 Oxidation Inhibitor (%) D1298 Specific Gravity D.856 D88 Viscosity (SUS) D97 Pour Point (°C) D92 Flash Point (°C) D92 Fire Point (°C) D1807 Refractive Index D1275 Corrosive Sulfur Degree of Polymerization Estimated % Life Remaining	D971		29	.7	
D1524 Visual Examination D1816 Imm Dielectric BV (kV) D1816 Imm Dielectric BV (kV) D24 Power Factor (% at 25 °C) D2568 Oxidation Inhibitor (%) D1298 Specific Gravity D97 Pour Point (°C) D99 Flash Point (°C) D99 Fire Point (°C) D1807 Refractive Index D1275 Corrosive Sulfur Degree of Polymerization Estimated % Life Remaining	D974	Acid Number (mg KOH/g)	0.02	20	
Dislectric BV (kV) 24 Dislectric BV (kV) 24 Dislectric BV (kabb) 24 Dislectric BV (kV) 24 Dislectric	D1500	Color Number	<1	.5	
Disl6 1mm Dielectric BV (kV) 24 D924	D1524	Visual Examination	Clear & Brig	ht	
D924 Power Factor (% at 25 °C) D.015 D924 Power Factor (% at 100 °C) D2668 Oxidation Inhibitor (%) D1298 Specific Gravity D.856 D88 Viscosity (SUS) D97 Pour Point (°C) D92 Flash Point (°C) D92 Fire Point (°C) D1807 Refractive Index D1275 Corrosive Sulfur Degree of Polymerization Estimated % Life Remaining	D877	Dielectric BV (kV)	_		
D924 Power Factor (% at 100 °C) D2668 Oxidation Inhibitor (%) D1298 Specific Gravity D97 Pour Point (°C) D92 Flash Point (°C) D92 Fire Point (°C) D93 Refractive Index D1275 Corrosive Sulfur Degree of Polymerization Estimated % Life Remaining	D1816 1mm	Dielectric BV (kV)	2	24	
D2668 Oxidation Inhibitor (%) D1298 Specific Gravity	D924	Power Factor (% at 25 °C)	0.01	15	
D1298 Specific Gravity 0.856 D88 Viscosity (SUS) D97 Pour Point (°C) D92 Flash Point (°C) D92 Fire Point (°C) D1807 Refractive Index D1275 Corrosive Sulfur Degree of Polymerization Estimated % Life Remaining	D924	Power Factor (% at 100 °C)			
D88 Viscosity (SUS) D97 Pour Point (°C) D92 Flash Point (°C) D93 Fire Point (°C) D1807 Refractive Index D1275 Corrosive Sulfur PCB Content (ppm) Degree of Polymerization Estimated % Life Remaining	D2668	Oxidation Inhibitor (%)			
D97 Pour Point (°C) D92 Flash Point (°C) D93 Fire Point (°C) D1807 Refractive Index D1275 Corrosive Sulfur PCB Content (ppm) Degree of Polymerization Estimated % Life Remaining	D1298	Specific Gravity	0.85	56	
D97 Pour Point (°C) D92 Flash Point (°C) D93 Fire Point (°C) D1807 Refractive Index D1275 Corrosive Sulfur D28 PCB Content (ppm) Degree of Polymerization Estimated % Life Remaining	D88	Viscosity (SUS)			
D92 Fire Point (°C) D1807 Refractive Index D1275 Corrosive Sulfur PCB Content (ppm) Degree of Polymerization Estimated % Life Remaining	D97				
D1807 Refractive Index D1275 Corrosive Sulfur PCB Content (ppm) Degree of Polymerization Estimated % Life Remaining	D92	Flash Point (°C)			
D1275 Corrosive Sulfur PCB Content (ppm) Degree of Polymerization Estimated % Life Remaining	D92	Fire Point (°C)			
PCB Content (ppm) Degree of Polymerization Estimated % Life Remaining	D1807	Refractive Index			
Degree of Polymerization Estimated % Life Remaining	D1275	Corrosive Sulfur			
Estimated % Life Remaining		PCB Content (ppm)			
• ,		Degree of Polymerization			
terpretation: Moisture (25 ppm) and interfacial tension (29.7 dynes/cm) are questionable. All other oil quality properties and dissolved gas		Estimated % Life Remaining			
	nterpretation:	Moisture (25 ppm) an	d interfacial tension (29.7 dy	vnes/cm) are questionable. All c	ther oil quality properties and dissolved gas

levels are within acceptable limits.



Samantha Evelyn Hydro Ottawa 2711 Hunt Club Road Ottawa, ON K1G 3S4 STARK International Inc. 113 Archimedes Street New Glasgow, Nova Scotia B2H 2T3

Toll Free: 1-877-875-2775 Fax: (902) 755-2949

8-Jun-22

0-Jun-22			Toll Fice. 1-677-673-2773 Fax. (702) 753-2
Unit ID Serial Numbo	er	2 TC	Power Rating (MVA) Voltage
Location		esbury	Fluid Volume
Manufacture			Fluid Type
Year of Manu	ıfacture 19	165	Preservation
	Sample Date	17-May-22	2
	Laboratory No.	185	
	Container No.	37029)
	Temperature (°C)		
H ₂	Hydrogen (ppm)	15	
CH ₄	Methane (ppm)	39	
C_2H_6	Ethane (ppm)	40	
C_2H_6 C_2H_4	Ethylene (ppm)	342	
		935	
C ₂ H ₂	Acetylene (ppm)		
CO	Carbon monoxide (ppm)	78	
CO ₂	Carbon dioxide (ppm)	728	
N_2	Nitrogen (ppm)	85681	
O_2	Oxygen (ppm)	37309)
	Total Gas (ppm)	125167	
	Total Combustible Gas (ppm)	1449	
	Communication (Heav)		
D1533	Moisture (ppm)	28	}
D971	Interfacial Tension (dynes/cm)	40.0)
D974	Acid Number (mg KOH/g)	0.005	j
D1500	Color Number	<2.5	j
D1524	Visual Examination	Clear & Bright	t
D877	Dielectric BV (kV)	-	
D1816 1mm	Dielectric BV (kV)	22	2
D924	Power Factor (% at 25 °C)	0.030)
D924	Power Factor (% at 100 °C)		
D2668	Oxidation Inhibitor (%)		
D1298	Specific Gravity	0.871	1
D88	Viscosity (SUS)		
D97	Pour Point (°C)		
D92	Flash Point (°C)		
D92	Fire Point (°C)		
D1807	Refractive Index		
D1275	Corrosive Sulfur		
	PCB Content (ppm)		
	Degree of Polymerization		
	Estimated % Life Remaining		
Interpretation	A 11 a 21 a 22 a 22 de a a a a a a a a a a a a a a a a a a	and dissolved age levels are	21.

Interpretation:

All oil quality properties and dissolved gas levels are within acceptable limits.



Samantha Evelyn Hydro Ottawa 2711 Hunt Club Road Ottawa, ON K1G 3S4 STARK International Inc. 113 Archimedes Street New Glasgow, Nova Scotia B2H 2T3

Toll Free: 1-877-875-2775 Fax: (902) 755-2949

8-Jun-22

Unit ID SST3 Power Rating (MVA)
Serial Number C-09062-5-1 Voltage 15kV
Location Hawkesbury Fluid Volume 18665 L
Manufacturer PT Fluid Type Mineral Oil
Year of Manufacture 2014 Preservation Conservator

Manufacture		PT	Fluid Type	Mineral Oil
Year of Man	ufacture	2014	Preservation	Conservator
	Sample Date	17-May-2	2	
	Laboratory No.	18	7	
	Container No.	3717	6	
	Temperature (°C)	2	5	
H_2	Hydrogen (ppm)	1'	7	
CH ₄	Methane (ppm)		3	
C_2H_6	Ethane (ppm)	<	1	
C_2H_4	Ethylene (ppm)		1	
C_2H_2	Acetylene (ppm)	<		
CO	Carbon monoxide (ppm)	39		
CO ₂	Carbon dioxide (ppm)	125		
N_2	Nitrogen (ppm)	9374		
_		2438		
O_2	Oxygen (ppm)	2438	1	
	Total Gas (ppm)	11979	7	
	Total Combustible Gas (ppm)	41		
	(FF)			
D1533	Moisture (ppm)	2	=	
D971	Interfacial Tension (dynes/cm)	43.	1	
D974	Acid Number (mg KOH/g)	0.00	=	
D1500	Color Number	<0.	_	
D1524	Visual Examination	Clear & Brigh	t	
D877	Dielectric BV (kV)			
	Dielectric BV (kV)	2		
D924	Power Factor (% at 25 °C)	0.00	9	
D924	Power Factor (% at 100 °C)			
D2668	Oxidation Inhibitor (%)			
D1298	Specific Gravity	0.87	9	
D88	Viscosity (SUS)			
D97	Pour Point (°C)			
D92	Flash Point (°C)			
D92	Fire Point (°C)			
D1807	Refractive Index			
D1275	Corrosive Sulfur			
	PCB Content (ppm)			
	Degree of Polymerization			
	Estimated % Life Remaining			
nterpretation:	Carbon monoxide (395	ppm) is slightly elevated. M	Ioisture (28 ppm) is questiona	ble. All other oil quality properties and dissolve

Interpretation:

Carbon monoxide (395 ppm) is slightly elevated. Moisture (28 ppm) is questionable. All other oil quality properties and dissolved gas levels are within acceptable limits.



Samantha Evelyn Hydro Ottawa 2711 Hunt Club Road Ottawa, ON K1G 3S4 STARK International Inc. 113 Archimedes Street New Glasgow, Nova Scotia B2H 2T3

8-Jun-22 Toll Free: 1-877-875-2775 Fax: (902) 755-2949

Unit ID Serial Number Location Manufacturer Year of Manufacture	SST3 TC C-09062-5-1 Hawkesbury	Power Rating (MVA) Voltage Fluid Volume Fluid Type Preservation
Sample Date	17-May	
Laboratory No. Container No.	370	.88 101
Temperature (°C)	<u> </u>	20
H ₂ Hydrogen (ppm)		<1
CH ₄ Methane (ppm)		<1
C_2H_6 Ethane (ppm)		<1
C_2H_4 Ethylene (ppm)		<1
C_2H_2 Acetylene (ppm)		<1
CO Carbon monoxide (ppm)		10
CO ₂ Carbon dioxide (ppm)		202
N ₂ Nitrogen (ppm)	572	278
O ₂ Oxygen (ppm)	206	37
Total Gas (ppm) Total Combustible Gas (78 1	27 10
D1533 Moisture (ppm)		22
D971 Interfacial Tension (dyne	*	4.8
D974 Acid Number (mg KOH/	6/	003
D1500 Color Number D1524 Visual Examination	Clear & Brid	0.5
D877 Dielectric BV (kV)	Clear & Brig	jiit
D1816 1mm Dielectric BV (kV)		32
D924 Power Factor (% at 25 °C	C) 0. 0	002
D924 Power Factor (% at 100 °	PC)	
D2668 Oxidation Inhibitor (%)		
D1298 Specific Gravity	0.8	379
D88 Viscosity (SUS)		
D97 Pour Point (°C) D92 Flash Point (°C)		
D92 Fiash Point (°C) D92 Fire Point (°C)		
D1807 Refractive Index		
D1275 Corrosive Sulfur		
PCB Content (ppm)		
Degree of Polymerization Estimated % Life Remain	1	

All oil quality properties and dissolved gas levels are within acceptable limits.



Samantha Evelyn Hydro Ottawa 2711 Hunt Club Road Ottawa, ON K1G 3S4

STARK International Inc. 113 Archimedes Street New Glasgow, Nova Scotia B2H 2T3

8-Jun-22

Toll Free: 1-877-875-2775 Fax: (902) 755-2949 Unit ID 43T1 Power Rating (MVA) 16.7 0308401001 44kV/12.4kV Serial Number Voltage **Hawkesbury DS** 7185 L Location Fluid Volume Manufacturer **General Electric** Fluid Type 1985 Sealed Year of Manufacture Preservation Sample Date 17-May-22 Laboratory No. 184 37172 Container No. Temperature (°C) 35 Hydrogen (ppm) 9 H_2 CH_4 6 Methane (ppm) C_2H_6 Ethane (ppm) <1 13 C_2H_4 Ethylene (ppm) C_2H_2 Acetylene (ppm) <1 CO Carbon monoxide (ppm) 970 Carbon dioxide (ppm) CO_2 4019 99448 N_2 Nitrogen (ppm) 15332 O_2 Oxygen (ppm) 119797 Total Gas (ppm) Total Combustible Gas (ppm) 998 D1533 25 Moisture (ppm) D971 Interfacial Tension (dynes/cm) 41.1 D974 Acid Number (mg KOH/g) 0.004 D1500 Color Number < 0.5 D1524 Visual Examination Clear & Bright Dielectric BV (kV) D877 D1816 1mm Dielectric BV (kV) 20 D924 Power Factor (% at 25 °C) 0.006 Power Factor (% at 100 °C) D924 D2668 Oxidation Inhibitor (%) 0.865 D1298 Specific Gravity D88 Viscosity (SUS) Pour Point (°C) D97 D92 Flash Point (°C) D92 Fire Point (°C) D1807 Refractive Index

Interpretation:

D1275

Corrosive Sulfur PCB Content (ppm) Degree of Polymerization Estimated % Life Remaining

> Carbon monoxide (970 ppm) is slightly elevated. Moisture (25 ppm) and dielectric breakdown voltage (20 kV) are questionable. All other oil quality properties and dissolved gas levels are within acceptable limits.

Recommendation: Gases are normal for the age of the unit. However, we recommend resampling to verify the dielectric breakdown voltage.



Samantha Evelyn Hydro Ottawa 2711 Hunt Club Road Ottawa, ON K1G 3S4 STARK International Inc. 113 Archimedes Street New Glasgow, Nova Scotia B2H 2T3

Toll Free: 1-877-875-2775 Fax: (902) 755-2949

8-Jun-22

 Unit ID
 43T2
 Power Rating (MVA)
 16.7

 Serial Number
 G16194-1
 Voltage
 44kV/12.4kV

 Location
 Hawkesbury DS
 Fluid Volume
 10020 L

 Manufacturer
 Pioneer
 Fluid Type
 Mineral Oil

 Year of Manufacture
 2012
 Preservation
 Sealed

Manufacture	r	Pioneer	Fluid Type	Mineral Oil
Year of Man	ufacture	2012	Preservation	Sealed
	Sample Date	1	7-May-22	
	Laboratory No.		186	
	Container No.		37006	
	Temperature (°C)			
H ₂	Hydrogen (ppm)		1	
CH_4	Methane (ppm)		2	
C_2H_6	Ethane (ppm)		<1	
C_2H_4	Ethylene (ppm)		1	
C_2H_2	Acetylene (ppm)		2	
CO	Carbon monoxide (ppm)		68	
CO ₂	Carbon dioxide (ppm)		575	
N_2	Nitrogen (ppm)		54334	
O_2	Oxygen (ppm)		17012	
O_2	Oxygen (ppin)		17012	
	Total Gas (ppm)		71995	
	Total Combustible Gas (ppm)		74	
	Total Comoustible Gas (ppili)		74	
D1533	Moisture (ppm)		19	
D971	Interfacial Tension (dynes/cm)		41.7	
D974	Acid Number (mg KOH/g)		0.003	
D1500	Color Number		<0.5	
D1524	Visual Examination	Clear	& Bright	
D877	Dielectric BV (kV)			
	Dielectric BV (kV)		17	
D924	Power Factor (% at 25 °C)		0.020	
D924	Power Factor (% at 100 °C)			
D2668	Oxidation Inhibitor (%)			
D1298	Specific Gravity		0.846	
D88	Viscosity (SUS)			
D97	Pour Point (°C)			
D92 D92	Flash Point (°C)			
D92 D1807	Fire Point (°C) Refractive Index			
D1807 D1275	Corrosive Sulfur			
D1213				
	PCB Content (ppm)			
	Degree of Polymerization			
<u></u>	Estimated % Life Remaining			
nterpretation:	Dielectric breakdowi	ı voltage (17 kV) is u	nacceptable. All other oil quality proper	ties and dissolved gas levels are within

Interpretation:

Dielectric breakdown voltage (17 kV) is unacceptable. All other oil quality properties and dissolved gas levels are within acceptable limits.

Recommendation: We recommend resampling to verify dielectric breakdown voltage.



Samantha Evelyn Hydro Ottawa 2711 Hunt Club Road Ottawa, ON K1G 3S4 STARK International Inc. 113 Archimedes Street New Glasgow, Nova Scotia B2H 2T3

8-Jun-22 Toll Free: 1-877-875-2775 Fax: (902) 755-2949

Unit ID Serial Number Location Manufacturer Year of Manufacturer	er 1ZSC 8 Hawk r Al	2 TC :714 910 esbury BB 113	Power Rating (MVA) Voltage Fluid Volume Fluid Type Preservation	Mineral Oil
	Sample Date Laboratory No.	17-May-22 183		
	Container No.	37066		
	Temperature (°C)			
H_2	Hydrogen (ppm)	4		
CH_4	Methane (ppm)	1		
C_2H_6	Ethane (ppm)	<1		
C_2H_4	Ethylene (ppm)	<1		
C_2H_2	Acetylene (ppm)	<1		
CO	Carbon monoxide (ppm)	18		
CO_2	Carbon dioxide (ppm)	442		
N_2	Nitrogen (ppm)	64922		
O_2	Oxygen (ppm)	30865		
	Total Gas (ppm) Total Combustible Gas (ppm)	96252 23		
D1533	Moisture (ppm)	23		
D971	Interfacial Tension (dynes/cm)	40.1		
D974	Acid Number (mg KOH/g)	0.003		
D1500 D1524	Color Number Visual Examination	<0.5 Clear & Bright		
D1324 D877	Dielectric BV (kV)	Clear & Bright		
	Dielectric BV (kV)	19.5		
D924	Power Factor (% at 25 °C)	0.006		
D924	Power Factor (% at 100 °C)			
D2668	Oxidation Inhibitor (%)			
D1298	Specific Gravity	0.857		
D88	Viscosity (SUS)			
D97	Pour Point (°C)			
D92	Flash Point (°C)			
D92	Fire Point (°C)			
D1807 D1275	Refractive Index Corrosive Sulfur			
D1213				
	PCB Content (ppm)			
	Degree of Polymerization Estimated % Life Remaining			
Interpretation:		age (19.5 kV) is auestiona	ble. All other oil quality propertie	es and dissolved gas levels are within

Interpretation:

Dielectric breakdown voltage (19.5 kV) is questionable. All other oil quality properties and dissolved gas levels are within acceptable limits.



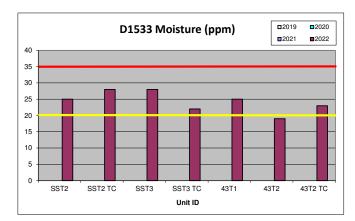
Hawkesbury

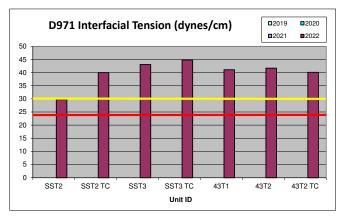
Unit ID	SST2	SST2 TC	SST3	SST3 TC	43T1	43T2	43T2 TC
Serial Number	55.2	00.1.0	C-09062-5-1	C-09062-5-1	0308401001	G16194-1	1ZSC 8714 910
Location	Hawkesbury	Hawkesbury	Hawkesbury	Hawkesbury	Hawkesbury DS	Hawkesbury DS	Hawkesbury
Manufacturer		,	PT		General Electric	Pioneer	ABB
Year of Manufacture	1965	1965	2014		1985	2012	2013
Power Rating (MVA)					16.70	16.67	
Voltage	15 kV		15kV		44kV/12.4kV	44kV/12.4kV	
Fluid Volume			18665 L		7185 L	10020 L	
Fluid Type			Mineral Oil			Mineral Oil	Mineral Oil
Breathing	Conservator		Conservator		Sealed	Sealed	
Sample Date	17-May-22	17-May-22	17-May-22	17-May-22	17-May-22	17-May-22	17-May-22
Laboratory No.	189	185	187	188	184	186	183
Container No.	37141	37029	37176	37001	37172	37006	37066
Temperature (C)	25		25	20	35		
H2 - Hydrogen (ppm)	6	15	17	<1	9	1	4
CH4 - Methane (ppm)	2	39	3	<1	6	2	1
C2H6 - Ethane (ppm)	<1	40	<1	<1	<1	<1	<1
C2H4 - Ethylene (ppm)	15	342	1	<1	13	1	<1
C2H2 - Acetylene (ppm)	<1	935	<1	<1	<1	2	<1
CO - Carbon monoxide (ppm)	256	78	395	10	970	68	18
CO2 - Carbon dioxide (ppm)	1920	728	1258	202	4019	575	442
N2 - Nitrogen (ppm)	78870	85681	93742	57278	99448	54334	64922
O2 - Oxygen (ppm)	33520	37309	24381	20637	15332	17012	30865
Total (ppm)	114589	125167	119797	78127	119797	71995	96252
TDCG (ppm)	279	1449	416	10	998	74	23
D1533 Moisture (ppm)	25	28	28	22	25	19	23
D971 Interfacial Tension (dynes/cm)	29.7	40.0	43.1	44.8	41.1	41.7	40.1
D974 Acid Number (mg KOH/g)	0.020	0.005	0.003	0.003	0.004	0.003	0.003
D1500 Color Number	<1.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5
D1524 Visual Examination	Clear & Bright	Clear & Bright	Clear & Bright				
D1816 Dielectric BV (kV)	24	22	24	32	20	17	20
D924 Power Factor (% at 25 C)	0.015	0.030	0.009	0.002	0.006	0.020	0.006
D2668 Oxidation Inhibitor (%)							
D1298 Specific Gravity	0.856	0.871	0.879	0.879	0.865	0.846	0.857
Furans dP							
% Life Remaining							

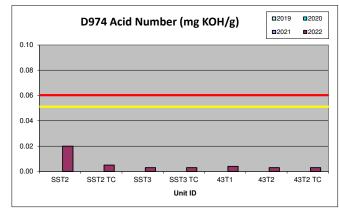
2022 Page 1 of 1

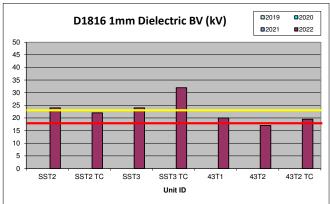


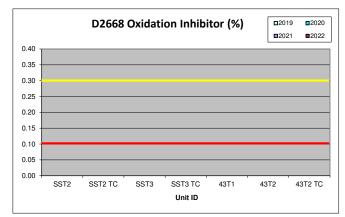
Hawkesbury Min Oil

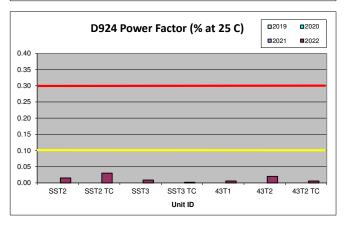


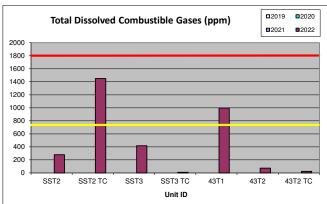












Warning Level

Acceptance

Charts Page 1 of 1



Hawkesbury Hydro

Q3 Station Inspections

at 44KV Tessier M.S. & 115KV Main St. W. T.S.

Hydro Ottawa Sept. 7th, 2022



Contents

- 44KV Tessier St. Q1/Q2 Corrective Action
 44KV Tessier St. Recommendations/Corrective Actions
- 2. 44KV Tessier St. Station Inspection Report Q3
- 3. 115KV Main St. Q1/Q2 Corrective Action 115KV Main St Recommendations/Corrective Actions
- 4. 115KV Main St. Station Inspection Report Q3



44KV Station (Tessier St.) - Q3 Inspection

Q1/Q2 Corrective Actions

• Upon further inspection fans were found to be in working condition. Low voltage supply breaker to fans was found turned off.

Recommendations for Corrective Actions

• Crews did not report any new deficiencies during this inspection. No new recommendations to report at this time.



TYPE MAINT	ENANCE		STATIO	ON	MS	S #2			ISSUE DATE	
								COM	PLETED DATE	8/29/2022
SUBSTATION ADDRESS						_	TESTE	D BY	DOMINI	QUE RIVET
FEEDER/NOMENCLATURE	TESSIEF	?	AMBIENT	TEMPERATI	JRE 2	<u>25</u> ℃	TESTE	D BY	BEN	BOILEAU
WORK ORDER #	680819					TEST S	TATUS			
PROCEDURE										
FOLLOW WORK PROCE	DURES FOR	THE LIST	TED INDIVID	UAL INSPE	ECTION	S AND (CHECK A	PPRORI	ATE BOX	
CHECK ALL ITEMS SPEC	IFIC TO THIS	STATION .	AND COMPL	ETE ALL P	AGES.					
CALL INTO SYSTEM AN	Y TARGETS	OR FLAG	GING AND	RESET UP	ON DE	PARTUR	E			
CONDITION	INSPE	CTION ITE	М				F	REMARKS	<u> </u>	
G P C I N/A	YARD (fence, g	ate, grounds,	, stone)							
G P C I N/A	OVERALL BUIL	DING COND	ITION							
G P C I V N/A	PROTECTION	RELAY PANE	ELS							
G P C I N/A	OUTDOOR STE	RUCTURES								
G P C I N/A	STATION SERV	/ICE TRANS	FORMERS							
G P C I N/A	SWITCHGEAR	/ RECLOSE	RS							
G P C I N/A	STATION IDEN	TIFICATION	SIGN							
G P C I N/A	PPE SIGN									
G P C I N/A	SITE SAFETY N	NOTICE SIGN	N							
G P C I V N/A	CONTAINMENT	ΓPIT								
G P C I V N/A	SUMP PIT / OIL	WATER SE	PARATOR	CLEAN W	ATER	OILS	SHEEN	SCA	DA STATUS OK	
G P C I V N/A	SMOKE DETEC	TOR VERIF	ICATION							
☐ G ☐ P ☐ C ☐ I ▼ N/A	DGA SERVICE	LIGHTS								
G P C I V N/A	VERIFY ATS O	PERATION								
G = ITEMS FOUND IN SATISFAC	TORY CONDITION	ON								
P = ITEMS FOUND IN POOR CO	NDITION AND RI	EQUIRING	FUTURE COR	RECTIVE AC	TION					
C = ITEMS REPAIRED OR CORR				ONDITION						
I = ITEMS REQUIRING IMMEDIA	TE CORRECTIV	'E ACTIONS	5							
COMMENTS: FANS ARE OK DEFICIENCIES:	ON TRANSFOR	MER . BRE	AKER WAS O	FF.						
DEL TOTEMOLES.										
		AL	ARMS & GREE	EN TAGS (S)	STEM C	FFICE CH	ECK)			
ALARM OR GREEN TAG	AS FOUN	ID	AS LE	FT				N	NOTES	
N/A	N/A		N/A		N/A					
		•	AUTOM	IATIC TRAN	SFER SW	VITCH				
				<u> </u>				NOTES	•	
OPERATION	NODMAL ECEP			N/A				NOTE		
VERIFY OPERTION BY OPENING			PASS	N/A						
CONFIRM STATUS WITH SYSTEM			PASS	N/A						
CONFIRM STATUS WITH SYSTEM			PASS	N/A						
CONFIRM STATUS WITH SYSTEM OFFICE				1						



PAGE STATION BATTERIES AND CHARGER NUMBER OF CELLS 10 SPECIFIED VOLTAGE PER CELL 12 DC SYSTEM PASS / FAIL NOTES VERIFY NO ALARMS ON CHARGER **PASS** VERIFY GROUNDING CONTINUITY PASS VERIFY CORROSION PASS VERIFY WATER LEVELS (top-up if required) PASS DC VOLTAGE ACCEPTABLE RANGE Volts CHARGER DISPLAY VOLTAGE 132 125V to 130V MEASURED BANK VOLTAGE (disconnect charger) > 90% OF (SPECIFIED CELL VOLTAGE x NUMBER OF CELLS) > 90% OF (SPECIFIED CELL VOLTAGE x NUMBER OF CELLS) MEASURED BANK VOLTAGE (disconnect charger) SUMP PUMP Operation PASS / FAIL RUN FOR 1 MIN TO CONFIRM OPERATION **PASS**

www.hydroottawa.com



MANUFACTURER	FERRANTI-PACKARD	KVA	10,000 /	13,300 /	16,700	
SERIAL NUMBER	0308401001	PRIMARY VOLTAGE	44,000 /		DELTA	
YEAR	1985	SECONDARY VOLTAGE	12,470 /	7,200	WYE	
ΓΥΡΕ <u></u>	SEALED	OIL VOLUME	L			
MPEDANCE	6.96 %	TOTAL WEIGHT	31397 KG			
TEMPERATURE RISE	65 °C	# OF FANS	6			
HV BIL	250	TAP CHANGER	INTERNAL			
_V BIL	95		_			
VISUAL INSPECTION	CONDITION	GAUGES	NOTE:	TRANSFORMER C	OIL LEVEL = 50% (@ 25C
BUSHINGS	VA B B C D D	WINDING TEMPERATUR	RE MIN	Max	AS FOUND	
MAIN TANK	VA DB DC DD D	OIL TEMPERATURE	MIN	Max	AS FOUND	50
COOLING	VA DB DC DD	TRANSFORMER OIL LEV		100%	<u> </u>	60
OIL TANK	V A □ B □ C □ D □	BUSHING OIL LEVEL	0%	100%	AS FOUND	
FOUNDATION	VA DB CC DD	TRANSFORMER PRESSU GAS RELAY	KE	KPA PSI	AS FOUND AS FOUND	
GROUNDING	VA DB DC DD	ONO NEENT	<u>l</u>		ACTOCKE	
GASKET & SEALS	VA DB CC DD	TAP CHANGER				
CONNECTORS	VA DB DC DD	MANUFACTURER		MODE	L	
DIL LEAKS	VA DB DC DD	SERIAL NO.	Y	EAR	GALLONS	
		TAP CHANGER OIL TEM	IP MIN	Max	AS FOUND	
OIL LEVEL	V A B C D	TAP CHANGER OIL LEVE	EL MIN	Max	AS FOUND	
OVERALL	A B C D C	TAP POSITION	MIN	Max	AS FOUND	
		COUNTER			AS FOUND	
		DIVERTOR OIL LEVEL	MIN	Max	AS FOUND	
		HEATER CONDITION	ГБГ	РПСПІ		



PAGE TRANSFORMER MANUFACTURER PIONEER TRANSFORMERS **KVA** 10,000 13,330 16,670 PRIMARY VOLTAGE DELTA SERIAL NUMBER G16194-1 44,000 YEAR 2012 SECONDARY VOLTAGE 12,470 7,200 DELTA TYPE SEALED OIL VOLUME 6.91 **IMPEDANCE** % TOTAL WEIGHT 28880 TEMPERATURE RISE # OF FANS HV BIL TAP CHANGER **EXTERNAL** LV BIL **GAUGES** CONDITION VISUAL INSPECTION NOTE: TRANSFORMER OIL LEVEL = 50% @ 25C WINDING TEMPERATURE MIN AS FOUND **BUSHINGS** VA B B C C D D E Max OIL TEMPERATURE MIN Max AS FOUND 30 MAIN TANK V A □ B □ C □ D □ E TRANSFORMER OIL LEVEL AS FOUND 0% 100% 50 COOLING VA B C C D E **BUSHING OIL LEVEL** 0% 100% AS FOUND 50 OIL TANK ✓ A ☐ B ☐ C ☐ D ☐ E TRANSFORMER PRESSURE AS FOUND KPA 🗸 PSI **FOUNDATION** V A □ B □ C □ D □ E **GAS RELAY** AS FOUND GROUNDING **V**A □B □C □D □E **TAP CHANGER GASKET & SEALS** MANUFACTURER MODEL UZERT 250/300 ABB CONNECTORS ▼A □B □C □D □E 1ZSC 8714 910 YEAR GALLONS SERIAL NO. 2013 OIL LEAKS VA B C C D E TAP CHANGER OIL TEMP AS FOUND MIN Max 30 OIL LEVEL **V**A □B □C □D □E TAP CHANGER OIL LEVEL Max AS FOUND MIN 50 OVERALL V A □ B □ C □ D □ E TAP POSITION MIN 12 Max 12 AS FOUND COUNTER AS FOUND 2.895 **DIVERTOR OIL LEVEL** MIN Max AS FOUND HEATER CONDITION **▽** G □ P □ C □ I RELIEF VENT **√** G □ P □ C □ I OIL FILTRATION PUMP PSI: 0 FILTER TYPE: FILTER CHANGE DATE: HOURS: 9:59



115KV Station (Main St. W.) - Q3 Inspection

Q1/Q2 Corrective Actions

 Crews replaced the battery pack in the emergency lighting in the P&C Shed.

Recommendations for Corrective Actions

• Crews did not report any new deficiencies during this inspection. No new recommendations to report at this time.



TYPE MAINT	ENANCE	STATIO	ON			ISSUE DATE
			<u></u>		COI	MPLETED DATE 8/29/2022
SUBSTATION ADDRESS					TESTED BY	DOMINIQUE RIVET
FEEDER/NOMENCLATURE HA	WKSBURY 115	KV AMBIENT	TEMPERATU	IRE <u>°C</u>	TESTED BY	BEN BOILEAU
WORK ORDER #	680819			TEST ST	ATUS	
PROCEDURE						
FOLLOW WORK PROCE	OURES FOR THE	LISTED INDIVID	OUAL INSPE	CTIONS AND C	HECK APPROR	RIATE BOX
CHECK ALL ITEMS SPECI	FIC TO THIS STAT	TION AND COMPL	ETE ALL PA	AGES.		
CALL INTO SYSTEM ANY	TARGETS OR F	FLAGGING AND	RESET UP	ON DEPARTURE		
CONDITION	INSPECTIO	ON ITEM			REMARK	KS
G P C I N/A	YARD (fence, gate, gre	rounds, stone)				
VG P C I N/A	OVERALL BUILDING	CONDITION				
VG P C C I N/A	PROTECTION RELAY	Y PANELS				
☑ G ☐ P ☐ C ☐ I ☐ N/A	OUTDOOR STRUCTU	URES				
G P C I N/A	STATION SERVICE T	RANSFORMERS				
V G □ P □ C □ I □ N/A	SWITCHGEAR / RECI	LOSERS				
G P C I N/A	STATION IDENTIFICA	ATION SIGN				
☑ G ☐ P ☐ C ☐ I ☐ N/A	PPE SIGN					
G P C I N/A	SITE SAFETY NOTICE	E SIGN				
▼G P C I N/A	CONTAINMENT PIT	DF	RY			
G P C I V N/A	SUMP PIT / OIL WATE	ER SEPARATOR	CLEAN W	ATER OIL SH	HEEN SC	ADA STATUS OK
G P C I V N/A	SMOKE DETECTOR \	VERIFICATION				
G P C I V N/A	DGA SERVICE LIGHT	rs				
G P C I V N/A	VERIFY ATS OPERAT	TION				
G = ITEMS FOUND IN SATISFACT	ORY CONDITION					
P = ITEMS FOUND IN POOR CON				TION		
C = ITEMS REPAIRED OR CORRE			NOITION			
I = ITEMS REQUIRING IMMEDIA	TE CORRECTIVE AC	TIONS				
COMMENTS: DEFICIENCIES:						
		ALARMS & GREE	EN TAGS (SY	STEM OFFICE CHE	CK)	
ALARM OR GREEN TAG	AS FOUND	AS LE	EFT			NOTES
N/A	I/A	N/A				
		AUTON	MATIC TRANS	SFER SWITCH		
OPERATION		PASS / FAIL			NOTI	ES
VERIFY OPERTION BY OPENING N	ORMAL FEED	PASS	N/A			
CONFIRM STATUS WITH SYSTEM	OFFICE	PASS	N/A			
CONFIRM STATUS WITH SYSTEM	OFFICE	PASS	N/A			
CONFIRM STATUS WITH SYSTEM	OFFICE					



STATION BATTERIES AND CHARGER 10										PAGI	E		
DC SYSTEM				STATION	BATTERI	IES AND CHAR	RGER						
DC SYSTEM	NUMBER OF CELLS		10										
VERIFY NO ALARMS ON CHARGER	SPECIFIED VOLTAGE PER CELL		12										
VERIFY GROUNDING CONTINUITY	DC SYSTEM	1	PASS / F	AIL				NO	TES				
PASS N/A PAS	VERIFY NO ALARMS ON CHARGER		PASS	;									
PASS N/A	VERIFY GROUNDING CONTINUITY		PASS	;									
DC VOLTAGE Volts ACCEPTABLE RANGE CHARGER DISPLAY VOLTAGE CHARGER DISPLAY VOLTAGE MEASURED BANK VOLTAGE (disconnect charger) MEASURED BANK VOLTAGE (disconnect charger) SUMP PUMP Operation PASS / FAIL RUN FOR 1 MIN TO CONFIRM OPERATION PASS CIRCUIT SWITCHER VOMENCLATURE SIEMENS OUR CLASS VISUAL IMSPECTION CONDITION SPELEAKS VISUAL IMSPECTION VISUAL IMSPECTION OPERATION VISUAL IMSPECTION OPERATION NA CIRCUIT SWITCHER CURRENT RATING VOLTAGE CLASS 121 KV OPERATION COUNTER 60 OPERATION COUNTER 60 CONTROL MECHANISM VA B C D E FOUNDATION, FRAME, GROUNDING VA B C D E FOUNDATION, FRAME, GROUNDING VISUAL IMSPECTION CONDITION NA CIRCUIT SWITCHER CURRENT RATING 1200 AMPERES OPERATION COUNTER 60 AMPERES OPERATION COUNTER 60 OPERATION COUNTER 60 OPERATION COUNTER SPE CLASS 121 KV OPERATION COUNTER 63 63 63 63 OPERATION COUNTER 20 OPER	VERIFY CORROSION		PASS										
HARGER DISPLAY VOLTAGE	- /ERIFY WATER LEVELS (top-up if red	quired)	PASS	. 1	N/A								
September Sept	DC VOLTAGE		Volts			A	CCEPTAB	BLE RANGE					
SUMP PUMP SUMP PUMP PUMP PUMP PUMP PUMP PUMP PUMP	CHARGER DISPLAY VOLTAGE		135		125V to 1	30V							
SUMP PUMP	MEASURED BANK VOLTAGE (discon	nect charger)		:	> 90% OF	F (SPECIFIED (CELL VOL	TAGE x NUME	BER OF CELLS)				
Operation PASS / FAIL RUN FOR 1 MIN TO CONFIRM OPERATION PASS CIRCUIT SWITCHER NOMENCLATURE 55T3-L VISUAL IMSPECTION CONDITION SISTELEANS	MEASURED BANK VOLTAGE (discon	nect charger)		;	> 90% OF	F (SPECIFIED (CELL VOL	TAGE x NUME	BER OF CELLS)				
CIRCUIT SWITCHER					SUMP	PUMP							
CIRCUIT SWITCHER NOMENCLATURE 55T3-L CURRENT RATING 1200 AMPERES WANUFACTURER SIEMENS VOLTAGE CLASS 121 KV VISUAL IMSPECTION CONDITION SF6 LEAKS VA B C B SUBHINGS & INSULATORS VA B C D E OPERTION COUNTER 60 OPERTION COUNTER 60 CONTROL MECHANISM COMENCLATURE 55T2-L CURRENT RATING 1200 AMPERES CONTROL MECHANISM FAME, GROUNDING CONTROL MECHANISM VA B C D E WHITE BLUE OPERTION COUNTER 60 CURRENT RATING 1200 AMPERES VOLTAGE CLASS 121 KV CURRENT RATING 1200 AMPERES VOLTAGE CLASS 121 KV CURRENT RATING 1200 AMPERES VOLTAGE CLASS 121 KV VISUAL IMSPECTION COUNTION SF6 LEAKS VA C E TANK & MECHANISM BOX VA B C D E TANK & MECHANISM BOX VA B C D E SF6 GAS PRESSURE 63 63 63 63 OPERTION COUNTER 20	Operation		PASS / F	FAIL									
NOMENCLATURE SIEMENS VOLTAGE CLASS 121 KV VISUAL IMSPECTION CONDITION SF6 LEAKS VA B C B BUSHINGS & INSULATORS CONTROL MECHANISM CIRCUIT SWITCHER NOMENCLATURE SIEMENS CONDITION VA B C D B BUSHINGS & INSULATORS CONDITION VA B C D B CONTROL MECHANISM VA B C D D B CONTROL MECHANISM CIRCUIT SWITCHER NOMENCLATURE SIEMENS CURRENT RATING 1200 AMPERES OPERTION COUNTER 60 AMPERES CURRENT RATING 1200 AMPERES CURRENT RATING 121 KV CURRENT RATING 1200 AMPERES VOLTAGE CLASS 121 KV VISUAL IMSPECTION CONDITION SF6 LEAKS VOLTAGE CLASS 121 KV CURRENT RATING 1200 AMPERES VOLTAGE CLASS 121 KV CURRENT RATING 1200 AMPERES VOLTAGE CLASS 121 KV VISUAL IMSPECTION CONDITION SF6 LEAKS VA B C B CONTROL MECHANISM BOX VA B C B USHINGS & INSULATORS CONTROL MECHANISM BOX VA B C D B USHINGS & INSULATORS CONTROL MECHANISM VA B C D D B USHINGS & INSULATORS VA B C D D B USHINGS & INSULATORS VA B C D D B USHINGS & INSULATORS CONTROL MECHANISM VA B C D D B USHINGS & INSULATORS VA B C D D B USHINGS & INSULATORS VA B C D D B USHINGS & INSULATORS VA B C D D B USHINGS & INSULATORS VA B C D D B USHINGS & INSULATORS VA B C D D B USHINGS & INSULATORS VA B C D D B USHINGS & INSULATORS VA B C D D B USHINGS & INSULATORS VOLTAGE CLASS 121 KV	RUN FOR 1 MIN TO CONFIRM OPERATION PASS				1								
SEG LEAKS				<u> </u>									
TANK & MECHANISM BOX V A B C D E		-											
AUSHINGS & INSULATORS V A B C D E				<u> </u>		SF6	GAS PRES	SSURE	65	65	65		
FOUNDATION, FRAME, GROUNDING	BUSHINGS & INSULATORS					OPE	RTION CO	UNTER	60]			
CIRCUIT SWITCHER NOMENCLATURE 55T2-L CURRENT RATING 1200 AMPERES WANUFACTURER SIEMENS VOLTAGE CLASS 121 kV VISUAL IMSPECTION CONDITION SF6 LEAKS 7 A C E TANK & MECHANISM BOX 7 A B C D E BUSHINGS & INSULATORS 7 A B C D E CONTROL MECHANISM 7 A B C D E CONTROL MECHANISM 7 A B C D E													
CIRCUIT SWITCHER NOMENCLATURE 55T2-L CURRENT RATING 1200 AMPERES MANUFACTURER SIEMENS VOLTAGE CLASS 121 kV VISUAL IMSPECTION CONDITION FSI KPA RED WHITE BLUE SF6 LEAKS A B C D E SF6 GAS PRESSURE 63 63 63 TANK & MECHANISM BOX A B C D E OPERTION COUNTER 20	-OUNDATION, FRAME, GROUNDING		ч в с										
CURRENT RATING 1200 AMPERES WANUFACTURER SIEMENS VOLTAGE CLASS 121 KV VISUAL IMSPECTION CONDITION SF6 LEAKS TANK & MECHANISM BOX BUSHINGS & INSULATORS CONTROL MECHANISM CURRENT RATING 1200 AMPERES VOLTAGE CLASS 121 KV FIGURE FIGURE CONTROL MECHANISM CONDITION SF6 GAS PRESSURE FIGURE CONTROL MECHANISM CONTROL MECHANISM CURRENT RATING 1200 AMPERES VOLTAGE CLASS 121 KV FIGURE CONTROL MECHANISM CONDITION SF6 GAS PRESSURE FIGURE CONTROL MECHANISM CONDITION CONDITION CONDITION SF6 GAS PRESSURE FIGURE CONTROL MECHANISM CONDITION CONDITION CONDITION SF6 GAS PRESSURE FIGURE CONTROL MECHANISM CONDITION CONDITION CONDITION SF6 GAS PRESSURE FIGURE CONTROL MECHANISM CONDITION CONDITION SF6 GAS PRESSURE FIGURE CONTROL MECHANISM CONDITION CONDITION CONDITION SF6 GAS PRESSURE FIGURE CONTROL MECHANISM CONDITION CONDITION CONDITION SF6 GAS PRESSURE FIGURE CONTROL MECHANISM CONDITION CONDIT	HEATING BLANKET OPERATION		N/A										
VISUAL IMSPECTION CONDITION SF6 LEAKS TANK & MECHANISM BOX BUSHINGS & INSULATORS CONTROL MECHANISM VOLTAGE CLASS 121 KV VOLTAGE CLASS 121 KV PSI	CIRCUIT SWITCHER												
VISUAL IMSPECTION CONDITION SF6 LEAKS TANK & MECHANISM BOX BUSHINGS & INSULATORS CONTROL MECHANISM CONDITION CONDITION CONDITION CONDITION FINANCE FINANCE FINANCE FINANCE FINANCE CONTROL MECHANISM CONDITION CONDITION CONDITION FINANCE	NOMENCLATURE	55T2	2-L			CURRENT R	ATING		1200	A	MPERES		
SF6 LEAKS TANK & MECHANISM BOX BUSHINGS & INSULATORS CONTROL MECHANISM SF6 GAS PRESSURE FINANCE STANCE	MANUFACTURER	SIEMI	ENS			VOLTAGE CI	LASS		121	k	V		
TANK & MECHANISM BOX BUSHINGS & INSULATORS CONTROL MECHANISM A B C D E OPERTION COUNTER 20	VISUAL IMSPECTION		CONDITIO	N		● PSI		C KPA	RED	WHITE	BLUE		
BUSHINGS & INSULATORS OPERTION COUNTER 20 CONTROL MECHANISM OPERTION COUNTER 20						SF6	GAS PRE	SSURE	63	63	63		
CONTROL MECHANISM						OPE	RTION CO	UNTER	20	1			
										_			
	HEATING BLANKET OPERATION		N/A										



					PAGE
SWITCH					
NOMENCLATURE	55T3-LBS				
VISUAL IMSPECT	ION CONDITION				
BUSHINGS & INSULATORS	V A □ B □ C □	D T E			
FOUNDATION, FRAME, GROUN		D TE			
DISCONNECT LIVE PARTS		D TE			
DISCONNECT LIVE PARTS	V A D C				
SWITCH					
	5570 / DO				
NOMENCLATURE	55T2-LBS				
VISUAL IMSPECT	ION CONDITION				
BUSHINGS & INSULATORS	Г А ГВ ГС Г	D TE			
FOUNDATION, FRAME, GROUN	DING A B C	D 🔲 E			
DISCONNECT LIVE PARTS	V A □ B □ C □	D TE			
	-				
TRANSFORMER					
MANUFACTURER	MOLONEY ELECTRIC	KVA	3,500 /	10,000 /	13,500
				10,000 /	DELTA
SERIAL NUMBER YEAR	213081 1965	PRIMARY VOLTAGE SECONDARY VOLTAGE	110,000 / 12,480 /	7,200	WYE
					VVIL
	ONSERVATOR	OIL VOLUME	L	•	
MPEDANCE	8.9 %	TOTAL WEIGHT	94850 LBS	•	
TEMPERATURE RISE	<u>°C</u>	# OF FANS	8	•	
HV BIL	550	TAP CHANGER	EXTERNAL	•	
LV BIL	110				
VISUAL INSPECTION	CONDITION	GAUGES	NOT	E: TRANSFORMER	OIL LEVEL = 50% @ 25C
BUSHINGS	V A □ B □ C □ D □ E	WINDING TEMPERA	TURE MIN	Max	AS FOUND
MAIN TANK	VA □B □C □D □E	OIL TEMPERATUR	RE MIN	Max	AS FOUND 54
COOLING	V A □ B □ C □ D □ E	TRANSFORMER OIL I		100%	AS FOUND 60
OIL TANK	V A □ B □ C □ D □ E	BUSHING OIL LEV TRANSFORMER PRES		100%	AS FOUND AS FOUND
FOUNDATION	VA □ B □ C □ D □ E	GAS RELAY	SSORE	KPA PSI	AS FOUND
GROUNDING	V A □ B □ C □ D □ E		l .		
GASKET & SEALS	V A □ B □ C □ D □ E	TAP CHANGE	R		
CONNECTORS	VA B C D E	MANUFACTURER	MOLONEY ELE	CTRIC MODE	L
OIL LEAKS	VA DB DC DD E	SERIAL NO.		YEAR 1965	GALLONS 400L
OIL LEVEL	✓ A B C D E	TAP CHANGER OIL 1		Max	AS FOUND 40
OVERALL	VA B C D E	TAP CHANGER OIL L		Max Max	AS FOUND 25
V. L. V. LL	14 11 01 01 01	TAP POSITION COUNTER	IVIIIN 5	Max 11	AS FOUND 9 AS FOUND 20,382
		DIVERTOR OIL LEV	VEL MIN	Max	AS FOUND 20,382
		HEATER CONDITION			<u>' </u>
		RELIEF VENT	☐ G [
OIL FILTRATION PUMP PS	SI: 1 FILTER TYPE:	1	FILTER CHANGE D	ATE:	HOURS:



OIL FILTRATION PUMP

PSI:

FILTER TYPE:

PAGE TRANSFORMER MANUFACTURER PENSYLVANIA TRANSFORMER TECH 15,000 20,000 **KVA** 25,000 PRIMARY VOLTAGE DELTA SERIAL NUMBER C-09062-5-1 110,000 YEAR 2014 SECONDARY VOLTAGE 12,480 7,205 WYE TYPE CONSERVATOR OIL VOLUME 18665 **IMPEDANCE** 10.2 % TOTAL WEIGHT 54735 KG TEMPERATURE RISE °C # OF FANS HV BIL 550 TAP CHANGER **EXTERNAL** LV BIL 110 **GAUGES** CONDITION VISUAL INSPECTION NOTE: TRANSFORMER OIL LEVEL = 50% @ 25C WINDING TEMPERATURE MIN AS FOUND **BUSHINGS** VA B B C C D D E Max OIL TEMPERATURE MIN Max AS FOUND 50 MAIN TANK V A □ B □ C □ D □ E TRANSFORMER OIL LEVEL AS FOUND 0% 100% 50 COOLING VA B C C D E **BUSHING OIL LEVEL** 0% 100% AS FOUND 50 OIL TANK ✓ A ☐ B ☐ C ☐ D ☐ E TRANSFORMER PRESSURE AS FOUND KPA **FOUNDATION** V A □ B □ C □ D □ E **GAS RELAY** AS FOUND GROUNDING **V**A □B □C □D □E **TAP CHANGER GASKET & SEALS** MANUFACTURER REINHAUSSEN MODEL MD1-I CONNECTORS ▼A □B □C □D □E 1400253 YEAR GALLONS SERIAL NO. 2013 OIL LEAKS VA B C C D E TAP CHANGER OIL TEMP Max AS FOUND MIN 34 OIL LEVEL **V**A □B □C □D □E Max TAP CHANGER OIL LEVEL AS FOUND MIN 50 OVERALL V A □ B □ C □ D □ E MIN 9 TAP POSITION Max 17 AS FOUND COUNTER AS FOUND 34.559 **DIVERTOR OIL LEVEL** MIN Max AS FOUND HEATER CONDITION **▽** G □ P □ C □ I RELIEF VENT **√** G □ P □ C □ I

FILTER CHANGE DATE:

HOURS:



Hawkesbury Hydro

Q4 Station Inspections &

Transformer Maintenance (55T3)

at 44KV Tessier M.S. & 115KV Main St. W. T.S.

Hydro Ottawa Dec. 14th, 2022





Contents

- 1. 44KV Tessier St. Recommendations/Corrective Actions
- 2. 44KV Tessier St. Station Inspection Report Q4
- 3. 115KV Main St Recommendations/Corrective Actions
- 4. 115KV Main St. Station Inspection Report Q4
- 5. 55T3 Transformer Maintenance/Inspection Report
- 6. 55T3 Winding Resistance Test Results
- 7. 55T3 Transformer Load Tap Changer Turns Ratio Test
- 8. 55T3 Insulation Test Results
- 9. 55T3 Recommendations For Corrective Actions



44KV Station (Tessier St.) - Q4 Inspection

Recommendations for Corrective Actions

• Crews did not report any new deficiencies during this inspection. No new recommendations to report at this time.



TYPE ROUTINE	INSPECTION	S ⁻	TATION	AWKESBURY N		ISSUE DATE	11/0/0000
SUBSTATION ADDRESS		TESSIER ST				COMPLETED DATE	11/9/2022
FEEDER/NOMENCLATURE	TESSIER	R AMBI	ENT TEMPERAT	URE °C			BOILEAU S ZLOTY
		, AMBI	LIVI TEMI LIVII				
WORK ORDER #	680819	-		TESTS	STATUS	Pas	5
PROCEDURE							
FOLLOW WORK PROCE					CHECK APPF	RORIATE BOX	
CHECK ALL ITEMS SPEC					DE		
			T RESET O	-ON DEPARTOR		ADVE	1
CONDITION G P C I N/A		ate, grounds, stone)			KEWI	ARKS	
G P C I N/A		DING CONDITION					
□ G □ P □ C □ I ▼ N/A		RELAY PANELS					
VG P C I N/A	OUTDOOR STR	RUCTURES					
VG P C C I N/A	STATION SERV	/ICE TRANSFORMERS	;				
VG P C I I N/A	SWITCHGEAR	/ RECLOSERS					
G P C C I N/A	STATION IDEN	TIFICATION SIGN					
VG P C I I N/A	PPE SIGN						
VG P C C I N/A	SITE SAFETY N	NOTICE SIGN					
G P C I V N/A	CONTAINMENT	PIT					
G P C I V N/A	SUMP PIT / OIL	. WATER SEPARATOR	CLEAN	VATER OIL	SHEEN	SCADA STATUS OK	
G P C I V N/A		CTOR VERIFICATION					
G P C I V N/A	DGA SERVICE						
G P C I V N/A	VERIFY ATS OF	PERATION					
G = ITEMS FOUND IN SATISFAC							
P = ITEMS FOUND IN POOR COC = ITEMS REPAIRED OR CORF				CTION			
I = ITEMS REQUIRING IMMEDIA			ar constrict				
COMMENTS:							
DEFICIENCIES:							
		ALARMS &	GREEN TAGS (S	YSTEM OFFICE CH	HECK)		
ALARM OR GREEN TAG	AS FOUN	ID /	AS LEFT			NOTES	
		AL	TOMATIC TRAN	SFER SWITCH			
OPERATION		PASS / FAIL			N	IOTES	
VERIFY OPERTION BY OPENING	NORMAL FEED	PASS					
CONFIRM STATUS WITH SYSTEM	1 OFFICE	PASS					



										PAGE	
			:	STATION	I BATTERIES AND CHARGE	R					
NUMBER OF CELLS											
SPECIFIED VOLTAGE PER	R CELL										
DC SYS	STEM		PASS / FA	AIL			N	OTES			
VERIFY NO ALARMS ON C	CHARGER		PASS								
VERIFY GROUNDING CON	NTINUITY		PASS								
VERIFY CORROSION			PASS								
VERIFY WATER LEVELS (top-up if red	quired)	PASS								
DC VOL	TAGE		Volts		ACC	EPTABL	E RANGE				
CHARGER DISPLAY VOLT	AGE				125V to 130V						
MEASURED BANK VOLTA	GE (disconi	nect charger)			> 90% OF (SPECIFIED CEL	L VOLT	AGE x NUI	MBER OF	CELLS)		
					SUMP PUMP						
Operati	ion		PASS / F	AIL	$\overline{}$						
RUN FOR 1 MIN TO CONF	IRM OPER	ATION	PASS								
TRANSFORME MANUFACTURER SERIAL NUMBER YEAR TYPE IMPEDANCE TEMPERATURE RISE HV BIL LV BIL				- - P S C T	PRIMARY VOLTAGE DECONDARY VOLTAGE OIL VOLUME OTAL WEIGHT OF FANS TAP CHANGER	10,000 44,000 12,470 31397 6) /) / L KG	7,200		6,700 DELTA WYE	
VISUAL INSPECTION	N	CONI	DITION	7	GAUGES		NOTE:	TRANSFO	RMER OIL	LEVEL = 50°	% @ 25C
BUSHINGS			CDDE		WINDING TEMPERATURE	RE MIN		Max Max		S FOUND	25
MAIN TANK	_	A		-	TRANSFORMER OIL LEV			100%		S FOUND	50
OIL TANK		ABB		-	BUSHING OIL LEVEL	0%		100%		S FOUND	
FOUNDATION		A B B	C D D E		TRANSFORMER PRESSU	JRE		KPA		S FOUND	
GROUNDING		АВВ		٠.	GAS RELAY			1	P	S FOUND	
GASKET & SEALS	_	A B	C D D E		TAP CHANGER						
CONNECTORS				-	MANUFACTURER				MODEL		
	_	A			SERIAL NO.		Y	EAR		GALLONS _	
OIL LEAKS		A B	CDDE		TAP CHANGER OIL TEM	MIN AI	N	Max	А	S FOUND	
OIL LEVEL		АВ			TAP CHANGER OIL LEVI	EL MI	ν	Max	А	S FOUND	
OVERALL		AB	CDDE		TAP POSITION	MIN	N	Max		S FOUND	
					COUNTER			1		S FOUND	
					DIVERTOR OIL LEVEL	. MIN		Max		S FOUND	<u> </u>
					HEATER CONDITION	<u> </u>		P 🔲 C	=		
					RELIEF VENT		G	Р 🗌 С	<u> </u>		

FILTER TYPE:

OIL FILTRATION PUMP PSI:

HOURS:

FILTER CHANGE DATE:



ANDIEACTURER	DIONIEED TO ANOCODMEDO	10.44	10.000	40.000 /	40.070
ANUFACTURER	PIONEER TRANSFORMERS		10,000 /	13,330 /	16,670
ERIAL NUMBER	G16194-1		14,000 /		DELTA
EAR	2012		2,470 /	7,200	DELTA
'PE	SEALED	OIL VOLUME	<u>L</u>		
PEDANCE	6.91 %	TOTAL WEIGHT	28880		
MPERATURE RISE	65 °C	# OF FANS	6		
/ BIL		TAP CHANGER EX	KTERNAL		
/ BIL					
VISUAL INSPECTION	CONDITION	GAUGES	NOTE:	TRANSFORMER (OIL LEVEL = 50% @ 25
SHINGS	V A □ B □ C □ D □ E	WINDING TEMPERATURE	MIN	Max	AS FOUND 10
JIN TANK	V A □ B □ C □ D □ E	OIL TEMPERATURE	MIN	Max	AS FOUND 10
OCLING	V A □ B □ C □ D □ E	TRANSFORMER OIL LEVEL	0%	100%	AS FOUND 50
_ TANK	V A □ B □ C □ D □ E	BUSHING OIL LEVEL	0%	100%	AS FOUND
		TRANSFORMER PRESSURE		KPA 🗸 PSI	
DUNDATION		GAS RELAY			AS FOUND
ROUNDING	VA B C D E	TAP CHANGER			
ASKET & SEALS	VA B C D E	MANUFACTURER	— ABB	MODE	L UZERT 250/300
DNNECTORS	✓ A B C D E	SERIAL NO. 1ZSC 8714	4 910 YI	EAR 2013	GALLONS
L LEAKS	V A □ B □ C □ D □ E	TAP CHANGER OIL TEMP	MIN	Max	AS FOUND
L LEVEL	✓ A ☐ B ☐ C ☐ D ☐ E	TAP CHANGER OIL LEVEL	MIN	Max	AS FOUND 40
/ERALL	V A □ B □ C □ D □ E	TAP POSITION	MIN	Max	AS FOUND
		COUNTER			AS FOUND 2,586
		DIVERTOR OIL LEVEL	MIN	Max	AS FOUND
		HEATER CONDITION	☐ G ☐	P 🔲 C 🔲 I	



115KV Station (Main St. W.) - Q4 Inspection

Recommendations for Corrective Actions

• Crews did not report any new deficiencies during this inspection. No new recommendations to report at this time.



TYPE ROUTINE IN	NSPECTION	STATIO	N <u>HA</u>	WKESBURY I	MTS	ISSU	E DATE	
SUBSTATION ADDRESS		MAIN ST				COMPLETE		11/9/2022
	MKSDLIDV 11EK			°C		STED BY		BOILEAU
FEEDER/NOMENCLATURE HAY		AMBIENT I	EMPERATO	JRE °C	TE	STED BY		S ZLOTY
WORK ORDER #	680819			TEST	STATUS		Pas	S
PROCEDURE								
PROCEDURE		OTED			0.1501	/ ADDDODUATE D	.0.4	
FOLLOW WORK PROCED CHECK ALL ITEMS SPECI					CHECK	C APPRORIATE B	SOX .	
CHECK ALL ITEMS SPECI				-	IRF			
CONDITION	INSPECTION					REMARKS		
GONDITION G P C I N/A	YARD (fence, gate, ground					KLIIIAKKO		
G P C I N/A	OVERALL BUILDING CO							
G P C I N/A	PROTECTION RELAY P.	ANELS						
G P C I N/A	OUTDOOR STRUCTURE	:S						
G P C I N/A	STATION SERVICE TRA	NSFORMERS						
G P C I N/A	SWITCHGEAR / RECLO	SERS						
G P C I N/A	STATION IDENTIFICATION	ON SIGN						
G P C I N/A	PPE SIGN							
G P C I N/A	SITE SAFETY NOTICE S	IGN						
G P C I N/A	CONTAINMENT PIT					_		
G P C I N/A	SUMP PIT / OIL WATER	SEPARATOR	CLEAN W	ATER OII	L SHEEN	SCADA STA	ATUS OK	
G P C I N/A	SMOKE DETECTOR VEI	RIFICATION						
G P C I N/A	DGA SERVICE LIGHTS							
G P C I N/A	VERIFY ATS OPERATION	N						
G = ITEMS FOUND IN SATISFACT								
P = ITEMS FOUND IN POOR CONC = ITEMS REPAIRED OR CORRE				TION				
I = ITEMS REQUIRING IMMEDIAT			Nomon					
COMMENTS:								
DEFICIENCIES:								
		ALARMS & GREEI	N TAGS (SY	STEM OFFICE (CHECK)			
ALARM OR GREEN TAG	AS FOUND	AS LEI	FT			NOTES		
		AUTOMA	ATIC TRANS	SFER SWITCH				
OPERATION	F	ASS / FAIL				NOTES		
VERIFY OPERTION BY OPENING N	ORMAL FEED	PASS						
CONFIRM STATUS WITH SYSTEM (OFFICE	PASS						



								PAG	SE
		ST	ATION BA	TTERIES AND	CHARGER				
NUMBER OF CELLS									
SPECIFIED VOLTAGE PER CELL									
DC SYSTEM		PASS / FAIL	_			NO ⁻	TES		
VERIFY NO ALARMS ON CHARGER		PASS							
VERIFY GROUNDING CONTINUITY		PASS							
VERIFY CORROSION		PASS							
/ERIFY WATER LEVELS (top-up if requ	uired)	PASS							
DC VOLTAGE		Volts			ACCEP	TABLE RANGE		$\overline{}$	
CHARGER DISPLAY VOLTAGE			125	5V to 130V					
MEASURED BANK VOLTAGE (disconn	ect charger)				FIED CELL	VOLTAGE x NUME	BER OF CELLS)		
				SUMP PUMP					
Operation		PASS / FAI	L						
RUN FOR 1 MIN TO CONFIRM OPERA	TION	PASS							
MANUFACTURER	SIEME	NS		VOLTAGE CLASS 121				k	kV
VISUAL IMSPECTION		CONDITION		•	PSI	C KPA	RED	WHITE	BLUE
SF6 LEAKS TANK & MECHANISM BOX	✓ A	ВС			SF6 GAS I	PRESSURE		<u> </u>	
BUSHINGS & INSULATORS		вс			OPERTION	N COUNTER	70		
CONTROL MECHANISM	✓ A			-			-	•	
FOUNDATION, FRAME, GROUNDING		ВГСГ	D E						
HEATING BLANKET OPERATION		N/A							
CIRCUIT SWITCHER	-		-						
NOMENCLATURE	55T2-	L		CURRE	ENT RATING	3	1200	ļ	AMPERES
MANUFACTURER	SIEMEI	NS		VOLTA	GE CLASS		121	ŀ	kV
					.	0.17	T		T
VISUAL IMSPECTION SF6 LEAKS	 A	CONDITION	Гε		PSI SE6 GAS I	PRESSURE	RED	WHITE	BLUE
TANK & MECHANISM BOX	V ∧		D E		5. U GAG I		<u>l</u>		
BUSHINGS & INSULATORS	✓ A		D E		OPERTION	N COUNTER	21		
CONTROL MECHANISM	✓ A		D E						
FOUNDATION, FRAME, GROUNDING	√ A	ВГСГ	D E						
HEATING DI ANIVET OPERATION		N 1/A		· 					
HEATING BLANKET OPERATION		N/A							



										PAGE	
SWITCH											
NOMENCLATURE		55T3-LBS									
VISUAL IMSPEC	TION	CONDITION		7							
BUSHINGS & INSULATORS		V A □B □ C □	D Γ E	:							
FOUNDATION, FRAME, GROU	NDING	V A □B □ C □	D D E	<u> </u>							
DISCONNECT LIVE PARTS		V A □ B □ C □	D \prod E								
SWITCH											
NOMENCLATURE		55T2-LBS									
VISUAL IMSPEC	TION	CONDITION		\neg							
BUSHINGS & INSULATORS		Г А	D E	:							
FOUNDATION, FRAME, GROU	NDING		D E								
DISCONNECT LIVE PARTS			D E	:							
		, , , , , , , , , , , , , , , , , , , ,	<u> </u>	_							
TRANSFORMER	₹										
MANUFACTURER	MOLONE	Y ELECTRIC	K۱	/A	3,	500	/ 1	0,000	/	13,500	
SERIAL NUMBER	21	3081	PF	RIMARY VOLTAGE	110	0,000	/			DELTA	
YEAR	1965		SE	CONDARY VOLTAGE	12	,480	/	7,200		WYE	
TYPE	CONSERVATOR		OI	L VOLUME			L				
IMPEDANCE	8.9 %	<u> </u>	TC	TAL WEIGHT	948	50 LBS					
TEMPERATURE RISE	°C			of Fans		8					
HV BIL	550	-)	ΤA	.P CHANGER	EXT	ERNAL					
LV BIL	110	=		-			,				
	<u> </u>	- 1		CALICES							
VISUAL INSPECTION		CONDITION	i	GAUGES	UDE .				ORMER O	IL LEVEL = 50	
BUSHINGS	V A C	B C D E		OIL TEMPERATUR		MIN MIN		Лах Лах		AS FOUND	20
MAIN TANK		B C D D E		TRANSFORMER OIL LE		0%		00%		AS FOUND	50
COOLING		B C D E		BUSHING OIL LEVE	EL	0%	1	00%	•	AS FOUND	
OIL TANK		B C D D E		TRANSFORMER PRESS	SURE		Г	KP/	A PSI	AS FOUND	
FOUNDATION		B C D E		GAS RELAY						AS FOUND	
GROUNDING		B C D E		TAP CHANGER	,						
GASKET & SEALS		B C D E	·	MANUFACTURER			EL ECTRI	_	MODEL		
CONNECTORS	✓ A □	B C D D E		SERIAL NO.	WIOL	ONLIL	YEA		1965	GALLONS	400L
OIL LEAKS	V A Γ	BCCDCE		TAP CHANGER OIL TE	EMP	MIN	_	Лах			14
OIL LEVEL	✓ A □	B C D D E		TAP CHANGER OIL LE		MIN		Лах	1	AS FOUND	50
OVERALL	✓ A	BCCDDE		TAP POSITION		MIN	N	Лах		AS FOUND	
				COUNTER						AS FOUND	35,938
				DIVERTOR OIL LEVI	EL	MIN	N	/lax		AS FOUND	
				HEATER CONDITION	٧		G ∏ P		_		
				RELIEF VENT			: 🗆 P		: 🗖 i		

FILTER TYPE:

OIL FILTRATION PUMP PSI:

HOURS:

FILTER CHANGE DATE:



MANUFACTURER	PENSYLV	ANIA TRANSFO	RMER TECH	K	VA	15	,000	/	20,000	/	25,000	
SERIAL NUMBER		C-09062-5-1		Pl	RIMARY VOLTAGE	110	0,000	/			DELTA	
'EAR	201	14		SI	ECONDARY VOLTAGE	12	,480	/	7,205		WYE	
YPE	CONSER	VATOR		0	IL VOLUME	18	3665	L				
MPEDANCE	10.2	%_		Т	OTAL WEIGHT	54	735 KG					
EMPERATURE RISE	65	°C		#	OF FANS		8					
IV BIL		550		T	AP CHANGER	EX	ΓERNA	L				
V BIL		110										
VISUAL INSPECT	ION	CONDIT	TION		GAUGES			NOTE:	TRANSF	ORMER C	OIL LEVEL = 50)% @ 25C
BUSHINGS	F	7 A \square B \square C	DDE		WINDING TEMPERA	TURE	MIN		Max		AS FOUND	38
IAIN TANK	Ī,	7 а Пв По	СПРПЕ		OIL TEMPERATU	RE	MIN		Max		AS FOUND	30
OOLING	Ī	7 A \square B \square C	СГОГЕ		TRANSFORMER OIL	LEVEL	0%		100%		AS FOUND	50
DIL TANK		7 A \square B \square C	ОПОПЕ		BUSHING OIL LEV		0%		100%	. =	AS FOUND	
OUNDATION		7 А Г В Г С			TRANSFORMER PRES	SSURE			KP/	A PSI	AS FOUND	
BROUNDING			ЭПОПЕ		GAO REEAT				<u> </u>		AO I OOND	_
GASKET & SEALS		7 A ПВПО			TAP CHANGE	R	_					
CONNECTORS			, , , , , , , , , , , , , , , , , , ,		MANUFACTURER	F	REINHA	USSEN		MODE	LM	D1-I
OIL LEAKS			СПОПЕ		SERIAL NO.	1400253	}	YE	EAR _	2013	GALLONS	
			ЭПОПЕ		TAP CHANGER OIL		MIN		Max		AS FOUND	
NI LEVEL	_	7 A \Box B \Box C			TAP CHANGER OIL L		MIN		Max		AS FOUND	40
		ALBEC			TAP POSITION		MIN		Max		AS FOUND	21 = 11
					COUNTER						AS FOUND	21,714
					DIVERTOR OIL LE	\/FI	MIN		May		AS FOLIND	I
DIL LEVEL DVERALL					DIVERTOR OIL LE		MIN	G 🗌	Max P C	<u> </u>	AS FOUND	



TRANSFORMER INSPECTION

TYPE	MAINTENANCE		STATION _	HAWKE	SBURY MTS		ISSUE DATE		
SUBSTATION ADDRESS		MAI	N ST				PLETED DATE	10/30/2	
				DED 4 TUDE	°C	TESTED BY			
FEEDER/NOMENCLATUR	E	3	AMBIENT TEMP	PERATURE _		TESTED BY			ΙΥ
WORK ORDER #					TEST STA	TUS	Pa	ISS	
NAMEPLATE DATA									
		Pensylvania	Transformer			SERIAL N	NO	C-09062-	5-1
SPECIFICATION NO.	20162	-	KVA 15,000	0 / 20,000	/ 25,000	TYPE LTC	CLASS	ONAN	ONAF/ONAF
PHASE 3 T		65 °C	_ IMPEDAN	CE <u>10.2</u>	<u>%</u>	B.I.L. RATING _			
COOLANTWINDING POLARITY			CAPACITY WINDING MATERI					_	54735KG
PRIMARY VOLTAGE	110,000		DELTA) WYE	Copper RATED CU	IRRENT 79		R	
SECONDARY VOLTAGE				WYE	RATED CU	IRRENT 694	/ 925 /		
TAP VOLTAGES									
TAP CONNECTIONS			 		·				
TAP SETTING		_ Volts #	FANS 4	TA	AP CHANGER:	C INTERNA	AL © EXTE	ERNAL	DRY TYPE
GAUGES:									
WINDING TEMPERATURE		°C MAX	IMUM WINDING T	EMPERATUR	E	°C			
COOLANT TEMPERATUR	E	°C MAX	IMUM COOLANT T	ΓEMPERATUR	E	°C	RESET TEM	IPERATURE	GAUGES
COOLANT LEVEL		PRE	SSURE VACUUM		#	LCR COUNTE	ER		
OTHER GAUGES									
VISUAL INSPECTION:									
BUSHINGS		SUF	PPORT INSULATOR	RS		CONNECTI	ONS		
PAINT		RAI	DIATORS			FANS			
NO-LOAD TAP CHANGER		- LEA	.KS						
FAN PUMP CONTROLS		-							
ADDITIONAL EQUIPMENT		AMC/KCN	1 NO. OF GROU	IND CONDUC	TORS	CE	ROUND CONDU	CTOR CON	DITION
GROUND CONDUCTOR S		AWG/RCIV	I NO. OF GROO	IND CONDOC			COND CONDO	CTOR CON	
	VECTOR DIAGRA	AM_				_	POST TEST VO	LTAGES	
$A \bigtriangleup D \bigtriangleup$	$_{ extsf{H}}$ \prec $_{ extsf{L}}$				Γ	NO I		DV VOI TA	25
В €	, >- M LL		CTOR: E		<u> </u>	X1 - X2	OAD SECONDA	X0 - G).
c ∕ F ₹	,	SEC. VE	CTOR: I		-	X1 - X2 X1 - X3	V	X0 - X1	V
	- () " ^					X2 - X3	V	X0 - X2	V
G €	K Y O/\								



3Ø Winding Resistance and Turns Ratio

TYPE		M	1AINTENANCE		7 :	STATION	HAWKES	BURY MTS	<u>s</u>	ISSUE DATE				
	TION AC	DDRESS			 MAIN ST			\neg		COMPLETED DATE	30	0/10/202	22	
										JA				
FEEDER	R/NOMEN	ICLATURE	55	Т3	AMI	BIENT TEMP	ERATURE	℃	TESTED BY	DOM	INIQU	E RIV	ET_	
WORK C	ORDER#	<u> </u>						TEST STA	TUS	Р	ass			
Name	plate													
	MFR	Pensylvania	Transformer	WEIGHT	Г 63,0	00 lb	OIL V	OLUME	G	AL	Dyn1			
SE	ER NO	C-0906	62-5-1			NAF/ONAF		OLANT		<u>H</u> H ₂			X ₂	
			14	BII	_ 55	50 kV	IMPE	DANCE	10 %	<u>.</u> .\	х	1○──	_∞ x _o	
	TYPE [SEALED-	CONSER							H ₁ ([⊢] H3		8	
										Diagram #	<u>5</u> (ANS	SI)	Х ₃	
		Voltage	(V) kVA	Rated I	# Taps	Nominal	Tap Changer	Tap Setting	First T			© N	laterial	
Prima	2017	L-L 112,750	L-G		5	2			10	,o romag	•		C	4
	ndary		7,205		33	17	DETC OLTC		10,61	4 14,346	3		Cu Cu	
Trans	former	Test Condi	itions											
AME	BIENT TE	MP	°C		OIL	TEMP		°C	F	REASON				
	HUMII	OITY	%		WINDING	TEMP		°C		STATUS			<u></u>	
		HER												

Resis	tance -	Secondary	1											
		Test Cur	rent (A)											
		Stability (, ,		Measured	d Resistance		U	nits: mΩ	*	1			
#	Тар		x ₁ - x ₀		Х2	- X ₀		x ₃ - x ₀	ı	Winding Diff Max: 2 %		Make/	'Break	
45	1	9.9865 99.982	13.86	10.0 99.9		13.85	9.972 99.98		3.95	0.718	5 ms	Pass	Pass	Pass
46	2	9.9869 99.994	13.66	10.0 99.9		13.62	9.972 99.99		3.66	0.301	5 ms	Pass	Pass	Pass
47	3	9.9873 99.989	13.62	9.99		13.61	9.972 99.98	1	3.65	0.294	5 ms	Pass	Pass	Pass
48	4	9.9880 99.975	13.41	9.99		13.34	9.972 99.96		3.43	0.653	5 ms	Pass	Pass	Pass
49	5	9.9885 99.981	13.37	9.99		13.35	9.972 99.99		3.44	0.668	5 ms	Pass	Pass	Pass
50	6	9.9896 99.987	13.20	9.99		13.11	9.972 99.99		3.20	0.709	5 ms	Pass	Pass	Pass
51	7	9.9903	13.30	9.99		13.14	9.973	⁷ 1:	3.21	1.216	5 ms	Pass	Pass	Pass

99.984

9.9905

99.943

12.95

99.990

9.9736

99.980

13.10

3.327

99.981

9.9926

99.989

13.39

Pass

5 ms

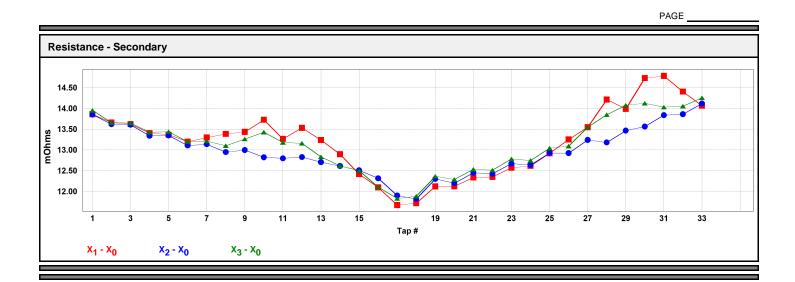


3Ø Winding Resistance and Turns Ratio

PAGE _____

		Test Cur Stability (Meas	sured Resistance		Units: mΩ	•				
#	Тар	Stability (X ₁ - X ₀		x ₂ - x ₀		x ₃ - x ₀	Winding Diff Max: 2 %		Make/	Break	
53	9	9.9914 99.986	13.43	9.9920 99.997	13.00	9.9738 99.998	13.26	3.314	5 ms	Pass	Pass	Pass
54	10	9.9925 99.928	13.73	9.9912 99.995	12.82	9.9736 99.921	13.43	6.783	5 ms	Pass	Pass	Pass
55	11	9.9924 99.935	13.26	9.9904 99.995	12.80	9.9737 99.974	13.18	3.570	5 ms	Pass	Pass	Pass
56	12	9.9933 99.924	13.53	9.9897 99.965	12.83	9.9738 99.939	13.16	5.335	5 ms	Pass	Pass	Pass
57	13	9.9943 99.954	13.24	9.9893 99.968	12.71	9.9741 99.974	12.83	4.116	5 ms	Pass	Pass	Pass
58	14	9.9951 99.929	12.90	9.9886 99.990	12.61	9.9741 99.940	12.62	2.217	5 ms	Pass	Pass	Pass
59	15	9.9960 99.975	12.42	9.9878 99.944	12.51	9.9744 99.921	12.50	0.716	5 ms	Pass	Pass	Pass
60	16	9.9975 99.949	12.10	9.9868 99.932	12.32	9.9748 99.964	12.10	1.804	5 ms	Pass	Pass	Pass
61	Nominal	9.9984 99.984	11.67	9.9860 99.988	11.90	9.9752 99.934	11.83	1.936	5 ms	Pass	Pass	Pass
62	18	9.9997 99.989	11.72	9.9855 99.958	11.82	9.9751 99.994	11.88	1.394	5 ms	Pass	Pass	Pass
63	19	10.0010 99.993	12.12	9.9847 99.986	12.30	9.9754 99.994	12.36	1.983	5 ms	Pass	Pass	Pass
64	20	10.0023 99.994	12.12	9.9840 99.990	12.20	9.9756 99.958	12.29	1.350	5 ms	Pass	Pass	Pass
65	21	10.0035 99.994	12.34	9.9835 99.938	12.45	9.9764 99.990	12.53	1.590	5 ms	Pass	Pass	Pass
66	22	10.0051 99.978	12.35	9.9833 99.994	12.43	9.9769 99.991	12.51	1.323	5 ms	Pass	Pass	Pass
67	23	10.0066 99.994	12.57	9.9824 99.978	12.67	9.9776 99.987	12.78	1.667	5 ms	Pass	Pass	Pass
68	24	10.0086 99.995	12.61	9.9816 99.984	12.63	9.9781 99.991	12.75	1.044	5 ms	Pass	Pass	Pass
69	25	10.0124 99.978	12.92	9.9811 99.968	12.93	9.9788 99.960	13.04	0.967	5 ms	Pass	Pass	Pass
70	26	10.0145 99.880	13.25	9.9806 99.992	12.92	9.9796 99.994	13.09	2.503	5 ms	Pass	Pass	Pass
71	27	10.0165 99.904	13.55	9.9798 99.994	13.24	9.9807 99.964	13.54	2.280	5 ms	Pass	Pass	Pass
72	28	10.0192 99.835	14.21	9.9793 99.996	13.18	9.9816 99.921	13.85	7.510	5 ms	Pass	Pass	Pass
73	29	10.0215 99.868	13.99	9.9781 99.989	13.46	9.9830 99.952	14.08	4.417	5 ms	Pass	Pass	Pass
74	30	10.0250 99.759	14.73	9.9771 99.964	13.56	9.9845 99.949	14.12	8.257	5 ms	Pass	Pass	Pass
75	31	10.0282 99.758	14.78	9.9763 99.985	13.84	9.9888 99.945	14.03	6.648	5 ms	Pass	Pass	Pass
76	32	10.0337 99.952	14.40	9.9757 99.981	13.86	9.9925 99.964	14.05	3.859	5 ms	Pass	Pass	Pass
77	33	10.0650 99.989	14.07	9.9751 99.944	14.12	9.9985 99.991	14.25	1.325	5 ms	Pass	Pass	Pass

3Ø Winding Resistance and Turns Ratio



COMMENTS: DEFICIENCIES:

52,53,54,55,56,57,58,70,71,72,73,74,75,76 Failed



TRANSFORMER LOAD TAP CHANGER TURNS RATIO TEST 3 Phase Test Method

TYPE	MAINTENANCE	STATION	HAWKESBL	JRY MTS		ISSUE DATE		
					COM	PLETED DATE	10/30/2022	
SUBSTATION ADDRESS		MAIN ST		•	TESTED BY	DOMINI	QUE RIVET	
FEEDER/NOMENCLATURE	55T3	AMBIENT TEMPI	ERATURE	°C	TESTED BY	JAME	S ZLOTY	
WORK ORDER #				TEST STA	TUS	Pas	S	
NAMEPLATE DATA								
MANUFACTURER	Pe	ensylvania Transformer			SERIAL NU	JMBER	C-09062-5-1	

TAP	SECONDARY TAP VOLTAGE	PRIMARY VOLTAGE	CALCULATED		MEASURED RATIO	
NO.	(volts)	(volts)	RATIO	H ₁ H ₃ /X ₃ X ₀	H ₁ H ₂ /X ₁ X ₀	H ₂ H ₃ /X ₂ X ₀
16L	10,614 / 6,128	112,750	18.3992	18.4130	18.3760	18.4040
15L	10,730 / 6,195	112,750	18.2002	18.2340	18.2260	18.2280
14L	10,847 / 6,263	112,750	18.0026	18.0150	18.0020	18.0030
13L	10,964 / 6,330	112,750	17.8120	17.8450	17.8410	17.8420
12L	11,080 / 6,397	112,750	17.6254	17.6370	17.6310	17.6330
11L	11,197 / 6,466	112,750	17.4374	17.4500	17.4670	17.4740
10L	11,314 / 6,532	112,750	17.2612	17.2740	17.2660	17.2680
9L	11,430 / 6,599	112,750	17.0859	17.1180	17.1110	17.1420
8L	11,547 / 6,667	112,750	16.9117	16.9260	16.9200	16.9210
7L	11,664 / 6,734	112,750	16.7434	16.7750	16.7680	16.7760
6L	11,780 / 6,801	112,750	16.5784	16.5750	16.5820	16.5850
5L	11,897 / 6,869	112,750	16.4143	16.4350	16.4370	16.4430
4L	12,013 / 6,936	112,750	16.2558	16.2670	16.2610	16.2540
3L	12,130 / 7,003	112,750	16.1002	16.1320	16.1250	16.1310
2L	12,247 / 7,071	112,750	15.9454	15.9610	15.9530	15.9550
1L	12,363 / 7,138	112,750	15.7957	15.8290	15.8220	15.8260
N	12,480 / 7,205	112,750	15.6489	15.6610	15.6540	15.6540
1R	12,597 / 7,273	112,750	15.5025	15.5350	15.5330	15.5320
2R	12,713 / 7,340	112,750	15.3610	15.3490	15.3660	15.3680
3R	12,830 / 7,407	112,750	15.2221	15.2550	15.2500	15.2540
4R	12,947 / 7,480	112,750	15.0735	15.0950	15.0910	15.0900
5R	13,063 / 7,542	112,750	14.9496	14.9800	14.9770	14.9820
6R	13,180 / 7,609	112,750	14.8180	14.8280	14.8250	14.8250
7R	13,296 / 7,676	112,750	14.6886	14.7170	14.7140	14.7170
8R	13,413 / 7,744	112,750	14.5597	14.5720	14.5660	14.5660
9R	13,530 / 7,811	112,750	14.4348	14.4660	14.4610	14.4640
10R	13,646 / 7,878	112,750	14.3120	14.3180	14.3150	14.3180
11R	13,763 / 7,946	112,750	14.1895	14.2200	14.2150	14.2210
12R	13,880 / 8,014	112,750	14.0691	14.0830	14.0750	14.0750
13R	13,996 / 8,081	112,750	13.9525	13.9830	13.9770	13.9830
14R	14,113 / 8,148	112,750	13.8378	13.8480	13.8440	13.8440
15R	14,230 / 8,216	112,750	13.7232	13.7550	13.7520	13.7560
16R	14,346 / 8,283	112,750	13.6122	13.6170	13.6160	13.6190

COMMENTS:	
DEFICIENCIES:	



INSULATION TESTS TWO-WINDING TRANSFORMERS

TYPE	MA	INTENANCE			STATION		n	one			SUE DATE _			
SUBSTATIC	N ADDRESS			MAIN S	Т						TED DATE			
FEEDER/NO	OMENCLATURE	55	iT3	A	MBIENT TE	MPERATU	RE	5			DOMINIQU JAMES			
WORK ORD											Pass			
NAMEPLA [*]	TE DATA									BUSHING	NAMEPLATE			
								Dsg	SERIAL NUM	MFR.	TYPE/CLASS	kV	AMPS	YEAR
MFR	Ivania Transformer and I	CLASS	ONAN_ON	NAF_ONAF	PHASES	3		H1	13-151063	PCORE Electric	POC	115	1200	2012
SER NO	C-09062-5-1	COOLANT	Oil		REASON			H2	13-151345	PCORE Electric	POC	115	1200	2012
YEAR	2014	TANK TYPE	SEALEDC	ONSER	WEIGHT	54735	KG		13-151419	PCORE Electric	POC	115	1200	2012
H ₂	Dy7 x ₃			WINDING	MATERIAL .	Cu		X0	13-280180	PCORE Electric	PRC	15	2000	2012
Å	٩			OII	L VOLUME	22,014	L	X1	13-286172	PCORE Electric	PRC	15	2000	2012
	/	X ₁			TEMP	5	°C	X2	13-280162	PCORE Electric	PRC	15	2000	2012
H ₁	Н ₃ х ₂			IM	IPEDANCE .		%	Х3	13-280169	PCORE Electric	PRC	15	2000	2012
Diagram #				1	WEATHER .	Sunny	у							
J	<u>···</u> (AIVOI)				BIL	550	kV						,	
	VOLTAGE (kV)	Undefin RATED	TAPS	NOMINAL	CHANGER	TAF SETT								
PRIMARY	': 110	25 0.13	5	3	DETC									
SECONE): 7.205		1											
COMMENTS	:													



INSULATION TESTS TWO-WINDING TRANSFORMERS

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	TRAN	ISFORMER	OVE	RALL	TEST S	SET U	P		Г пс Г∕	Temp Corr.		IER OVERALI	L TEST RES	ULTS		
Test	Insulation	Test	Tes	t Lead	Connect	tions	TEST	DFR	Capacitance		OWER FACTOR	. %	DIR	ECT	0() /DE	IR
No.	Tested	Mode	HV	Red	Blue	Gnd	kV	DFR	C (pF)	Measured	@ 20°C	Corr Factor	mA	Watts	%VDF	Auto/Man
1	C _{HG} + C _{HL}	GST-GND	Н	L		G	10.00		6,381.24	0.28	0.27	0.982	24.0563	0.6706		Unrated
2	C _{HG}	GSTg-RB	Н	L		G	10.00		2,374.15	0.31	0.31	0.982	8.9500	0.2805		Unrated
3	C _{HL}	UST-R	Н	L		G	10.00		4,004.92	0.25	0.25	0.982	15.0973	0.3820		Unrated
4	C _{HL} '		Te	est 1 Mi	nus Tes	st 2			4,007.08				15.1063	0.3900		Valid
5	C _{LG} + C _{HL}	GST-GND	L	Н		G	5.00		14,590.10	0.37	0.36	0.982	55.0026	2.0357		Unrated
6	C _{LG}	GSTg-RB	L	Н		G	5.00		10,583.50	0.42	0.41	0.982	39.8973	1.6567		Unrated
7	C _{HL}	UST-R	L	Н		G	5.00		4,006.34	0.25	0.24	0.982	15.1037	0.3747		Unrated
8	C _{HL} '		Te	est 5 Mi	nus Tes	st 6			4,006.60				15.1052	0.3789		Valid
9	C _{HG} '		CHO	3 Minus	H Bush	nings			2,374.15				8.9500	0.2805		Unrated
10	C _{LG} '		CLC	3 Minus	L Bush	ings			10,583.50				39.8973	1.6567		Unrated
Oil Test 1	Overall Oil Test	UST-R	L	Н		G						1.000				
Oil Test 2	LTC Chamber Oil Test	UST-R	L	Н		G						1.000				

NOTE: SHORT EACH WINDING ON ITSELF

INSULATION RATING KEY

G = GOOD

D = DETERIORATED I = INVESTIGATE

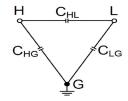
B = BAD

H = HIGH VOLTAGE WINDING L = LOW VOLTAGE WINDING

G = GROUND

N = NEUTRAL BUSHING

EQUIVALENT CIRCUIT



						Tra	ansforme	er - Bush	ning C1 Tests	Apply	C1 Correc	tion Factor		t Bushing ITC 🔽 T		
Test		Bus	hing Nameplate			Test	TEST		Capacitance	POW	ER FACTO)R %	DIR	ECT		
No.	Dsg.	SERIAL#	CAT.#	PF	Cap. (pF)	Mode	kV	DFR	C (pF)	Measured	@ 20°C	Corr Factor	mA	Watts	%VDF	IR
11	H1	13-151063	POC550G0800S	0.28	475.00	UST-B	10.00		471.42	0.29	0.29	1.000	1.7772	0.0511		Unrated
12	H2	13-151345	POC550G0800S	0.29	478.00	UST-B	10.00		473.18	0.29			1.7838	0.0525		Unrated
13	НЗ	13-151419	POC550G0800S	0.29	478.00	UST-B	10.00		473.33	0.31			1.7843	0.0547		Unrated
14	X0	13-280180	B-89123-70	0.68	435.00	UST-B	5.00		453.33	0.65			1.7090	0.1105		Unrated
15	X1	13-286172	B-89123-70	0.67	453.00	UST-B	5.00		449.15	0.66	0.57	0.854	1.6932	0.1123		Unrated
16	X2	13-280162	B-89123-70	0.68	445.00	UST-B	5.00		441.76	0.68			1.6654	0.1128		Unrated
17	Х3	13-280169	B-89123-70	0.68	448.00	UST-B	5.00		444.99	0.68			1.6775	0.1134		Unrated
18						UST-R	5.00									
19		_				UST-R			_	_	-	_		_		



INSULATION TESTS TWO-WINDING TRANSFORMERS

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						Transforn	ner - Bus	shing C2 Test	ts						
Test		Bus	hing Nameplate			Test	TEST	Capacitance	POW	ER FACTO	R %	DIR	ECT		
No.	Dsg.	SERIAL#	CAT.#	PF	Cap. (pF)	Mode	kV	C (pF)	Measured	@ 20°C	Corr Factor	mA	Watts	%VDF	IR
20	H1	13-151063		0.30	3,492.00	GST-GND	2.00	3,474.00	0.27	0.27	1.000	13.0964	0.3509		Unrated
21	H2	13-151345	POC550G0800S	0.31	3,296.00	GST-GND	2.00	3,278.33	0.29	0.29	1.000	12.3587	0.3561		Unrated
22	НЗ	13-151419	POC550G0800S	0.31	3,392.00	GST-GND	2.00	3,374.10	0.29	0.29	1.000	12.7198	0.3733		Unrated
23	X0					GST-GND	2.00				0.854				
24	X1					GST-GND	2.00				0.854				
25	X2					GST-GND	2.00				0.854				
26	Х3					GST-GND	2.00				0.854				
27						GST-GND	2.00								

EXCITING CURRENT TESTS

C	ONNEC	TIONS:	PH/	ASE A: -			US	ST-R	PH/	ASE B: -			Ĺ	IST-R	PH	ASE C:	-		l	JST-R	
	DETC	LTC	TEST	L(H) /		A	EQUIV.	. 10 kV	TEST	L(H) /		A	EQU	V. 10 kV	TEST	L(H) /		A	EQU	IV. 10 kV	IR
	DETC	LIC	kV	C (pF)		mA		Watts	kV	C (pF)		mA		Watts	kV	C (pF)		mA		Watts	uto/Ma
47	0	1	10.00		┙	7.7841		48.60	10.00		L	7.9189		49.62	10.00		L	3.3754		22.04	Unrated
48	0	6	10.00		┙	54.4847		59.06	10.00		L	53.3872		63.59	10.00		L	53.6155		29.75	Unrated
49	0	12	9.99		L	54.5382		63.24	10.00		L	53.4571		69.12	10.00		L	53.7075		32.85	Unrated
50	0	17	10.00		L	7.8040		48.60	10.00		L	7.9086		49.61	10.00		L	3.3704		22.03	Unrated
51	0	22	10.00		L	54.4843		59.19	9.99		L	53.3645		63.45	10.00		L	53.6064		29.87	Unrated
52	0	27	10.00		L	7.8073		48.61	10.01		L	7.9040		49.61	10.00		L	3.3679		22.02	Unrated
53	0	32	10.00		Ĺ	54.5686		62.40	10.00		L	53.4456		66.49	10.00		L	53.7077		33.45	Unrated

COMMENTS:	$\overline{}$						
DEFICIENCIES:	i —		,				
		·	·			·	
EQUIPMENT USED:	#	Manufacturer	Model	Serial / ID Number	Type	Calibration Date	Calibration Due
	1	DOBLE	M4100	121732514	INSULATION A	4/2/2018	4/2/2023



115KV Station (Main St. W.) - Transformer Maintenance

Recommendations for Corrective Actions

• While performing our transformer testing the crews have reported a hairline crack in the Secondary White Phase bushing. It tested well and was not considered a concern however this should be monitored and replaced when possible. After further discussion and review it has been recommended that applying Glyptal paint to the crack may be a possible secondary solution to replacing the bushing.

