Appendix 5.0-1

MILL 1A1 LOW LOAD MAXIMUM FINENESS TESTS - JAN. 28, 29, 1997 AT NYSE&G CORP. MILLIKEN STATION FOR MICRONIZED COAL REBURN DEMONSTRATION PROJECT

MILL 1A1 LOW LOAD
MAXIMUM FINENESS TESTS - JAN. 28, 29, 1997

AT

NYSE&G CORP. MILLIKEN STATION

FOR

MICRONIZED COAL REBURN

DEMONSTRATION PROJECT

FEBRUARY 27, 1997

DB RILEY CONTRACT NO. 97801

DEUTSCHE BABCOCK

DB RILEY, INC.

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1.0 Introduction and Background

Introduction

In 1996, NYSE&G Corporation contracted DB Riley, Inc. to provide mill system technical support in conjunction with NYSE&G's DOE-sponsored Micronized Coal Reburn Demonstration Project, utilizing, as a test site, Unit 1 at NYSE&G's Milliken Station.

This report summarizes part load, maximum mill capability, fineness tests conducted January 28, 29, 1997 on Mill 1A1 serving the boiler's top burner row. Test loads and procedures were outlined in DB Riley's 1A1 Mill Test Plan submitted to NYSE&G on January 7, 1997 (see Appendix).

Background

Mill 1A1 is one of a total of eight MPS 150 mills supplied by DB Riley as part of an entire milling system retrofit project for the two 148 MW Milliken Station units (4 mills/unit). Commissioning of these two new milling systems occurred in July 1993 for Unit 1 and December 1994 for Unit 2.

All MPS 150 mills installed at Milliken Station are equipped with planetary gear reducers, hydro-pneumatic roller loading, and hydraulically-driven dynamic classifiers (type SLS). Mills were guaranteed to deliver 18.4 ton/hr of pulverized coal at a minimum fineness of 87% thru 200 mesh and 98% thru 100 mesh, when grinding an eastern bituminous coal having a moisture content of 5.6% and grindability of 57 HGI. Previous mill tests at 18.4 ton/hr demonstrated a mill product fineness capability of 94% thru 200 mesh and 100% thru 100 mesh with coal having a moisture level of 5.0% and HGI of 55.8.

Singular to mill 1A1 is a different Rexroth-supplied back pressure roller loading control valve intended to provide higher and more stable cap-end loading cylinder pressure for better system cushioning.

2.0 Executive Summary

2.1 Objective

This report is intended to summarize operating performance of the Milliken Station 1A1 mill under reduced coal throughput levels but at elevated classifier speeds to create equivalent maximum mill grinding capability conditions.

2.2 Findings

2.2.1 For load tests of 8, 10, & 12 ton/hr product fineness values ranged as follows:

51- 63% thru 325 mesh
92+ - 97+ % thru 200 mesh
100% thru 100 mesh
100% thru 50 mesh
(see RR size distribution plots and lab results in Appendix)

2.2.2 Incidents of mill vibration occurred primarily in the transitional stages while increasing classifier speeds.

2.2.3 Classifier speeds reached, and grinding pressures established for the three tests were as follows:

Load (TPH)	Classifier Speed (RPM)	Grinding Loading (PSIG)
12	119	986
10	128	840
8	132	737

(See loading characterization & classifier speed curves in Appendix)

2.2.4 Corresponding Back Loading Pressures:

12	50-200
10	50-150
8	50-150

(See data sheets in Appendix)

2.2.5 Indicated test air flows (with a 4%+ bias) were about 6.5% higher than 'standard' air flows. Calculated air flows by mill heat balance, using raw coal laboratory air dry values, were 3 to 5% higher than standard values.

(See air/coal characterization curve sheet & lab report in Appendix)

2.2.6 Mill differentials for each test were as follows:

Load (TPH)	Mill ΔP "wc
12	21 → 21+
10	20.4 → 21+
8	20"

2.3 Conclusions

2.3.1 A1 mill can operate stably over a load range of 8-12 ton/hr at elevated classifier cage speeds while producing mill differentials in the range of 20-21+ "wc.

2.3.2 The higher classifier speeds produce much steeper (more vertical) particle size distributions when plotted on Rosin-Rarmecer probability grids, indicating better sharpness of classification.

2.3.3 Based on observed analog charting of mill differentials, future maximum fineness runs at reduced mill loads in the 8-12 TPH range should have slightly altered classifier speeds.

2.3.4 From these tests, one can now predict a range of mill product fineness values when 1A1 mill is operated in similar fashion over an 8-12 ton/hr load range.

2.3.5 The special back pressure control valve installed on the HPU of mill 1A1 provides no noticeable improvement in back-pressure cushioning.

2.4 Recommendations

2.4.1 For future maximum fineness operation of mill 1A1 over the 8-12 ton/hr load range, air flows, roller loadings, and classifier speeds should be as follows:

Air Flow

Anywhere between the standard characterized values and those for the Jan. 28 & 29 test runs which represented a +4% bias adjustment. (See attached marked air characterization curves in Appendix).

Roller Loading

Per the characterization established for the 1A1 mill on Jan. 27, '97 and, if necessary, biased down to the lower values used during the Jan. 28 & 29 tests. See roller loading characterization curve in Appendix.

Classifier Speeds

Per the recommended curve shown on the classifier speed vs. mill load curve in the Appendix. Specific values:

12 ton/hr - 118 RPM
10 ton/hr - 126 RPM
8 ton/hr - 134 RPM

3.0 Discussion

From the mill product size distribution plot on R-R, I would estimate the classifier separating size for the speeds tested to be about 65 mm. This is based on an assumed level of 95% + 325 mesh and 90% + 200 mesh in the classifier rejects. This would yield an average (8-12 TPH range) classifier efficiency of about 92%. Of course, to accurately determine the above values, we would need to obtain samples and determine the particle sizing of material to the classifier and in the classifier rejects.

The steepness of the RR particle size distribution and hence sharpness of classification, as measured in these tests, supports previously stated claims for dynamic classification and, in particular, the SLS classifier. An example of this is DBR's R-R plot (included in the Appendix) showing the effect of increasing SLS classifier cage speed on particle size distribution.

For any given mill throughput, the upper limit on classifier cage speed, which has a direct effect on product fineness, is determined by the mill's grinding capability, which is, in turn, affected by the amount of applied roller loading. Therefore, if the level of roller loading is reduced to assure adequate grinding table bed level to prevent mill vibration, then the mill grinding capability is reduced and likewise the maximum classifier speed at that particular mill loading.

The roller loading characterization curve established for 1A1 mill on Jan. 27 and included in the Appendix seems to be a good 'target' for continued mill operation with the existing grinding parts. Also shown on this curve sheet is the original roller loading curve established at the time of mill commissioning in 1993, and actual values employed during the Jan. 28-29 tests.

For the 12 & 10 TPH tests, a slight upward drift of mill ΔP was noted, whereas a stable (and lower value) mill ΔP existed for the 8TPH test - despite a lower coal grindability of 52HGI vs 56 HGI for the other tests. For this reason, I have shown recommended revised classifier speeds over the 8-12 ton/hr load range on the classifier speed vs. mill load curve sheet in the Appendix. Interestingly, the new selected values plot as a linear function with mill loading.

The slightly higher than standard air flows used for the January 28-29 tests were a carry-over from Jan. 27 when a 4% + bias was applied to prevent coal dribble during mill start-up with very low grinding pressures. This higher air flow was not thought to significantly affect mill performance so was maintained throughout the two days of testing. Future tests could be carried out with or without this added air flow.

To try to confirm the amount of primary air flow, heat balance calculations were made. Calculated values were within 2% of indicated values. This is shown on the air/coal characterization curve sheet in the Appendix. For moisture remaining in the pulverized coal, the DBR laboratory's "air dry loss" was used rather than the measured value in the pulverized coal. This was done because of the likelihood of reabsorbed moisture during the handling and splitting of the PC samples at the plant. Further, for the mill entering temperature, a value 5°F less than the recorded value was used because of the uninsulated mill inlet ducting on Unit 1 mills downstream of the mill inlet temperature sensor.

As noted in earlier correspondence, DBR's reported fineness values thru 170 mesh for the 10 TPH test appear to be in error (sample Nos. 47562 & 47563). I did not include these two values when calculating an average thru 170 mesh for the 10 TPH test.

Mill 1A1 loading cylinder back pressures (cap end of cylinder) fluctuated constantly between <50 psig & 200 psig throughout the tests; similar to that on the other mills. Hence, there appears to be little or no benefit provided by the special back pressure control valve on mill 1A1. This most likely is due to the fixed open flow path thru the orifices located in the back pressure circuitry. Good back pressure control with unlimited pressure range flexibility would require entirely new circuitry - such as provided at this time on new MPS mill roller loading hydraulic systems.

NYSE&G CORP.

MILLIKEN STATION

MILL 1A1

REDUCED MILL LOAD PRODUCT FINENESS TEST PLAN

REF.
MICRONIZED COAL REBURN DEMONSTRATION PROJECT

DB RILEY CONTRACT NO. 97801

OBJECTIVE

Determine 1A1 mill's maximum attainable product fineness at designated reduced mill loadings.

METHODOLOGY

At each chosen mill loading, classifier cage speed will be increased to the limit of mill grinding capability as determined by the level and stability of mill differential pressure or by the retention of an adequate grinding table fuel bed. At each such limiting but stable mill condition, pulverized coal samples will be obtained by traversing the mill's four output coal pipes. Also, during each test run, raw coal samples will be obtained, along with mill system operating data as indicated herein.

PRE TEST REQUIREMENTS/ADJUSTMENTS

- Reset tension rod bed level indicators to zero with the mill out of service and grinding rollers resting on a clean grinding track.
- Adjust the back cylinder-loading control valve on the HPU to provide maximum back pressure (up to but not to exceed 300 psig).
- Have available ASME cyclone sampling assemblies.
- Have on hand sufficient sample collection containers
- Install a local manometer to obtain mill outlet pressure (a connection should exist in the classifier top inspection cover).

MILL TEST LOADINGS

Tests will be conducted at the following mill throughputs:

8 ton/hr.
10 ton/hr.
12 ton/hr.

One test run at each mill throughput will be sufficient unless it is necessary to adjust grinding pressure to sustain an adequate fuel bed. If this becomes the limiting factor, a second test at different classifier cage speed and grinding pressure would be advisable.

CONTROL SETTINGS

ITEM	MODE
Mill load demand	manual
Primary air flow	auto
Mill exit temperature*	auto
Roller loading	auto
Seal air	auto
Feeder	auto
Classifier speed	manual

*May need to reduce if fuel bed retention becomes a problem.

RAW COAL SAMPLING AND ANALYSIS

- Two raw coal samples from coal feeder per test run (one each for NYSE&G and DBR)
- Analyze for moisture and grindability

PULVERIZED COAL SAMPLING AND ANALYSIS

- Multiple traverse samples from all four coal pipes
- Determine moisture content
- Analyze per ASTM D197-30 for fineness thru 50, 100, 120, 140, 170, 200, 325 and 400 mesh screens

NOTE: Samples should be split for separate analysis by NYSE&G and DBR.

DATA ACQUISITION AND ANALOG DEPICTION

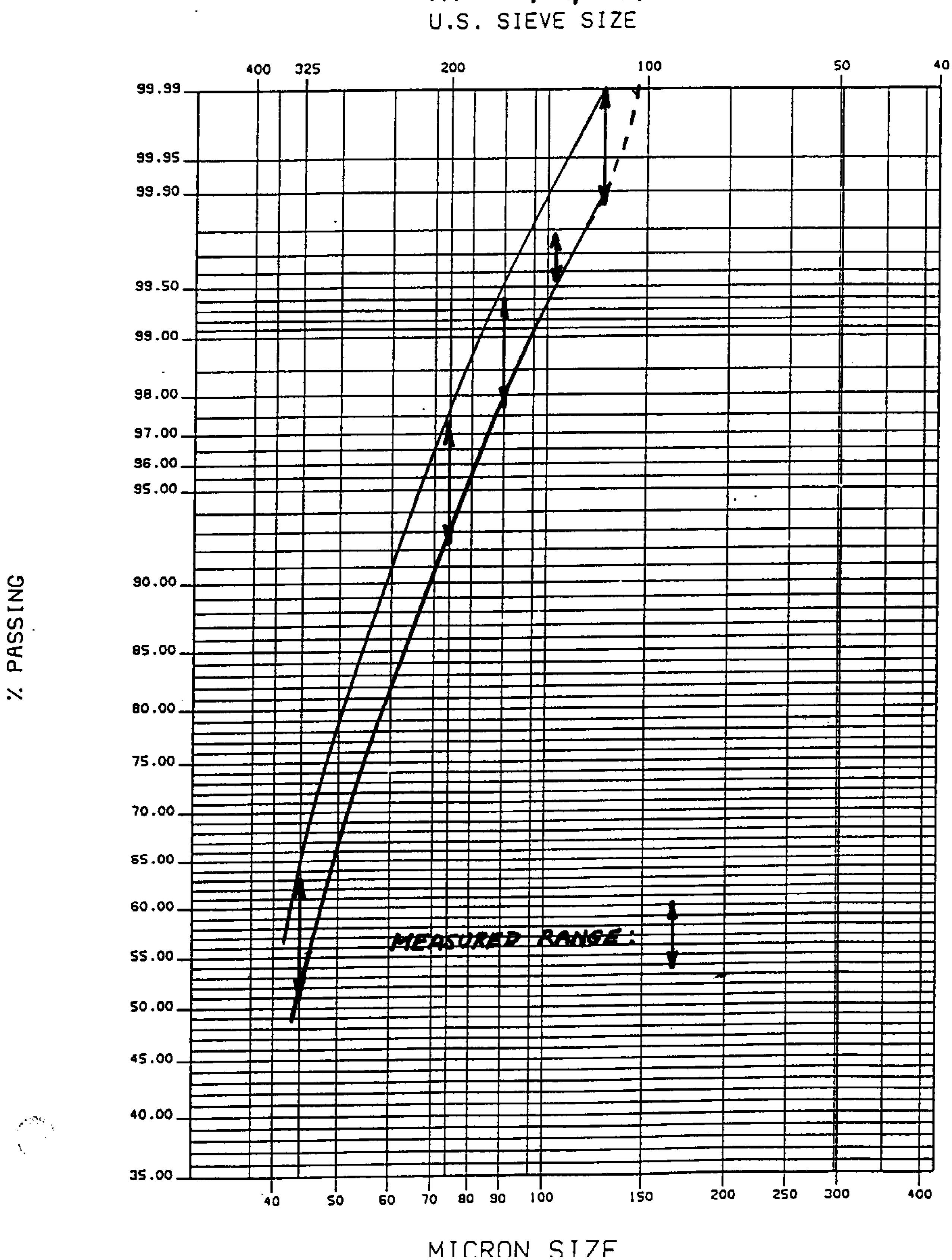
The attached boiler and mill system data sheets shall be completed twice for each test run. Computer screen print-outs should be obtained as well for verification.

Throughout test runs, mill differential and mill exit temperature should be continuously exhibited as analog signals.

TEST SET-UP AND MILL STABILIZATION

On each test day, the 1A1 mill should be at the designated test load by 6 AM under normal operating conditions. This will provide a minimum two hour stabilization period before the start of classifier speed adjustment and attendant observation of mill operating parameters.

ROSIN-RAMMLER
PARTICLE SIZE DISTRIBUTION
NYSE&G CORP. MILLIKEN STA.
MILL 1A1
8, 10, & 12 TPH
JAN. 28, 29, 1997



RILEY

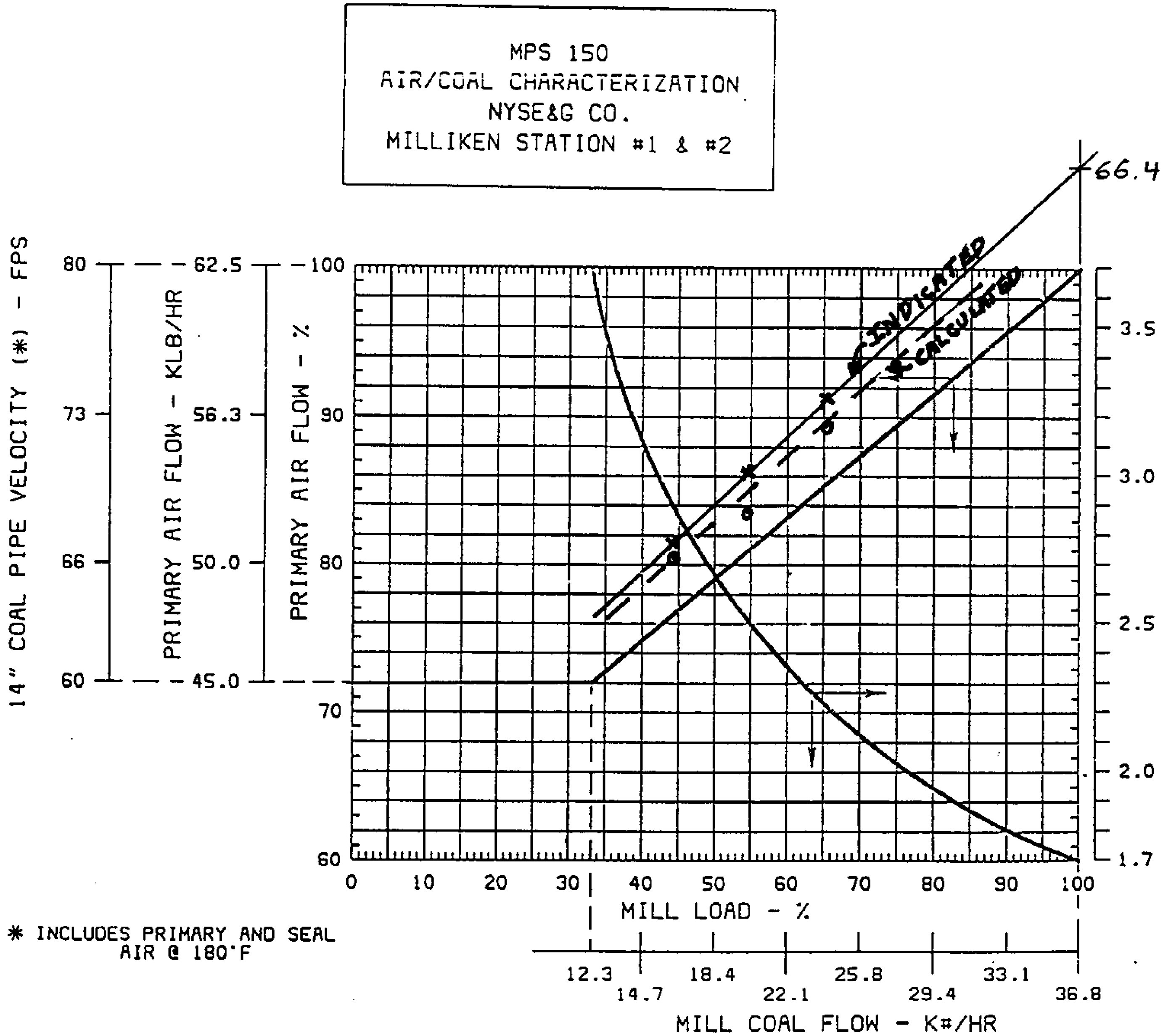
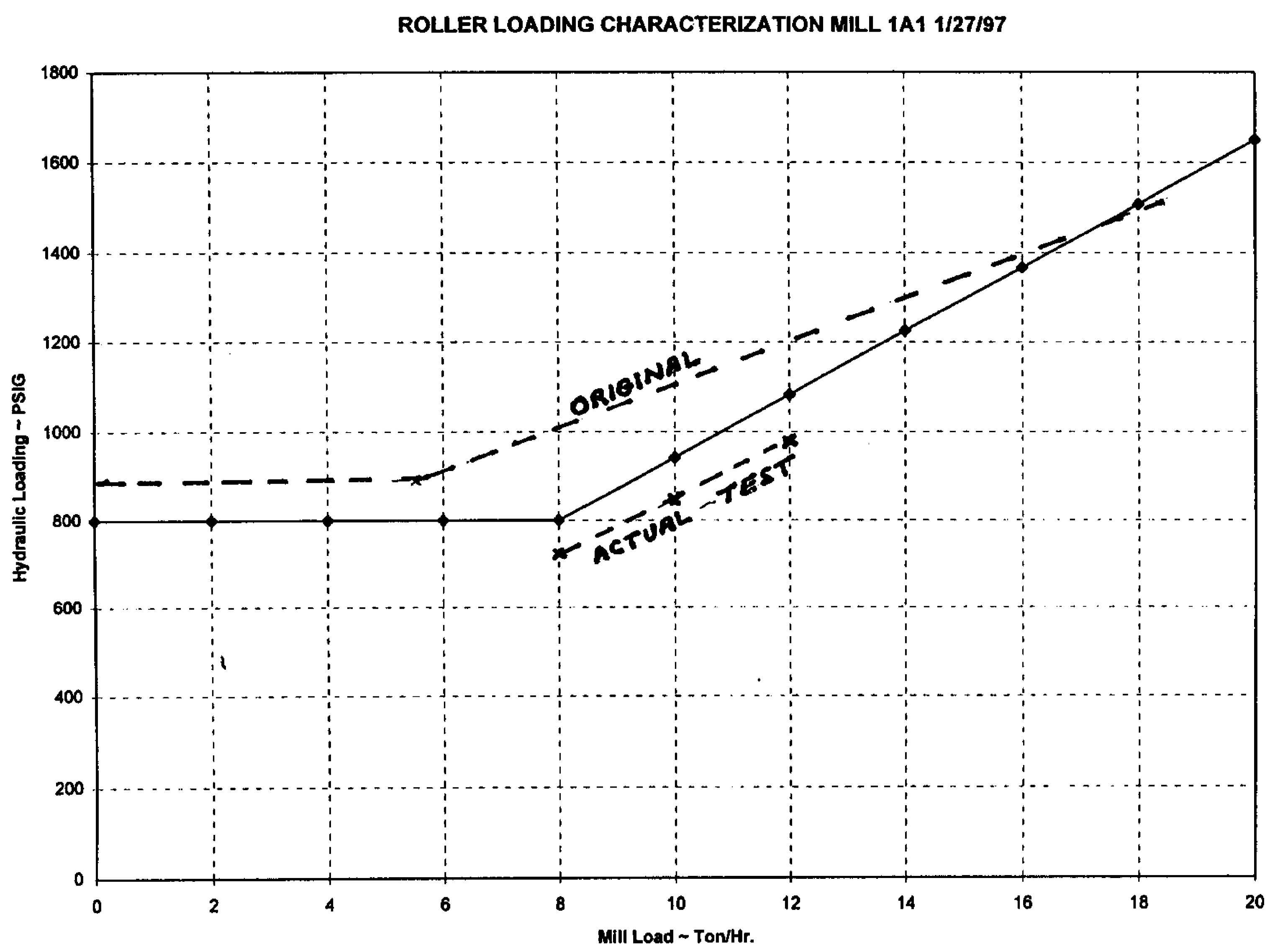
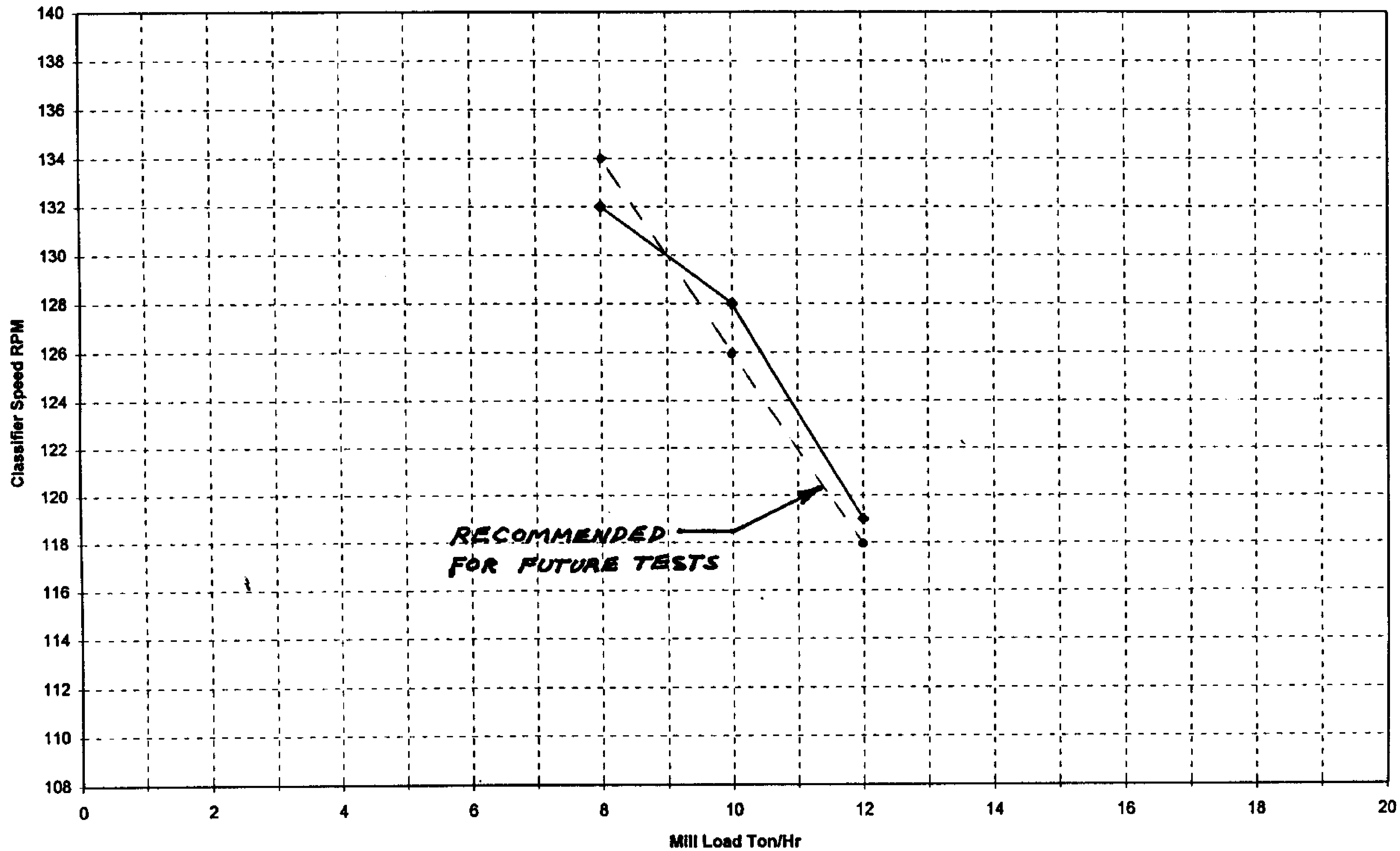


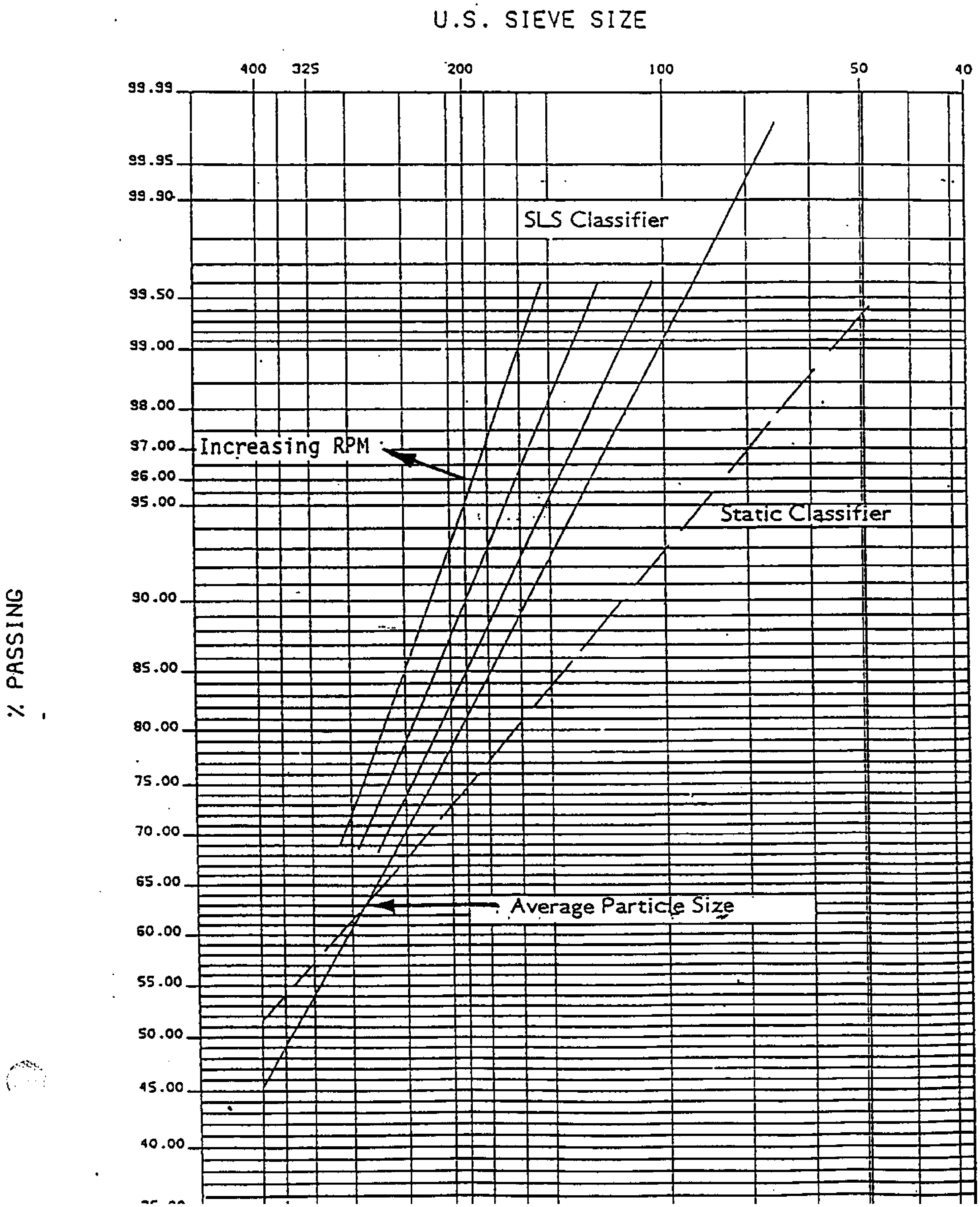
Figure 1.


ROLLER LOADING CHARACTERIZATION MILL 1A1 1/27/97
Hydraulic Loading ~ PSIG
Mill Load ~ Ton/Hr.
ORIGINAL
ACTUAL TEST
1800
1600
1400
1200
1000
800
600
400
200
0
0
2
4
6
8
10
12
14
16
18
20

Mill 1A1 Classifier Speed Vs. Mill Load Jan. 28, 29, 1997



ROSIN-RAMMLER PARTICLE SIZE DISTRIBUTION



R. Gillette
E. Reicker
J. McAloney
Lab

DEUTSCHE BABCOCK
DB RILEY, INC.

FUELS LABORATORY

Test Report

Laboratory No. 47558-47569 **Sample of:** Pulverized Coal **Date Rec'd:** 2/3/97

Received From: New York State Electric and Gas Co. Milliken Station

Sample Data: Pulverized Coal, Tests 1 - 3

Contract No: 97801 **Field Sample by:** J. McAloney

Fineness Test

Sample Number	%thru 50mesh	%thru 100mesh	%thru 120mesh	%thru 140mesh	%thru 170mesh	%thru 200mesh	%thru 325mesh	%thru 400mesh
47558	100	100	99.9	99.8	98.0	92.2	37.5	11.4
47559	100	100	99.9	99.7	97.9	91.1	44.7	10.7
47560	100	100	99.7	99.5	97.8	92.7	53.8	10.2
47561	100	100	99.9	99.6	97.8	93.2	69.1	10.5
47562	100	100	100	99.2	96.6	96.6	74.5	11.7
47563	100	100	100	99.9	96.1	96.7	61.3	10.5
47564	100	100	100	99.9	99.3	95.8	56.7	10.0
47565	100	100	100	99.9	99.5	96.7	59.1	9.5
47566	100	100	99.7	99.4	99.1	96.5	45.3	9.6
47567	100	100	99.7	99.3	99.1	97.3	53.8	10.4
47568	100	100	100	99.7	99.6	97.3	55.4	9.0
47569	100	100	100	99.9	99.7	98.0	63.9	11.1

Sample Number	Sample Information	% Moisture	Weight, as recieved
47558	Test 1,1A1-A, 1/28/97, 12.0 T/hr	1.1	119.8g
47559	Test 1,1A1-B, 1/28/97, 12.0 T/hr	0.9	132.5
47560	Test 1,1A1-C, 1/28/97, 12.0 T/hr	0.9	99.5
47561	Test 1,1A1-D, 1/28/97, 12.0 T/hr	1.1	121.0
47562	Test 2, 1A1-A, 1/29/97, 10.0 T/hr	0.4	104.4
47563	Test 2, 1A1-B, 1/29/97, 10.0 T/hr	0.3	84.3
47564	Test 2, 1A1-C, 1/29/97, 10.0 T/hr	0.4	88.0
47565	Test 2, 1A1-D, 1/29/97, 10.0 T/hr	0.5	101.6
47566	Test 3, 1A1-A, 1/29/97, 8.0 T/hr	0.8	86.9
47567	Test 3, 1A1-B, 1/29/97, 8.0 T/hr	0.8	69.7
47568	Test 3, 1A1-C, 1/29/97, 8.0 T/hr	0.9	72.4
47569	Test 3, 1A1-D, 1/29/97, 8.0 T/hr	0.3	81.1

Methods used: Moisture - ASTM D2013
Fineness - ASTM D197

Date: 2/5/97

W Stewart
W. Stewart

E. Reicker
R. Gillette
J. McAloney
Lab

DEUTSCHE BABCOCK
DB RILEY, INC.

FUELS LABORATORY

Test Report

Laboratory No. 47570 **Sample of:** Coal **Date Rec'd:** 2/7/97

Received From: New York State Electric and Gas Co., Milliken Station

Sample Data: Mill 1A1, 8 Ton Test, 1/29/97

Contract No: 97801 **Field Sample by:**

Air Drying Loss	4.3%				
Proximate Analysis (ASTM D3172)	As Rec'd	Dry	Ultimate Analysis (ASTM D3176)	As Rec'd	Dry
Moisture (ASTM D3173)	4.6%	----	Moisture (ASTM D3173)	%	73.6%
Volatile (ASTM D3175)	32.9%	34.5%	Carbon (ASTM D3178)	%	5.0%
Ash (ASTM D3174)	10.7%	11.2%	Hydrogen (ASTM D3178)	%	1.17%
Fixed Carbon	51.8%	54.3%	Nitrogen (ASTM D3179)	%	7.03%
	100%	%	Oxygen	%	2.0%
British Thermal Units	12,668	13,279	Sulfur (ASTM D3177)	%	11.2%
Fusibility of Ash	Atmosphere		Ash (ASTM D3174)	%	%
	Oxid.	Red		100.0%	100.0%
Initial Deformation Softening (H=W)	°F °F	°F °F	Free Swelling Index (ASTM D72)		
Hemispherical (H=½W) Fluid	°F °F	°F °F	Grindability Index (ASTM D409)	@ 0.3% Moisture 52	

Date: February 18, 1997

W. Stewart
W. Stewart

E. Reicker
R. Gillette
J. McAloney
Lab

DEUTSCHE BABCOCK
DB RILEY, INC.

FUELS LABORATORY

Test Report

Laboratory No. 47571 **Sample of:** Raw Coal **Date Rec'd:** 2/7/97

Received From: New york State Electric and Gas Co., Milliken Station

Sample Data: Composite of Mills 1A1, 1B2, 1A3, 1B4, 8 Ton Test 1//29/97

Contract No: 97801 **Field Sample by:**

Air Drying Loss	4.4%				
Proximate Analysis (ASTM D3172)	As Rec'd	Dry	Ultimate Analysis (ASTM D3176)	As Rec'd	Dry
Moisture (ASTM D3173)	4.7%	----	Moisture (ASTM D3173)	%	71.9%
Volatile (ASTM D3175)	32.0%	33.6%	Carbon (ASTM D3178)	%	4.9%
Ash (ASTM D3174)	12.8%	13.4%	Hydrogen (ASTM D3178)	%	1.17%
Fixed Carbon	50.5%	53.0%	Nitrogen (ASTM D3179)	%	6.33%
	100%	%	Oxygen	%	2.3%
British Thermal Units	12,325	12.933	Sulfur (ASTM D3177)	%	13.4%
Fusibility of Ash	Atmosphere		Ash (ASTM D3174)	%	%
	Oxid.	Red		100.0%	100.0%
Initial Deformation Softening (H=W)	°F °F	°F °F	Free Swelling Index (ASTM D72)		
Hemispherical (H=½W) Fluid	°F °F	°F °F	Grindability Index (ASTM D409)	@0.3% Moisture 53	

Date: February 18, 1997

W Stewart
W. Stewart

E. Reicker
R. Gillette
J. McAloney
Lab

DEUTSCHE BABCOCK
DB RILEY, INC.

FUELS LABORATORY

Test Report

Laboratory No. 47572 **Sample of:** Raw Coal **Date Rec'd:** 2/7/97

Received From: New York State Electric and Gas Co., Milliken Station

Sample Data: Mill 1A1, 10 Ton Test, 1//29/97

Contract No: 97801 **Field Sample by:**

Air Drying Loss	4.7%				
Proximate Analysis (ASTM D3172)	As Rec'd	Dry	Ultimate Analysis (ASTM D3176)	As Rec'd	Dry
Moisture (ASTM D3173)	5.0%	----	Moisture (ASTM D3173)	%	—
Volatile (ASTM D3175)	32.7%	34.4%	Carbon (ASTM D3178)	%	74.5%
Ash (ASTM D3174)	10.0%	10.5%	Hydrogen (ASTM D3178)	%	5.1%
Fixed Carbon	52.3%	55.1%	Nitrogen (ASTM D3179)	%	1.20%
	100.0%	100.0%	Oxygen	%	6.60%
British Thermal Units	12,584	13,246	Sulfur (ASTM D3177)	%	2.1%
<u>Fusibility of Ash</u>	<u>Atmosphere</u>		Ash (ASTM D3174)	%	10.5%
	<u>Oxid.</u>	<u>Red</u>		100.0%	100.0%
Initial Deformation Softening (H=W)	°F °F	°F °F	Free Swelling Index (ASTM D72)		
Hemispherical (H=½W) Fluid	°F °F	°F °F	Grindability Index (ASTM D409)	@0.3% Moisture 56	

Date: February 18, 1997

W. Stewart
W. Stewart

E. Reicker
R. Gillette
J. McAloney
Lab

DEUTSCHE BABCOCK
DB RILEY, INC.

FUELS LABORATORY

Test Report

Laboratory No. 47573 **Sample of:** Raw Coal **Date Rec'd:** 2/7/97

Received From: New York State Electric and Gas Co., Milliken Station

Sample Data: Composite of Mills 1A1, 1B2, 1A3, 1B4, 10 Ton Test, 1/29/97

Contract No: 97801 **Field Sample by:**

Air Drying Loss	4.8%				
Proximate Analysis (ASTM D3172)	As Rec'd	Dry	Ultimate Analysis (ASTM D3176)	As Rec'd	Dry
Moisture (ASTM D3173)	5.1%	----	Moisture (ASTM D3173)	%	—%
Volatile (ASTM D3175)	32.6%	34.4%	Carbon (ASTM D3178)	%	74.3%
Ash (ASTM D3174)	10.2%	10.7%	Hydrogen (ASTM D3178)	%	5.0%
Fixed Carbon	52.1%	54.9%	Nitrogen (ASTM D3179)	%	1.20%
	100.0%	100.0%	Oxygen	%	6.90%
British Thermal Units	12,667	13,348	Sulfur (ASTM D3177)	%	1.9%
Fusibility of Ash	Atmosphere		Ash (ASTM D3174)	%	10.7%
	Oxid.	Red		100.0%	100.0%
Initial Deformation Softening (H=W)	°F °F	°F °F	Free Swelling Index (ASTM D72)		
Hemispherical (H=½W) Fluid	°F °F	°F °F	Grindability Index (ASTM D409)	@0.3% Moisture 57	

Date: February 18, 1997

W. Stewart

W. Stewart

E. Reicker
R. Gillette
J. McAloney
Lab

DEUTSCHE BABCOCK
DB RILEY, INC.

FUELS LABORATORY

Test Report

Laboratory No. 47574 **Sample of:** Raw Coal **Date Rec'd:** 2/7/97

Received From: New York State Electric and Gas Co., Milliken Station

Sample Data: Mill 1A1, 12 Ton Test, 1/29/97

Contract No: 97801 **Field Sample by:**

Air Drying Loss	4.1%				
Proximate Analysis (ASTM D3172)	As Rec'd	Dry	Ultimate Analysis (ASTM D3176)	As Rec'd	Dry
Moisture (ASTM D3173)	4.5%	----	Moisture (ASTM D3173)	%	--%
Volatile (ASTM D3175)	32.9%	34.5%	Carbon (ASTM D3178)	%	74.7%
Ash (ASTM D3174)	10.1%	10.6%	Hydrogen (ASTM D3178)	%	4.5%
Fixed Carbon	52.5%	54.9%	Nitrogen (ASTM D3179)	%	1.18%
	100.0%	100.0%	Oxygen	%	7.22%
British Thermal Units	12,780	13,382	Sulfur (ASTM D3177)	%	1.8%
Fusibility of Ash	Atmosphere		Ash (ASTM D3174)	%	10.6%
	Oxid.	Red		100.0%	100.0%
Initial Deformation Softening (H=W)	°F °F	°F °F	Free Swelling Index (ASTM D72)		
Hemispherical (H=½W) Fluid	°F °F	°F °F	Grindability Index (ASTM D409)	@0.4% Moisture 56	

Date: February 18, 1997

W Stewart
W. Stewart

E. Reicker
R. Gillette
J. McAloney
Lab

DEUTSCHE BABCOCK
DB RILEY, INC.

FUELS LABORATORY

Test Report

Laboratory No. 47575 **Sample of:** Raw Coal **Date Rec'd:** 2/7/97

Received From: New York State Electric and Gas Co., Milliken Station

Sample Data: Composite of Mills 1A1, 1B2, 1A3, 1B4, 12 Ton Test, 1/28/97

Contract No: 97801 **Field Sample by:**

Air Drying Loss	4.7%				
Proximate Analysis (ASTM D3172)	As Rec'd	Dry	Ultimate Analysis (ASTM D3176)	As Rec'd	Dry
Moisture (ASTM D3173)	5.0%	----	Moisture (ASTM D3173)	%	—%
Volatile (ASTM D3175)	32.8%	34.5%	Carbon (ASTM D3178)	%	73.6%
Ash (ASTM D3174)	10.4%	11.0%	Hydrogen (ASTM D3178)	%	4.9%
Fixed Carbon	51.8%	54.5%	Nitrogen (ASTM D3179)	%	1.20%
	100.0%	100.0%	Oxygen	%	5.90%
British Thermal Units	12,607	13,270	Sulfur (ASTM D3177)	%	3.4%
Fusibility of Ash	Atmosphere		Ash (ASTM D3174)	%	11.0%
	Oxid.	Red		100.0%	100.0%
Initial Deformation Softening (H=W)	°F °F	°F °F	Free Swelling Index (ASTM D72)		
Hemispherical (H=½W) Fluid	°F °F	°F °F	Grindability Index (ASTM D409)	@0.3% Moisture 57	

Date: February 18, 1997

W. Stewart

80 160 850 psi 1140 ΔP=10" 1A1
200
21 1500

BOILER/MILL SYSTEM DATA
NYSE&G CORP. MILLIKEN STATION 1 & 2
RSC #92531/92532

Date:		1/28/97	1/28/97	1/28/97
Time:		9:20	2:15	2:45
Unit No.		1	1	1
Unit Load - MW	WT100	140	141	140.5
Boiler Steam Flow ~ KLB/HR	FI170	1025	1015	1008
Turbine Throttle Press.- PSIG	PI104	1803	1802	1801
Air Heater Outlet Temp. - °F	TI4211/TI4214	571/572	573	573/574
F.D. Fan Disch. Press. - "WC	PT4311/PT4312	9.4/9.3	9.5/9.4	9.2/9.0
Windbox Press. ~ " WC	PT156A/PT156B	4.2	4.2/4.0	4.2/4.0
Barometric Press. - "Hg	PT 4714			
Mill System Control Room Data				
Mill No.	1A1	1A1	1A1	1A1
Coal Flow ~ KLB/Hr	ST110A1	24.0	24.0	24.0
Air Flow ~ KLB/HR	PT110A1	57	57	57
Mill Inlet Temp. ~ °F	TE113A1	319	317	319
Mill Outlet Temp. - °F	TE111A1	171	171	171
Hot Air to Mills ~ °F	TE4135	573	575	575
Tempering Air ~ °F	TE4307/TE4308	76	75	~~73~~ 75
Hot Air Damper - % LDG	ZT111A1	28.5	28	29
Tempering Air Damp. ~ % LDG	ZT117A1	71	72	71
P.A. Damper ~ % LDG	ZT113A1	36	39	40
Seal Air Damper ~ % LDG	PT111A1S	50	63	65
Mill Inlet Press. ~ "WC	PT4105	25	34	35
Mill Differential ~ "WC	PT110A1	12	21	21+
Seal Air Differential ~ "WC	PT111A1S	9.9	10	10
Roller Loading Press. ~ PSIG	PT116A1	954	986	997
Classifier Speed ~ RPM	ST115A1	93	119	119
PA Fan & Mill Bus Voltage		473		472
PA Fan Motor AMPS	IT4121/IT4101			33

BOILER/MILL SYSTEM DATA
NYSE&G CORP. MILLIKEN STATION 1 & 2
RSC #92531/92532 1/28/97 — 3:15 1/28/97

Mill Motor AMPS	IT4101	27	31	31
Seal Air Fan & Hyd. Motor Bus Voltage				
Seal Air Fan Motor AMPS				
Hydraulic Classifier Motor AMPS				
Gear Reducer Thrust Bag Temp. °F	TE4119	123	125	126
Gear Reducer Sump Temp. °F	TE4120	106	108	108
Lube Oil Skid Disch. Press. - PSIG	PT4115	40	39	39
Hydraulic Sump Temp. °F	TE116A1	103	105	104
Mill System Local Data				
Lube Oil Pump Disch. Press. - PSIG		68	67	66
Lube Oil Filter ΔP ~ PSI		8	8	8
Lube Oil Skid Outlet Press. - PSIG		36	35	35
Lube Oil Flow ~ GPM		38	37	37.5
Lube Oil Skid Outlet Temp.- °F		102	104	104
Hydraulic Circ. Press ~ PSIG		<200	50-200	0-200
Hydraulic Grinding Press. - PSIG		960	990	995
Hydraulic Control Press. ~ PSIG		700	700	700
Classifier System Press. - PSIG		810	900	900
Classifier Boost Press. - PSIG		333	373	330
Coal Bed Depth ~ MM		3/4" AVG.	3/4 - 1 1/2	<3/4 - 1 1/2
Mill Outlet Press. ~ "WC			10.9	11.0
Seal Air Header Press. - "WC				
Hydraulic Tri-Pump Motor AMPS				
PA Lube Pump Motor AMPS				
Mill Lube Oil Pump Motor AMPS				

BOILER/MILL SYSTEM DATA
NYSE&G CORP. MILLIKEN STATION 1 & 2
RSC #92531/92532

Date:	1/29/97	1/29/97	1/29/97	
Time:	11:00	1:15	3:00	
Unit No.	1	1	1	
Unit Load - MW NET	140	140	141	
Boiler Steam Flow ~ KLB/HR	1013	1027	1007	
Turbine Throttle Press.- PSIG	1802	1800	1798	
Air Heater Outlet Temp. - °F	570/571	568/572	572/573	
F.D. Fan Disch. Press. - "WC	9.2/9.1	8.9/8.7	9.1/8.9	
Windbox Press. ~ " WC	4.0/3.8	4.1/4.0	4.0/3.9	
Barometric Press. - "Hg				
Mill System Control Room Data				
Mill No.	1A1	1A1	1A1	
Coal Flow ~ KLB/Hr	20.0	20	16	
Air Flow ~ KLB/HR	54	54	51	
Mill Inlet Temp. ~ °F	311	305	281	
Mill Outlet Temp. - °F	169	170	169	
Hot Air to Mills ~ °F	572	572	573	
Tempering Air ~ °F	76/75	77/76	77/76	
Hot Air Damper - % LDG	31	27	24	
Tempering Air Damp. ~ % LDG	69	73	76	
P.A. Damper ~ % LDG	34	36	33	
Seal Air Damper ~ % LDG	45	58	54	
Mill Inlet Press. ~ "WC	21	32	30	
Mill Differential ~ "WC	11	20.4	20	
Seal Air Differential ~ "WC	10.1	10.0	10.0	
Roller Loading Press. ~ PSIG	805	840	737	
Classifier Speed ~ RPM	93	128	132	
PA Fan & Mill Bus Voltage	4134	4136	4136	
PA Fan Motor AMPS	32	32	32	

BOILER/MILL SYSTEM DATA
NYSE&G CORP. MILLIKEN STATION 1 & 2
RSC #92531/92532

Mill Motor AMPS	25.5	29	27	
Seal Air Fan & Hyd. Motor Bus Voltage				
Seal Air Fan Motor AMPS				
Hydraulic Classifier Motor AMPS				
Gear Reducer Thrust Bag Temp. °F	124	127	128	
Gear Reducer Sump Temp. °F	106	110	110	
Lube Oil Skid Disch. Press. - PSIG	39	37	38	
Hydraulic Sump Temp. °F	102	107	107	
Mill System Local Data				
Lube Oil Pump Disch. Press. - PSIG	66	64	64.5	
Lube Oil Filter ΔP ~ PSI	8.0	8.0	< 8	
Lube Oil Skid Outlet Press. - PSIG	34	34	34	
Lube Oil Flow ~ GPM	38	38+	38	
Lube Oil Skid Outlet Temp.- °F	104	106+	106+	
Hydraulic Circ. Press ~ PSIG	50-150	50-150	50-150	
Hydraulic Grinding Press. - PSIG	805	850	750	
Hydraulic Control Press. ~ PSIG	700	700	700	
Classifier System Press. - PSIG	900	920	920	
Classifier Boost Press. - PSIG	330	327	325	
Coal Bed Depth ~ MM	3/4"-1.0"	3/4"-1½"	<3/4->1½	
Mill Outlet Press. ~ "WC	9.0	9.0	7.5	
Seal Air Header Press. - "WC				
Hydraulic Tri-Pump Motor AMPS				
PA Lube Pump Motor AMPS				
Mill Lube Oil Pump Motor AMPS				