

BOILER PERFORMANCE SUMMARY		Fuel Analysis		Page 1		
Fiberight Facility - Hampden, Maine - PHS Biomass + Wood		% by Weight		9/21/2015		
Boiler Horsepower	986	} Ash	5.64	6.16	0.4	
Steam Flow lb/hr	27,500		} S	0.06	0.07	0
Steam Pres. psig	405			3.98	3.95	4.3
Steam Temp. F	750		} C	28.54	28.15	32.4
Feedwater Temp. F	220			0.64	0.7	0
Feedwater Rate GPM	57.32		} O2	12.51	10.97	27.9
Steam Enth. btu/lb	1388.7			48.64	50	35
Feedwater Enth. btu/lb	189		Chlorine			
Heat Absorb. by stm. btu/lb	1199.7		Total 100			100
Ex. Air [include tramp air] %	40		} Calculated Mix			As Received
Unburn Carbon Loss %	0.5	} btu value=			As Received	
Air Temp. To Boiler F (ambient)	80	} kcal/kg=			As Received	
Gas Temp. Leaving Boiler F	350	} Fuel Type				
Excess Air to Burners %	45	} Fuel			PHS	
Moist. In Air lb H2O/lb air	0.013	} Mixture			Biomass	
Radiation Loss %	0.5	} % of Mixture			91%	
Manufactures Margin %	0.5	} Tons/Hr			5.00	
Moist. from Atm. Stm. #/10kbtu	0	} Hrs/Yr Oper.			7,884	
Fuel BTU/LB	4,443					
Water from Fuel lb/10 kbtu	1.90					
Theoretical Air lb/10 kbtu	9.28					
Fuel wt.- Ash wt. lb/10 kbtu	2.12					
Actual Dry Air lb/10 kbtu	12.95					
Wt. of Fuel Burned Wet lb/10 kbtu	2.12					
Moisture in Air lb/10 kbtu	0.17					
Added Moist.:Atm.stm.lb/10kbtu	0.00					
Total Wet Gas lb/10 kbtu	15.24					
Water from Fuel lb/10 kbtu	1.90					
Water in Wet Gas lb/10 kbtu	2.06					
Dry Gas total lb/10 kbtu	13.18					
% water by wt. in Gas %	13.54					
Gas out F - Air in F	270					
EFFICIENCY LOSSES						
Dry Gas Loss %	8.54					
H2O from Fuel Loss %	22.26					
Moist. In Air Loss %	0.22					
Unburn Comb. Loss %	0.50					
Radation Loss %	0.50					
Manufac.Unaccount.Margin %	0.50					
Total Losses %	32.52					
BOILER EFFICIENCY						
	67.48					
Fuel Input mmBtu/hr	48.89	Heat Output mmBtu/hr	32.99			
Wet Gas Weight M lb/hr [x1000]	74.52	Fuel Rate-Tons/hr (as rec'd)	5.50			
Total Air to Burners Mlb/hr x1000	66.61	Total Air Flow ACFM 70 F	14,823			
Fuel Rate lb/hr	11,004.9	Fuel Rate-Tons/hr (into Boiler)	5.50			

CONSTITUENTS OF FLUE GAS				
	WET BASIS		DRY BASIS	
	% BY WT.	% BY VOL.	% BY WT.	%BYVOL
CO2	15.33	9.64	17.72	12.16
SO2	0.02	0.01	0.02	0.01
H2O	13.48	20.72	0.00	0.00
N2	65.58	64.79	75.79	81.73
O2	5.60	4.84	6.47	6.10
Total	100.00	100.00	100.00	100.00
Flue Gas				F
Density Flue Gas #/cf		0.044	350	
Flue Gas Flow ACFM		28,379	350	
Flue Gas Flow SCFM		18,219	70	
Gas Flow DSCFM		14,443	70	
Corrected 8% O2 dscf		16,567	70	

PROJECTED EMISSIONS	RATE (lb/mmBtu)		lbs/hr	US Tons/yr
PM -10 with Multicyclone	0.2		9.78	38.55
PM-2.5 with Multicyclone	0.12		5.87	23.13
Total PM with Multicyclone	0.30		14.67	57.82
PM-10 with Baghouse	0.022		1.08	4.24
PM-2.5 with Baghouse	0.020		0.98	3.85
Total PM with Baghouse	0.030		1.47	5.78
Nox	0.22		10.76	42.40
CO	0.22		10.76	42.40
SO2	0.025		1.22	4.82
TOC	0.039		1.91	7.52
VOC	0.013		0.64	2.51