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Analytical Report

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

TP ID Number:	DBL250133-1	**Sample Weight (lbs):**	1.40
Product Recognized As:	Woody Biomass	**Sample Received:**	2/24/2025
Sample Designation:	Penderosa Pine Saw Dust	**Report Date:**	3/31/2025
Sample Date:		**Purchase Order:**	SWSIE 1 Biomass to X

Parameter	As-Received	Dry Basis	Analytical Method	ISO 17025
Total Moisture (%)	23.75		ISO 18134-1	Q
Ash (%)	0.37	0.48	ISO 18122	Q
Volatiles (%)	64.36	84.40	ISO 18123	Q
Fixed Carbon (%)	11.51	15.11	By Difference	
GCV (GJ/Tonne)	15.99	20.98	ISO 18125	Q
NCV cV (GJ/Tonne)	14.47	19.69	ISO 18125	Q
NCV cP (GJ/Tonne)	14.38	19.62	ISO 18125	Q
Carbon (%)	39.56	51.88	ISO 16948	Q
Hydrogen (%)	4.76	6.24	ISO 16948	Q
Nitrogen (%)	0.13	0.16	ISO 16948	Q
Oxygen (%)	31.44	41.23	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)	1390	ISO 21404	Q
Hemispherical Temperature - HT (°C)	1400	ISO 21404	Q
Flow Temperature - FT (°C)	1400	ISO 21404	Q

Parameter	Dry Basis	Analytical Method	ISO 17025
Aluminum (Al) mg/kg	42.2	ISO 16967/16968	Q
Antimony (Sb) mg/kg	< 0.100	ISO 16967/16968	Q
Arsenic (As) mg/kg	< 0.010	ISO 16967/16968	Q
Barium (Ba) mg/kg	4.60	ISO 16967/16968	Q
Cadmium (Cd) mg/kg	0.095	ISO 16967/16968	Q
Calcium (Ca) mg/kg	754	ISO 16967/16968	Q
Chromium (Cr) mg/kg	< 1.00	ISO 16967/16968	Q
Cobalt (Co) mg/kg	< 0.100	ISO 16967/16968	Q
Copper (Cu) mg/kg	< 1.00	ISO 16967/16968	Q

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	Dry Basis	Analytical Method	ISO 17025
Iron (Fe) mg/kg	50.7	ISO 16967/16968	Q
Lead (Pb) mg/kg	0.032	ISO 16967/16968	Q
Magnesium (Mg) mg/kg	194	ISO 16967/16968	Q
Manganese (Mn) mg/kg	11.6	ISO 16967/16968	Q
Mercury (Hg) mg/kg	< 0.010	ISO 16967/16968	Q
Molybdenum (Mo) mg/kg	< 0.100	ISO 16967/16968	Q
Nickel (Ni) mg/kg	< 1.00	ISO 16967/16968	Q
Phosphorus (P) mg/kg	34.8	ISO 16967/16968	Q
Potassium (K) mg/kg	430	ISO 16967/16968	Q
Selenium (Se) mg/kg	< 0.050	ISO 16967/16968	Q
Silicon (Si) mg/kg	152.5	ISO 16967/16968	Q
Sodium (Na) mg/kg	15	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	4.63	ISO 16967/16968	Q
Vanadium (V) mg/kg	< 0.100	ISO 16967/16968	Q
Zinc (Zn) mg/kg	7.84	ISO 16967/16968	Q

Parameter	**Dry Basis**	**Analytical Method**	**ISO 17025**
Aluminum (Al) mg/kg	18458.8	Metals in Ash(550˚C)	
As (Arsenic) mg/kg	3.933	Metals in Ash(550˚C)	
Barium (Ba) mg/kg	980.55	Metals in Ash(550˚C)	
Calcium (Ca) mg/kg	156819	Metals in Ash(550˚C)	
Cd (Cadmium) mg/kg	16.431	Metals in Ash(550˚C)	
Co (Cobalt) mg/kg	8.143	Metals in Ash(550˚C)	
Cr (Chromium) mg/kg	78.76	Metals in Ash(550˚C)	
Cu (Copper) mg/kg	174.32	Metals in Ash(550˚C)	
Hg (Mercury) mg/kg	0.197	Metals in Ash(550˚C)	
Iron (Fe) mg/kg	17406.5	Metals in Ash(550˚C)	
Magnesium (Mg) mg/kg	45111	Metals in Ash(550˚C)	

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	Dry Basis	Analytical Method	ISO 17025
Manganese (Mn) mg/kg	2836.8	Metals in Ash(550˚C)	
Mo (Molybdenum) mg/kg	5.064	Metals in Ash(550˚C)	
Ni (Nickel) mg/kg	41.75	Metals in Ash(550˚C)	
Pb (Lead) mg/kg	10.726	Metals in Ash(550˚C)	
Phosphorus (P) mg/kg	14274.4	Metals in Ash(550˚C)	
Potassium (K) mg/kg	94698	Metals in Ash(550˚C)	
Sb (Antimony) mg/kg	1.987	Metals in Ash(550˚C)	
Se (Selenium) mg/kg	3.478	Metals in Ash(550˚C)	
Silicon (Si) mg/kg	71651.4	Metals in Ash(550˚C)	
Sn (Tin) mg/kg	3.76	Metals in Ash(550˚C)	
Sodium (Na) mg/kg	5879	Metals in Ash(550˚C)	
Te (Tellurium) mg/kg	< 1.00	Metals in Ash(550˚C)	
Titanium (Ti) mg/kg	1830.07	Metals in Ash(550˚C)	
Tl (Thallium) mg/kg	< 1.00	Metals in Ash(550˚C)	
V (Vanadium) mg/kg	24.004	Metals in Ash(550˚C)	
Zn (Zinc) mg/kg	2105.99	Metals in Ash(550˚C)	

Parameter	As-Received	Dry Basis	Analytical Method	ISO 17025
Lignin (%)	22.2	29.1	AOAC 973.18	O

Parameter	As-Received	Dry Basis	Analytical Method	ISO 17025
Cellulose (%)	42.9	56.3	Extrapolation	O
Hemicellulose (%)	11.8	15.5	Extrapolation	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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