STANDARD LABORATORIES, INC.

Novacool Testing Project – August 2008

Conduct Site: Standard Laboratories Casper, Wyoming facility

Introduction: A study was conducted to determine the affect if any on coal treated with Fire Defense Technology & Safety Product's Novacool fire quenching agent. Three samples were run for moisture, ash, sulfur and heating value; one portion treated with the Novacool reagent, one untreated.

Protocol: Three samples were submitted for testing in addition to the concentrated Novacool reagent. To minimize variance due to sample homogeneity and preparation, the six samples were initially crushed with a ½" screen in a Holmes 250 crusher. The samples were then divided using a floor riffle to provide one portion for treating and one to use as a control. The Novacool reagent was made to the concentration used in the field, 0.4% vol/vol and, based on the sample weight, was applied in the ratio of 0.5 gallons per ton of coal. Simulating handling of coal the samples were then allowed to sit undisturbed for four days after which they were crushed then processed in accordance with normal laboratory procedures. The samples were air dried for twelve hours at approximately 90°F then pulverized to a nominal sixty mesh particle size (250µm) and analyzed for the test parameters mentioned above.

Findings: Caution should be used in any conclusions drawn from this data given the small database/study conducted. That aside, the treated and untreated results were compared for any impact and/or trends. All differences were very low and well within established experimental limits for each test parameter indicating little or no affect on results after treatment with the Novacool reagent.

Repeatability figures reference studies conducted by ASTM and are based on results determined from splits of the same sample analyzed by the same laboratory using the same equipment. Moisture gave a -0.053 mean difference of the six data sets with comparable standard deviations. The total moisture mean difference represents 12.7% of the allowed repeatability. Dry ash gave a mean difference of +0.093 with comparable standard deviations. The dry ash mean difference represents 28.3% of the allowed repeatability. Dry sulfur gave a mean difference of +0.003 with comparable standard deviations. The dry sulfur mean difference represents 4.3% of the allowed repeatability. Dry btu gave a mean difference of -26 with comparable standard deviations. The dry btu mean difference represents 30.9% of the allowed repeatability.

ASTM Standards: The following standards all reference the ASTM Annual Book of Standards, Volume 05.06, Gaseous Fuels; Coal and Coke.

Sample preparation	D2013
Air dry moisture	D3302
Residual moisture	D3173
Ash in the analysis sample	D3174
Sulfur in the analysis sample	D4239, method B – infrared absorption method
Gross calorific value	D5865

Respectfully submitted,
STANDARD LABORATORIES INC.

Steve Miladinovich, Jr.
Western Division Manager

STANDARD LABORATORIES,INC.

09/02/08

Customer: FIRE DEFENSE TECHNOLOGY
Lab #:200803032

LOCATION: CASPER, WY
APPROVAL:

	AIR DRY LOSS	RESDL MOIST	AS RECVD MOIST	AS RECVD ASH	DRY ASH	AS RECVD VM	DRY VM	AS RECVD FC	DRY FC	AS RECVD SULF	DRY SULF	AS RECRV BTU	DRY BTU	MAF BTU
001	-0.42	11.19	10.82	6.24	7.00					0.38	0.43	10337	11591	12463
SAMPLE RAWHIDE W/NOVA COAL														
002	-0.17	11.04	10.89	6.20	6.96					0.40	0.45	10363	11630	12500
SAMPLE RAWHIDE														
003	0.07	11.01	11.07	6.67	7.50					0.45	0.51	10326	11611	12552
SAMPLE #1 RAWHIDE PRB W/NOVA COAL														
004	-0.33	11.14	10.85	6.51	7.30					0.45	0.51	10337	11595	12508
SAMPLE #1 RAWHIDE PRB														
005	-1.09	11.39	10.42	6.64	7.41					0.45	0.50	10371	11577	12504
SAMPLE #2 RAWHIDE PRB W/NOVA COAL														
006	-1.60	11.57	10.16	6.62	7.37					0.42	0.47	10449	11631	12556
SAMPLE #2 RAWHIDE PRB														