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Analytical Report

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

TP ID Number:	DBL250132-1	**Sample Weight (lbs):**	1.46
Product Recognized As:	Woody Biomass	**Sample Received:**	2/24/2025
Sample Designation:	Penderosa Pine White Wood Chips	**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 (%)	21.22		ISO 18134-1	Q
Ash (%)	0.37	0.47	ISO 18122	Q
Volatiles (%)	66.67	84.63	ISO 18123	Q
Fixed Carbon (%)	11.73	14.89	By Difference	
GCV (GJ/Tonne)	16.21	20.58	ISO 18125	Q
NCV cV (GJ/Tonne)	14.75	19.34	ISO 18125	Q
NCV cP (GJ/Tonne)	14.66	19.27	ISO 18125	Q
Carbon (%)	40.54	51.46	ISO 16948	Q
Hydrogen (%)	4.72	5.99	ISO 16948	Q
Nitrogen (%)	0.12	0.15	ISO 16948	Q
Oxygen (%)	33.03	41.93	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)	1430	ISO 21404	Q
Hemispherical Temperature - HT (°C)	1440	ISO 21404	Q
Flow Temperature - FT (°C)	1440	ISO 21404	Q

Parameter	Dry Basis	Analytical Method	ISO 17025
Aluminum (Al) mg/kg	42.5	ISO 16967/16968	Q
Antimony (Sb) mg/kg	< 0.100	ISO 16967/16968	Q
Arsenic (As) mg/kg	0.011	ISO 16967/16968	Q
Barium (Ba) mg/kg	4.65	ISO 16967/16968	Q
Cadmium (Cd) mg/kg	0.074	ISO 16967/16968	Q
Calcium (Ca) mg/kg	747	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	41.9	ISO 16967/16968	Q
Lead (Pb) mg/kg	0.032	ISO 16967/16968	Q
Magnesium (Mg) mg/kg	228	ISO 16967/16968	Q
Manganese (Mn) mg/kg	13.2	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	79.2	ISO 16967/16968	Q
Potassium (K) mg/kg	485	ISO 16967/16968	Q
Selenium (Se) mg/kg	< 0.050	ISO 16967/16968	Q
Silicon (Si) mg/kg	69.3	ISO 16967/16968	Q
Sodium (Na) mg/kg	< 10	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	5.01	ISO 16967/16968	Q
Vanadium (V) mg/kg	< 0.100	ISO 16967/16968	Q
Zinc (Zn) mg/kg	8.40	ISO 16967/16968	Q

Parameter	**Dry Basis**	**Analytical Method**	**ISO 17025**
Aluminum (Al) mg/kg	12064.5	Metals in Ash(550˚C)	
As (Arsenic) mg/kg	2.446	Metals in Ash(550˚C)	
Barium (Ba) mg/kg	1034.87	Metals in Ash(550˚C)	
Calcium (Ca) mg/kg	171357	Metals in Ash(550˚C)	
Cd (Cadmium) mg/kg	13.297	Metals in Ash(550˚C)	
Co (Cobalt) mg/kg	7.146	Metals in Ash(550˚C)	
Cr (Chromium) mg/kg	44.33	Metals in Ash(550˚C)	
Cu (Copper) mg/kg	139.25	Metals in Ash(550˚C)	
Hg (Mercury) mg/kg	< 0.010	Metals in Ash(550˚C)	
Iron (Fe) mg/kg	10059.6	Metals in Ash(550˚C)	
Magnesium (Mg) mg/kg	48811	Metals in Ash(550˚C)	

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	Dry Basis	Analytical Method	ISO 17025
Manganese (Mn) mg/kg	3037.3	Metals in Ash(550˚C)	
Mo (Molybdenum) mg/kg	1.668	Metals in Ash(550˚C)	
Ni (Nickel) mg/kg	28.68	Metals in Ash(550˚C)	
Pb (Lead) mg/kg	7.758	Metals in Ash(550˚C)	
Phosphorus (P) mg/kg	18826.6	Metals in Ash(550˚C)	
Potassium (K) mg/kg	105636	Metals in Ash(550˚C)	
Sb (Antimony) mg/kg	0.937	Metals in Ash(550˚C)	
Se (Selenium) mg/kg	< 0.050	Metals in Ash(550˚C)	
Silicon (Si) mg/kg	36126.2	Metals in Ash(550˚C)	
Sn (Tin) mg/kg	2.44	Metals in Ash(550˚C)	
Sodium (Na) mg/kg	2709	Metals in Ash(550˚C)	
Te (Tellurium) mg/kg	< 1.00	Metals in Ash(550˚C)	
Titanium (Ti) mg/kg	1212.18	Metals in Ash(550˚C)	
Tl (Thallium) mg/kg	< 1.00	Metals in Ash(550˚C)	
V (Vanadium) mg/kg	16.861	Metals in Ash(550˚C)	
Zn (Zinc) mg/kg	2212.89	Metals in Ash(550˚C)	

Parameter	As-Received	Dry Basis	Analytical Method	ISO 17025
Lignin (%)	24.5	31.1	AOAC 973.18	O

Parameter	As-Received	Dry Basis	Analytical Method	ISO 17025
Cellulose (%)	40.9	51.9	Extrapolation	O
Hemicellulose (%)	11.8	15.0	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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