STANDARD LABORATORIES, INC.

Novacool Testing Project – April 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. Six samples were run for moisture, ash, sulfur and heating value; one portion treated with the Novacool reagent, one untreated.

Protocol: Six 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 300 gallons per 100 tons of coal. Simulating handling of coal at the power plant, the samples were then allowed to sit undisturbed for four days after which they were crushed to a nominal eight mesh particle size (2.36mm) and again treated with the Novacool reagent but with only half the original amount. The samples were, again, allowed to sit undisturbed for another four days 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 +0.107 mean difference of the six data sets with comparable standard deviations. The total moisture mean difference represents 25% of the allowed repeatability. Dry ash gave a mean difference of +0.003 with comparable standard deviations. The dry ash mean difference represents 1% of the allowed repeatability. Dry sulfur gave a mean difference of -0.005 with comparable standard deviations. The dry sulfur mean difference represents 6% of the allowed repeatability. Dry btu gave a mean difference of -3.3 with the treated values showing a slightly higher standard deviation but still comparable. The dry btu mean difference represents 4% of the allowed repeatability. Note the as received btu was the only parameter with a trend, all treated coals slightly lower than the untreated. Bear in mind, however, that the as

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received btu contains the variance due not only to the btu but also that of the total moisture.

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

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FIRE DEFENSE TECHNOLOGY

		MOISTURE			DRY ASH			DRY SULFUR			AR BTU			DRY BTU			MAF BTU		
SAMPID	DATE	Treated	Untreated		Treated	Untreated		Treated	Untreated		Treated	Untreated		Treated	Untreated		Treated	Untreated	
Best Buy	4/25/2008	8.54	8.28	0.26	6.17	6.29	-0.12	0.40	0.38	0.02	10873	10888	-15.0	11888	11871	17.0	12670	12668	2.0
Winco	4/25/2008	7.17	7.13	0.04	9.08	8.98	0.10	0.39	0.40	-0.01	10996	11025	-29.0	11845	11871	-26.0	13028	13042	-14.0
Target #1	4/25/2008	8.02	7.63	0.39	6.07	6.04	0.03	0.37	0.38	-0.01	10988	10998	-10.0	11946	11906	40.0	12718	12671	47.0
Staples	4/25/2008	8.24	8.39	-0.15	5.10	5.14	-0.04	0.32	0.33	-0.01	10903	10935	-32.0	11882	11936	-54.0	12521	12583	-62.0
Target #2	4/25/2008	8.56	8.44	0.12	5.96	5.80	0.16	0.37	0.36	0.01	10917	10922	-5.0	11939	11929	10.0	12696	12663	33.0
Sears	4/25/2008	8.58	8.60	-0.02	5.77	5.88	-0.11	0.50	0.53	-0.03	10904	10908	-4.0	11927	11934	-7.0	12657	12680	-23.0
Mean Difference				0.107			0.003			-0.005			-15.8			-3.3			-2.83
Mean		8.19	8.08		6.36	6.36		0.39	0.40		10930	10946		11905	11908		12715	12718	
Standard Deviation		0.545	0.573		1.387	1.342		0.060	0.069		50.1	53.8		39.3	30.5		168.1	162.7	
ASTM Method		D3302 & D3173			D3174			D4239						D5865					
ASTM Repeatability Limit		0.42			0.33			0.08						83					
Mean Difference/Repeatability		25.4%			1.0%			-6.3%						-4.0%					

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Customer: FIRE DEFENSE TECHNOLOGY
Lab #:200801281

04/25/08
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	2.66	6.04	8.54	5.64	6.17					0.37	0.40	10873	11888	12670
BEST BUY BAG 1A														
002	2.51	5.92	8.28	5.77	6.29					0.35	0.38	10888	11871	12668
BEST BUY BAG 1B														
003	2.37	4.92	7.17	8.43	9.08					0.36	0.39	10996	11845	13028
WINCO FOODS BAG 2A														
004	2.20	5.04	7.13	8.34	8.98					0.37	0.40	11025	11871	13042
WINCO FOOD BAG 2B														
005	2.55	5.61	8.02	5.58	6.07					0.34	0.37	10988	11946	12718
TARGET #1 BAG 3A														
006	1.99	5.75	7.63	5.58	6.04					0.35	0.38	10998	11906	12671
TARGET #1 BAG 3B														
007	2.58	5.81	8.24	4.68	5.10					0.29	0.32	10903	11882	12521
STAPLES BAG 4A														
008	2.45	6.09	8.39	4.71	5.14					0.30	0.33	10935	11936	12583
STAPLES BAG 4B														
009	2.75	5.97	8.56	5.45	5.96					0.34	0.37	10917	11939	12696
TARGET #2 BAG 5A														
010	2.31	6.27	8.44	5.31	5.80					0.33	0.36	10922	11929	12663
TARGET #2 BAG 5B														
011	2.72	6.02	8.58	5.27	5.77					0.46	0.50	10904	11927	12657
SEARS BAG 6A														
012	2.45	6.30	8.60	5.37	5.88					0.48	0.53	10908	11934	12680
SEARS BAG 6B														