ISSUE NO. 1 DATE: May 11, 2021

SUBSTATION: ORANGE BAY 69/24 kV SUBSTATION (TRANSFORMER T1 OIL PROCESSING)

The equipment summarized below has been subjected to the precommissioning tests detailed in the specifications and has been found to be in acceptable condition to be energized. This also certifies that the equipment is authorized for commercial use following satisfactory completion of on-load tests.

ATTACHED: Test Reports

EQUIDMENT O INCRECTION/DECT (DEMC	INSPECTION/TEST STATUS			
EQUIPMENT & INSPECTION/TEST ITEMS	COMPLETE	INCOMPLETE		
25 MVA 69-24 kV DISTRIBUTION TRANSFORMER T1				
EXTERNAL VISUAL INSPECTION	~			
VALVE POSITIONS (RADIATOR, CONSERVATOR, ETC)	→			
CONSERVATOR & AIR BREATHERS	~			
CONSERVATOR & AIR BREATHERS	•			
BUSHINGS & SURGE ARRESTERS	✓			
BUCHHOLZ RELAY & PRESSURE RELIEF DEVICE	•			
OIL TEMPERATURE GAUGES	~			
WINDING TEMPERATURE GAUGES	~			
COOLING FANS	~			
OIL LEVEL INDICATORS (TRANSF & CONSERVATOR)	~			
GROUNDING	~			
OIL DIELECTRIC TESTS	~			
INSULATION RESISTANCE/PI TESTS	~			
TURNS RATIO TEST	~			
WINDING RESISTANCE TEST	~			
TAP CHANGER OPERATION	~			
TAP CHANGER RELAY	~			
INSULATION CAPACITANCE/P.F. TESTS	~			

PREPARED BY:	ISSUED FOR TEST:	TEST STATUS CERT:	AUTHOR TO ENERGIZE &
\mathcal{L}	Ω .	1 Days	FOR COMMERCIAL USE:
		Heforen	1
DATE: May-11-2021	DATE: May-11-2021	DATE: May-11-2021	DATE: May-14-2021

SUBSTATION WEST





INSULATION RESISTANCE

Substation/Location:	ORANGE BAY
Date:	2-May-21
Transformer S.N.:	88.2.4020
MVA Rating	25
Manufacturer:	PAUWEL TRAFO
Voltage Rating HV/LV, kV:	69/24

Ambient Temperature:		Deg. C
Temperature Correction Factor:	20	
Winding Temp, Deg. C	40	
Oil Temp, Deg. C	40	
Humidity:		

Test Equipment	MEGGER
Model	S1-1568

Oil Dielectric Test					
Test 1	56.2				
Test 2	60.1				
Test 3	52.8				
Test 4	59.2				
Test 5	59.3				
Average	57.52				

				R	esistance Read	lings - M Oh	ms	
Item No.	Test	Test Volts	Duration	Measured	Corrected to 20 deg. C	Duration	Measured	PI
1	Megger - Insulation			Ω			Ω	
1.1	HV to LV & ground	5 KV	1 Min	5.47 GΩ		10 Min	8.28 GΩ	1.51
1.2	LV to HV and Ground	5 KV	1 Min	3.56 GΩ		10 Min	6.44 GΩ	1.81
1.3	HV To LV	5 KV	1 Min	4.11 GΩ		10 Min	7.78 GΩ	1.89
1.4								
2	Core Insulation Res.	500V	2 Min					
2.1	Core ground strap - tank ground			3.18 GΩ				

Tested by	V. Thorpe & Crew	Date:	2-May-21	43A
Checked by	E. Vassell	Date:	11-May-21	May-14-2021
Approved: #	Gomes	Date:	May-11-2021	

Orange Bay 2021

Session Test Date

5/2/2021 1:33:51 PM



Company	JPS	Serial Number	88.2.4020
Location	Orange Bay s/s	Special ID	T1
Division	SUBSTATIONS WEST	Circuit Designation	
Manufacturer	Pauwels Trafo	Configuration	Δ-Υ
Year Manufactured	1988	Tank Type	Sealed Conservation
Mfr Location	Belgium	Coolant	Oil
Phases	Three	Class	OA
Oil Volume	15.8 TN	BIL	350 kV
Weight	63.5 TN		
kV	69, 24	VA Rating	25 MVA

Administration

Test Date	5/2/2021	Test Time:	1:33 PM	Weather	Cloudy
Air Temperature	13°C	Apparatus Temp	40°C	Humidity	8%
Tester	V. Thorpe & Crew	Work Order		Date Last Tested	
Verified by	E. Vassell	Test Set Type		Date Retested	
	6-May-21	Set Top Serial #		Reason	
Approved by	Afforen	Set Bottom Serial #		Travel Time	
Approved Date		Ins. Book #		Duration	
Authorized by	1	Authorized Date	May-14-2021	Crew Size	3

Overall Tests

	Insulation	Test kV	mA	Watts	% PF Corr.	Corr Fctr	Cap (pF)	FRANK™	Manual
1	CH+CHL	10	40.788	1.017	0.222	0.889	13114.6		
2	СН	10.001	11.242	0.451	0.357	0.889	3614.785	Good	
3	CHL(UST)	10.001	29.532	0.559	0.168	0.889	9495.49	Good	
4	CHL	0	29.546	0.566	0.17	0.889	9499.815		
5	CL+CHL	10	63.281	1.778	0.25	0.889	20346.35		
6	CL	10	33.74	1.219	0.321	0.889	10848.05	Good	
7	CHL(UST)	10	29.531	0.551	0.166	0.889	9494.8		
8	CHL	0	29.541	0.559	0.168	0.889	9498.299	Good	

otes:			

TRANSFORMER WINDING RESISTANCE TEST





OWNER		DATE	5/2/2021	PAGE _	1					
		AMBIENT TEMP.	°C	JOB#						
SUBSTATION	Orange Bay	HUMIDITY	%	ASSET ID	T1					
EQUIPMENT	<u>T1</u>	TEST STATUS								
EQUIPMENT LOCATION Hanover										

MFR	Pauwels Trafo	
SER NO	88,2,4020	
YEAR	1988	
TYPE	SEALED-CONSER	IN
CLASS	OA	
PHASES	3	

WEIGHT	63.5	tn
WEATHER	Cloudy	
BIL	350	kV
IMPEDANCE	11.65	%
REASON	Acceptance	
Max V	Vda Diff (%):	5

OIL VOLUME	15.8	TN
OIL TEMP	40	°C
WINDING TEMP	39	°C
CORRECT TO	85	°C
COOLANT	OIL	

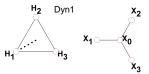


Diagram # 5 (ANSI)

	VOLTAGE (kV)		MVA	RATED I	RECOMMENDED TEST I	# TAPS	NOMINAL	CHANGER	TAP SETTING	WINDING MATERIAL
PRIMARY:	69		25	209.18	10.0A	17	9	LTC		Cu
SECOND:	24	13.856406	25	601.41	10.0A	1				Cu

	HIGH VOLTAGE WINDING RESISTANCE							Show	w Graph	V				
			Measured Resistance					Disable Recording of Make/Break Transition Units: m©						
#	TAP	Current (amp)	Nameplate Voltage	H ₁ - H ₃	H ₂ - H ₁	H ₃ - H ₂	Reading Stability %	Winding Difference %		Make/	Break			
1	1	0.1077	75,900	470.3	465.4	471.1	99.8810	1.212	20 ms	Pass	Pass	Pass		
2	2		75,037											
3	3		74,175											
4	4		73,312											
5	5		72,450											
6	6		71,587											
7	7		70,725											
8	8		69,862											
9	Nominal	0.1077	69,000	366.7	364.8	367.6	99.8622	0.761	20 ms	Pass	Pass	Pass		
10	10		68,137											
11	11		67,275											
12	12		66,412											
13	13		65,550											
14	14		64,687											

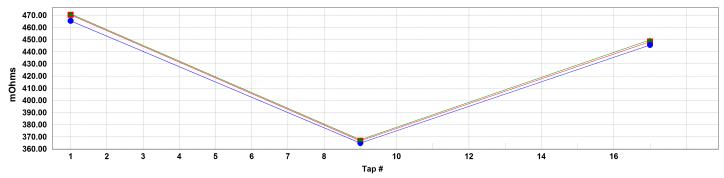


TRANSFORMER WINDING RESISTANCE TEST



PAGE 2

HIGH VOLTAGE WINDING RESISTANCE Measured Resistance							Disable Recordi	Shov	w Graph ansition	_	Units:	m©
#	TAP	Current (amp)	Nameplate Voltage	H ₁ - H ₃	H ₂ - H ₁	H ₃ - H ₂	Reading Stability %	Winding Difference %		Make/	Break	
15	15		63,825									
16	16		62,962									
17	17	0.1077	62,100	448.4	445.6	449.8	99.9277	0.941	20 ms	Pass	Pass	Pass



H₁ - H₃ H₂ - H₁ H₃ - H₂

LOW VOLTAGE WINDING RESISTANCE Show Graph 🗸 Units: m© Measured Resistance Nameplate Voltage Reading Stability % Winding Difference % Current $x_3 - x_0$ # TAP $X_1 - X_0$ $X_2 - X_0$ (amp) 18 Nominal 1.0091 24,000 19.69 19.78 19.67 99.9651 0.585



Tap#

COMMENTS: DEFICIENCIES:

Form Number and Date: 56353, REVISED 03-May-17

Firmware Information: 310

May-11-2021

Serial Number: <u>4003_1116</u>

Calibration Date: 11/15/2016

May-11-2021

4-JA

May-14-2021

Ratio Tests - Turns Ratio Test (TTR) Method

Substation:	ORANGE BAY	
Date:	02-May-21	
Transformer S.N.:	88.2.4020	
MVA Rating	25	
Manufacturer:	PAUWELS TRAFO	
Year of Manufacturer:	1988	
Voltage Rating HV/LV:	69/24	kV

Test	Equipment	Result
Ambient Temperature		
Humidity		

Test Method	Equipment	Type/Model
SINGLE	MEGGER	TTR 100-1

Item	Connections		Ratio															
No.			Tap Positions															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Voltage	75,900								69,000								62,100
	Design Ratio																	
1	Star - Delta (Ynd)																	
1.1	Phase A (H ₁ -Ho:X ₁ -X ₂)																	
1.2	Phase B (H ₂ -Ho:X ₂ -X ₃)																	
1.3	Phase C (H ₃ -Ho:X ₃ -X ₁)																	
1.4	Maximum Variation (%)																	
2	Delta - Star (Dyn1)																	
2.1	Phase A (H ₁ -H ₃ :X ₁ -Xo)	5.51								5.01								4.50
2.2	Phase B (H ₂ -H ₁ :X ₂ -Xo)	5.51								5.01								4.50
2.3	Phase C(H ₃ -H ₂ :X ₃ -Xo)	5.51								5.01								4.50
2.4	Maximum Variation (%)	0.16%								0.18%								0.18%
	Max allowed = 0.5%																	

Notes
1. Perform Null & Unity Ratio checks
2. Check winding polarity
3. Do not change connection until the test set is deenergised

Tested By	V. THORPE and Crew	Date:	2-May-21

May-11-2021 Date:

May-11-2021 Date:

May-14-2021

Signature Certificate





Author: Earl Vassell Creation Date: 11 May 2021, 13:08:23, EST Completion Date: 14 May 2021, 13:47:30, EST

Document Details:

STATEMENT STATEM

Name: OBay - Results_After Processing

Type:

Document Ref: 6b290480fe9823705364d83262d3605ae3482a022cc8a9a5211

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Document Total 6

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Document Signed By:

Name: Hugh Garvey

 Email:
 hGarvey@jpsco.com

 IP:
 208.131.181.146

 Location:
 KINGSTON, 02 (JM)

Date: 11 May 2021, 13:48:21, EST
Consent: eSignature Consent Accepted

Security Level: Email

Name: Earl Vassell

 Email:
 eVassell@jpsco.com

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 208.131.181.146

 Location:
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Date: 11 May 2021, 13:23:05, EST
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Name: Lenbern Hopkins

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Document History:

Folder Created Earl Vassell created this folder on 11 May 2021, 13:08:23, EST
Invitation Sent Invitation sent to Earl Vassell on 11 May 2021, 13:22:50, EST
Invitation Accepted Invitation accepted by Earl Vassell on 11 May 2021, 13:22:50, EST
Signed By Earl Vassell Earl Vassell signed this folder on 11 May 2021, 13:23:05, EST

Invitation Sent
Invitation Sent
Invitation Accepted
Invitation accepted by Hugh Garvey on 11 May 2021, 13:23:05, EST
Invitation Accepted
Invitation accepted by Hugh Garvey on 11 May 2021, 13:42:53, EST
Invitation Sent
Invitation Sent
Invitation Sent
Invitation Accepted
Invitation accepted by Lenbern Hopkins on 14 May 2021, 13:43:48, EST
Signed By Lenbern Hopkins
Lenbern Hopkins signed this folder on 14 May 2021, 13:47:29, EST
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