



Analysis Report

August 29, 2022

SWITZERLAND AG

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SWITZERLAND

Client Sample ID: Sample ID By:
 Date Sampled: N/A Sample ID:
 Date Received: Aug 1, 2022 Sample Wt.: 142.00 lbs
 Product Description: COAL
 Comments: Submitted Sample.

SGS Minerals Sample ID: 411-2255624-001

| | <u>Method</u> | <u>As Received</u> | <u>Dry</u> | <u>DAF</u> |
|------------------------------|----------------------|--------------------|------------|------------|
| Phosphorus In Coal % | ASTM D6349 (Mod) | 0.017 | 0.019 | |
| Moisture, Total % | ASTM D3302/D2961 | 10.83 | | |
| Ash % | ASTM D3174/D7582 | 6.67 | 7.48 | |
| Volatile Matter % | ASTM D3175 | 16.68 | 18.70 | |
| Fixed Carbon % | ASTM D3172 (by diff) | 65.82 | 73.82 | |
| Sulfur % | ASTM D4239 (A) | 0.88 | 0.99 | |
| Gross Calorific Value Btu/lb | ASTM D5865 | 12835 | 14393 | 15556 |
| Chlorine, Cl µg/g | ASTM D6721 | 722 | 810 | |
| Fluorine, F µg/g | ASTM D3761 | 69 | 77.8 | |

Samples for Ash are analyzed by either D7582 or D3174 depending on what equipment is available. For details on which method was utilized, request information from SGS Beckley.

| <u>Tests</u> | <u>Result</u> | <u>Unit</u> | <u>Method</u> |
|---------------------------------------|---------------|-------------|---------------|
| Coke Reactivity Index of Run 1 (CRI) | 29.4 | % | ASTM D5341 |
| Coke Reactivity Index of Run 2 (CRI) | 27.6 | % | ASTM D5341 |
| Average Coke Reactivity Index (CRI) | 28.5 | % | ASTM D5341 |
| Coke Strength Reaction of Run 1 (CSR) | 60.5 | % | ASTM D5341 |
| Coke Strength Reaction of Run 2 (CSR) | 62.4 | % | ASTM D5341 |
| Average Coke Strength Reaction (CSR) | 61.5 | % | ASTM D5341 |
| FREE SWELLING INDEX | | | |
| Free Swelling Index | 8.0 | --- | ASTM D720 |
| HARDGROVE GRINDABILITY | | | |
| Hardgrove Grindability Index | 88 | --- | ASTM D409 |

Eric Hatfield
Branch Manager

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| <u>Tests</u> | <u>Result</u> | <u>Unit</u> | <u>Method</u> |
|------------------------------------|---------------|-------------|------------------|
| GIESELER PLASTOMETER | | | |
| Maximum Fluidity | 46 | DDPM | ASTM D2639 |
| Initial Softening Temperature | 434 | °C | ASTM D2639 |
| Maximum Fluid Temperature | 466 | °C | ASTM D2639 |
| Solidification Temperature | 494 | °C | ASTM D2639 |
| Plastic Range | 60 | °C | ASTM D2639 |
| PETROGRAPHIC ANALYSIS | | | |
| Vitrinite Type V14 | 16.0 | % | ASTM D2798 |
| Vitrinite Type V15 | 41.0 | % | ASTM D2798 |
| Vitrinite Type V16 | 30.0 | % | ASTM D2798 |
| Vitrinite Type V17 | 13.0 | % | ASTM D2798 |
| Mean Maximum Vitrinite Reflectance | 1.59 | % | ASTM D2798 |
| TRACE ELEMENTS - DRY BASIS | | | |
| Arsenic, As | 11.52 | mg/Kg | ASTM D6357 (Mod) |
| Mercury, Hg | 0.09 | µg/g | ASTM D6722 |

SIEVE ANALYSIS ASTM D4749/D293

| <u>Passing</u> | <u>Retained on</u> | <u>% Weight</u> | <u>CUMULATIVE RESULTS</u> | |
|----------------|--------------------|-----------------|---------------------------|------------------|
| | | | <u>% Retained</u> | <u>% Passing</u> |
| ----- | 2" Sq | 0.00 | 0.00 | 100.00 |
| 2" Sq | 0 | 100.00 | 100.00 | 0.00 |



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