



**DTE Gas
Laboratory Services
Gas Analysis Report**

17150 Allen Road
Melvindale, MI 48122
P: (313) 389-7354 F: (313) 389-7757

Date Analyzed:	5/21/2014	Lab Run No.:	GQR_SaultSteMarie_050614
LOCATION:	Sault Ste. Marie	DATE SAMPLED:	5/6/2014
REQUESTOR:	Gas Quality	DATE RECEIVED:	5/19/2014
METER NO.:	00029	GAS TEMP. (F):	100
FORMATION:	-----	GAS PRESSURE (psig):	920
SAMPLE PT.:	Meter Run	SAMPLED BY:	S.J.

ANALYTICAL RESULTS

GAS ANALYSIS

	MOL %
Nitrogen	1.080
Methane	96.207
Carbon Dioxide	0.594
Ethane	1.930
Propane	0.127
I-Butane	0.019
N-Butane	0.022
I-Pentane	0.007
N-Pentane	0.005
Hexanes	0.005
Heptanes	0.001
Octanes	0.003
Nonane	<0.001
TOTAL:	100.000

GROSS HEATING VALUE (BTU/SCF)

	14.65 DRY	14.73 DRY
Calculated (Real)	1010	1016

SPECIFIC GRAVITY

Calculated (Real)	0.5780
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OTHER

Pounds of Water/MMCF:	4.0
Hydrogen Sulfide (ppm)	2.0
Hydrocarbon Dewpoint (°F @ 500 PSIG):	-44.6
Hydrocarbon Liquid (GAL/MMCF) (@ 500 PSIG & 0°F):	0.00

REMARKS:

Gas Sampling Method: GPA 2166 / API 14.1 Section 1
Hydrogen Sulfide Content: ASTM D-4810 (Tested by Sampler)
Water Content: ASTM D-4888 (Tested by Sampler)
Sampler is not a member of the ISO 17025 A2LA Accredited Laboratory
Gas Analysis Method: GPA 2286

ANALYZED BY: L. Cao
AUTHOR : P. Urso

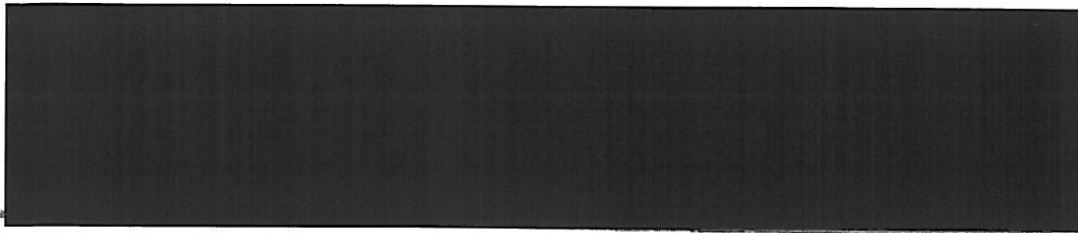
APPROVED BY: *Marina Darling*

Marina Darling, Supervisor, Laboratory Services



Testing Cert. No. 2811.01

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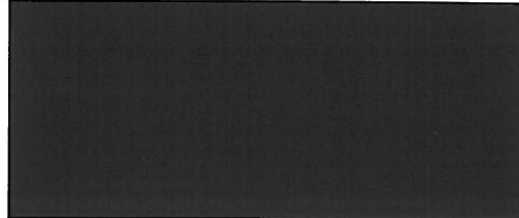


To: Verso Paper Corporation
P O Box 271
Norway, Michigan 49870-0271

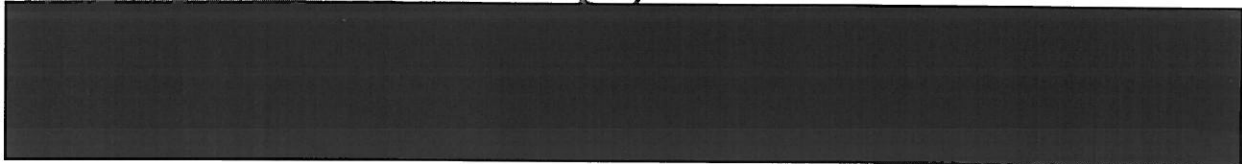
Negotiated Date: 02/27/2013

Buyer Contact

Verso Paper Corporation
Bill Schiltz, C.P.M.
Phone: 906-779-3278 Fax:



(B3)



PRODUCT: East Kentucky Stoker Blend
DELIVERY TERMS: FOB Origin
ORIGIN: CRCC-Escanaba
DESTINATION: Verso Quinnesec Mill
TITLE TRANSFER: CRCC-Escanaba
PERIOD: 10/1/2013 to 4/30/2014
DELIVERY METHOD: TRUCK
QUANTITY: 1,000.00 net ton(s) Approximately
PRICE(S):



QUALITY: Per the following specifications

	TYPICAL
MOISTURE (%)	5 - 6
ASH (%)	8 - 9
VOLATILE (%)	34 - 36
BTU (BTU/LB)	12,500
SULFUR (%)	.95 Max
FUSION (F°)	2700 Fluid reducing
HGI (PTS)	42
SIZING (IN)	2 x 1/4
BOTTOM SIZE (IN)	15% -1/4" x 0 fines

MEASUREMENT REJECTION REJECTION
BASIS MIN MAX



Verso Lab Bark Testing

Variable ID 21697
 Start Date 1/1/2013
 End Date 12/31/2013
 Variable Description Hogged Fuel BTU (dry)
 Units BTU/#

Test Number	Result Time Stamp	Test Value	Test Status
1 of 11	03-Jan-13 06:22	8176.00	Good
2 of 11	27-Feb-13 07:00	7935.00	Good
3 of 11	26-Mar-13 09:00	7971.00	Good
4 of 11	25-Apr-13 09:00	7987.00	Good
5 of 11	29-May-13 08:00	8066.00	Good
6 of 11	26-Jun-13 08:00	7931.00	Good
7 of 11	25-Jul-13 10:00	7973.00	Good
8 of 11	01-Aug-13 11:45	8107.00	Good
9 of 11	01-Sep-13 11:45	8037.00	Good
10 of 11	01-Oct-13 12:36	8001.00	Good
11 of 11	04-Nov-13 12:19	8021.00	Good

Variable ID 21714
 Start Date 1/1/2013
 End Date 12/31/2013
 Variable Description Hogged Fuel BTU (wet)
 Units BTU/#

Test Number	Result Time Stamp	Test Value	Test Status
1 of 11	03-Jan-13 06:22	4718.00	Good
2 of 11	27-Feb-13 07:00	4425.00	Good
3 of 11	26-Mar-13 09:00	4697.00	Good
4 of 11	25-Apr-13 09:00	4471.00	Good
5 of 11	29-May-13 08:00	4698.00	Good
6 of 11	26-Jun-13 08:00	4696.00	Good
7 of 11	25-Jul-13 10:00	5093.00	Good
8 of 11	01-Aug-13 11:45	4779.00	Good
9 of 11	01-Sep-13 11:45	4748.00	Good
10 of 11	01-Oct-13 12:36	4809.00	Good
11 of 11	04-Nov-13 12:19	4756.00	Good

Variable ID 21690
 Start Date 1/1/2013
 End Date 12/31/2013
 Variable Description Hogged Fuel % Moisture
 Units %

Test Number	Result Time Stamp	Test Value	Test Status
1 of 11	03-Jan-13 06:22	42.30	Good
2 of 11	27-Feb-13 07:00	44.24	Good
3 of 11	26-Mar-13 09:00	41.07	Good
4 of 11	25-Apr-13 09:00	44.02	Good
5 of 11	29-May-13 08:00	41.76	Good
6 of 11	26-Jun-13 08:00	40.79	Good
7 of 11	25-Jul-13 10:00	36.12	Good
8 of 11	01-Aug-13 11:45	41.05	Good
9 of 11	01-Sep-13 11:45	40.92	Good
10 of 11	01-Oct-13 12:36	39.90	Good
11 of 11	04-Nov-13 12:19	40.71	Good

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LIQ:10:73
W.O.#B00048

Purchased

Date rec'd

Nov 2/09 Nov 2/09 Jan 19/10 Jan 19/10

Analysis	Unit	Analytical Methods	Mixed Hardwood from Tops Horizontal Drum Chipper Oct 22/09	Mixed Softwood from Tops Horizontal Drum Chipper Oct 23/09	Hog Fuel to Boiler Jan 13 to 15/10	Hog Fuel Self Generated Jan 16/10
Moisture content	% as rec'd basis	ASTM E871	34.5	28.9	43.5	39.9
Higher heating value	BTU/lb, green basis	ASTM D5865/E711	5272	6107	4660	5200
Higher heating value	BTU/lb, dry basis	ASTM D5865/E711	8050	8590	8250	8650
Ultimate Analysis:						
Ash @ 750°C						
Carbon, C	% dry basis	ASTM D3174	2.52	0.58	5.26	4.10
Hydrogen, H	% dry basis	ASTM D5373	53.10	49.10	46.90	47.20
Nitrogen, N	% dry basis	ASTM D5373	8.33	7.74	7.12	6.95
Total sulfur, S	% dry basis	ASTM D5373	0.174	0.305	0.240	0.410
Oxygen, O (by difference)	% dry basis	ESM 266B	35.876	42.275	40.442	41.293
Total			100.00	100.00	100.00	100.00
Proximate Analysis:						
Volatile matter	% dry basis	ASTM E872	81.11	82.75	79.65	67.69
Fixed carbon	% dry basis	by calculation	16.37	16.67	15.09	28.21
Ash @ 750°C	% dry basis	ASTM D3174	2.52	0.58	5.26	4.10
Total			100.00	100.00	100.00	100.00
Ash Composition:						
Sulfur as SO ₃	% weight of ash	ESM 054B	0.755	1.59	0.734	1.13
Chlorides, Cl	% weight of ash	ESM 132D	0.030	0.047	0.079	0.184
**Ash Fusion Temperature:						
(oxidizing atmosphere)						
Initial Deformation	°C	ASTM D1857	1246	1460	1276	1476
Softening (h=W)	°C	ASTM D1857	1271	>1482	1321	>1482
Hemispherical	°C	ASTM D1857	1279	>1482	1332	>1482
Fluid	°C	ASTM D1857	1304	>1482	1349	>1482
**Ash Fusion Temperature:						
(reducing atmosphere)						
Initial Deformation	°C	ASTM D1857	1233	1446	1262	1468
Softening (h=W)	°C	ASTM D1857	1261	>1482	1311	>1482
Hemispherical	°C	ASTM D1857	1268	>1482	1320	>1482
Fluid	°C	ASTM D1857	1296	>1482	1342	>1482

**subcontracted analysis

Verso Lab Fired Black Liquor Routine Testing

Variable ID	3655
Start Date	1/1/2013
End Date	12/31/2013
Variable Description	FBL BTU Dry
Variable Units	BTU/#

Test Number	Result Time Stamp	Test Value	Test Status
1 of 48	07-Jan-13 05:00	5555.00	Good
2 of 48	14-Jan-13 05:00	5417.00	Good
3 of 48	28-Jan-13 05:00	5529.00	Good
4 of 48	04-Feb-13 05:00	5377.00	Good
5 of 48	11-Feb-13 05:00	5253.00	Good
6 of 48	18-Feb-13 05:00	5334.00	Good
7 of 48	25-Feb-13 05:00	5229.00	Good
8 of 48	04-Mar-13 05:00	5319.00	Good
9 of 48	11-Mar-13 05:00	5396.00	Good
10 of 48	25-Mar-13 05:00	5362.00	Good
11 of 48	01-Apr-13 05:00	5283.00	Good
12 of 48	08-Apr-13 05:00	5428.00	Good
13 of 48	15-Apr-13 05:00	5626.00	Good
14 of 48	22-Apr-13 05:00	5281.00	Good
15 of 48	29-Apr-13 05:00	5314.00	Good
16 of 48	06-May-13 05:00	5068.00	Good
17 of 48	13-May-13 05:00	5281.00	Good
18 of 48	20-May-13 05:00	5478.00	Good
19 of 48	03-Jun-13 05:00	5121.00	Good
20 of 48	10-Jun-13 05:00	5379.00	Good
21 of 48	24-Jun-13 05:00	5257.00	Good
22 of 48	01-Jul-13 05:00	5368.00	Good
23 of 48	10-Jul-13 05:00	5302.00	Good
24 of 48	15-Jul-13 05:00	5295.00	Good
25 of 48	22-Jul-13 05:00	5337.00	Good
26 of 48	26-Jul-13 05:00		Good
27 of 48	31-Jul-13 05:00	5305.00	Good
28 of 48	05-Aug-13 05:00	5323.00	Good
29 of 48	12-Aug-13 05:00	5550.00	Good
30 of 48	19-Aug-13 05:00	5502.00	Good
31 of 48	28-Aug-13 05:00	5190.00	Good
32 of 48	04-Sep-13 05:00	5357.00	Good
33 of 48	09-Sep-13 05:00	5368.00	Good
34 of 48	18-Sep-13 05:00	5275.00	Good
35 of 48	23-Sep-13 05:00	5489.00	Good
36 of 48	30-Sep-13 05:00	5404.00	Good
37 of 48	07-Oct-13 05:00	5512.00	Good
38 of 48	16-Oct-13 05:00	5273.00	Good
39 of 48	21-Oct-13 05:00	5318.00	Good
40 of 48	28-Oct-13 05:00	5449.00	Good
41 of 48	04-Nov-13 05:00	5168.00	Good
42 of 48	11-Nov-13 05:00	5269.00	Good
43 of 48	18-Nov-13 05:00	5547.00	Good
44 of 48	27-Nov-13 05:00	5760.00	Good
45 of 48	02-Dec-13 05:00	4998.00	Good
46 of 48	09-Dec-13 05:00	5407.00	Good
47 of 48	16-Dec-13 05:00	5267.00	Good
48 of 48	30-Dec-13 05:00	5373.00	Good

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LIQ:13:188

W.O.#B13157

Page 2

1/18/2013

Analysis	Unit	Weak Black Liquor	As-Fired Black Liquor
Total solids	%, as-rec'd	20.4	71.4
Calorific value (HHV)	BTU/lb, dry solids basis	*5905(5950/5860)	5615(5670/5560)
Carbon, C	%, dry solids basis	34.1	33.3
Hydrogen, H	%, dry solids basis	3.66	3.61
Nitrogen, N	%, dry solids basis	0.12	0.11
Oxygen, O	%, dry solids basis	36.5	36.7
Total sulfur, S	%, dry solids basis	4.14	4.73
Total chloride, Cl	%, dry solids basis	0.29	0.29
Sodium, Na	%, dry solids basis	16.6	17.4
Potassium, K	%, dry solids basis	2.32	2.66
Inorganic sulfated ash (as NaOH)	%, dry solids basis	34.7	38.6
Organic (100-% sulfated ash)	%, dry solids basis	65.3	61.4
Organic/inorganic ratio		1.88	1.59
Metals scan			
Aluminum, Al	mg/kg, dry solids basis	19	18
Arsenic, As	mg/kg, dry solids basis	<10	<10
Barium, Ba	mg/kg, dry solids basis	7	6.2
Boron, B	mg/kg, dry solids basis	48	45
Cadmium, Cd	mg/kg, dry solids basis	<0.5	<0.5
Calcium, Ca	mg/kg, dry solids basis	228	213
Chromium, Cr	mg/kg, dry solids basis	<0.5	1.4
Cobalt, Co	mg/kg, dry solids basis	<1	<1
Copper, Cu	mg/kg, dry solids basis	<2	<2
Iron, Fe	mg/kg, dry solids basis	42.8	48.2
Lead, Pb	mg/kg, dry solids basis	<5	<5
Lithium, Li	mg/kg, dry solids basis	1.4	1.3
Magnesium, Mg	mg/kg, dry solids basis	193	197
Manganese, Mn	mg/kg, dry solids basis	96.7	92.9
Molybdenum, Mo	mg/kg, dry solids basis	2	1.8
Nickel, Ni	mg/kg, dry solids basis	<5	<5
Phosphorus, P	mg/kg, dry solids basis	81	80
Potassium, K	mg/kg, dry solids basis	23200	26600
Silicon, Si	mg/kg, dry solids basis	298	281
Sodium, Na	mg/kg, dry solids basis	166000	174000
Strontium, Sr	mg/kg, dry solids basis	<5	<5
Titanium, Ti	mg/kg, dry solids basis	<0.5	<0.5
Vanadium, V	mg/kg, dry solids basis	<2	<2
Zinc, Zn	mg/kg, dry solids basis	8.2	10.2

*Sample was concentrated to higher solids level prior to analysis.

This foregoing document was electronically filed with the Public Utilities

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in

Case No(s). 14-0432-EL-REN

Summary: Response Attachments to Second Staff Interrogatories electronically filed by Mr. Rex Zhang on behalf of VERSO QUINNESEC LLC and Brooks, Steven Mr.