Oil Analysis Report [OLXX03]

Demo Company - All Modules

Site 1

Tag Number: PT4545

Wednesday, November 4, 2020

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TxMonitor, Unit 2/15 Hector Street (West), Osborne Park, WA 6017

Oil Analysis Report

Report No.: OLXX03	Date: 04/Nov/2020	Client: Demo Company - All Modules

Customer Details

Customer: Demo Company - All Modules **Contact:** Demo Admin **Email:** tobias.bloem@machinemonitor.com

Asset Description

Asset Tag:	PT4545	**Serial No.:**	123456
Site:	Site 1	**Area:**	Substation 1
Power Rating:	17.50 MVA	**Voltage:**	132kV/11kV
Oil Volume:	1000L	**Insulation Fluid:**	Mineral Oil
Manufacturer:	Wilson	**Asset Class:**	Power Transformer

Sampling Point:	Bottom Valve	**Cooling:**	ODWF	**YOM:**	1977

TxAnalyser Assessment (This section is not part of the scope of NATA accreditation)

IEEE DGA Interpretation Guidelines (C57.104)

	Guideline	Result
Hydrogen (PPM)	< 200	704
Methane (PPM)	< 200	500
Ethane (PPM)	< 250	500
Ethylene (PPM)	< 175	500
Acetylene (PPM)	< 4	25
Carbon Monoxide (PPM)	< 1100	99
Carbon Dioxide (PPM)	< 14000	990
Total Gas Volume (%)		2.315

IEEE Oil Quality Interpretation Guidelines (C57.106)

	Guideline	Result	Statement of Conformity For a transformer of this age and voltage class.
Acidity (mgKOH/g)	< 0.15	0.02	Complies
Colour	< 3.5	<0.5	Complies
Water (PPM)	< 25	7	Complies
Interfacial Tension (mN/m)	> 30	36	Complies
Breakdown Voltage (Avg.kV)	> 47	64	Complies
Power Factor @ 25°C* (%)	< 0.5	0.0	Complies
Power Factor @ 100°C* (%)	< 5	1.4	Complies
PCB* (PPM)	< 2	<1	Complies
Specific Gravity* (g/ml)	< 0.92	0.89	Complies

Comments

This sample is classified as DGA Status 3. Hydrogen, Methane, Ethane, Ethylene and Acetylene gas levels are exceedingly elevated.
Exercise extreme caution. Plan outage.

Based on the 2FAL levels found in the sample, the estimated life remaining in the paper is 66%

Diagnosis based on Gas Ratios:

CO2/CO ratio: Normal operation.

Assessment: **Urgent**

Next Sampling Date: 01/Feb/2021

Additional interpretation of results are available on TxAnalyser Client Login

Assessment Code Legend
Acceptable: Asset is in a healthy/normal condition. The available data does not indicate an active fault mechanism.
Caution: Alert condition. There is an indication of an active fault mechanism in its early stages of development.
Urgent: Alarm condition. An active fault mechanism is highly likely and prompt attention to this asset is required.

Statements of conformity (e.g., Complies/Fails) to standard guidelines are made in this report without taking measurement uncertainty into account except when requested by the customer.
Where statements of conformity are made in this report, the following decision rules are applied:
Complies – Results are within standard guidelines
Fails – Results are outside the standard guidelines

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Analysis Results (cont. on Page 4)

Sample Identification: Latest sample taken by TxMonitor/Machinemonitor

		Sample Date	01/Nov/2020	24/Feb/2015	23/Jan/2011
		Analysis Date	04/Nov/2020	28/Feb/2015	27/Jan/2011
		Report Date	04/Nov/2020	04/Mar/2015	03/Feb/2011
		Temp °C *	35	25	31
		Laboratory	TxMonitor	TxMonitor	TxMonitor
		Sample ID	TX0003	TX002	TX0001
Dissolved Gas Analysis:	± denotes MU				
Method C - ppm at an STP of 0°C and 760 torr					
ASTM-D3612	**Hydrogen (H_2)**	**PPM (±14)**	704	450	350
ASTM-D3612	**Methane (CH_4)**	**PPM (±13)**	500	250	174
ASTM-D3612	**Ethylene (C_2H_4)**	**PPM (±15)**	500	50	34
ASTM-D3612	**Ethane (C_2H_6)**	**PPM (±16)**	500	65	40
ASTM-D3612	**Acetylene (C_2H_2)**	**PPM (±16)**	25	25	5
ASTM-D3612	**Carbon Monoxide (CO)**	**PPM (±272)**	99	501	399
ASTM-D3612	Carbon Dioxide (CO_2)	PPM (±1992)	990	600	2490
ASTM-D3612	Oxygen (O_2)	PPM (±294)	600	200	150
ASTM-D3612	Nitrogen (N_2)	PPM (±1105)	12,850	548	25
	TDCG	**PPM**	2,328	1,340	1,003
Oil Quality Tests:	± denotes MU				
ASTM-D974	Acidity	mgKOH/g (±0.01)	0.02	0.01	0.01
ASTM-D1500	Colour	-	<0.5	<0.5	<0.5
ASTM-D1533	Water Content	PPM (±6)	7	5	6
ASTM-D971	Interfacial Tension	mN/m (±6)	36	36	35
AS1767-2.1	Breakdown Voltage	Avg.kV (±13)	64	65	62
ASTM-D1524	Visual Examination	-	Clear & Bright	Clear & Bright	Clear & Bright
ASTM-D924	Power Factor @ 25°C*	% (±0.01)	0.02	0.01	0.02
ASTM-D924	Power Factor @ 100°C*	% (±0.30)	1.40	1.20	1.30
	OQIN	-	1500	1500	1500
Furanic Compounds:	± denotes MU				
ASTM-D5837	5-HMF	PPB (±10)	2	4	6
ASTM-D5837	2-FAL	PPB (±13)	634	360	482
ASTM-D5837	2-FOL	PPB (±7)	<5	<5	<5
ASTM-D5837	2-ACF	PPB (±4)	<8	<8	<8
ASTM-D5837	5-M2F	PPB (±5)	<3	<3	6
	Calculated D.P.	-	496	566	530
	Calculated Remaining Life	%	66	75	70

Signatory:

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Analysis Results (cont.)

Sample Identification: Latest sample taken by TxMonitor/Machinemonitor

		Sample Date	01/Nov/2020	24/Feb/2015	23/Jan/2011	
		Analysis Date	04/Nov/2020	28/Feb/2015	27/Jan/2011	
		Report Date	04/Nov/2020	04/Mar/2015	03/Feb/2011	
		Temp °C *	35	25	31	
		Laboratory	TxMonitor	TxMonitor	TxMonitor	
		Sample ID	TX0003	TX002	TX0001	
Special Tests:	± denotes MU					
ASTM-D4243	Paper D.P.*^	-	350	900	875	
EPA-8082	PCB*	PPM (±1)	<1	<1	<1	
ASTM-D1298	Specific Gravity*	g/ml	0.89	0.89	0.89	
ASTM-D1169	Resistivity @ 25°C*	Ω-cm (±6.5)	16.00	12.00	15.00	
ASTM-D1169	Resistivity @ 100°C*	Ω-cm (±7.5)	20.00	18.00	15.00	
ASTM-D2668	DBPC*^	%w/w (±0.05)	0.05	0.15	<0.05	
ASTM-D2668	TIC*^	%w/w (±0.05)	0.05	0.15	<0.05	
IEC-60296	IC Classification*^	-	Trace inhibited oil	Inhibited oil	Trace inhibited oil	
ASTM-D5185	Silicone Content*^	PPM				
Particle Count:						
ISO 4406	Particles*^	>4µm	600	1200	1500	
ISO 4406	Particles*^	>6µm	52	100	132	
ISO 4406	Particles*^	>21µm	20	56	85	
ISO 4406	Particles*^	>38µm	2	5	12	
ISO 4406	Particles*^	>70µm	1	2	<1	
	ISO Code*^	-	15/12/8	16/13/10	20/15/12	
	Cleanliness Code*^	-	Good	Good	Poor	

(*) Tests marked with this asterisk are not part of the scope of NATA accreditation.

(^) Tests marked with this symbol are performed by a NATA accredited third-party.

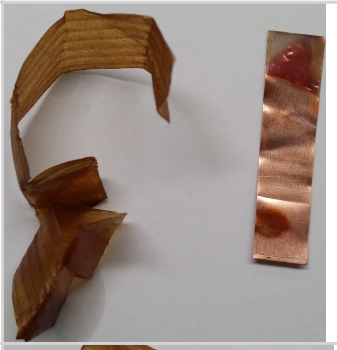
N/A Not Applicable

Signatory:

Corrosive Sulphur per ASTM D1275B* (This section is not part of the scope of NATA accreditation)

Details	Class	Description	Photo
Sample ID: TX0003 Date: 1/11/2020	Non Corrosive	1a - Slight Tarnish Light Orange, almost the same as freshly polished strip	
Sample ID: TX002 Date: 24/02/2015	Corrosive	4c - Corrosion Glossy or Jet Black	
Sample ID: TX0001 Date: 23/01/2011	Non Corrosive	1a - Slight Tarnish Light Orange, almost the same as freshly polished strip	

Corrosive Sulphur per IEC 62535* (This section is not part of the scope of NATA accreditation)

Details	Class	Paper Description	Copper Description	Photo
Sample ID: TX0003 Date: 1/11/2020	Non Corrosive	No deposits visible	1a - Slight Tarnish Light Orange, almost the same as freshly polished strip	
Sample ID: TX002 Date: 24/02/2015	Non Corrosive	No deposits visible	4a - Corrosion Transparent Black, Dark Gray or Brown with Peacock Green barely showing	
Sample ID: TX0001 Date: 23/01/2011	Potentially Corrosive	No deposits visible	4b - Corrosion Graphite or lusterless Black	

Corrosive Sulphur per DIN 51353* (This section is not part of the scope of NATA accreditation)

Details	Class	Photo
Sample ID: TX0003 Date: 1/11/2020	Absent	
Sample ID: TX002 Date: 24/02/2015	Present	
Sample ID: TX0001 Date: 23/01/2011	Absent	

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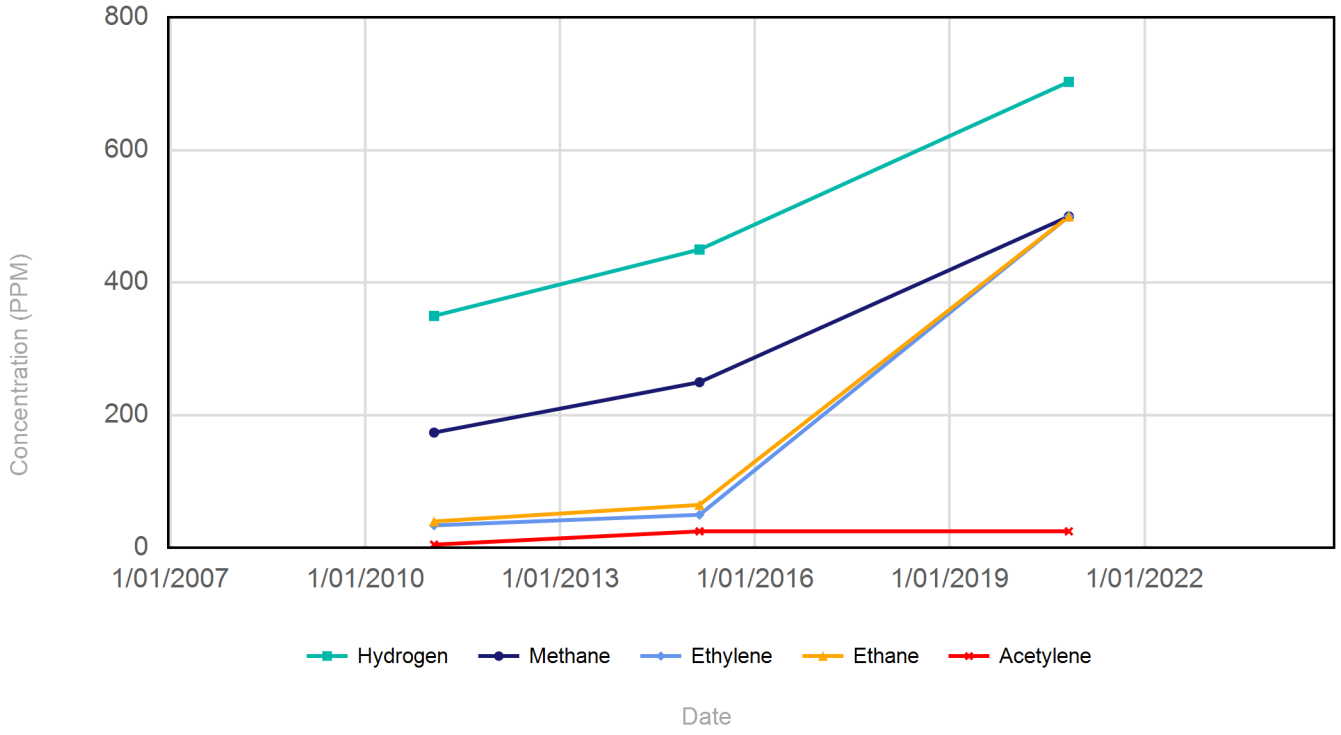
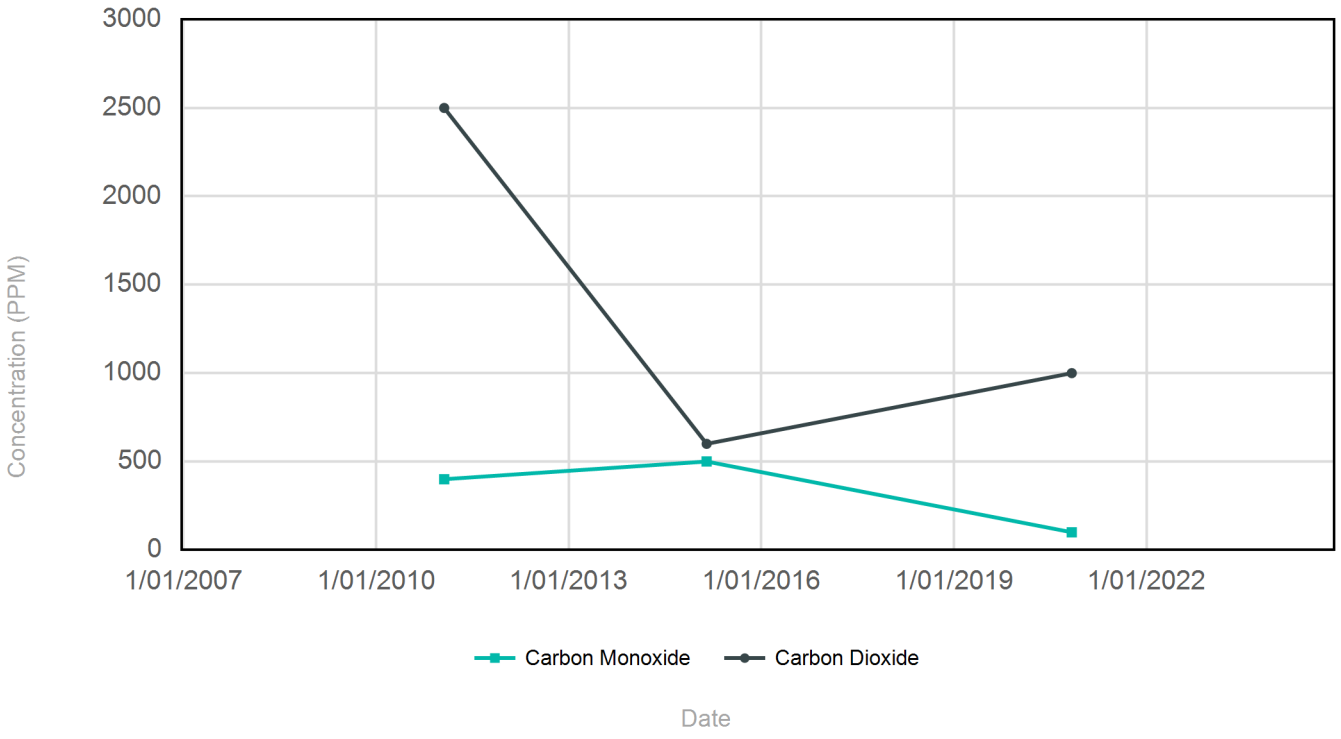
Trend Charts (This section is not part of the scope of NATA accreditation)

Dissolved Gas Analysis



Carbon Oxides



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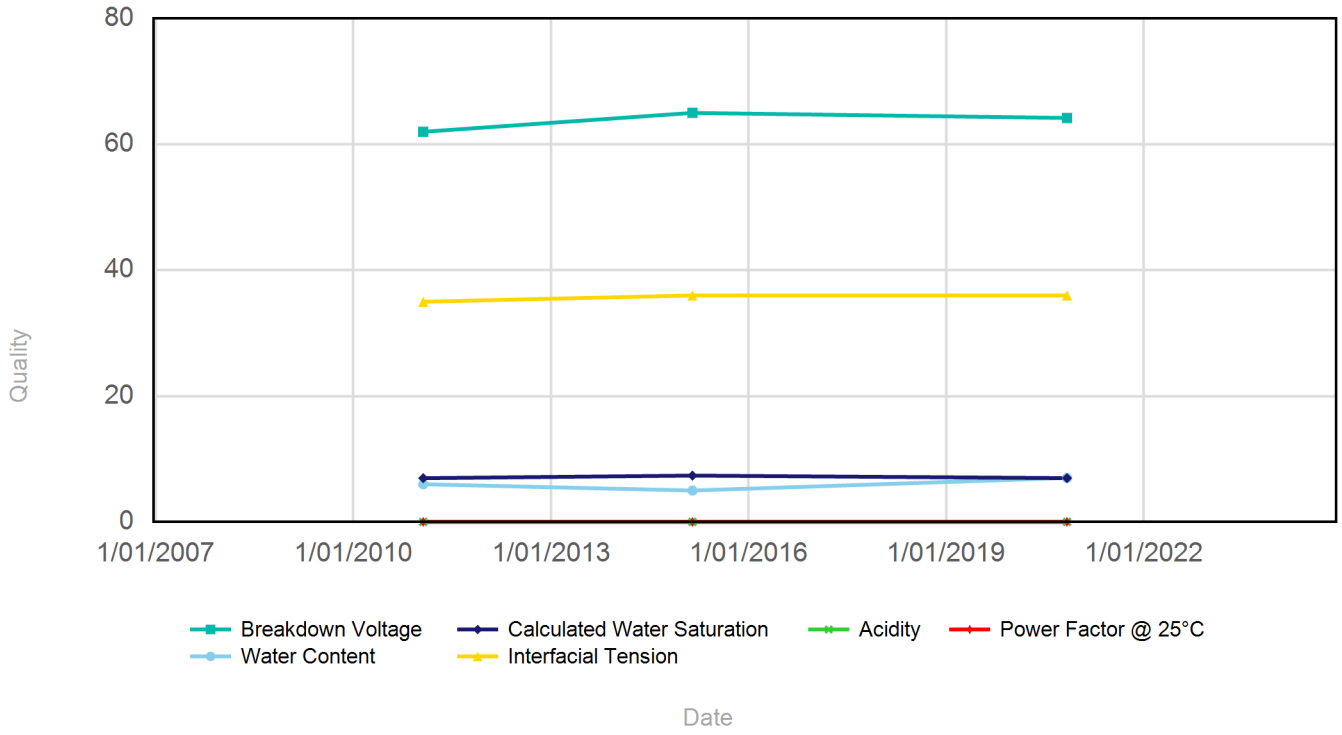
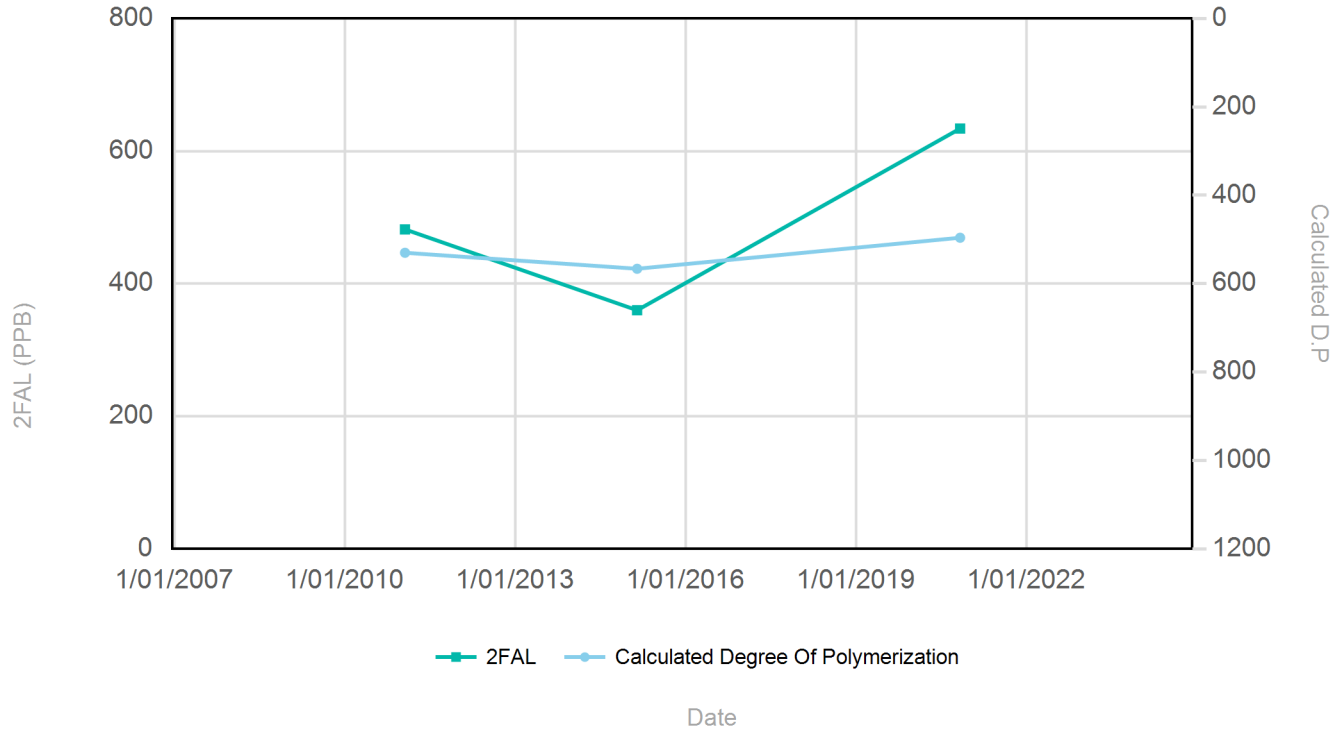
Oil Quality



Furanic Compounds



External Subcontractors (This section is not part of the scope of NATA accreditation)

Test	External Provider	Accreditation	Address
Particle Count	SGS Australia	NATA: 15506	28 Reid Rd., Perth Airport, WA 6105
Specific Gravity	Powerlink Queensland	NATA: 13401	33 Harold Street Virginia, QLD 4014
Degree of Polymerization	Ventia	IANZ: 4253	Gridco Rd., Gate 2, Otara, Otahuhu 1640, NZ
Inhibitor Content - DBPC (ASTM D2668)	SGS Australia	NATA: 15506	28 Reid Rd., Perth Airport, WA 6105

End of Report