Burns & McDonnell
SINCE 1898

December 3, 2003

Mr. Ed Thatcher
Vice President of Operations & Chief Engineer
Deseret Generation & Transmission Cooperative
10714 South Jordan Gateway
South Jordan, Utah 84095

Combustion Optimization and NO_x Reduction Project
Bonanza Power Plant
B&MCD Project 34321
Results of Mill Performance Testing

Dear Ed:

These test results are in regard to the recent mill performance testing performed by Burns & McDonnell.

1.0 INTRODUCTION

Burns & McDonnell performed clean air tests and isokinetic sampling at Bonanza Unit 1. Unit 1 is equipped with five pulverizers. Each pulverizer feeds four burners. Mills 2, 3 and 4 burners are located on the front wall and mills 1 and 5 burners are located on the rear wall.

This report contains the results for each individual mill test. The results for the mill tests include air/fuel distribution plots, air/fuel ratio plots, fineness test data sheets, Rosin-Rammler plots and Burns & McDonnell mill test data sheets.

- Air/Fuel Distribution Plots
- Air-to-Fuel Ratio Plots
- Fineness Test and Fuel Analysis Data Sheets
- Rosin-Rammler Plots
- BMcD Mill Test Data Sheets

ENGINEERS • ARCHITECTS • CONSULTANTS
9400 Ward Parkway
Kansas City, Missouri 64114-3319
Tel: 816 333-9400
Fax: 816 333-3690
http://www.burnsmcd.com

2.0 PROCEDURE

Burns & McDonnell arrived on site on October 15th, 2003. Testing commenced that day and continued until October 17th, 2003. Each mill was isokinetically tested once.

The procedure followed for the performed isokinetic coal sampling at Bonanza Unit 1 is as follows:

1. For a given mill, each coal pipe was traversed with a dirty air probe to establish the dirty air velocity.
2. Static pressure and temperature were measured and recorded.
3. Dirty air velocities were used to calculate a sampling rate.
4. Coal samples were extracted using a sampling apparatus recommended in ASME PTC 4.2 Section 5.4 ASTM D197 Section 6.2.
5. Each extracted sample was sealed in a Ziploc bag, weighed and labeled.
6. Sample weight data was used to calculate pipe to pipe balance.
7. Sample bags were left for Deseret personnel to send to a lab for a method D197 fineness test.
8. Fineness data was used to plot Rosin-Rammler charts.

3.0 DISCUSSION

3.1 ISOKINETIC SAMPLING

Dirty air test results determine the primary airflow in each coal pipe exiting a pulverizer while coal is being transported. Dirty air tests are used for the following:

1. The results of the dirty air test are used to determine the required suction velocity in the sample probe during the gram recovery test. This provides an isokinetic sample extraction of the coal such that the

coal is extracted from the pipe at the same velocity at which it is traveling in the pipe.

2. Dirty air tests are used to measure the total and individual coal pipe primary air flow. This data, in conjunction with the gram recovery test data, is used to determine the pulverizer air/fuel ratios, and as a tool for fine tuning NO_X and unburned carbon losses.

Gram recovery tests provide a method of determining pulverizer product fineness and balance. The following information can be obtained from gram recovery tests when used in conjunction with dirty air testing.

1. The coal distribution between pipes.
2. The average and individual coal pipe air-to-fuel ratio.
3. The coal fineness in each pipe. A weighted average fineness based on the coal flow in each pipe provides an indication of overall pulverizer performance.

4.0 RESULTS

Each mill was isokinectically sampled at a set fuel flow. The fuel control for the mill being tested was taken into manual and kept steady for the entire test. The primary air flows are shown in Table 1-1.

Table 1-1 Mill Primary Airflow

	Pipe 1	Pipe 2	Pipe 3	Pipe 4	Total
Mill 1	61,669	60,499	63,264	62,835	248,267
Mill 2	62,082	57,457	58,063	61,485	239,088
Mill 3	52,791	53,388	52,025	51,456	209,660
Mill 4	64,574	65,910	64,348	67,335	262,167
Mill 5	64,442	64,998	61,752	65,131	256,323

The samples extracted isokinectically from each pipe are weighed and the data is used to create air/fuel distribution graphs. Table 1-2, below, shows the overall balance of the pipes. Industry targets for these values are +/- 5% for air flow and +/- 10% for fuel flow.

	Table 1-2 Mill Fuel Balance						
	Pipe 1	Pipe 2	Pipe 3	Pipe 4	Error High %	ErrorLow %	Total
Mill 1	26,727	37,039	26,374	33,859	**19.5**	**14.9**	124,000
Mill 2	23,271	27,818	25,785	19,125	**15.9**	**20.3**	96,000
Mill 3	21,017	28,260	23,345	23,378	**17.8**	**12.4**	96,000
Mill 4	30,013	38,026	31,150	32,811	**15.2**	**9.1**	132,000
Mill 5	32,450	31,262	33,242	27,046	**7.2**	**12.8**	124,000

Air/Fuel distribution graphs show the pipe-to-pipe balance between fuel and air. The graphs are located in Attachment A. Air/Fuel ratio graphs are located in Attachment B. The graphs show individual pipe and total mill air/fuel ratios.

The CTE test data sheets and raw coal sample analysis are located in Attachment C. Each sample extracted was used in a sieve analysis to measure the mill fineness. The data collected was plotted on Rosin-Rammler graphs and is located in Attachment D. The Burns & McDonnell mill test data sheets located in Attachment E.

5.0 DISCUSSION OF RESULTS

The objective of the isokinetic testing has three purposes. The first purpose is to measure and quantify a primary air flow to determine pipe-to pipe airflow balance and for use in evaluating burner geometry. The second is to measure the pipe-to-pipe fuel balance. The third is to measure mill fineness.

Primary air pipe-to-pipe balance is excellent for all mills. No change in orifice sizing is recommended. Test results also confirm that primary air velocity at the burner nozzles is very high.

Pipe-to-pipe fuel balance is fair. All mills are within +/-20%. The goal should be are +/-10%, however most utilities have found achieving this balance difficult. Lowering primary airflow also tends to help the fuel balance. This should be tried before other attempts are made to balance fuel.

Fineness for the 5 mills does not meet industry standards. Industry standards use a target of 70% through a 200-mesh. As shown in the fineness results, all mills are significantly worse than 70%. This condition is also most likely due to excessive primary air flow. Lowering primary air flow may significantly improve fineness and reduce unburned carbon.

We appreciate the opportunity to offer our services to Deseret. If you have any question concerning this report, please call me at (816) 822-3860.

Sincerely,

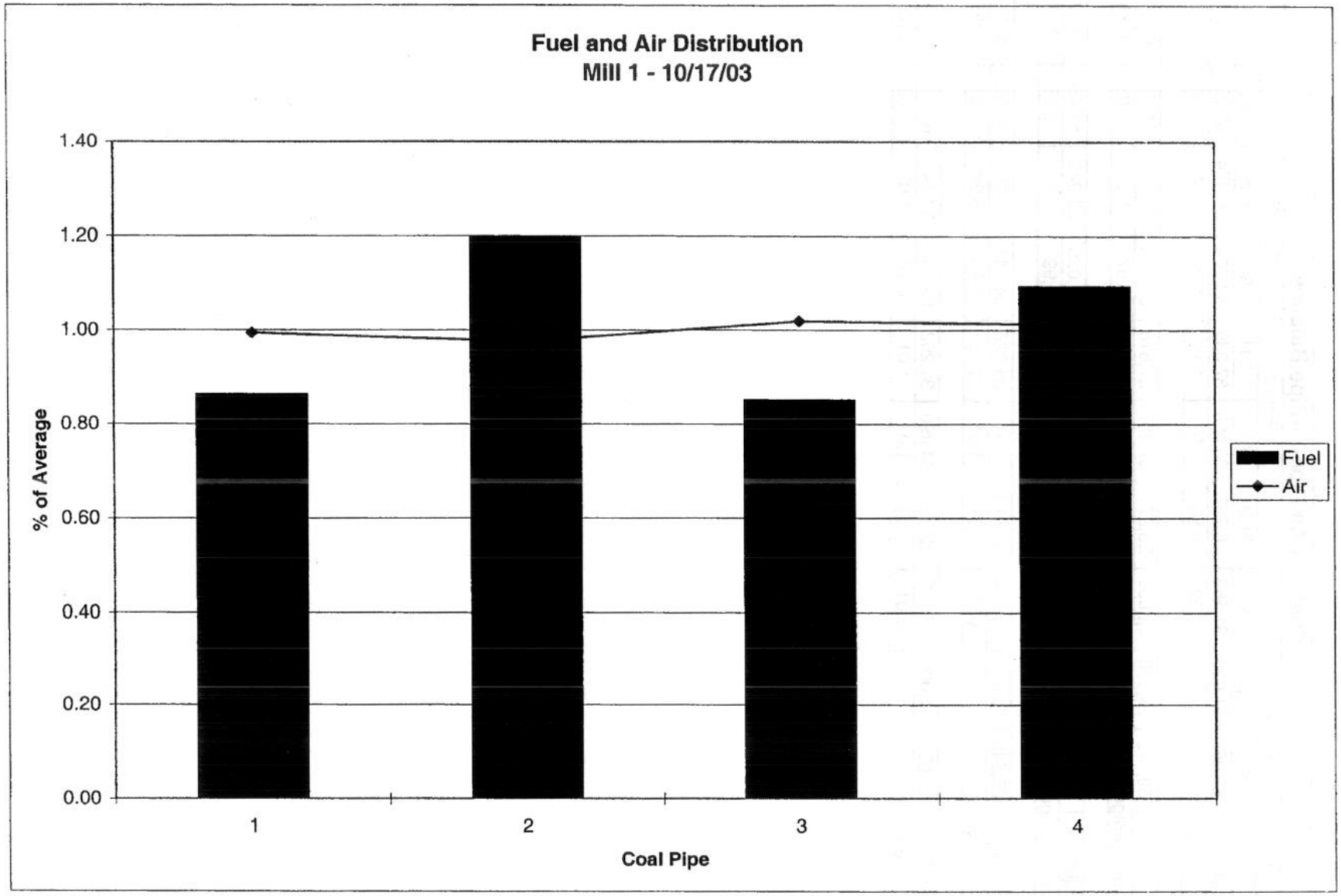
Andrew Burge
Project Manager

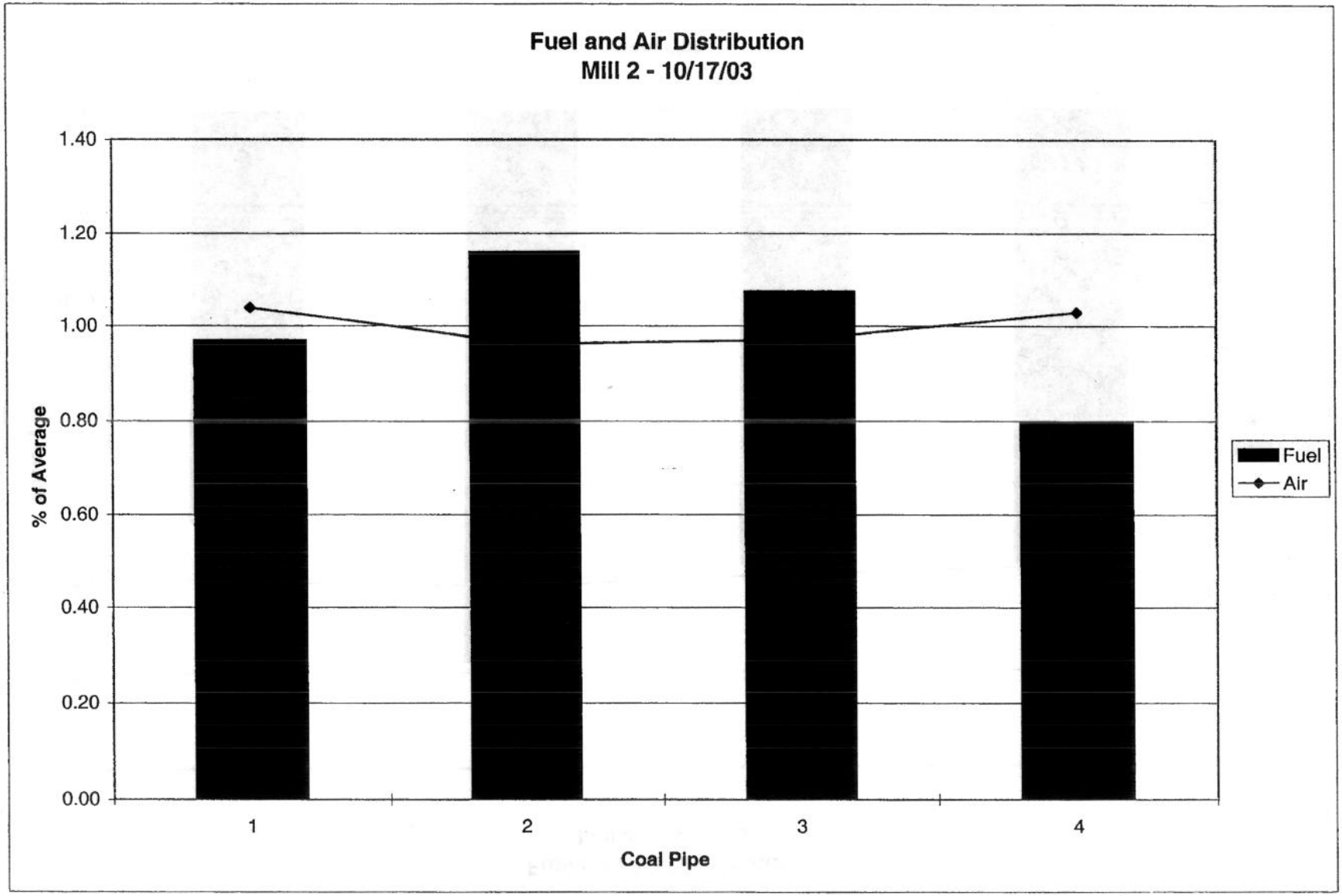
Attachments

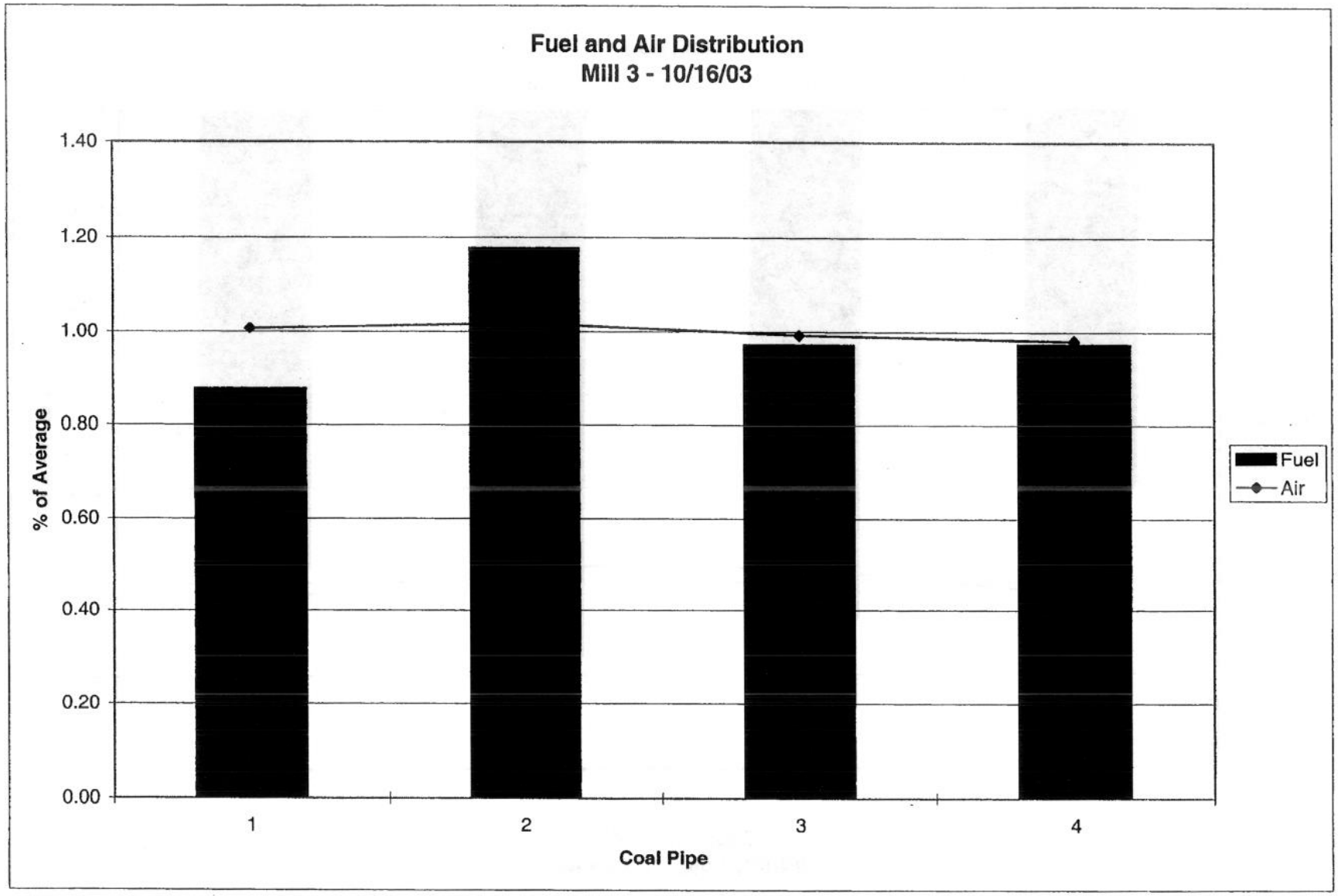
cc: Mr. Stan Gordon
Mr. Dan Howell
Mr. Steve Voss
Mr. Bill Smith

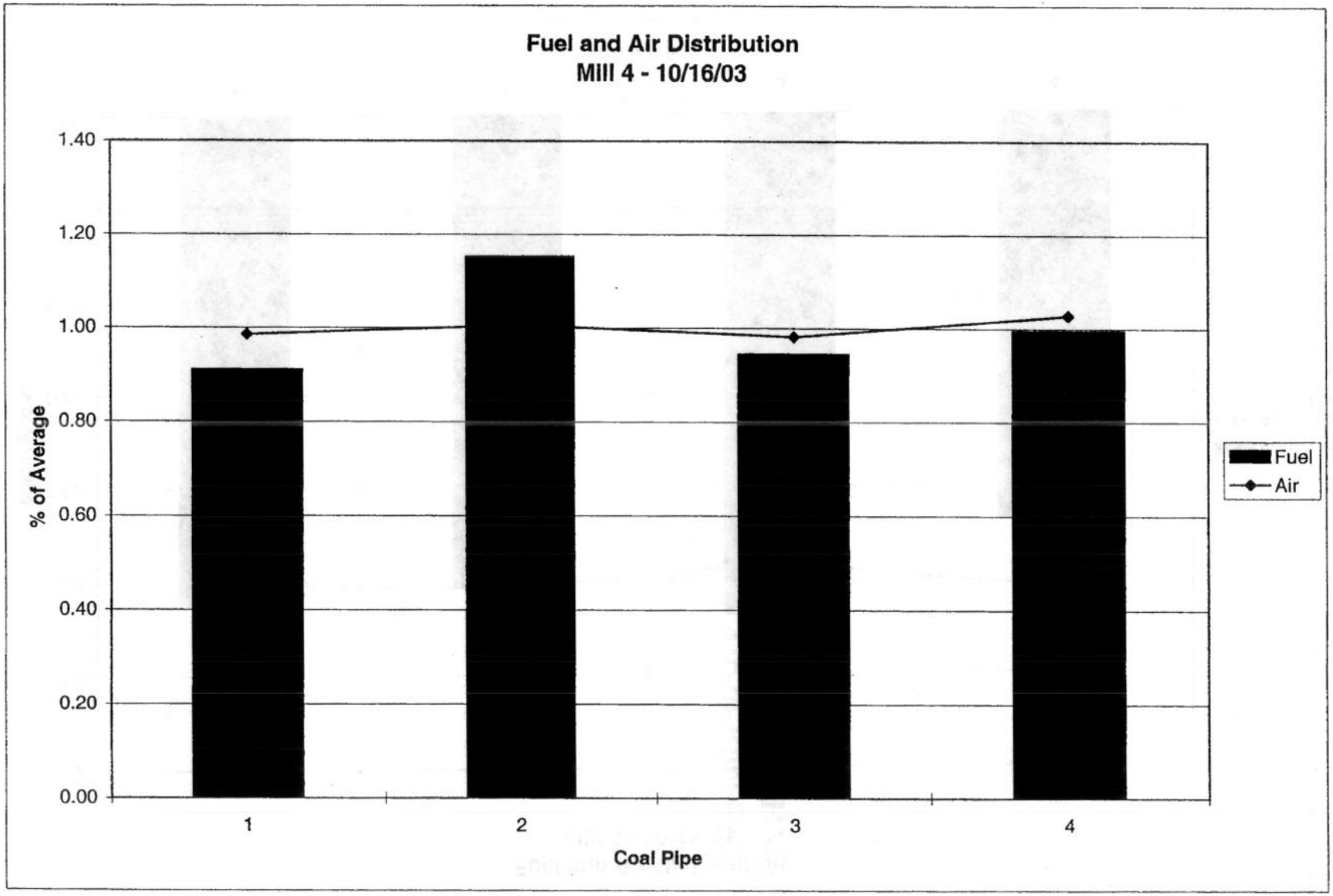
ATTACHMENT A
Air/Fuel Distribution Plots

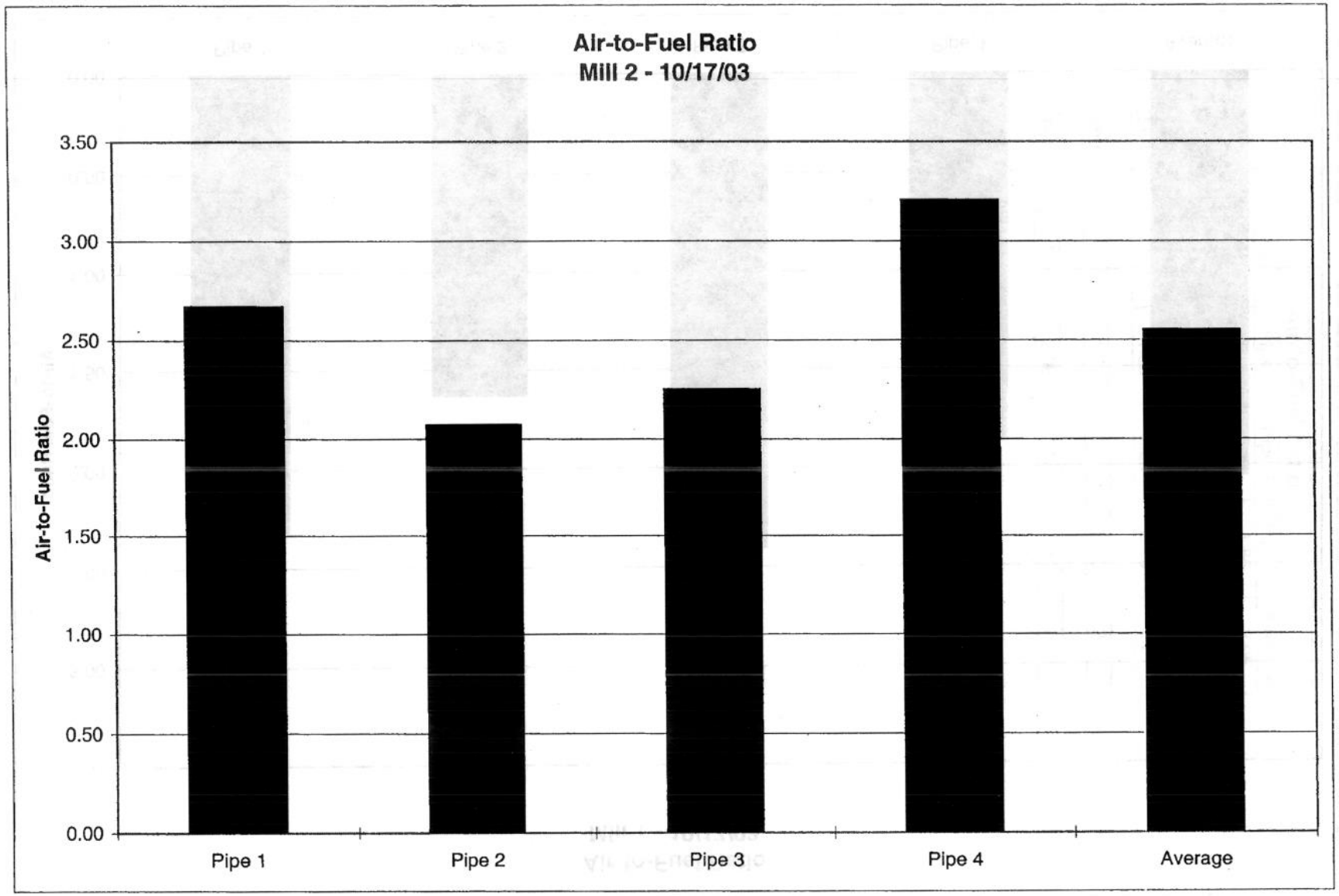
Fuel and Air Pipe-to-Pipe Balance										
	Average		Pipe 1		Pipe 2		Pipie 3		Pipe 4	
	Air	Fuel	Air	Fuel	Air	Fuel	Air	Fuel	Air	Fuel
Mill 1 (lb/hr)	62,067	31,000	61,669	26,727	60,499	37,039	63,264	26,374	62,835	33,859
% of Average			0.99	0.86	0.97	1.19	1.02	0.85	1.01	1.09
Mill 2 (lb/hr)	59,772	24,000	62,082	23,271	57,457	27,818	58,063	25,785	61,485	19,125
% of Average			1.04	0.97	0.96	1.16	0.97	1.07	1.03	0.80
Mill 3 (lb/hr)	52,415	24,000	52,791	21,017	53,388	28,260	52,025	23,345	51,456	23,378
% of Average			1.01	0.88	1.02	1.18	0.99	0.97	0.98	0.97
Mill 4 (lb/hr)	65,542	33,000	64,574	30,013	65,910	38,026	64,348	31,150	67,335	32,811
% of Average			0.99	0.91	1.01	1.15	0.98	0.94	1.03	0.99
Mill 5 (lb/hr)	64,081	31,000	64,442	32,450	64,998	31,262	61,752	33,242	65,131	27,046
% of Average			1.01	1.05	1.01	1.01	0.96	1.07	1.02	0.87

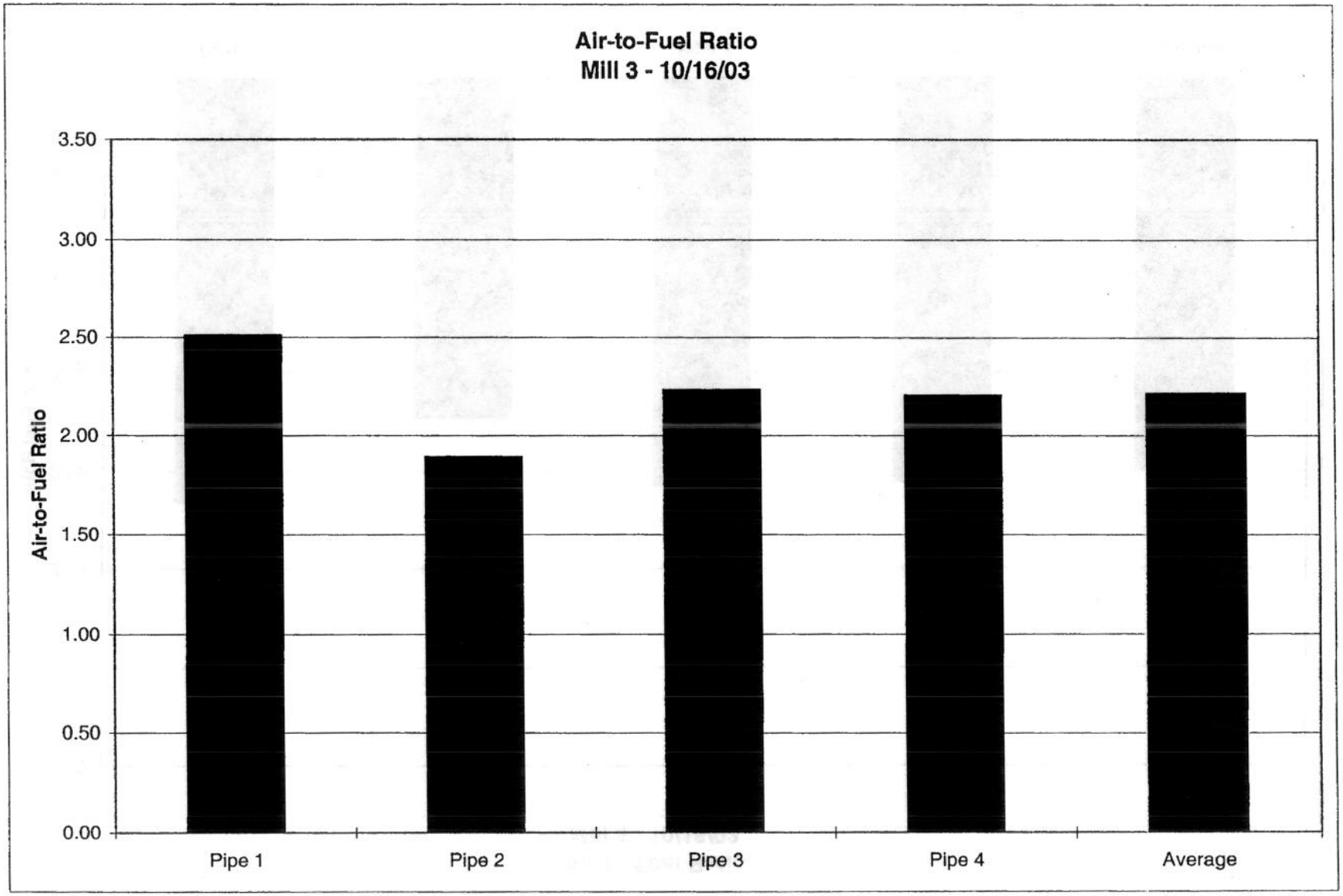

Fuel and Air Distribution
Mill 1 - 10/17/03
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
% of Average
1
2
3
4
Coal Pipe
Fuel
Air

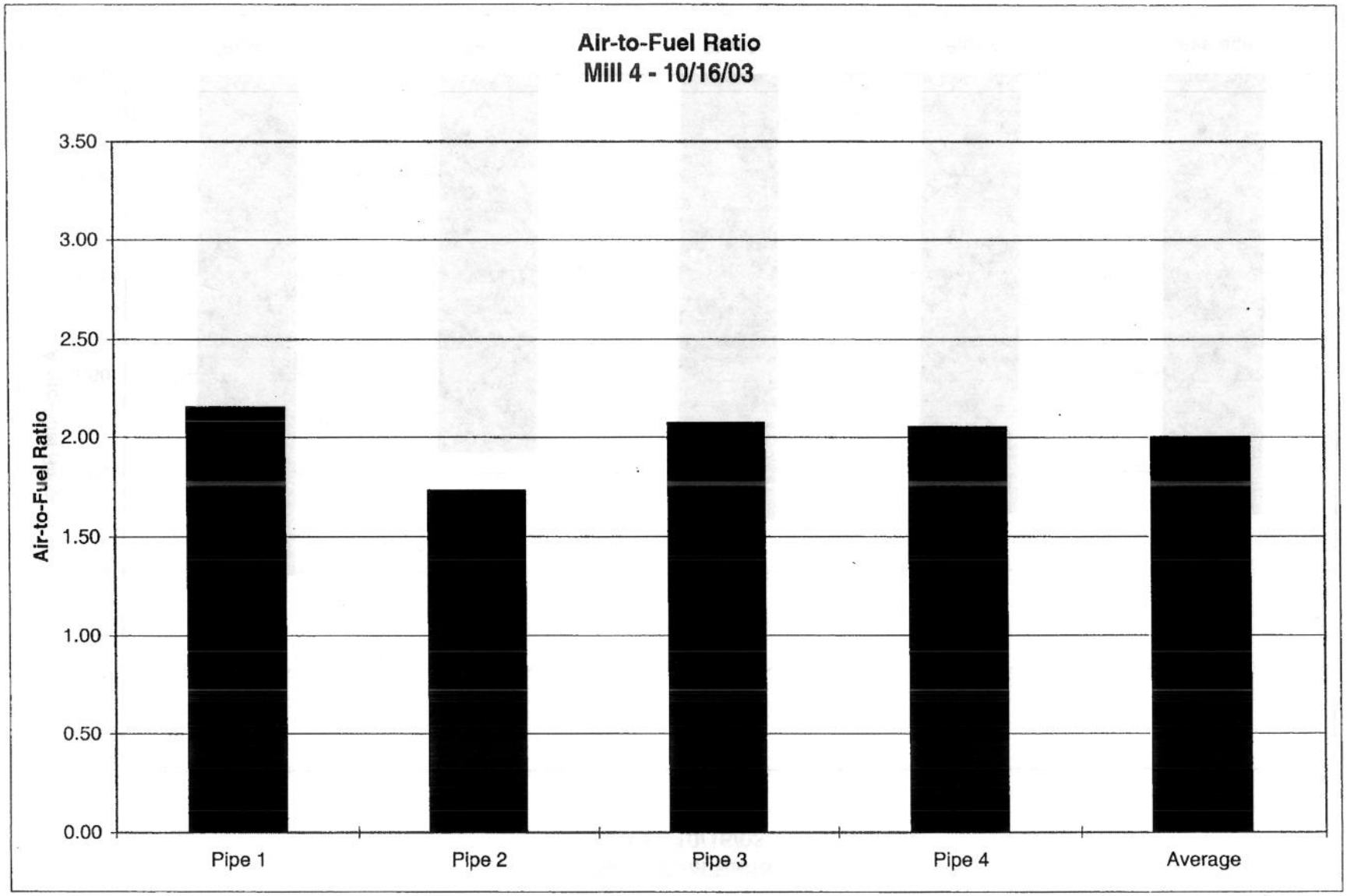

Fuel and Air Distribution
Mill 2 - 10/17/03
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
% of Average
1
2
3
4
Coal Pipe
Fuel
Air

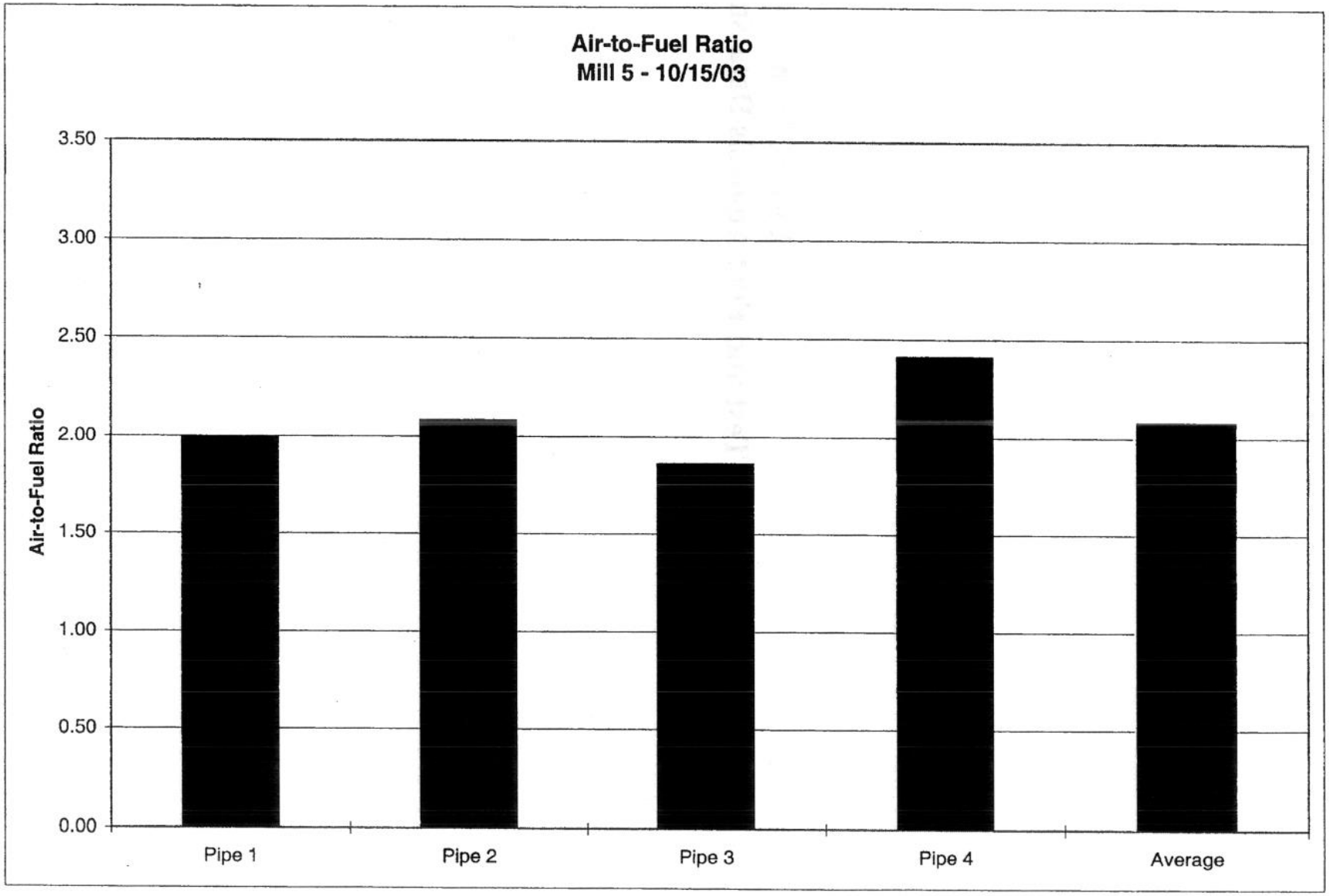

Fuel and Air Distribution
Mill 3 - 10/16/03
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
% of Average
1
2
3
4
Coal Pipe
Fuel
Air


Fuel and Air Distribution
Mill 4 - 10/16/03
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
% of Average
1
2
3
4
Coal Pipe
Fuel
Air


Air-to-Fuel Ratio
Mill 2 - 10/17/03
Air-to-Fuel Ratio
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Pipe 1
Pipe 2
Pipe 3
Pipe 4
Average


Air-to-Fuel Ratio
Mill 3 - 10/16/03
Air-to-Fuel Ratio
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Pipe 1
Pipe 2
Pipe 3
Pipe 4
Average


Air-to-Fuel Ratio
Mill 4 - 10/16/03
Air-to-Fuel Ratio
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Pipe 1
Pipe 2
Pipe 3
Pipe 4
Average


Air-to-Fuel Ratio
Mill 5 - 10/15/03
Air-to-Fuel Ratio
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Pipe 1
Pipe 2
Pipe 3
Pipe 4
Average

ATTACHEMENT C
Fineness Test and Fuel Analysis Data Sheets

SGS

ADDRESS ALL CORRESPONDENCE TO:
COMMERCIAL TESTING & ENGINEERING CO.
4665 PARK STREET, SUITE B-200
DENVER, CO 80239
TEL: (303) 373-4772
FAX: (303) 373-4791

November 17, 2003

DESERET GENERATION & TRANS.
12500 EAST 25500 SOUTH
VERNAL UT 84078

Sample identification by
DESERET GENERATION & TRANS.

SAMPLE ID: CTE-P1
MILL #1
COMBINED PIPES

P.O. No.: 56796

Kind of sample reported to us: COAL

Sample taken at: XXXXXXX

Sample taken by: DESERET GENERATION & TRANS.

Date sampled: October 17, 2003

Date received: November 5, 2003

Analysis Report No. 72-491176

SIEVE ANALYSIS

Passing	Retained On	% Weight	CUMULATIVE RESULTS % Retained	% Passing
-----	#100	2.90	2.90	100.00
#100	#140	10.92	13.82	97.10
#140	#200	27.60	41.42	86.18
#200	#270	35.63	77.05	58.58
#270	#325	9.01	86.06	22.95
#325		13.94	100.00	13.94

Post-it® Fax Note 7671	Date 11/18/03 # of pages ▶ 5
To Brian Ohler	From
Co./Dept.	Co. SGS - Denver
Phone #	Phone #
Fax # 435.781.5816	Fax #

MEMBER ACIII

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Kristi Brell for
Denver Laboratory

SGS

ADDRESS ALL CORRESPONDENCE TO:
COMMERCIAL TESTING & ENGINEERING CO.
4665 PARIS STREET, SUITE B-200
DENVER, CO 80239
TEL: (303) 373-4772
FAX: (303) 373-4701

November 17, 2003

DESERET GENERATION & TRANS.
12500 EAST 25500 SOUTH
VERNAL UT 84078

Sample identification by
DESERET GENERATION & TRANS.

SAMPLE ID: CTR-F2
MILL #2
COMBINED PIPES

P.O. No.: 56796

Kind of sample reported to us: COAL

Sample taken at: XXXXXXX

Sample taken by: DESERET GENERATION & TRANS.

Date sampled: October 17, 2003

Date received: November 5, 2003

Analysis Report No. 72-491177

SIEVE ANALYSIS

Passing	Retained On	% Weight	CUMULATIVE RESULTS % Retained	% Passing
-----	#100	16.30	16.30	100.00
#100	#140	12.92	29.22	83.70
#140	#200	15.52	44.74	70.78
#200	#270	29.56	74.29	55.26
#270	#325	7.04	81.33	25.71
#325		18.67	100.00	18.67

MEMBER ACIL

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Kristi Brell /jr

Denver Laboratory

SGS

ADDRESS ALL CORRESPONDENCE TO:
COMMERCIAL TESTING & ENGINEERING CO.
4665 PARIS STREET, SUITE B-200
DENVER, CO 80239
TEL: (303) 373-4772
FAX: (303) 373-4791

November 17, 2003

DESERET GENERATION & TRANS.
12500 EAST 25500 SOUTH
VERNAL UT 84078

Sample identification by
DESERET GENERATION & TRANS.

SAMPLE ID: CTE-F3
P.O. No.: 56796
MILL #3

Kind of sample reported to us: COAL

Sample taken at: XXXXXXX

Sample taken by: DESERET GENERATION & TRANS.

Date sampled: October 16, 2003

Date received: November 5, 2003

Analysis Report No. 72-491178

SIEVE ANALYSIS

Passing	Retained On	% Weight	CUMULATIVE RESULTS % Retained	% Passing
-----	#100	10.40	10.40	100.00
#100	#140	11.31	21.71	89.60
#140	#200	24.49	46.20	78.29
#200	#270	40.98	87.18	53.80
#270	#325	7.18	94.36	12.82
#325		5.64	100.00	5.64

MEMBER ACIII

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.
Kristi Bells /jp
Denver Laboratory

SGS

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DENVER, CO 80239
TEL: (303) 373-4772
FAX: (303) 373-4791

November 17, 2003

DESERET GENERATION & TRANS.
12500 EAST 25500 SOUTH
VERNAL, UT 84078

Sample identification by
DESERET GENERATION & TRANS.

SAMPLE ID: CTE-F4
MILL #4
COMBINED PIPES

P.O. No.: 56796

Kind of sample reported to us: COAL

Sample taken at: XXXXXXX

Sample taken by: DESERET GENERATION & TRANS.

Date sampled: October 16, 2003

Date received: November 5, 2003

Analysis Report No. 72-491179

SIEVE ANALYSIS

Passing	Retained On	% Weight	CUMULATIVE RESULTS % Retained	% Passing
-----	#100	3.35	3.35	100.00
#100	#140	13.68	17.03	96.65
#140	#200	38.38	55.41	82.97
#200	#270	29.73	85.14	44.59
#270	#325	3.47	88.61	14.86
#325		11.39	100.00	11.39

MEMBER ACIL

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Kristi Bells/jp

Denver Laboratory

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ADDRESS ALL CORRESPONDENCE TO:
COMMERCIAL TESTING & ENGINEERING CO.
4565 PARIS STREET, SUITE B-200
DENVER, CO 80239
TEL: (303) 373-4772
FAX: (303) 373-4791

November 17, 2003

DESERET GENERATION & TRANS.
12500 EAST 26500 SOUTH
VERNAL UT 84078

Sample identification by
DESERET GENERATION & TRANS.

SAMPLE ID: CTE-#5
MILL #5
COMBINED PIPES

P.O. No.: 56796

Kind of sample reported to us: COAL

Sample taken at: XXXXXXX

Sample taken by: DESERET GENERATION & TRANS.

Date sampled: October 15, 2003

Date received: November 5, 2003

Analysis Report No. 72-491180

SIEVE ANALYSIS

Passing	Retained On	% Weight	CUMULATIVE RESULTS % Retained	% Passing
-----	#100	3.01	3.01	100.00
#100	#140	12.36	15.37	96.99
#140	#200	32.08	47.45	84.63
#200	#270	36.26	83.71	52.55
#270	#325	2.98	86.69	16.29
#325		13.31	100.00	13.31

MEMBER AOAC II

Respectfully submitted.
COMMERCIAL TESTING & ENGINEERING CO.

Kristi Bulls

Denver Laboratory

SGS

ADDRESS ALL CORRESPONDENCE TO:
COMMERCIAL TESTING & ENGINEERING CO.
4685 PARIS STREET, SUITE B-200
DENVER, CO 80239
TEL: (303) 373-4772
FAX: (303) 373-4791

November 11, 2003

DESERET GENERATION & TRANS.
12500 EAST 25500 SOUTH
VERNAL UT 84078

Sample identification by
DESERET GENERATION & TRANS.

SAMPLE ID: CTE-1
PULV. #3
BEGINNING TEST
1ST SAMPLE

P.O. No: 56796

Kind of sample COAL

Sample taken at XXXXXXX

Sample taken by DESERET GENERATION & TRANS.

Date sampled October 16, 2003

Date received November 5, 2003

Analysis report no. 72-491170

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	14.23	XXXXXX
% Ash	11.57	13.49
% Volatile	32.64	38.05
% Fixed Carbon	41.56	48.46
	100.00	100.00
Btu/lb	10051	11718
% Sulfur	0.56	0.65

MAF Btu/lb	13545		
% MAF Volatile	43.98		
% MAF Fixed Carbon	56.02		
lb SO_2/mm Btu	1.11	lb Sulfur/mm Btu	0.56
% Air Dry Loss	8.68	As Received Net Sample Wt.	1003.60 g

MEMBER ACIL

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Krista Bulls

Denver Laboratory

SGS

ADDRESS ALL CORRESPONDENCE TO:
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4665 PARIS STREET, SUITE B-200
DENVER, CO 80239
TEL: (303) 373-4772
FAX: (303) 373-4791

November 11, 2003

DESERET GENERATION & TRANS.
12500 EAST 25500 SOUTH
VERNAL UT 84078

Sample identification by
DESERET GENERATION & TRANS.

SAMPLE ID: CTE-2
PULV. #3
2ND SAMPLE
END TEST
RAW COAL

Kind of sample COAL

Sample taken at XXXXXXX

Sample taken by DESERET GENERATION & TRANS.

Date sampled October 16, 2003

Date received November 5, 2003

P.O. No.: 56796

Analysis report no. 72-491171

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	13.36	XXXXXX
% Ash	13.38	15.44
% Volatile	32.44	37.44
% Fixed Carbon	40.82	47.12
	100.00	100.00
Btu/lb	9977	11515
% Sulfur	0.61	0.70

MAF Btu/lb	13618		
% MAF Volatile	44.28		
% MAF Fixed Carbon	55.72		
lb SO_2/mm Btu	1.22	lb Sulfur/mm Btu	0.61
% Air Dry Loss	8.23	As Received Net Sample Wt.	1074.30 g

MEMBER ACIL

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Kristi Bulls

Denver Laboratory

SGS

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4665 PARIS STREET, SUITE B-200
DENVER, CO 80239
TEL: (303) 373-4772
FAX: (303) 373-4791

November 11, 2003

DESERET GENERATION & TRANS.
12500 EAST 25500 SOUTH
VERNAL UT 84078

Sample identification by
DESERET GENERATION & TRANS.

SAMPLE ID: CTE-3
PULV. #4
BEGINNING TEST
1ST SAMPLE
RAW COAL

P.O. No.: 56796

Kind of sample COAL

Sample taken at XXXXXXX

Sample taken by DESERET GENERATION & TRANS.

Date sampled October 16, 2003

Date received November 5, 2003

Analysis report no. 72-491172

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	13.88	xxxxxx
% Ash	11.94	13.86
% Volatile	32.83	38.12
% Fixed Carbon	41.35	48.02
	100.00	100.00
Btu/lb	10085	11710
% Sulfur	0.63	0.73

MAF Btu/lb	13594
% MAF Volatile	44.25
% MAF Fixed Carbon	55.75
lb SO_2/mm Btu	1.25
% Air Dry Loss	8.51

lb Sulfur/mm Btu	0.62
As Received Net Sample Wt.	1013.60 g

MEMBER ACIL

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Kristi Bells

Denver Laboratory

SGS

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4665 PARIS STREET, SUITE B-200
DENVER, CO 80239
TEL: (303) 373-4772
FAX: (303) 373-4791

November 11, 2003

DESERET GENERATION & TRANS.
12500 EAST 25500 SOUTH
VERNAL UT 84078

Sample identification by
DESERET GENERATION & TRANS.

SAMPLE ID: CTE-4
PULV. #4
END TEST
2ND SAMPLE
RAW COAL

P.O. No.: 56796

Kind of sample COAL

Sample taken at XXXXXXX

Sample taken by DESERET GENERATION & TRANS.

Date sampled October 16, 2003

Date received November 5, 2003

Analysis report no. 72-491173

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	13.10	XXXXXX
% Ash	13.96	16.07
% Volatile	32.60	37.52
% Fixed Carbon	40.34	46.41
	100.00	100.00
Btu/lb	9967	11470
% Sulfur	0.67	0.77

MAF Btu/lb	13666
% MAF Volatile	44.70
% MAF Fixed Carbon	55.30
lb SO_2/mm Btu	1.34
% Air Dry Loss	7.76

lb Sulfur/mm Btu	0.67
As Received Net Sample Wt.	1040.50 g

MEMBER ACIL

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Kristi Bells

Denver Laboratory

SGS

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FAX: (303) 373-4791

November 11, 2003

DESERET GENERATION & TRANS.
12500 EAST 25500 SOUTH
VERNAL UT 84078

Sample identification by
DESERET GENERATION & TRANS.

SAMPLE ID: CTE-5
PULV. #5
BEGINNING TEST
13:45 Hrs.
RAW COAL

P.O. No.: 56796

Kind of sample COAL

Sample taken at XXXXXXX

Sample taken by DESERET GENERATION & TRANS.

Date sampled October 15, 2003

Date received November 5, 2003

Analysis report no. 72-491174

ULTIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	12.36	xxxxx
% Carbon	61.23	69.86
% Hydrogen	4.10	4.68
% Nitrogen	1.24	1.42
% Sulfur	0.73	0.83
% Ash	11.74	13.40
% Oxygen (diff)	8.60	9.81
	100.00	100.00

MEMBER ACIL

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Kristi Bells

Denver Laboratory

SGS

ADDRESS ALL CORRESPONDENCE TO:
COMMERCIAL TESTING & ENGINEERING CO.
4665 PARIS STREET, SUITE B-200
DENVER, CO 80239
TEL: (303) 373-4772
FAX: (303) 373-4791

November 11, 2003

DESERET GENERATION & TRANS.
12500 EAST 25500 SOUTH
VERNAL UT 84078

Sample identification by
DESERET GENERATION & TRANS.

SAMPLE ID: CTE-5
PULV. #5
BEGINNING TEST
13:45 Hrs.
RAW COAL

P.O. No.: 56796

Kind of sample reported to us: COAL

Sample taken at: XXXXXXX

Sample taken by: DESERET GENERATION & TRANS.

Date sampled: October 15, 2003

Date received: November 5, 2003

Analysis Report No. 72-491174

ANALYSIS OF ASH	WEIGHT %, IGNITED BASIS
Silicon dioxide	55.19
Aluminum oxide	22.45
Titanium dioxide	0.79
Iron oxide	4.46
Calcium oxide	6.90
Magnesium oxide	2.76
Potassium oxide	0.63
Sodium oxide	0.84
Sulfur trioxide	5.08
Phosphorus pentoxide	0.46
Strontium oxide	0.12
Barium oxide	0.03
Manganese oxide	0.02
Undetermined	0.27
	100.00

Silica Value = 79.63
Base:Acid Ratio = 0.20
T_{250} Temperature = 2756 °F

Type of Ash = LIGNITIC
Fouling Index = 0.84
Slagging Index = XXXXX

MEMBER ACIL

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Kristi Brells

Denver Laboratory

SGS

ADDRESS ALL CORRESPONDENCE TO:
COMMERCIAL TESTING & ENGINEERING CO.
4665 PARIS STREET, SUITE B-200
DENVER, CO 80239
TEL: (303) 373-4772
FAX: (303) 373-4791

November 11, 2003

DESERET GENERATION & TRANS.
12500 EAST 25500 SOUTH
VERNAL UT 84078

Sample identification by
DESERET GENERATION & TRANS.

SAMPLE ID: CTE-6
PULV. #5
2ND SAMPLE
16:45 Hrs.
END TEST
RAW COAL

P.O. No.: 56796

Kind of sample COAL

Sample taken at XXXXXXX

Sample taken by DESERET GENERATION & TRANS.

Date sampled October 15, 2003

Date received November 5, 2003

Analysis report no. 72-491175

ULTIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	12.91	xxxxx
% Carbon	60.43	69.39
% Hydrogen	4.05	4.65
% Nitrogen	1.21	1.39
% Sulfur	0.64	0.73
% Ash	11.64	13.36
% Oxygen(diff)	9.12	10.48
	100.00	100.00

MEMBER ACIL

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

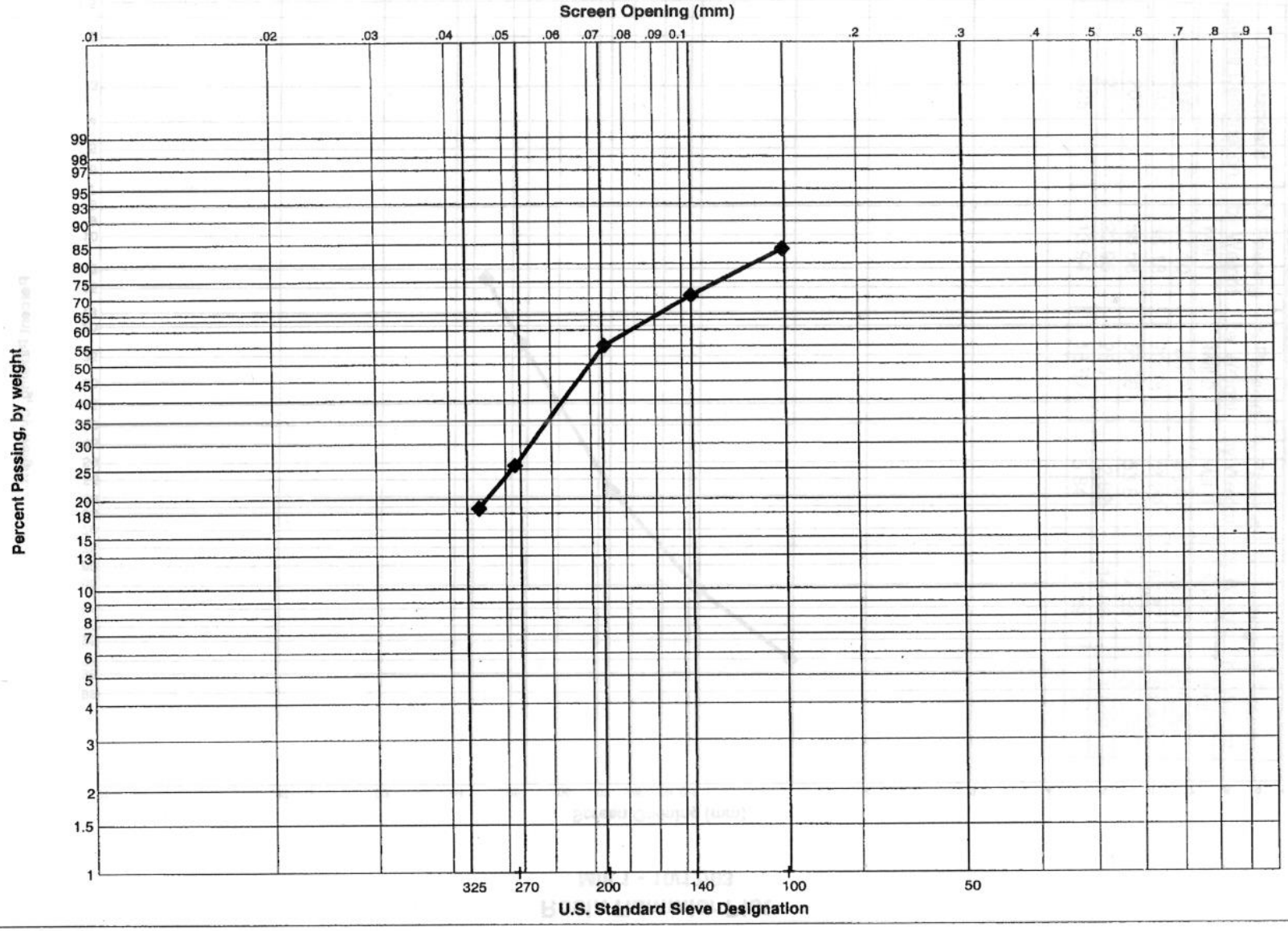
Kristi Bells

Denver Laboratory

ATTACHMENT D
Rosin-Rammler Plots

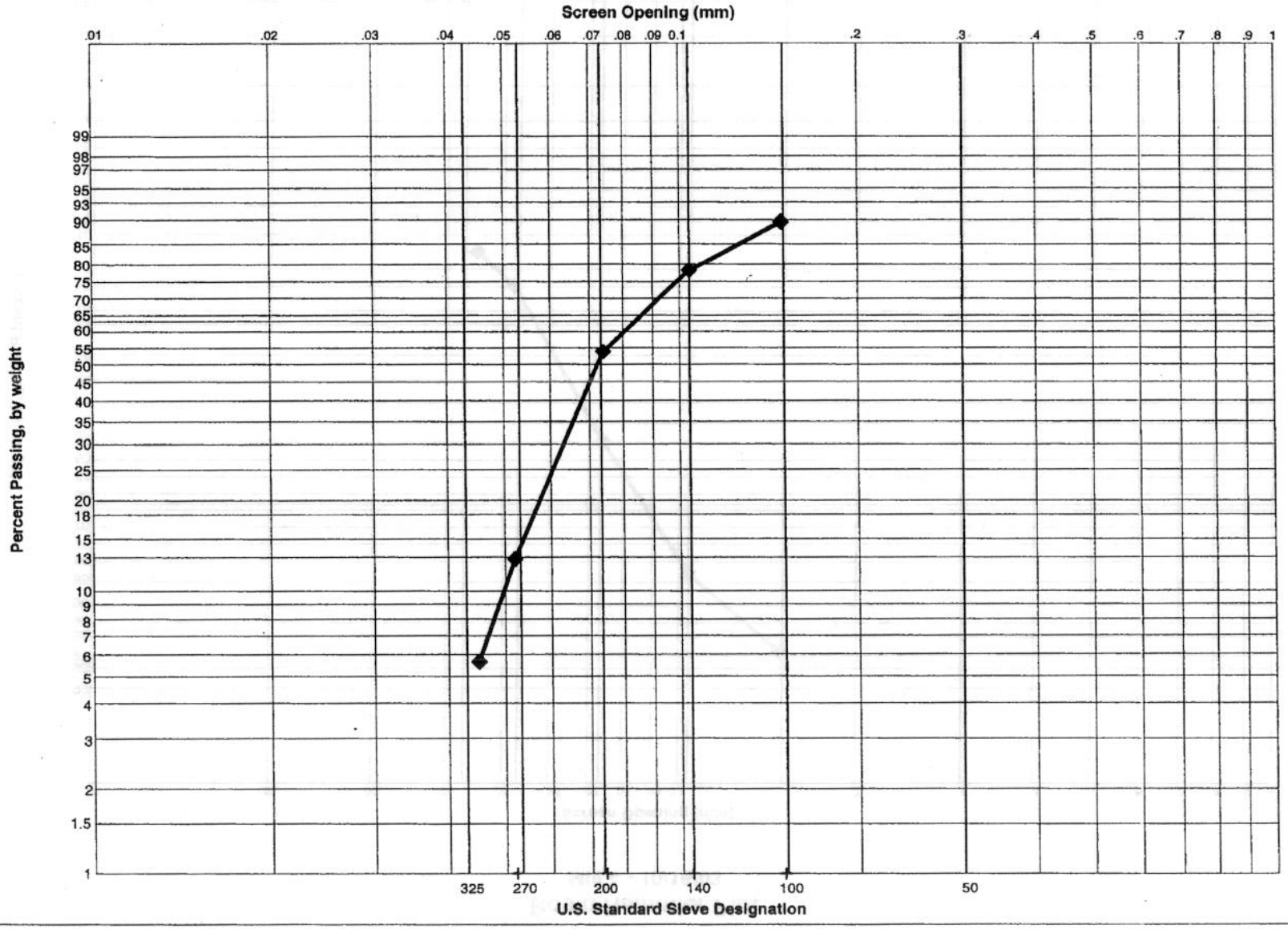
Rosin Rammler Plot

Mill 2 - 10/17/03



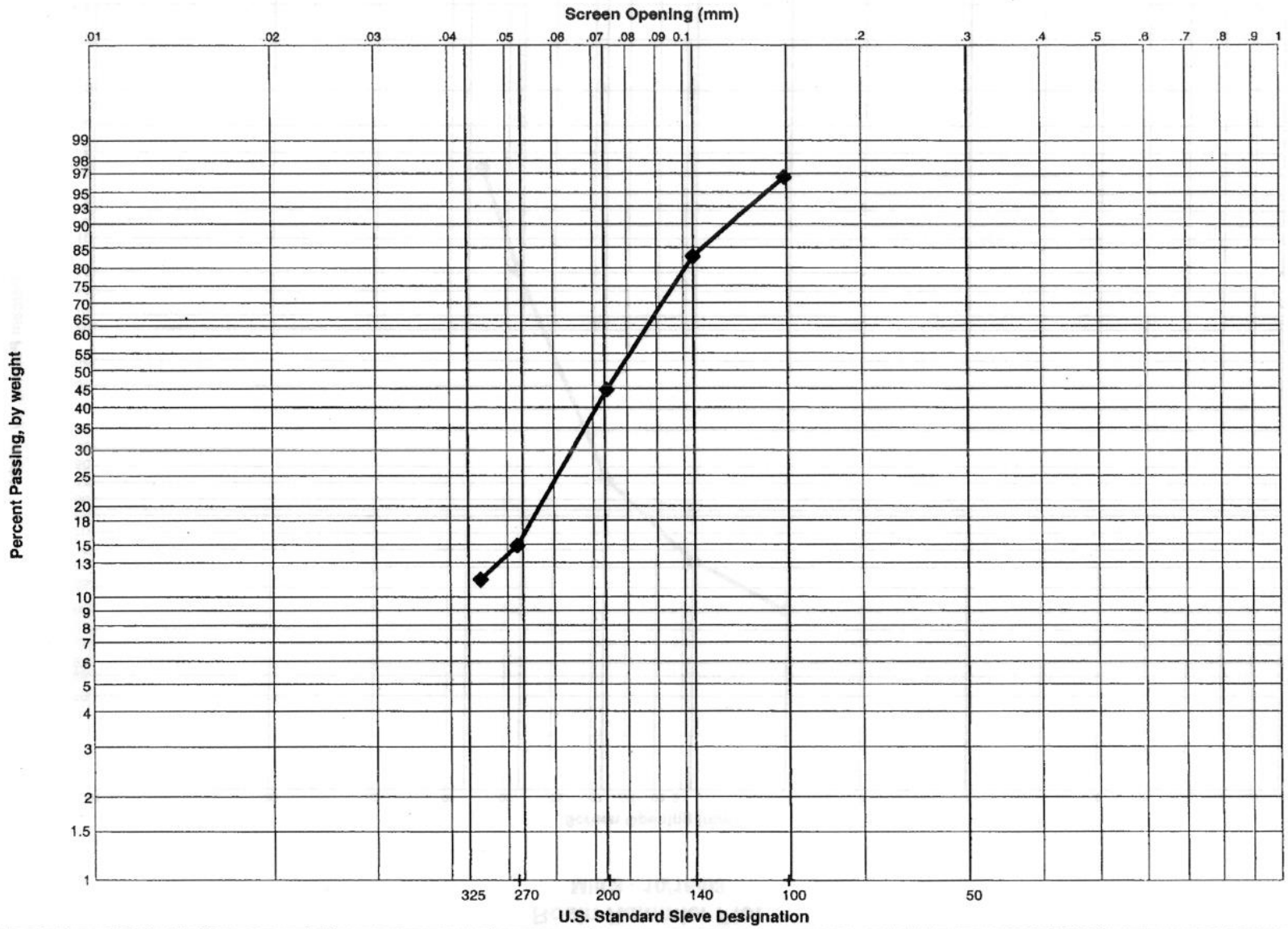
Rosin Rammler Plot

Mill 3 - 10/16/03



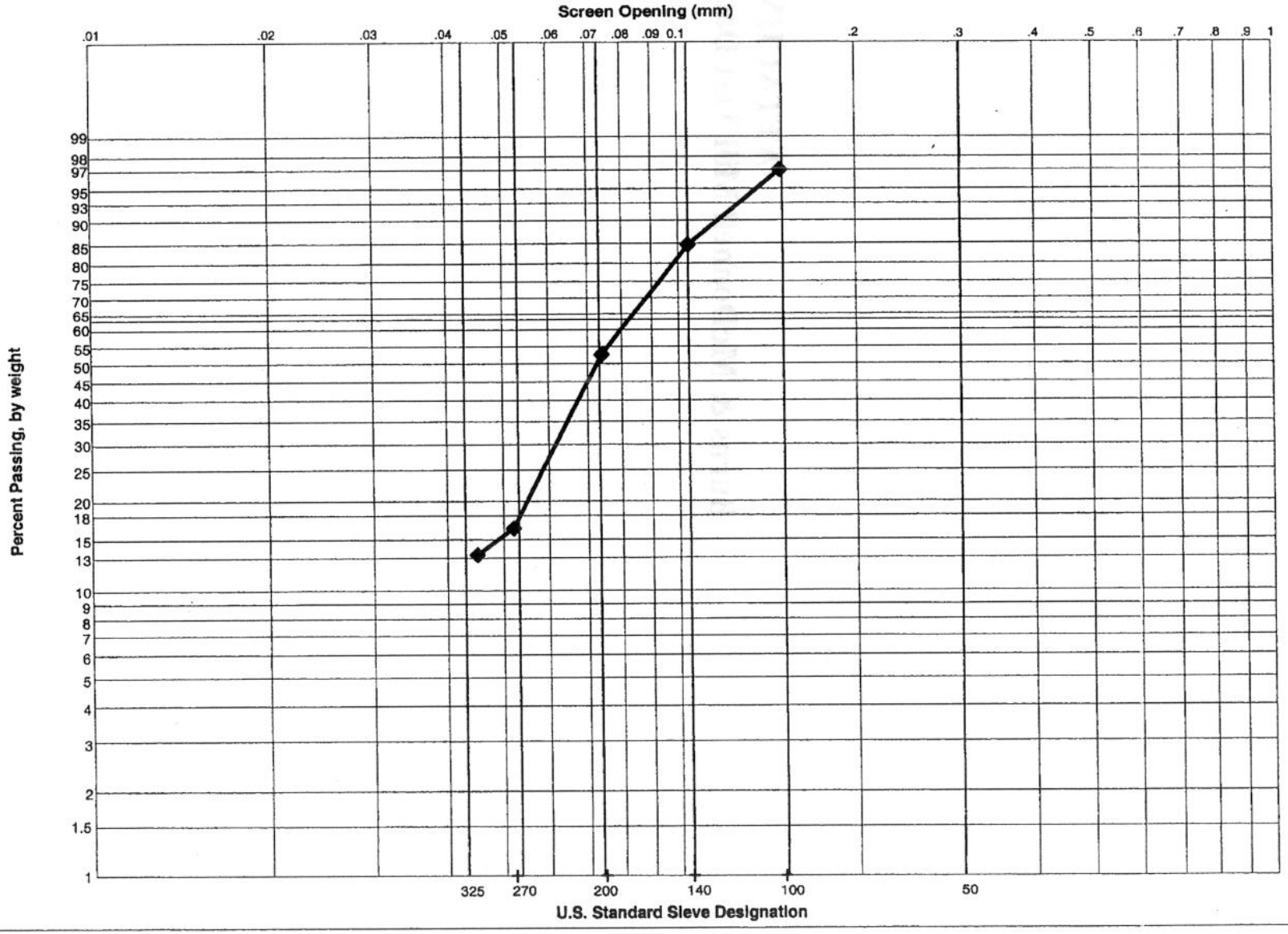
Rosin Rammler Plot

Mill 4 - 10/16/03



Rosin Rammler Plot

Mill 5 - 10/15/03



ATTACHMENT E
Burns & McDonnell Mill Test Data Sheets

Burns and McDonnell Engineering Co.
Pulverizer Performance Testing

SUMMARY

1	
22.500	
397.609	
4	
	0.28350
	6.0
	10

Parameter	Units
N/A	PPH
248,267	PPH
124,000	PPH
N/A	PPH
124,000	PPH
124,000	PPH
N/A	PPH
124,000	PPH
124,000	PPH
1,003	Grams
965	Grams
1	Percent
2.00	Ratio

Test Results Summary:													
Clean Air	Volumetric Flow	CFM	-	-	-	-	-	-	-	-	0	-	-
	Velocity	FPM	-	-	-	-	-	-	-	-	0	-	-
	Mass Flow	PPH	-	-	-	-	-	-	-	-	0	-	-
Dirty Air	Volumetric Flow	CFM	18,293	17,946	18,766	18,639	-	-	-	-	18,411	1.9	(2.5)
	Velocity	FPM	6,625	6,499	6,796	6,750	-	-	-	-	6,668	1.9	(2.5)
	Mass Flow	PPH	61,669	60,499	63,264	62,835	-	-	-	-	62,067	1.9	(2.5)
Gram Recovery		%	83.0	115.0	81.9	105.1	-	-	-	-	96.2	19.5	(14.9)
Pipe Coal Flow		PPH	26,727	37,039	26,374	33,859	-	-	-	-	31,000	19.5	(14.9)
Pipe A/F		Ratio	2.31	1.63	2.40	1.86	-	-	-	-	2.05	17.1	(20.3)

BMcD

Burns and McDonnell Engineering Co.
Pulverizer Performance Testing Program

TEST DATA

-	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
	113	111	108	107	110	109	150	150
	2.50	2.25	2.75	3.25	1.75	2.50	15.00	15.00
	30.02	30.02	30.02	30.02	30.02	30.02	30.02	30.02
124,000	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
	152	152	152	152	150	150	150	150
	11.50	11.50	11.50	11.50	15.00	15.00	15.00	15.00
124,000	25.07	25.07	25.07	25.07	29.92	29.92	29.92	29.92
	3.500	3.300	2.900	4.300				-
	3.000	3.200	2.800	4.000				-
N/A	2.800	2.900	2.300	3.300				-
	1.600	2.400	1.700	2.500				-
	1.300	2.300	1.200	2.200				-
N/A	1.000	2.200	1.100	1.900				-
	2.900	2.900	3.200	3.000				-
	3.600	3.200	3.900	3.800				-
124,000	4.000	3.600	4.000	4.000				-
	4.100	3.400	4.100	4.400				-
	3.700	3.300	3.800	4.500				-
124,000	3.600	1.900	3.700	4.500				-
	1.000	1.500	1.700	1.000				-
124,000	1.100	1.500	1.700	1.200				-
31,000	1.200	1.400	1.700	1.200				-
	1.200	1.500	2.000	1.200				-
	1.100	1.500	2.000	1.100				-
	1.200	1.700	1.800	1.300				-
10	3.100	2.900	2.500	3.600				-
	4.100	2.900	3.600	4.400				-
	4.800	3.000	4.300	4.700				-
1,003	5.400	3.000	5.200	4.900				-
965	5.600	2.800	5.800	5.300				-
96	4.000	2.000	5.000	2.300				-
	3.800	3.300	2.900	4.500				-
	3.900	3.300	3.600	4.200				-
	3.800	3.100	3.700	4.100				-
	3.700	3.000	3.800	4.100				-
	3.200	2.300	3.500	3.900				-
	2.500	2.500	2.600	2.500				-
	1.100	1.900	1.400	0.900				-
	1.200	1.800	1.400	0.900				-
	1.300	1.800	1.500	1.000				-
	1.300	2.000	1.300	0.900				-
	1.400	2.100	1.400	0.700				-
	1.500	1.800	1.500	0.600				-
	3.36	3.23	3.53	3.49	-	-	-	-
	832	1,153	821	1,054			-	-

BMcD

Burns and McDonnell Engineering Co.
Pulverizer Performance Testing

SUMMARY

Page 1 of 5

	1		0.28350
	22.750		8.0
	406.494		20
	4		

Parameter	Units
N/A	PPH
239,088	PPH
96,000	PPH
N/A	PPH
96,000	PPH
96,000	PPH
N/A	PPH
96,000	PPH
96,000	PPH
1,012	Grams
897	Grams
1	Percent
2.49	Ratio

Test Results Summary:												
Clean Air	Volumetric Flow	CFM	-	-	-	-	-	-	-	-	0	-	-
	Velocity	FPM	-	-	-	-	-	-	-	-	0	-	-
	Mass Flow	PPH	-	-	-	-	-	-	-	-	0	-	-
Dirty Air	Volumetric Flow	CFM	18,454	17,079	17,259	18,276	-	-	-	-	17,767	3.9	(3.9)
	Velocity	FPM	6,537	6,050	6,114	6,474	-	-	-	-	6,294	3.9	(3.9)
	Mass Flow	PPH	62,082	57,457	58,063	61,485	-	-	-	-	59,772	3.9	(3.9)
Gram Recovery		%	85.9	102.7	95.2	70.6	-	-	-	-	88.6	15.9	(20.3)
Pipe Coal Flow		PPH	23,271	27,818	25,785	19,125	-	-	-	-	24,000	15.9	(20.3)
Pipe A/F		Ratio	2.67	2.07	2.25	3.21	-	-	-	-	2.55	26.1	(19.0)

BMcD

Babcock & Wilcox Power Generation Group
Pulverizer Performance Testing Program

TEST DATA - 3A of 5

	1	2	3	4	5	6	7	8
	PIPE A	PIPE B	PIPE C	PIPE D	PIPE E	PIPE F	PIPE G	PIPE H
-	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
	150	150	150	150	150	150	150	150
	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
	29.92	29.92	29.92	29.92	29.92	29.92	29.92	29.92
	1	2	3	4	5	6	7	8
	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
	145	145	145	145	150	150	150	150
	7.50	7.50	7.50	7.50	15.00	15.00	15.00	15.00
96,000	25.02	25.02	25.02	25.02	29.92	29.92	29.92	29.92
	2.500	2.000	2.000	2.200	-	-	-	-
	2.500	2.300	2.200	2.400	-	-	-	-
96,000	2.800	2.500	2.200	2.600	-	-	-	-
N/A	2.800	2.600	2.200	2.400	-	-	-	-
	2.400	2.600	2.100	2.300	-	-	-	-
	2.300	2.600	2.000	2.200	-	-	-	-
N/A	2.400	2.300	2.100	2.400	-	-	-	-
	2.500	2.200	2.100	2.400	-	-	-	-
	2.700	2.100	2.100	2.400	-	-	-	-
96,000	2.600	2.000	2.000	2.500	-	-	-	-
	2.400	1.700	2.000	2.400	-	-	-	-
	2.100	0.900	1.800	2.100	-	-	-	-
96,000	1.800	1.800	1.800	1.700	-	-	-	-
	1.900	1.900	2.000	2.000	-	-	-	-
24,000	2.100	2.000	2.100	2.100	-	-	-	-
	2.100	2.100	2.100	2.100	-	-	-	-
	2.200	2.300	2.100	2.300	-	-	-	-
	2.200	2.200	2.100	2.300	-	-	-	-
20	2.400	2.500	2.400	2.800	-	-	-	-
	2.800	2.400	2.500	3.200	-	-	-	-
	3.200	2.400	2.700	3.500	-	-	-	-
1,012	3.400	2.400	2.700	3.500	-	-	-	-
897	3.100	2.100	2.400	2.800	-	-	-	-
89	2.000	1.100	1.900	1.600	-	-	-	-
	3.26	2.80	2.85	3.20	-	-	-	-
	870	1,040	964	715	-	-	-	-

BMcD

Burns and McDonnell Engineering Co.
Pulverizer Performance Testing

SUMMARY

	1		0.28350
	22.750		6.0
	406.494		15
	4		

Parameter	Units
N/A	PPH
209,660	PPH
96,000	PPH
N/A	PPH
96,000	PPH
96,000	PPH
N/A	PPH
96,000	PPH
96,000	PPH
759	Grams
742	Grams
1	Percent
2.18	Ratio

Test Results Summary

Clean Air	Volumetric Flov	CFM	-	-	-	-	-	-	-	-	0	-	-
	Velocity	FPM	-	-	-	-	-	-	-	-	0	-	-
	Mass Flow	PPH	-	-	-	-	-	-	-	-	0	-	-
Dirty Air	Volumetric Flov	CFM	15,822	16,000	15,592	15,422	-	-	-	-	15,709	1.9	(1.8)
	Velocity	FPM	5,605	5,668	5,523	5,463	-	-	-	-	5,565	1.9	(1.8)
	Mass Flow	PPH	52,791	53,388	52,025	51,456	-	-	-	-	52,415	1.9	(1.8)
Gram Recovery		%	85.6	115.1	95.1	95.2	-	-	-	-	97.8	17.8	(12.4)
Pipe Coal Flow		PPH	21,017	28,260	23,345	23,378	-	-	-	-	24,000	17.8	(12.4)
Pipe A/F		Ratio	2.51	1.89	2.23	2.20	-	-	-	-	2.21	13.8	(14.4)

BMcD

Burns and McDonnell Engineering Co.

Pulverizer Performance Testing Program

TEST DATA 3A of 5

	Unit	Pulverizer Max Rating, PPH							
		PIPE1	PIPE2	PIPE3	PIPE4	PIPE5	PIPE6	PIPE7	PIPE8
		0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
		150	150	150	150	150	150	150	150
		15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
		29.92	29.92	29.92	29.92	29.92	29.92	29.92	29.92
		0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
96,000		150	150	150	150	150	150	150	150
		7.50	7.50	7.50	7.50	15.00	15.00	15.00	15.00
96,000		25.02	25.02	25.02	25.02	29.92	29.92	29.92	29.92
		1.500	1.200	1.300	1.500	-	-	-	-
		1.600	1.400	1.400	1.700	-	-	-	-
N/A		1.600	1.700	1.500	1.700	-	-	-	-
		1.500	1.500	1.600	1.700	-	-	-	-
		1.600	1.500	1.600	1.600	-	-	-	-
N/A		1.300	1.500	1.600	1.600	-	-	-	-
		1.800	1.800	1.900	1.800	-	-	-	-
		2.000	2.100	2.000	2.000	-	-	-	-
96,000		2.100	2.400	2.200	2.000	-	-	-	-
		2.200	2.400	2.100	2.000	-	-	-	-
		2.100	2.200	2.000	2.100	-	-	-	-
96,000		1.100	1.600	1.400	1.000	-	-	-	-
		1.300	1.500	1.400	1.300	-	-	-	-
96,000		1.500	1.500	1.600	1.300	-	-	-	-
24,000		1.500	1.700	1.600	1.500	-	-	-	-
		1.600	1.800	1.600	1.500	-	-	-	-
		1.600	1.800	1.800	1.600	-	-	-	-
		1.700	1.800	1.800	1.600	-	-	-	-
15		2.000	2.100	1.900	2.000	-	-	-	-
		2.300	2.300	2.000	2.200	-	-	-	-
		2.500	2.300	2.100	2.200	-	-	-	-
759		2.500	2.400	2.300	2.200	-	-	-	-
742		2.500	2.300	2.200	1.600	-	-	-	-
98		2.000	1.500	1.100	1.400	-	-	-	-
		2.38	**2.43**	**2.31**	**2.26**	-	-	-	-
		650	874	722	723	-	-	-	-

BMcD

Brinks and McDonell Engineering Co.
Pulverizer Performance Testing

SUMMARY

	1
	22.500
	397.609
	4
	0.28350
	6.0
	10

Parameter	Units
N/A	PPH
262,167	PPH
132,000	PPH
N/A	PPH
132,000	PPH
132,000	PPH
N/A	PPH
132,000	PPH
132,000	PPH
1,067	Grams
1,133	Grams
1	Percent
1.99	Ratio

Test Results Summary:

Clean Air	Volumetric Flov	CFM	-	-	-	-	-	-	-	-	0	-	-
	Velocity	FPM	-	-	-	-	-	-	-	-	0	-	-
	Mass Flow	PPH	-	-	-	-	-	-	-	-	0	-	-
Dirty Air	Volumetric Flov	CFM	18,979	19,371	18,912	19,790	-	-	-	-	19,263	2.7	(1.8)
	Velocity	FPM	6,873	7,016	6,849	7,167	-	-	-	-	6,976	2.7	(1.8)
	Mass Flow	PPH	64,574	65,910	64,348	67,335	-	-	-	-	65,542	2.7	(1.8)
Grain Recovery		%	96.5	122.3	100.2	105.5	-	-	-	-	106.1	15.2	(9.1)
Pipe Coal Flow		PPH	30,013	38,026	31,150	32,811	-	-	-	-	33,000	15.2	(9.1)
Pipe A/F		Ratio	2.15	1.73	2.07	2.05	-	-	-	-	2.00	7.5	(13.4)

BMcD

Burns and McDonnell Engineering Co.
Pulverizer Performance Testing Program

TEST DATA

-	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
	113	111	108	107	110	109	150	150
	2.50	2.25	2.75	3.25	1.75	2.50	15.00	15.00
	30.02	30.02	30.02	30.02	30.02	30.02	30.02	30.02
132,000	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
	149	149	149	149	150	150	150	150
	13.00	13.00	13.00	13.00	15.00	15.00	15.00	15.00
132,000	25.07	25.07	25.07	25.07	29.92	29.92	29.92	29.92
	2.400	2.900	1.100	3.800				-
	2.300	2.800	1.300	3.500				-
N/A	2.400	2.300	1.600	3.100				-
	2.300	2.000	1.900	2.300				-
	2.000	1.700	2.000	2.000				-
N/A	1.900	1.600	2.000	1.800				-
	3.500	3.700	3.700	3.300				-
	4.000	4.300	4.500	4.100				-
132,000	4.100	4.400	4.700	4.600				-
	3.900	4.700	4.600	5.000				-
	4.000	4.700	4.000	5.400				-
132,000	3.100	3.500	3.200	5.100				-
	2.300	2.100	1.600	1.900				-
132,000	2.300	2.000	1.500	1.900				-
33,000	2.500	1.900	1.800	1.900				-
	2.100	2.000	1.900	1.800				-
	2.200	1.900	1.800	1.600				-
	2.200	2.000	1.800	1.700				-
10	2.900	3.200	3.500	3.400				-
	3.700	3.800	4.500	4.200				-
	4.200	4.100	5.000	4.600				-
1,067	4.700	4.100	5.500	5.100				-
1,133	5.500	4.200	6.400	4.900				-
106	3.000	2.900	6.100	2.200				-
	3.100	4.000	4.400	4.600				-
	3.300	4.400	4.600	4.500				-
	3.400	4.100	4.700	4.200				-
	3.500	3.900	4.800	4.100				-
	3.600	3.400	4.400	4.000				-
	3.100	2.700	3.200	3.100				-
	1.500	1.600	1.100	1.400				-
	1.500	1.800	0.900	1.400				-
	1.400	2.000	0.900	1.600				-
	1.400	2.000	0.800	1.600				-
	1.400	1.900	0.900	1.500				-
	1.300	1.600	0.700	1.500				-
	3.65	3.80	3.62	3.97	-	-	-	-
	1,030	1,305	1,069	1,126			-	-

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Burns and McDonnell Engineering Co.

Pulverizer Performance Testing

SUMMARY

	1		0.28350
	22.500		6.0
	397.609		10
	4		

Parameter	Units
N/A	PPH
256,323	PPH
124,000	PPH
N/A	PPH
124,000	PPH
124,000	PPH
N/A	PPH
124,000	PPH
124,000	PPH
1.003	Grams
1.096	Grams
1	Percent
2.07	Ratio

Test Results Summary:

Clean Air	Volumetric Flow	CFM	-	-	-	-	-	-	-	-	0	-	-
	Velocity	FPM	-	-	-	-	-	-	-	-	0	-	-
	Mass Flow	PPH	-	-	-	-	-	-	-	-	0	-	-
Dirty Air	Volumetric Flow	CFM	18,664	18,798	17,872	18,864	-	-	-	-	18,550	1.7	(3.7)
	Velocity	FPM	6,760	6,808	6,473	6,832	-	-	-	-	6,718	1.7	(3.7)
	Mass Flow	PPH	64,442	64,998	61,752	65,131	-	-	-	-	64,081	1.6	(3.6)
Gram Recovery		%	114.4	110.2	117.2	95.4	-	-	-	-	109.3	7.2	(12.8)
Pipe Coal Flow		PPH	32,450	31,262	33,242	27,046	-	-	-	-	31,000	7.2	(12.8)
Pipe A/F		Ratio	1.99	2.08	1.86	2.41	-	-	-	-	2.08	15.6	(10.8)

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Burns and McDonnell Engineering Co.
Pulverizer Performance Testing Program

TEST DATA

-	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
	113	111	108	107	110	109	150	150
	2.50	2.25	2.75	3.25	1.75	2.50	15.00	15.00
	30.02	30.02	30.02	30.02	30.02	30.02	30.02	30.02
124,000	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
	141	141	141	141	150	150	150	150
	13.50	14.00	13.75	13.50	15.00	15.00	15.00	15.00
124,000	25.07	25.07	25.07	25.07	29.92	29.92	29.92	29.92
	3.200	3.800	3.000	3.100				-
	3.200	3.900	2.800	3.300				-
N/A	3.000	3.400	2.300	3.200				-
	2.600	2.400	2.000	3.000				-
	2.100	1.900	1.600	2.600				-
N/A	1.800	1.500	1.500	2.200				-
	2.800	3.200	3.000	3.100				-
	3.400	4.000	3.300	3.500				-
124,000	3.800	4.300	3.800	3.700				-
	4.100	4.100	4.000	3.500				-
	4.400	3.600	4.100	3.400				-
124,000	3.300	3.000	2.700	3.300				-
	2.400	1.600	1.400	2.900				-
124,000	2.500	1.600	1.900	3.500				-
31,000	2.400	1.900	1.700	3.300				-
	2.100	1.900	1.800	3.500				-
	1.800	1.700	1.700	3.000				-
	1.700	1.500	1.800	2.500				-
10	2.300	2.800	3.000	1.700				-
	3.000	4.200	3.400	1.600				-
	3.700	4.800	3.600	1.900				-
1,003	4.000	6.400	3.700	2.000				-
1,096	4.200	6.400	3.400	2.000				-
109	3.800	3.500	2.100	1.100				-
	3.300	3.800	3.500	3.000				-
	3.800	4.000	3.600	3.400				-
	4.000	4.100	3.400	3.250				-
	4.000	4.000	3.400	3.250				-
	3.200	3.500	3.100	2.800				-
	2.500	2.800	2.700	2.350				-
	1.400	1.100	1.400	2.400				-
	1.300	1.000	1.400	2.550				-
	1.300	1.000	1.600	2.800				-
	1.300	1.000	1.500	2.750				-
	1.300	1.100	1.700	2.700				-
	1.200	1.000	1.000	2.200				-
	3.58	3.64	3.29	3.66	-	-	-	-
	1,147	1,105	1,175	956			-	-

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