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Analytical Report

E96-9431
JEFFREY M JACOBS
24 Rolling Roads, Henlopen Acres
Rehobath Beach, DE 19971

TP ID Number:	DBL250157-1	**Sample Weight (lbs):**	1.48
Product Recognized As:	Woody Biomass	**Sample Received:**	3/4/2025
Sample Designation:	Ponderosa Pine Unmerchantable Grindings	**Report Date:**	3/28/2025
Sample Date:	2/21/2025	**Purchase Order:**	

Parameter	As-Received	Dry Basis	Analytical Method	ISO 17025
Total Moisture (%)	18.89		ISO 18134-1	Q
Ash (%)	1.59	1.96	ISO 18122	Q
Volatiles (%)	67.76	83.54	ISO 18123	Q
Fixed Carbon (%)	11.75	14.49	By Difference	
GCV (GJ/Tonne)	16.60	20.47	ISO 18125	Q
NCV cV (GJ/Tonne)	15.12	19.18	ISO 18125	Q
NCV cP (GJ/Tonne)	15.04	19.11	ISO 18125	Q
Carbon (%)	40.92	50.46	ISO 16948	Q
Hydrogen (%)	5.06	6.24	ISO 16948	Q
Nitrogen (%)	0.15	0.18	ISO 16948	Q
Oxygen (%)	33.38	41.15	ISO 16948	Q
Sulfur (%)	0.01	0.01	ISO 16994	Q
Chlorine (%)	< 0.005	< 0.005	ISO 16994	Q

Parameter	Oxidizing	Analytical Method	ISO 17025
Deformation Temperature - DT (°C)	1210	ISO 21404	Q
Hemispherical Temperature - HT (°C)	1210	ISO 21404	Q
Flow Temperature - FT (°C)	1230	ISO 21404	Q

Parameter	Dry Basis	Analytical Method	ISO 17025
Aluminum (Al) mg/kg	640.3	ISO 16967/16968	Q
Antimony (Sb) mg/kg	< 0.100	ISO 16967/16968	Q
Arsenic (As) mg/kg	0.127	ISO 16967/16968	Q
Barium (Ba) mg/kg	9.39	ISO 16967/16968	Q
Cadmium (Cd) mg/kg	0.064	ISO 16967/16968	Q
Calcium (Ca) mg/kg	1120	ISO 16967/16968	Q
Chromium (Cr) mg/kg	27.65	ISO 16967/16968	Q
Cobalt (Co) mg/kg	0.669	ISO 16967/16968	Q
Copper (Cu) mg/kg	1.33	ISO 16967/16968	Q

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	Dry Basis	Analytical Method	ISO 17025
Iron (Fe) mg/kg	524.1	ISO 16967/16968	Q
Lead (Pb) mg/kg	0.202	ISO 16967/16968	Q
Magnesium (Mg) mg/kg	356	ISO 16967/16968	Q
Manganese (Mn) mg/kg	27.4	ISO 16967/16968	Q
Mercury (Hg) mg/kg	< 0.010	ISO 16967/16968	Q
Molybdenum (Mo) mg/kg	3.154	ISO 16967/16968	Q
Nickel (Ni) mg/kg	16.98	ISO 16967/16968	Q
Phosphorus (P) mg/kg	122.1	ISO 16967/16968	Q
Potassium (K) mg/kg	721	ISO 16967/16968	Q
Selenium (Se) mg/kg	< 0.050	ISO 16967/16968	Q
Silicon (Si) mg/kg	2553.8	ISO 16967/16968	Q
Sodium (Na) mg/kg	177	ISO 16967/16968	Q
Tellurium (Te) mg/kg	< 1.00	ISO 16967/16968	Q
Thallium (Tl) mg/kg	< 1.00	ISO 16967/16968	Q
Tin (Sn) mg/kg	< 1.00	ISO 16967/16968	Q
Titanium (Ti) mg/kg	126.83	ISO 16967/16968	Q
Vanadium (V) mg/kg	4.089	ISO 16967/16968	Q
Zinc (Zn) mg/kg	9.47	ISO 16967/16968	Q

Parameter	**Dry Basis**	**Analytical Method**	**ISO 17025**
Aluminum (Al) mg/kg	59833.3	Metals in Ash(550˚C)	
As (Arsenic) mg/kg	8.741	Metals in Ash(550˚C)	
Barium (Ba) mg/kg	606.86	Metals in Ash(550˚C)	
Calcium (Ca) mg/kg	70569	Metals in Ash(550˚C)	
Cd (Cadmium) mg/kg	4.839	Metals in Ash(550˚C)	
Co (Cobalt) mg/kg	55.970	Metals in Ash(550˚C)	
Cr (Chromium) mg/kg	2124.11	Metals in Ash(550˚C)	
Cu (Copper) mg/kg	109.58	Metals in Ash(550˚C)	
Hg (Mercury) mg/kg	< 0.010	Metals in Ash(550˚C)	
Iron (Fe) mg/kg	43969.7	Metals in Ash(550˚C)	
Magnesium (Mg) mg/kg	31758	Metals in Ash(550˚C)	

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	Dry Basis	Analytical Method	ISO 17025
Manganese (Mn) mg/kg	2042.5	Metals in Ash(550˚C)	
Mo (Molybdenum) mg/kg	192.071	Metals in Ash(550˚C)	
Ni (Nickel) mg/kg	1329.53	Metals in Ash(550˚C)	
Pb (Lead) mg/kg	17.894	Metals in Ash(550˚C)	
Phosphorus (P) mg/kg	11077.4	Metals in Ash(550˚C)	
Potassium (K) mg/kg	53110	Metals in Ash(550˚C)	
Sb (Antimony) mg/kg	3.171	Metals in Ash(550˚C)	
Se (Selenium) mg/kg	4.130	Metals in Ash(550˚C)	
Silicon (Si) mg/kg	212591.3	Metals in Ash(550˚C)	
Sn (Tin) mg/kg	3.74	Metals in Ash(550˚C)	
Sodium (Na) mg/kg	14377	Metals in Ash(550˚C)	
Te (Tellurium) mg/kg	< 1.00	Metals in Ash(550˚C)	
Titanium (Ti) mg/kg	11232.56	Metals in Ash(550˚C)	
Tl (Thallium) mg/kg	< 1.00	Metals in Ash(550˚C)	
V (Vanadium) mg/kg	321.185	Metals in Ash(550˚C)	
Zn (Zinc) mg/kg	801.36	Metals in Ash(550˚C)	

Parameter	As-Received	Dry Basis	Analytical Method	ISO 17025
Cellulose (%)	42.7	52.6	Extrapolation	O
Hemicellulose (%)	10.1	12.5	Extrapolation	O

Parameter	As-Received	Dry Basis	Analytical Method	ISO 17025
Lignin (%)	22.3	27.5	AOAC 973.18	O

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Method Description:	Method Code:
Determination of Carbon, Hydrogen, and Nitrogen via High-Temperature Elemental Analysis.	ISO 16948
Direct determination on fuel via ICP-MS. Al, Ca, Fe, Mg, P, K, Si, Na, Ti, Ba, and Mn determined via ISO16967. As, Cd, Co, Cr, Cu, Hg, Mn, Mo, Ni, Sb, V, Zn, Sn, Se, and Tl determined via ISO 16968.	ISO 16967/16968
Determination of Sulfur via High-Temperature Elemental Analysis.	ISO 16994
Metals in Ash done in accordance with ISO 16967, and reported values are perfromed on the ashed material.	Metals in Ash(550˚C)

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