

CHATEAUGAY  
POWER STATION  
INSULATING OIL ANALYSIS

For

**ReENERGY BIOMASS, LLC**  
*Chateaugay, NY*

2015



April 22, 2015

Mr. Mark Aanderud  
ReEnergy Biomass, LLC  
P.O. Box 24  
7019 State Route 374  
Chateaugay, NY 12920

**Re: Chateaugay Power Station – Insulating Oil Analysis: Main GSU & Station Service  
HMT Job Number: 2370-15026**

Dear Mark:

Enclosed for your records please find the reports documenting the insulating oil analysis performed for the Main GSU and Station Service transformers at your Chateaugay, NY facility. Historical data and trend graphs have been included in this report.

Insulating oil analysis results for both transformers were within normal limits.

Thank you for this opportunity to be of service.

Sincerely,

HMT, Inc.

A handwritten signature in black ink, appearing to read 'Paul W. Kolodzie', is written over a light blue horizontal line.

Paul W. Kolodzie  
Electrical Project Engineer

PWK/bwolff

**www.hmt-electric.com • Headquarters: 6268 Route 31, Cicero, New York 13039**

**Regional Offices: Buffalo • Rochester • White Plains**

**Ph: 315.699.5563 • Fx: 315.699.5911 • 24 Hour Emergency Service: 1.800.926.7795**

HMT Inc	Serial#: M162426A	Mfr: GENERAL ELECTRIC	Control#: 6746311
	Location: CHATEAUGAY POWER	kV: 34.5	Order#: 464189
	Equipment: TRANSFORMER	kVA: 21000	Account: 3122
CICERO, NY 13039 US	Compartment: MAIN(BOTTOM)	Year Mf'd:	Received: 02/02/2015
ATTN: RON PENNOCK	Breathing: SEAL	Syringe ID: 09267	Reported: 02/06/2015
PO#: 2370-15026-01	Bank: Phase: 3	Bottle ID:	
Project ID: REENERGY CHATEAUGAY	Fluid: MIN USGal: 1860	Sampled By: JS	
Customer ID: MAIN GSU			

Lab Control Number:		6746311	6297179	6255778
Date Sampled:		01/23/2015	06/02/2011	02/10/2011
Order Number:		464189	364814	356182
Oil Temp:		29	18	60
Dissolved Gas Analysis (DGA) ASTM D-3612 <sup>1</sup>	Hydrogen (H2) (ppm):	12	14	15
	Methane (CH4) (ppm):	17	20	27
	Ethane (C2H6) (ppm):	17	19	26
	Ethylene (C2H4) (ppm):	6	9	12
	Acetylene (C2H2) (ppm):	<1	<1	<1
	Carbon Monoxide (CO) (ppm):	87	169	236
	Carbon Dioxide (CO2) (ppm):	8095	7447	11109
	Nitrogen (N2) (ppm):	76251	60712	76438
	Oxygen (O2) (ppm):	3756	1249	<500
	Total Dissolved Gas (TDG) (ppm):	88241	69639	88361
	Total Dissolved Combustible Gas (TDCG) (ppm):	139	231	316
	Equivalent TCG (%):	0.1124	0.2458	0.2637

DGA Diagnostics	DGA Keys Gas / Interpretive Method:	Hydrogen within condition 1 limits (100 ppm).
	PER IEEE C57.104-2008	Methane within condition 1 limits (120 ppm).
	(most recent sample)	Ethane within condition 1 limits (65 ppm).
		Ethylene within condition 1 limits (50 ppm).
		Acetylene within condition 1 limits (1 ppm).
		Carbon Monoxide within condition 1 limits (350 ppm).
		Carbon Dioxide: Condition 3 Significant Indications of overheated cellulose insulation (4000 ppm).
		TDCG within condition 1 limits (720 ppm).
	DGA TDCG Rate Interpretive Method:	Retest Annually.
	PER IEEE C57.104-2008	1-Continue normal operation.
	(two most recent sample)	
	DGA Cellulose (Paper) Insulation:	CO2/CO Ratio not applicable - at least one gas doesn't exceed its limit.
	WDS DGA Condition Code:	NORMAL
	WDS Recommended Action:	Continue normal operation. Resample for testing within one year.

Comment:				
General Oil Quality (GOQ)				
D-1533 <sup>1</sup>	Moisture in Oil	(ppm):	6	12
D-971 <sup>1</sup>	Interfacial Tension	(dynes/cm):	38.92	39.4
D-974 <sup>1</sup>	Acid Number	(mg KOH/g):	0.022	0.013
D-1500 <sup>1</sup>	Color Number	(Relative):	L1.0	0.5
D-1524 <sup>1</sup>	Visual Exam.	(Relative):	CLR&SPRK	CLR&SPRK
D-1524 <sup>1</sup>	Sediment Exam.	(Relative):	ND	TRACE
D-877 <sup>1</sup>	Dielectric Breakdown	(kV):	44	32
D-1298	Specific Gravity	(Relative):	0.8753	0.878
GOQ Diagnostics				
Moisture in Oil:			Acceptable for in-service oil (35 ppm max).	
Interfacial Tension:			Acceptable for in-service oil (25 dynes/cm min).	

Notations: 1. Analysis is ISO/IEC 17025:2005 accredited, L-A-B Accredited Certificate Number L2303.02. 2. This test is conducted by a subcontracted laboratory. 3. Subcontracted laboratory has received ISO Standard 17025 accreditation for this test. 5. This test is conducted by Weidmann Laboratory other than Primary Lab. 6. Weidmann Laboratory has received ISO Standard 17025 accreditation for this test. 7. Imported Sample: WEIDMANN Electrical Technology accepts no responsibility for these results, accreditation status does not apply to these results. 8. Imported Equipment

Accreditation applies to current analysis only. The analyses, opinions or interpretations contained in this report are based upon material and information supplied by the client. WEIDMANN Electrical Technology does not imply that the contents of the sample received by this laboratory are the same as all such material in the environment from which the sample was taken. Our test results relate only to the sample or samples tested. Any interpretations or opinions expressed represent the best judgment of WEIDMANN Electrical Technology. WEIDMANN Electrical Technology assumes no responsibility and makes no warranty or representation, expressed or implied as to the condition, productivity or proper operation of any equipment or other property for which this report may be used or relied upon for any reason whatsoever. This test report shall not be reproduced except in full, without written approval of the laboratory.

HMT Inc	<b>Serial#:</b> M162426A	<b>Mfr:</b> GENERAL ELECTRIC	<b>Control#:</b> 6746311
	<b>Location:</b> CHATEAUGAY POWER	<b>kV:</b> 34.5	<b>Order#:</b> 464189
	<b>Equipment:</b> TRANSFORMER	<b>kVA:</b> 21000	<b>Account:</b> 3122
CICERO, NY 13039 US	<b>Compartment:</b> MAIN(BOTTOM)	<b>Year Mf'd:</b>	<b>Received:</b> 02/02/2015
ATTN: RON PENNOCK	<b>Breathing:</b> SEAL	<b>Syringe ID:</b> 09267	<b>Reported:</b> 02/06/2015
PO#: 2370-15026-01	<b>Bank:</b> Phase: 3	<b>Bottle ID:</b>	
<b>Project ID:</b> REENERGY CHATEAUGAY	<b>Fluid:</b> MIN <b>USGal:</b> 1860	<b>Sampled By:</b> JS	
<b>Customer ID:</b> MAIN GSU			

	<b>Lab Control Number:</b>	6746311	6297179	6255778
	<b>Date Sampled:</b>	01/23/2015	06/02/2011	02/10/2011
	<b>Order Number:</b>	464189	364814	356182
	<b>Oil Temp:</b>	29	18	60
(most recent sample)	<b>Acid Number:</b>	Acceptable for in-service oil (0.2 mg KOH/g max).		
	<b>Color Number and Visual:</b>	Diagnostic not applicable. Diagnostic not applicable.		
	<b>Dielectric Breakdown D-877:</b>	Diagnostic not applicable.		
<b>Comment:</b>				

## End of Test Report

Authorized By:   
KENNETH COCCIA  
LABORATORY SUPERVISOR

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**High Voltage Maintenance & Technical Services**

Customer: ReEnergy  
Location: Chateaugay, NY  
Equipment Location: Main Sub  
Weather:

Job No.: 2370-15026  
Technician: JS  
Date: 1/23/2015  
Humidity:

Equipment ID: MAIN GSU  
Mfr: GENERAL ELECTRIC  
S/N: M162426A  
Fluid Type: MINERAL OIL

kV: 34.5  
kVA: 21000

**INSULATING FLUID DISSOLVED GAS ANALYSIS**

SAMPLE DATE	<u>9/24/2003</u>	<u>10/15/2004</u>	<u>5/8/2009</u>	<u>2/10/2011</u>	<u>6/2/2011</u>	<u>1/23/2015</u>
Hydrogen (H2)	33	76	17	15	14	12
Methane (CH4)	24	22	18	27	20	17
Ethane (C2H6)	11	9.2	14	26	19	17
Ethylene (C2H4)	2.4	0	1	12	9	6
Acetylene (C2H2)	0	0	0	0	0	0
Carbon Monoxide (CO)	190	116	67	236	169	87
Carbon Dioxide (CO2)	9590	9730	8920	11109	7447	8095
Nitrogen (N2)	129200	92900	90000	76438	60712	76251
Oxygen (O2)	1420	537	306	498	1249	3756
Total (PPM)	140470.4	103390.2	99343	88361	69639	88241
TDCG (PPM)	260	223	117	316	231	139

**INSULATING FLUID QUALITY & MOISTURE**

Moisture (ppm)	7	10	12	6
Interf. Tension (dynes/cm)	40	43.9	39.4	38.92
Acid Number (mg KOH/g)	0.02	0.004	0.013	0.022
Color Number	L0.5	L0.5	L0.5	L1.0
Dielectric BV (kv)	54	43	32	44
Specific Gravity	0.877	0.879	0.878	0.8753
Visual Exam.	CLR&SPRK	H2O	CLR&SPRK	CLR&SPRK

Remarks:



High Voltage Maintenance & Technical Services

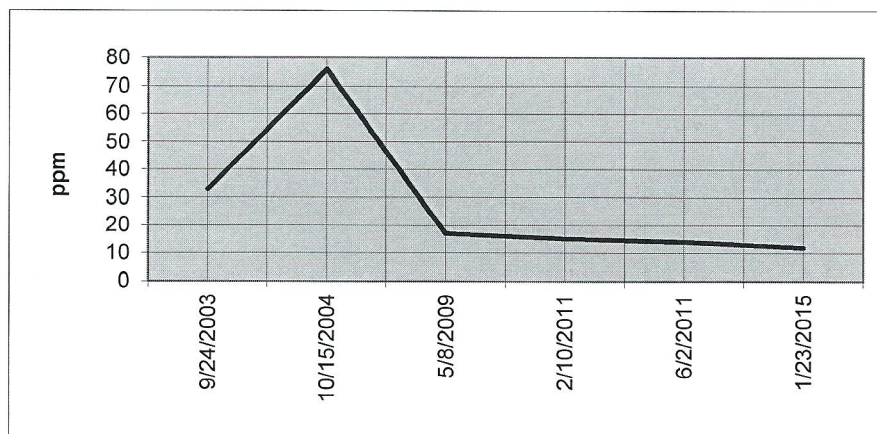
Customer: ReEnergy  
Location: Chateaugay, NY  
Equipment Location:  
Weather:

Job No.: 2370-15026  
Technician: JS  
Date: 1/23/2015  
Humidity:

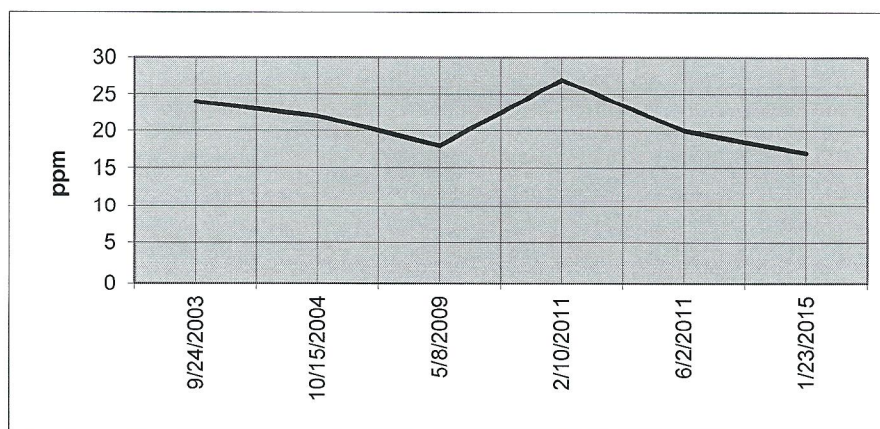
Equipment ID: MAIN GSU  
Mfr: GENERAL ELECTRIC  
S/N: M162426A  
Fluid Type: MINERAL OIL

KV: 34.5  
MVA: 21000

#### HYDROGEN TREND



#### METHANE TREND



Remarks:



High Voltage Maintenance & Technical Services

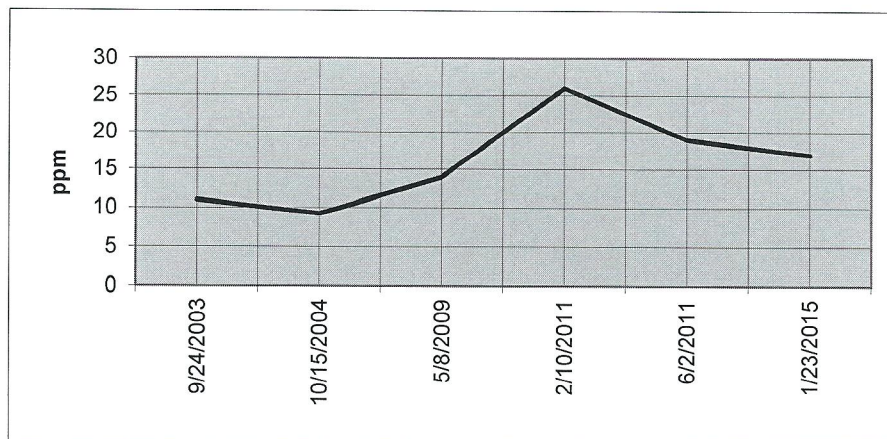
Customer: ReEnergy  
Location: Chateaugay, NY  
Equipment Location:  
Weather:

Job No.: 2370-15026  
Technician: JS  
Date: 1/23/2015  
Humidity:

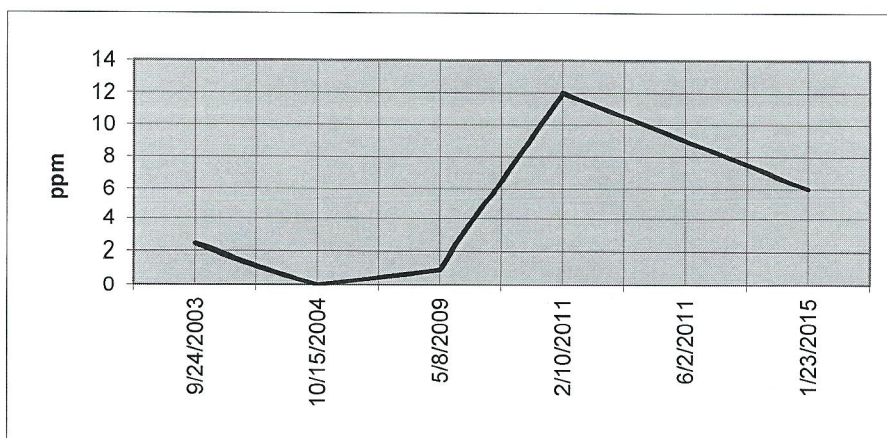
Equipment ID: MAIN GSU  
Mfr: GENERAL ELECTRIC  
S/N: M162426A  
Fluid Type: MINERAL OIL

KV: 34.5  
MVA: 21000

#### ETHANE TREND



#### ETHYLENE TREND



Remarks:





High Voltage Maintenance & Technical Services

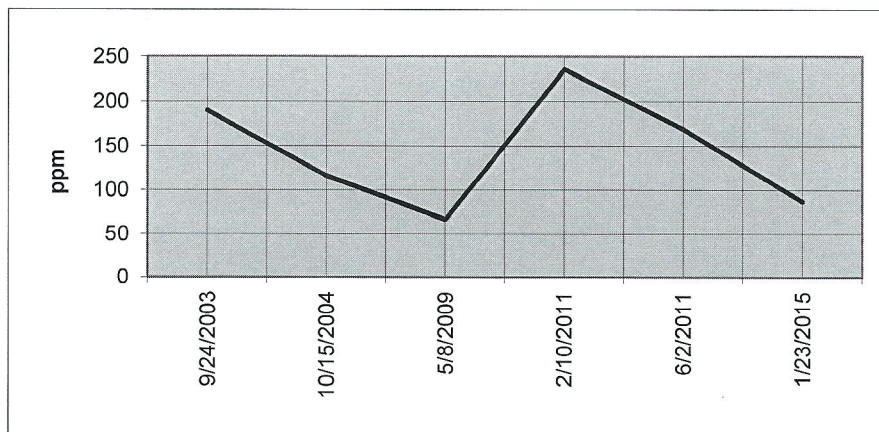
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Location: Chateaugay, NY  
Equipment Location:  
Weather:

Job No.: 2370-15026  
Technician: JS  
Date: 1/23/2015  
Humidity:

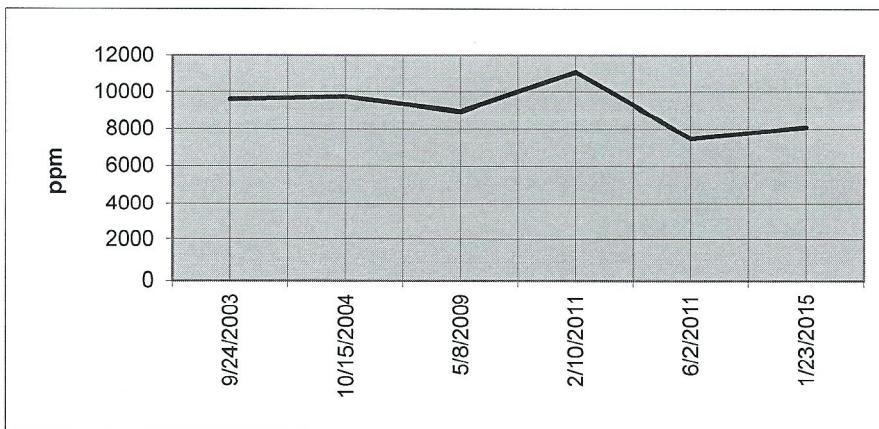
Equipment ID: MAIN GSU  
Mfr: GENERAL ELECTRIC  
S/N: M162426A  
Fluid Type: MINERAL OIL

KV: 34.5  
MVA: 21000

#### CARBON MONOXIDE TREND



#### CARBON DIOXIDE TREND



Remarks:





High Voltage Maintenance & Technical Services

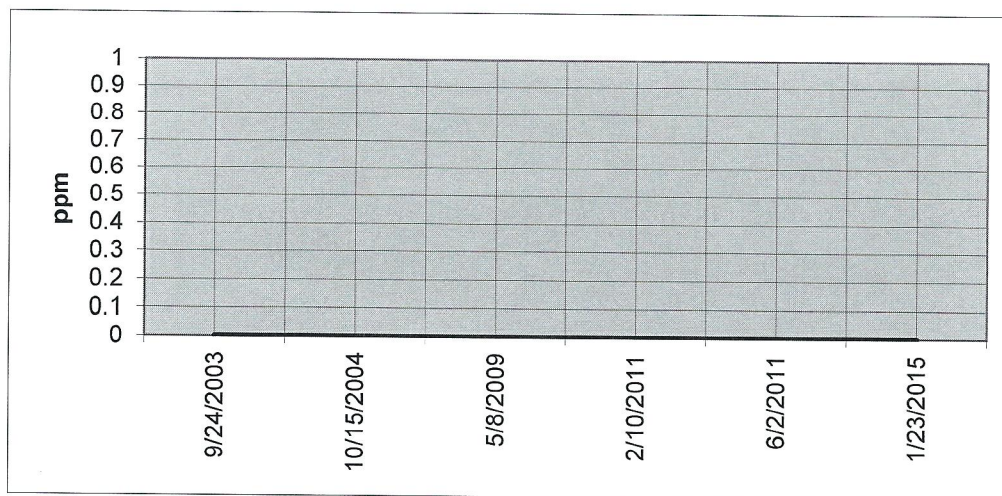
Customer: ReEnergy  
Location: Chateaugay, NY  
Equipment Location:  
Weather:

Job No.: 2370-15026  
Technician: JS  
Date: 1/23/2015  
Humidity:

Equipment ID: MAIN GSU  
Mfr: GENERAL ELECTRIC  
S/N: M162426A  
Fluid Type: MINERAL OIL

KV: 34.5  
MVA: 21000

#### ACETYLENE TREND



Remarks: