Note: This is a reference cited in *AP 42, Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources.* AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

AP42 Section:	9.10.1.2
Background Chapter	4
Reference:	22
Title:	Unit Nos. 1 and 2 Pulp Dryer Stacks Emission Testing Results for the February 22-26, 1993, Testing of Particulate Conducted at the American Crystal Sugar Company, Crookston, Minnesota, Bay West, Inc., St. Paul, MN, April 15, 1993.

APPENDIX U

REPORT EXCERPTS FROM REFERENCE 22

(American Crystal Sugar Company, April 15, 1993)

Bay West

Unit Nos. 1 and 2 Pulp Dryer Stacks
EMISSION TESTING RESULTS
for the
Feburary 22-26, 1993 Testing of
Particulate

conducted at the

American Crystal Sugar Company
Crookston, Minnesota

Submitted to:

Mr. Dave Noble
American Crystal Sugar Company
Highway 75 South
Crookston, Minnesota 56716

Submitted by:

BAY WEST, INC.
FIVE EMPIRE DRIVE
ST. PAUL, MINNESOTA 55103
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Timothy Roland Nelson
Project Manager
Air Quality

April 15, 1993
Project No. BW920441

1.0 EXECUTIVE SUMMARY

Bay West, Incorporated (Bay West) was contracted by American Crystal Sugar Company to perform particulate emissions compliance testing on the Unit Nos. 1 and 2 Pulp Dryer Stacks at the American Crystal Sugar Company facility located in Crookston, Minnesota. This series of testing was performed on Feburary 22-26, 1993. The results are summarized in the following table:

TEST RESULTS SUMMARY

SITE	PARAMETER	AVERAGE CONCENTRATION	AVERAGE MASS RATE
*Test No. 1 Unit No. 1 Pulp Dryer Stack	Particulate	0.1072 gr/dscf	21.266 lb/hr
Test No. 2 Unit No. 1 Pulp Dryer Stack	Particulate	0.0710 gr/dscf	18.047 lb/hr
Test No. 3 Unit No. 2 Pulp dryer Stack	Particulate	0.0747 gr/dscf	15.091 lb/hr
Test No. 4 Unit No. 2 Pulp dryer Stack	Particulate	0.0487 gr/dscf	10.469 lb/hr
Test No. 5 Unit No. 2 Pulp dryer Stack	Particulate	0.0564 gr/dscf	12.391 lb/hr

* Run No. 3 was not conducted on test No. 1 because of Dryer System failure

TABLE 1

CLIENT: AMERICAN CRYSTAL SUGAR, CROOKSTON
SOURCE/SITE: NO. 1 PULP DRYER STACK

RESULTS OF ORSAT & MOISTURE ANALYSES - EPA METHODS 3 & 4 (%V/V)

TEST NO.: 1	RUN 1	RUN 2
DATE OF TEST	22-Feb-93	22-Feb-93
DRY BASIS (ORSAT), %		
CARBON DIOXIDE	9.03	9.67
OXYGEN	10.42	9.76
CARBON MONOXIDE	NM	NM
NITROGEN	80.55	80.57
WET BASIS (ORSAT), %		
CARBON DIOXIDE	4.67	4.95
OXYGEN	5.39	5.00
CARBON MONOXIDE	NM	NM
NITROGEN	41.65	41.26
WATER VAPOR	48.29	48.80
DRY MOLECULAR WEIGHT	29.86	29.94
WET MOLECULAR WEIGHT	24.13	24.11

NM = NOT MEASURED

TABLE 2

CLIENT: AMERICAN CRYSTAL SUGAR, CROOKSTON
SOURCE/SITE: NO. 1 PULP DRYER STACK

RESULTS OF PARTICULATE LOADING DETERMINATIONS - EPA METHOD 5

TEST NO.: 1	RUN 1	RUN 2
DATE OF RUN	22-Feb-93	22-Feb-93
RUN START TIME	1200	1420
RUN END TIME	1340	1600
STACK STATIC PRESSURE (in. H2O)	-0.60	-0.60
CROSS SECTIONAL AREA (sq. ft.)	19.634	19.634
PITOT TUBE COEFFICIENT	0.840	0.840
SAMPLE GAS MOISTURE ANALYSES		
CONDENSER (ml.)	0.00	0.00
IMPINGER (ml.)	814.00	793.00
DESSICCANT (grams)	7.00	5.00
TOTAL (grams)	821.00	798.00
SAMPLE GAS MOISTURE CONTENT (%)	48.29	48.80
DRY GAS METER COEFFICIENT	1.039	1.039
BAROMETRIC PRESSURE (in. Hg)	29.30	29.30
AVG. ORIFICE PRESSURE DROP (in. H2O)	0.57	0.52
AVG. GAS METER TEMP. (degrees F)	94	94
VOLUME THROUGH GAS METER		
AT METER CONDITIONS (cf)	42.67	40.62
STANDARD CONDITIONS (dscf)	41.40	39.44
TOTAL SAMPLING TIME (min.)	96	96
NOZZLE DIAMETER (in.)	0.250	0.250
AVG. STACK GAS TEMP. (degrees F)	209	210
AVG. STACK GAS VELOCITY (ft/sec)	49.58	49.63
VOLUMETRIC FLOWRATE		
ACTUAL (acfm)	58413	58464
DRY STANDARD (dscfm)	23301	23076
ISOKINETIC VARIATION. %	106.67	102.61
PARTICULATE COLLECTED		
FILTER CATCH (g)	0.0752	0.1337
PROBE WASH (g)	0.1101	0.0984
IMPINGER CATCH (g)	0.0703	0.0722
TOTAL PARTICULATE COLLECTED (g)	0.2556	0.3043
PARTICULATE CONCENTRATION		
ACTUAL (gr/acf)	0.0380	0.0470
DRY STANDARD (gr/dscf)	0.0953	0.1191
PARTICULATE MASS RATE (lb/hr)	19.028	23.550

TABLE 3

CLIENT: AMERICAN CRYSTAL SUGAR, CROOKSTON
SOURCE/SITE: NO. 1 PULP DRYER STACK

RESULTS OF ORSAT & MOISTURE ANALYSES - EPA METHODS 3 & 4 (%V/V)

TEST NO.: 2	RUN 1	RUN 2	RUN 3
DATE OF TEST	23-Feb-93	23-Feb-93	23-Feb-93
DRY BASIS (ORSAT), %			
CARBON DIOXIDE	6.71	6.12	6.05
OXYGEN	13.15	13.86	13.93
CARBON MONOXIDE	NM	NM	NM
NITROGEN	80.14	80.02	80.02
WET BASIS (ORSAT), %			
CARBON DIOXIDE	4.08	3.76	3.75
OXYGEN	8.00	8.52	8.65
CARBON MONOXIDE	NM	NM	NM
NITROGEN	48.75	49.19	49.66
WATER VAPOR	39.17	38.53	37.93
DRY MOLECULAR WEIGHT	29.60	29.53	29.53
WET MOLECULAR WEIGHT	25.06	25.09	25.15

NM = NOT MEASURED

TABLE 4

CLIENT: AMERICAN CRYSTAL SUGAR, CROOKSTON
SOURCE/SITE: NO. 1 PULP DRYER STACK

RESULTS OF PARTICULATE LOADING DETERMINATIONS - EPA METHOD 5

TEST NO.: 2	RUN 1	RUN 2	RUN 3
DATE OF RUN	23-Feb-93	23-Feb-93	23-Feb-93
RUN START TIME	835	1050	1315
RUN END TIME	1015	1230	1455
STACK STATIC PRESSURE (in. H2O)	-0.65	-0.65	-0.65
CROSS SECTIONAL AREA (sq. ft.)	19.634	19.634	19.634
PITOT TUBE COEFFICIENT	0.840	0.840	0.840
SAMPLE GAS MOISTURE ANALYSES			
CONDENSER (ml.)	0.00	0.00	0.00
IMPINGER (ml.)	693.00	652.00	645.00
DESSICCANT (grams)	3.00	6.00	6.00
TOTAL (grams)	696.00	658.00	651.00
SAMPLE GAS MOISTURE CONTENT (%)	39.17	38.53	37.93
DRY GAS METER COEFFICIENT	1.039	1.039	1.039
BAROMETRIC PRESSURE (in. Hg)	29.40	29.40	29.40
AVG. ORIFICE PRESSURE DROP (in. H2O)	0.88	0.82	0.85
AVG. GAS METER TEMP. (degrees F)	99	98	100
VOLUME THROUGH GAS METER			
AT METER CONDITIONS (cf)	52.73	51.11	51.99
STANDARD CONDITIONS (dscf)	50.91	49.44	50.17
TOTAL SAMPLING TIME (min.)	96	96	96
NOZZLE DIAMETER (in.)	0.250	0.250	0.250
AVG. STACK GAS TEMP. (degrees F)	207	208	209
AVG. STACK GAS VELOCITY (ft/sec)	52.98	52.86	52.93
VOLUMETRIC FLOWRATE			
ACTUAL (acfm)	62418	62273	62355
DRY STANDARD (dscfm)	29486	29663	29946
ISOKINETIC VARIATION. %	103.65	100.06	100.57
PARTICULATE COLLECTED			
FILTER CATCH (g)	0.0478	0.0887	0.0685
PROBE WASH (g)	0.1106	0.0961	0.1198
IMPINGER CATCH (g)	0.0604	0.0567	0.0431
TOTAL PARTICULATE COLLECTED (g)	0.2188	0.2415	0.2314
PARTICULATE CONCENTRATION			
ACTUAL (gr/acf)	0.0313	0.0359	0.0342
DRY STANDARD (gr/dscf)	0.0663	0.0754	0.0712
PARTICULATE MASS RATE (lb/hr)	16.763	19.166	18.271

TABLE 5

CLIENT: AMERICAN CRYSTAL SUGAR, CROOKSTON
SOURCE/SITE: NO. 2 PULP DRYER STACK

RESULTS OF ORSAT & MOISTURE ANALYSES - EPA METHODS 3 & 4 (%V/V)

TEST NO.: 3	RUN 1	RUN 2	RUN 3
DATE OF TEST	24-Feb-93	24-Feb-93	24-Feb-93
DRY BASIS (ORSAT), %			
CARBON DIOXIDE	5.57	5.02	4.55
OXYGEN	14.45	15.10	15.63
CARBON MONOXIDE	NM	NM	NM
NITROGEN	79.98	79.88	79.82
WET BASIS (ORSAT), %			
CARBON DIOXIDE	3.58	3.29	3.07
OXYGEN	9.30	9.88	10.53
CARBON MONOXIDE	NM	NM	NM
NITROGEN	51.47	52.29	53.77
WATER VAPOR	35.64	34.54	32.64
DRY MOLECULAR WEIGHT	29.47	29.41	29.35
WET MOLECULAR WEIGHT	25.38	25.47	25.65

NM = NOT MEASURED

TABLE 6

CLIENT: AMERICAN CRYSTAL SUGAR, CROOKSTON
SOURCE/SITE: NO. 2 PULP DRYER STACK

RESULTS OF PARTICULATE LOADING DETERMINATIONS - EPA METHOD 5

TEST NO.: 3	RUN 1	RUN 2	RUN 3
DATE OF RUN	24-Feb-93	24-Feb-93	24-Feb-93
RUN START TIME	1010	1230	1440
RUN END TIME	1150	1410	1620
STACK STATIC PRESSURE (in. H2O)	-0.85	-0.85	-0.85
CROSS SECTIONAL AREA (sq. ft.)	12.306	12.306	12.306
PITOT TUBE COEFFICIENT	0.840	0.840	0.840
SAMPLE GAS MOISTURE ANALYSES			
CONDENSER (ml.)	0.00	0.00	0.00
IMPINGER (ml.)	428.00	683.00	637.00
DESSICCANT (grams)	2.00	9.00	7.00
TOTAL (grams)	430.00	692.00	644.00
SAMPLE GAS MOISTURE CONTENT (%)	35.64	34.54	32.64
DRY GAS METER COEFFICIENT	1.039	1.039	1.039
BAROMETRIC PRESSURE (in. Hg)	29.43	29.43	29.43
AVG. ORIFICE PRESSURE DROP (in. H2O)	0.44	1.26	1.31
AVG. GAS METER TEMP. (degrees F)	88	94	100
VOLUME THROUGH GAS METER			
AT METER CONDITIONS (cf)	37.13	63.25	64.78
STANDARD CONDITIONS (dscf)	36.57	61.77	62.61
TOTAL SAMPLING TIME (min.)	96	96	96
NOZZLE DIAMETER (in.)	0.190	0.250	0.250
AVG. STACK GAS TEMP. (degrees F)	195	195	195
AVG. STACK GAS VELOCITY (ft/sec)	61.72	61.59	61.38
VOLUMETRIC FLOWRATE			
ACTUAL (acfm)	45571	45475	45322
DRY STANDARD (dscfm)	23190	23547	24147
ISOKINETIC VARIATION. %	102.72	98.70	97.55
PARTICULATE COLLECTED			
FILTER CATCH (g)	0.0502	0.0664	0.0647
PROBE WASH (g)	0.1111	0.1714	0.1599
IMPINGER CATCH (g)	0.0296	0.0635	0.0521
TOTAL PARTICULATE COLLECTED (g)	0.1909	0.3013	0.2767
PARTICULATE CONCENTRATION			
ACTUAL (gr/acf)	0.0410	0.0390	0.0363
DRY STANDARD (gr/dscf)	0.0806	0.0753	0.0682
PARTICULATE MASS RATE (lb/hr)	16.013	15.192	14.116

TABLE 7

CLIENT: AMERICAN CRYSTAL SUGAR, CROOKSTON
SOURCE/SITE: NO. 2 PULP DRYER STACK

RESULTS OF ORSAT & MOISTURE ANALYSES - EPA METHODS 3 & 4 (%V/V)

TEST NO.: 4	RUN 1	RUN 2	RUN 3
DATE OF TEST	25-Feb-93	25-Feb-93	25-Feb-93
DRY BASIS (ORSAT), %			
CARBON DIOXIDE	3.18	3.74	3.75
OXYGEN	17.25	16.59	16.56
CARBON MONOXIDE	NM	NM	NM
NITROGEN	79.57	79.67	79.69
WET BASIS (ORSAT), %			
CARBON DIOXIDE	2.36	2.64	2.67
OXYGEN	12.79	11.72	11.79
CARBON MONOXIDE	NM	NM	NM
NITROGEN	58.98	56.29	56.73
WATER VAPOR	25.88	29.35	28.81
DRY MOLECULAR WEIGHT	29.20	29.26	29.26
WET MOLECULAR WEIGHT	26.30	25.96	26.02

NM = NOT MEASURED

TABLE 8

CLIENT: AMERICAN CRYSTAL SUGAR, CROOKSTON
SOURCE/SITE: NO. 2 PULP DRYER STACK

RESULTS OF PARTICULATE LOADING DETERMINATIONS - EPA METHOD 5

TEST NO.: 4	RUN 1	RUN 2	RUN 3
DATE OF RUN	25-Feb-93	25-Feb-93	25-Feb-93
RUN START TIME	910	1135	1350
RUN END TIME	1150	1315	1530
STACK STATIC PRESSURE (in. H2O)	-0.76	-0.76	-0.76
CROSS SECTIONAL AREA (sq. ft.)	12.306	12.306	12.306
PITOT TUBE COEFFICIENT	0.840	0.840	0.840
SAMPLE GAS MOISTURE ANALYSES			
CONDENSER (ml.)	0.00	0.00	0.00
IMPINGER (ml.)	463.00	575.00	547.00
DESSICCANT (grams)	8.00	14.00	14.00
TOTAL (grams)	471.00	589.00	561.00
SAMPLE GAS MOISTURE CONTENT (%)	25.88	29.35	28.81
DRY GAS METER COEFFICIENT	1.039	1.039	1.039
BAROMETRIC PRESSURE (in. Hg)	29.40	29.40	29.40
AVG. ORIFICE PRESSURE DROP (in. H2O)	1.32	1.49	1.43
AVG. GAS METER TEMP. (degrees F)	89	100	105
VOLUME THROUGH GAS METER			
AT METER CONDITIONS (cf)	64.47	69.20	68.16
STANDARD CONDITIONS (dscf)	63.54	66.78	65.29
TOTAL SAMPLING TIME (min.)	96	96	96
NOZZLE DIAMETER (in.)	0.250	0.250	0.250
AVG. STACK GAS TEMP. (degrees F)	193	194	194
AVG. STACK GAS VELOCITY (ft/sec)	58.97	59.42	60.19
VOLUMETRIC FLOWRATE			
ACTUAL (acfm)	43538	43872	44437
DRY STANDARD (dscfm)	25591	24558	25036
ISOKINETIC VARIATION. %	93.42	102.32	98.12
PARTICULATE COLLECTED			
FILTER CATCH (g)	0.0390	0.0521	0.0430
PROBE WASH (g)	0.1360	0.1017	0.1241
IMPINGER CATCH (g)	0.0440	0.0420	0.0350
TOTAL PARTICULATE COLLECTED (g)	0.2190	0.1958	0.2021
PARTICULATE CONCENTRATION			
ACTUAL (gr/acf)	0.0313	0.0253	0.0269
DRY STANDARD (gr/dscf)	0.0532	0.0452	0.0478
PARTICULATE MASS RATE (lb/hr)	11.667	9.524	10.251

TABLE 9

CLIENT: AMERICAN CRYSTAL SUGAR, CROOKSTON
SOURCE/SITE: NO. 2 PULP DRYER STACK

RESULTS OF ORSAT & MOISTURE ANALYSES - EPA METHODS 3 & 4 (%V/V)

TEST NO.: 5	RUN 1	RUN 2	RUN 3
DATE OF TEST	26-Feb-93	26-Feb-93	26-Feb-93
DRY BASIS (ORSAT), %			
CARBON DIOXIDE	3.92	3.60	3.46
OXYGEN	16.37	16.76	16.93
CARBON MONOXIDE	NM	NM	NM
NITROGEN	79.71	79.64	79.61
WET BASIS (ORSAT), %			
CARBON DIOXIDE	2.80	2.60	2.53
OXYGEN	11.69	12.10	12.37
CARBON MONOXIDE	NM	NM	NM
NITROGEN	56.93	57.51	58.17
WATER VAPOR	28.58	27.78	26.94
DRY MOLECULAR WEIGHT	29.28	29.25	29.23
WET MOLECULAR WEIGHT	26.06	26.12	26.21

NM = NOT MEASURED

TABLE 10

CLIENT: AMERICAN CRYSTAL SUGAR, CROOKSTON
SOURCE/SITE: NO. 2 PULP DRYER STACK

RESULTS OF PARTICULATE LOADING DETERMINATIONS - EPA METHOD 5

TEST NO.: 5	RUN 1	RUN 2	RUN 3
DATE OF RUN	26-Feb-93	26-Feb-93	26-Feb-93
RUN START TIME	805	1020	1230
RUN END TIME	945	1200	1410
STACK STATIC PRESSURE (in. H2O)	-0.82	-0.82	-0.82
CROSS SECTIONAL AREA (sq. ft.)	12.306	12.306	12.306
PITOT TUBE COEFFICIENT	0.840	0.840	0.840
SAMPLE GAS MOISTURE ANALYSES			
CONDENSER (ml.)	0.00	0.00	0.00
IMPINGER (ml.)	581.00	547.00	532.00
DESSICCANT (grams)	7.00	10.00	10.00
TOTAL (grams)	588.00	557.00	542.00
SAMPLE GAS MOISTURE CONTENT (%)	28.58	27.78	26.94
DRY GAS METER COEFFICIENT	1.039	1.039	1.039
BAROMETRIC PRESSURE (in. Hg)	29.52	29.52	29.52
AVG. ORIFICE PRESSURE DROP (in. H2O)	1.57	1.49	1.61
AVG. GAS METER TEMP. (degrees F)	93	100	104
VOLUME THROUGH GAS METER			
AT METER CONDITIONS (cf)	70.42	70.37	71.88
STANDARD CONDITIONS (dscf)	69.20	68.19	69.25
TOTAL SAMPLING TIME (min.)	96	96	96
NOZZLE DIAMETER (in.)	0.250	0.250	0.250
AVG. STACK GAS TEMP. (degrees F)	195	194	196
AVG. STACK GAS VELOCITY (ft/sec)	61.34	59.12	61.21
VOLUMETRIC FLOWRATE			
ACTUAL (acfm)	45293	43647	45191
DRY STANDARD (dscfm)	25677	25072	26167
ISOKINETIC VARIATION. %	101.40	102.33	99.57
PARTICULATE COLLECTED			
FILTER CATCH (g)	0.0480	0.0452	0.0509
PROBE WASH (g)	0.1581	0.1573	0.1656
IMPINGER CATCH (g)	0.0436	0.0412	0.0457
TOTAL PARTICULATE COLLECTED (g)	0.2497	0.2437	0.2622
PARTICULATE CONCENTRATION			
ACTUAL (gr/acf)	0.0316	0.0317	0.0338
DRY STANDARD (gr/dscf)	0.0557	0.0552	0.0584
PARTICULATE MASS RATE (lb/hr)	12.256	11.852	13.106

02/22/93

NUMBER 1 DRYER, NORTH

TIME OF DAY	1030	1130		1200	1230	1300	
SLICE RATE, TPH	198	228		239	238	231	
TOTAL PULP FLOW, TPH	56	57		59	59	64	
GRATE SPEED, %	91.57	77.70		85.41	76.27	76.69	
DRYER EXIT, °C	108.6	108.8		109.1	108.9	109.01	
ID FAN SPEED, %	85	85.0		85.0	85.0	85.0	
PULP FEED SCROLL, %	27.2	27.6	S	25.8	28.1	26.6	
PULP GATE, % CLOSED	40.0	40.0		40.0	40.0	40.0	
FD DAMPER, % OPEN	27.6	24.5	O	35.9	23.3	28.57	
RECYCLE DAMPERS, % OPEN	47.0	47.0		47.0	47.0	47.0	
RATIO SETUP	manual	manual	T	manual	Manual	Manual	
DRYER THROAT	867	864		848	847	839	
DRYER EXIT, °C	105	105	#1	105	105	106	
FURNACE PRESS, IN H20	0	-0.9		-0.6	-0.9	-0.7	
EXIT PRESS, INC H20	-1.6	-1.5	(2)	-1.6	-1.6	-1.5	
DRYER ΔP, IN H20	0.50	0.40		0.4	0.4	0.2	
DRUM AMPS	32	33	1200	35	33	35	
ID FAN, AMPS	168	168		170	169	169	
ID FLOW	61	62		61	62	61	
REC. FLOW	13.6	13.8		13.5	13.7	13.7	
M.C. ΔP	5.8	5.8		5.8	5.75	5.8	
BAGHOUSE ΔP	4.18	4.21		4.10	4.07	4.07	
ASP	8.0	8.0		8.0	8.0	7.9	
FD FLOW, ΔP	0.49	0.50		0.50	0.50	0.49	
#1 PULP FEED, TPH	31	31		31	31	31	@1311/1314
#2 PULP FEED, TPH	24	27		29	32	31	83.48/93.33 / 85.72
C, %	4.05	4.5		4.1	4.4	4.6	~~[illegible]~~ 16" in 96 sec
Brt in, °C	104.4	104.2		104.7	104.7	104.8	Wheel
out, °C	99.4	99.6		99.4	99.4	99.6	No 50
							3.75 4

time/wp51

02/22/93

NUMBER 1 DRYER, NORTH

TIME OF DAY	1330	1400		1430	1500		1530
SLICE RATE, TPH	246	229		215	151		245
TOTAL PULP FLOW, TPH	63	59		56	55		57
GRATE SPEED, %	86.25	89.14		78.12	81.66		91.48
DRYER EXIT, °C	108.5	108.4		109.1	108.6		108.7
ID FAN SPEED, %	85.0	85.0	S	85.0	85.0		85.0
PULP FEED SCROLL, %	27.8	27.6	6	27.9	31.2		31.6
PULP GATE, % CLOSED	40.0	40.0	0	40.0	40.0		40.0
FD DAMPER, % OPEN	47.08	37.66		24.92	43.96		44.14
RECYCLE DAMPERS, % OPEN	47.0	47.0	T	47.0	47.0		47.0
RATIO SETUP	—	—		—	—		—
DRYER THROAT							
DRYER EXIT, °C	838	818	#2	827	838		888
FURNACE PRESS, IN H20	106	.105		106	105		105
EXIT PRESS, INC H20	-0.1	-0.6	@	-0.8	-0.3		-0.1
DRYER ΔP, IN H20	-1.5	-1.5		-1.6	-1.5		-1.6
DRUM AMPS	0.1	0	1420	0	0.1		0.2
ID FAN, AMPS	32	32		33.5	34	1508/1510	33.5
ID FLOW	170	170		168	170	82.7/86.69	168
REC. FLOW	60	62		60	60	/88.22	59
M.C. ΔP	13.8	13.7		13.6	13.4	8" in	13.3
BAGHOUSE ΔP	5.8	5.85		5.8	5.8	53	5.7
ASP	4.11	4.09		4.13	4.13		4.21
FD FLOW, ΔP	8.0	8.0		7.9	8.0	Wheel	7.8
	0.49	0.48		0.49	0.50	No 50	0.52
#1 PULP FEED, TPH	31	31		31	31	3.75 4.0	31
#2 PULP FEED, TPH	28	33		27	21	3¾-3⅝	25
O_2, %	4.2	4.5		4.5	4.2		3.1
BH in, °C	105.0	104.9		105.0	105.1		105.2
out, °C	99.4	99.6		99.7	100.6		99.7

time/wp51

Kennecott

02/22/93

NUMBER 1 DRYER, NORTH

TIME OF DAY	1600						
SLICE RATE, TPH	210						
TOTAL PULP FLOW, TPH	41						
GRATE SPEED, %	82.31						
DRYER EXIT, °C	108.8						
ID FAN SPEED, %	85.0						
PULP FEED SCROLL, %	33.2						
PULP GATE, % CLOSED	40						
FD DAMPER, % OPEN	34.4						
RECYCLE DAMPERS, % OPEN	47.0						
RATIO SETUP	—						
DRYER THROAT	928						
DRYER EXIT, °C	105						
FURNACE PRESS, IN H20	-0.1						
EXIT PRESS, INC H20	-1.6						
DRYER ΔP, IN H20	0.3						
DRUM AMPS	34						
ID FAN, AMPS	167						
ID FLOW	~~7~~						
REC. FLOW	13.2						
M.C. ΔP	5.7						
BAGHOUSE ΔP	4.29						
ASP	7.8						
FD FLOW, ΔP	0.52						
#1 PULP FEED, TPH	31						
#2 PULP FEED, TPH	31						
O_2, %...	2.4						
BH in, °C..	105.1						
out, °C..	99.7						

time/wp51

02/23/93

NUMBER 1 DRYER (North)

TIME OF DAY	0830		0900	0930	1000	1030	
SLICE RATE, TPH	234		232	228	234	235	
TOTAL PULP FLOW, TPH	65		64	64	65	55	
GRATE SPEED, %	82.36		68.28	66.79	65.07	71.38	
DRYER EXIT, °C	107.9		108.4	107.8	107.7	108.2	
ID FAN SPEED, %	78.0		78.0	78.0	78.0	78.0	
PULP FEED SCROLL, %	20.5	S	20.1	20.2	19.8	20.5	S
PULP GATE, % CLOSED	40.0		40.0	40.0	40.0	40.0	
FD DAMPER, % OPEN	33.46	O	14.87	17.08	15.39	18.31	O
RECYCLE DAMPERS, % OPEN	47.0		47.0	47.0	47.0	47.0	
RATIO SETUP	Manual	T	Manual	Manual	Manual	Manual	T
DRYER THROAT	597		605	600	594	596	
DRYER EXIT, °C	105	#1	105	104	104	105	#2
FURNACE PRESS, IN H20	-0.6		-0.9	-1.1	-1.0	-1.0	
EXIT PRESS, INC H20	-1.4	(a)	-1.5	-1.6	-1.6	-1.6	(a)
DRYER ΔP, IN H20	0.9		0.9	0.9	1.0	0.8	
DRUM AMPS	31.5	0835	30.0	30.0	31.5	31.5	1050
ID FAN, AMPS	157		158	158	159	158	
ID FLOW	61		62	60	61	63	
REC. FLOW	13.5		13.5	13.4	13.5	13.5	
M.C. ΔP	4.8		4.8	4.8	4.8	4.8	
BAGHOUSE ΔP	4.19		4.21	4.29	4.28	4.24	
ASP	8.1		8.1	8.0	8.2	8.2	
FD FLOW	0.46		0.45	0.44	0.43	0.45	
#1 PULP FEED, TPH	26		26	26	26	26	
#2 PULP FEED, TPH	27		26	27	29	25	
O_2, %	6.6		7.2	7.2	6.9	7.2	
BH in, °C	104.5		104.3	104.4	104.5	104.5	
out, °C	98.6		98.3	99.1	99.4	99.6	

time/wp51

02/23/93

NUMBER 1 DRYER (North)

TIME OF DAY	1100	1130	1200	1230	1300		1330
SLICE RATE, TPH	225	224	226	223	202		231
TOTAL PULP FLOW, TPH	60	59	58	60	58		60
GRATE SPEED, %	67.78	81.95	76.69	77.47	63.41		74.50
DRYER EXIT, °C	107.7	108.3	108.2	107.8	108.2		107.5
ID FAN SPEED, %	78.0	78.0	78.0	78.0	78.0		78.0
PULP FEED SCROLL, %	20.3	20.3	20.3	20.9	20.2	S	19.8
PULP GATE, % CLOSED	40.0	40.0	40.0	40.0	40.0		40.0
FD DAMPER, % OPEN	21.15	14.22	16.90	27.58	12.86	O	27.62
RECYCLE DAMPERS, % OPEN	47.0	47.0	47.0	47.0	47.0		47.0
RATIO SETUP	—	—	—	—	—	T	—
DRYER THROAT	595	586	576	587	593		586
DRYER EXIT, °C	105	105	105	105	105	#3	105
FURNACE PRESS, IN H20	-0.9	-1.0	-1.0	-0.7	-1.0		-0.8
EXIT PRESS, INC H20	-1.6	-1.5	-1.5	-1.6	-1.4	@	-1.6
DRYER ΔP, IN H20	0.7	0.6	0.6	0.5	0.5		0.4
DRUM AMPS	32	32	32	32	32	1315	31
ID FAN, AMPS	158	158	158	157	158		158
ID FLOW	62	60	60	60	62		60
REC. FLOW	13.6	13.5	13.5	13.3	13.5		13.5
M.C. ΔP	4.8	4.75	4.8	4.75	4.8		4.8
BAGHOUSE ΔP	4.28	4.25	4.24	4.22	4.22		4.24
ASP	8.1	7.9	8.0	8.0	8.0		7.9
FD FLOW, ΔP	0.44	0.44	0.45	0.45	0.43		0.45
#1 PULP FEED, TPH	26	26	26	26	26		26
#2 PULP FEED, TPH	28	31	24	26	24		25
O_2, %	7.0	7.7	7.7	6.9	7.5		7.4
BH in, °C	104.4	104.4	104.4	104.5	104.3		104.4
out, °C	99.4	99.6	99.4	99.4	99.4		99.6

time/wp51

02/23/93

NUMBER 1 DRYER (North)

TIME OF DAY		1410		1445			
SLICE RATE, TPH		218		211			
TOTAL PULP FLOW, TPH		58		58			
GRATE SPEED, %		63.75		76.92			
DRYER EXIT, °C		108.2		107.6			
ID FAN SPEED, %		78.0		78.0			
PULP FEED SCROLL, %		20.0		20.3			
PULP GATE, % CLOSED		40.0		40.0			
FD DAMPER, % OPEN		12.06		29.66			
RECYCLE DAMPERS, % OPEN		47.0		47.0			
RATIO SETUP		—		—			
DRYER THROAT		580		591			
DRYER EXIT, °C		105		104			
FURNACE PRESS, IN H20		-1.1		-0.8			
EXIT PRESS, INC H20		-1.6		-1.5			
DRYER ΔP, IN H20		0.1		0.2			
DRUM AMPS		31		31			
ID FAN, AMPS		159		158			
ID FLOW		61		59			
REC. FLOW		13.7		13.6			
M.C. ΔP		4.8		4.75			
BAGHOUSE ΔP		4.29		4.26			
ASP		7.9	1414 – 1416	7.9			
FD FLOW, ΔP		0.43		0.44			
#1 PULP FEED, TPH	Wheel / 50	26	62.00 / 92.16 / 80.0	26			
#2 PULP FEED, TPH	NO / 4.0	25		26			
O_2, %	3.75, 3 3/4, 3 1/2, 3 3/4, 3 3/4	7.8	8" in 57 sec	6.9			
BH in, °C		104.5		104.4			
out, °C		99.4		99.4			

time/wp51

02/24/93

NUMBER 2 DRYER (South)

TIME OF DAY	0830	0910	0935	1000		1030	1106
SLICE RATE, TPH	227	221	228	225		225	234
TOTAL PULP FLOW, TPH	68	55	63	62		63	66
GRATE SPEED, %	70.07	79.50	79.16	73.56 ~~77.27~~		71.66	74.40
DRYER EXIT, °C	100.3	100.5	100.1	99.9		99.9	99.8
ID FAN SPEED, %	70.0	70.0	70.0	70.0		70.0	70.0
PULP FEED SCROLL, %	103.3	103.3	103.3	103.3		103.3	103.3
PULP GATE, % CLOSED	68.25	-3.34	-3.34	60.00	S	61.51	61.35
FD DAMPER, % OPEN	16.20	24.79	28.96	27.73		19.95	27.66
RECYCLE DAMPERS, % OPEN	26.0	65.0	49.0	45.0	O	45.0	45.0
RATIO SETUP	Manual	Manual	Manual	Manual		Manual	Manual
DRYER THROAT	704	608	612	651	T	653	649
DRYER EXIT, °C	101	101	100	100		100	100
FURNACE PRESS, IN H20	-1.3	-1.2	-1.2	-1.2	#1	-1.3	-1.2
EXIT PRESS, INC H20	-1.0	-1.0	-1.1	-1.0		-1.1	-1.1
DRYER ΔP, IN H20	1.2	1.2	1.1	1.1	@	1.2	1.2
DRUM AMPS	28	27.5	26.5	27		27.5	27
ID FAN, AMPS	154	154	154	154	1010	154	154
ID FLOW	32	34	33	32		33	32.5
REC. FLOW	5.0	10.6	9.6	8.7		8.6	8.3
M.C. ΔP	4.05	4.05	4.05	4.05		4.05	3.8
BAGHOUSE ΔP	4.78	4.70	4.69	4.69		4.65	4.67
ASP	7.4	6.9	7.25	7.4		6.7	7.3
FD FLOW, ΔP	1.03	1.03	1.03	1.03		1.03	1.03
#1 PULP FEED, TPH	32	28	33	31		31	32
#2 PULP FEED, TPH	26	27	30	27		27	30
O_2, %	9.5	8.8	8.8	8.8		9.0	8.3
BH in, °C	103.0	102.5	102.4	102.6		102.8	102.5
out, °C	93.7	93.9	93.5	93.3		93.3	93.5

time/wp51

02/24/93

NUMBER 2 DRYER (South) wheel @ 3.9

TIME OF DAY	1130	1200		1230		1300	1330
SLICE RATE, TPH	230	227		236		236	—
TOTAL PULP FLOW, TPH	66	59		60		62	60
GRATE SPEED, %	77.25	68.64		68.17		72.55	72.89
DRYER EXIT, °C	99.8	99.9		100.0		99.7	100.0
ID FAN SPEED, %	70.0	70.0		70.0		70.0	70.0
PULP FEED SCROLL, %	103.3	103.0		103.0		103.0	103.0
PULP GATE, % CLOSED	64.01	60.00	S	60.00		60.0	60.0
FD DAMPER, % OPEN	24.64	16.61		16.12		21.85	17.68
RECYCLE DAMPERS, % OPEN	45.0	45.00	O	45.0		45.0	45.0
RATIO SETUP	Manual	Manual		Manual		Manual	Manual
DRYER THROAT	688	676	T	589		626	621
DRYER EXIT, °C	100	100		100		100	101
FURNACE PRESS, IN H20	-1.2	-1.4	#2	-1.3		-1.3	-1.4
EXIT PRESS, INC H20	-1.1	-1.1		-1.0		-1.0	-1.1
DRYER ΔP, IN H20	1.3	1.3	@	1.2		1.2	1.2
DRUM AMPS	26.5	26.5		26.5		26.5	27
ID FAN, AMPS	154	154	1230	156		154	154
ID FLOW	32.5	32.5		33		34	32
REC. FLOW	9.0	9.1		8.5		9.0	9.4
M.C. ▲P	3.9	3.9		3.9		3.9	3.9
BAGHOUSE ▲P	4.66	4.69		4.67		4.65	4.65
ASP	7.2	7.3		7.2		7.35	7.2
FD FLOW, ΔP	1.03	1.03		1.03		1.03	1.03
#1 PULP FEED, TPH	32	31		30		32	31
#2 PULP FEED, TPH	28	27		28		28	25
O_2, %	8.1	9.3		10.2		9.0	9.6
BH in, °C	102.8	103.1		102.8		103.0	103.3
out, °C	93.5	93.2		93.1		93.6	93.6
	1137 - 1139	Wheel @		Furnace			
	77.36/80.75/	3.9		Static			
	84.76			-0.06" H_2O			
	8" in 70 sec.						

South: 3 5/8", 3 3/4", 3 3/4", 3 1/2", 3 1/8", 3 1/2", 3 5/8", 12", 3 5/8", 12", 3 5/8", 12", 3 1/2", 3 3/4"

North

time/wp51

02/24/93

NUMBER 2 DRYER (south)

TIME OF DAY	1400	1430		1500	1530	1600	1630
SLICE RATE, TPH	228	229		230	229	220	217
TOTAL PULP FLOW, TPH	59	58		57	56	55	57
GRATE SPEED, %	75.13	78.22		78.28	67.50	67.26	74.86
DRYER EXIT, °C	100.0	99.8		100.0	100.0	99.8	99.8
ID FAN SPEED, %	70.0	70.0		70.0	70.0	70.0	70.0
PULP FEED SCROLL, %	103.3	103.3		103.3	103.3	103.3	103.3
PULP GATE, % CLOSED	60.0	60.0		60.0	60.0	60.0	60.0
FD DAMPER, % OPEN	22.66	28.96		26.35	22.11	12.58	20.42
RECYCLE DAMPERS, % OPEN	45.0	45.0		45.0	45.0	45.0	45.0
RATIO SETUP	Manual	Manual		Manual	Manual	Manual	Manual
DRYER THROAT	582	577	S	573	523	504	559
DRYER EXIT, °C	100	100		100	100	100	101
FURNACE PRESS, IN H20	-1.2	-1.2	O	-1.3	-1.4	-1.4	-1.3
EXIT PRESS, INC H20	-1.1	-1.1		-1.1	-1.1	-1.1	-1.1
DRYER ΔP, IN H20	1.3	1.3	T	1.3	1.2	1.2	1.3
DRUM AMPS	26.5	27		27	27	27	27
ID FAN, AMPS	155	156	#3	154	154	154	154
ID FLOW	33	33		32.5	34	34	33.5
REC. FLOW	9.3	9.4	@	9.6	8.7	9.0	9.6
M.C. ΔP	3.9	3.9		3.9	3.95	3.95	3.95
BAGHOUSE ΔP	4.62	4.62	1440	4.54	4.54	4.62	4.50
ASP	6.9	7.1		7.2	7.0	7.1	7.2
FD FLOW, ΔP	1.03	1.03		1.03	1.03	1.03	1.03
#1 PULP FEED, TPH	30	30		30	30	29	31
#2 PULP FEED, TPH	27	27		27	26	27	27
O_2, %	9.8	9.4		9.5	10.2	10.4	9.4
BH in, °C	103.2	103.2		103.2	103.2	103.2	103.4
out, °C	93.5	93.7		93.4	93.4	93.4	94.0

time/wp51

02/25/93

NUMBER 2 DRYER (South)

TIME OF DAY	0900		0930	1000		1030	1100
SLICE RATE, TPH	233		233	227		160	234
TOTAL PULP FLOW, TPH	61		52	54		55	58
GRATE SPEED, %	67.10		62.42	64.50		67.18	77.83
DRYER EXIT, °C	98.9		98.9	98.8		98.8	98.8
ID FAN SPEED, %	70.0		70.0	70.0		70.0	70.0
PULP FEED SCROLL, %	103.3		103.3	103.3		103.3	103.3
PULP GATE, % CLOSED	65.00	S	60.00	60.00		60.00	60.00
FD DAMPER, % OPEN	17.16		13.23	15.03		17.60	25.96
RECYCLE DAMPERS, % OPEN	45.0	O	45.0	45.0		45.0	45.0
RATIO SETUP	Manual		Manual	Manual		Manual	Manual
DRYER THROAT	473	T	405	356		384	433
DRYER EXIT, °C	99		99	99		99	99
FURNACE PRESS, IN H20	-1.3	#1	-1.4	-1.4		-1.4	-1.3
EXIT PRESS, INC H20	-1.0		-0.8	-0.9		-0.9	-1.1
DRYER ΔP, IN H20	1.1	@	1.3	1.3		1.3	1.3
DRUM AMPS	26.5		26.0	26.5		26.5	27
ID FAN, AMPS	156	0910	156	155		154	154
ID FLOW	34		35	35		35	34
REC. FLOW	10		9.3	9.4		9.5	9.5
M.C. ΔP	4.05		4.05	4.05		4.05	4.05
BAGHOUSE ΔP	4.76		4.72	4.78		4.74	4.67
ASP	7.0		7.2	6.9		7.0	7.0
FD FLOW, ΔP	1.03		1.03	1.03		1.03	1.03
#1 PULP FEED, TPH	35		33	33		34	33
#2 PULP FEED, TPH	22		19	22		23	26
O_2, %	10.9		12.6	12.4		11.7	11.0
BH in, °C	102.8		102.8	102.7		102.8	103.0
out, °C	91.6		91.3	91.6		91.8	92.4

Middle 3.5" @ Wheel No 4"

1040 - 1044
68.54/67.69/69.37
8" in 9 gal.

time/wp51

02/25/93

NUMBER 2 DRYER (South)

TIME OF DAY	1130		1200	1230	1300	1315	1330
SLICE RATE, TPH	230		226	230	228	228	220
TOTAL PULP FLOW, TPH	60		64	67	66	64	63
GRATE SPEED, %	68.28		79.73	74.92	64.08	73.41	67.89
DRYER EXIT, °C	98.9		98.7	98.9	99.0	98.8	98.8
ID FAN SPEED, %	70.0		70.0	70.0	70.0	70.0	70.0
PULP FEED SCROLL, %	103.3		103.3	103.3	103.3	103.3	103.3
PULP GATE, % CLOSED	62.03		70.75	69.97	70.65	70.65	69.50
FD DAMPER, % OPEN	21.43	S	32.68	24.74	13.02	21.38	19.09
RECYCLE DAMPERS, % OPEN	45.0		45.0	45.0	45.0	45.0	45.0
RATIO SETUP	Manual	O	Manual	Manual	Manual	Manual	Manual
DRYER THROAT	467		482	439	427	429	434
DRYER EXIT, °C	99	T	99	99	99	99	99
FURNACE PRESS, IN H20	-1.4		-1.2	-1.4	-1.5	-1.4	-1.4
EXIT PRESS, INC H20	-0.9	#2	-1.2	-1.1	-1.1	-1.2	-1.0
DRYER ΔP, IN H20	1.3		1.1	1.3	1.3	1.2	1.2
DRUM AMPS	27	@	27	27		27.5	26.5
ID FAN, AMPS	154		154	154		155	154
ID FLOW	35	1135	34	33		33.5	33
REC. FLOW	9.4		9.4	9.6		9.4	9.3
M.C. ΔP	4.05		4.05	4.05		4.05	4.05
BAGHOUSE ΔP	4.66		4.61	4.63		4.57	4.63
ASP	7.0		7.0	7.2		7.0	6.9
FD FLOW, ΔP	1.03		1.03	1.03	1.03	1.03	1.03
#1 PULP FEED, TPH	35		35	35	36	36	36
#2 PULP FEED, TPH	26		22	22	22	21	20
O_2, %	10.4		10.7	11.5		11.3	11.4
BH in, °C	103.2		103.1	103.2		103.4	103.5
out, °C	92.6		92.6	92.6		92.9	92.8
				1230-1234			
				68.17/69.58			
				68.46			

time/wp51

g-in in 94 min.

02/25/93

NUMBER 2 DRYER (South)

TIME OF DAY		1400	1430	1500	1530		
SLICE RATE, TPH		228	230	226	225		
TOTAL PULP FLOW, TPH		61	61	60	58		
GRATE SPEED, %		78.33	61.30	65.05	65.67		
DRYER EXIT, °C		99.1	98.9	98.9	98.8		
ID FAN SPEED, %		70.0	70.0	70.0	70.0		
PULP FEED SCROLL, %		103.3	103.3	103.3	103.3		
PULP GATE, % CLOSED		67.0	69.76	69.76	69.76		
FD DAMPER, % OPEN	S	30.29	14.04	13.78	16.54		
RECYCLE DAMPERS, % OPEN		45.0	45.0	45.0	45.0		
RATIO SETUP	O	Manual	Manual	Manual	Manual		
DRYER THROAT		440	455	445	404		
DRYER EXIT, °C	T	100	99	99	99		
FURNACE PRESS, IN H20		-1.3	-1.5	-1.5	-1.5		
EXIT PRESS, INC H20	#3	-1.1	-1.1	-1.0	-1.0		
DRYER ΔP, IN H20		1.2	1.3	1.3	1.2		
DRUM AMPS	@	27	26	27	26.5		
ID FAN, AMPS		154	154	154	154		
ID FLOW	1350	35	33.5	34.5	36		
REC. FLOW		9.5	9.4	9.3	9.2		
M.C. ΔP		4.05	4.05	4.05	4.05		
BAGHOUSE ΔP		4.57	4.53	4.54	4.57		
ASP		7.1	7.0	6.9	6.8		
FD FLOW, ΔP		1.03	1.03	1.03	1.03		
#1 PULP FEED, TPH		35	35	35	35		
#2 PULP FEED, TPH		24	22	21	21		
O_2, %		10.7	11.0	11.2	11.7		
BH in, °C		103.5	103.2	103.3	103.3		
out, °C		93.2	93.1	93.0	92.6		
		1406					
		46.53/49.46		Furnace			
		53.84		Pressure:			
		64.53		0.14-0.16			

time/wp51

8" in 12 sec.

- in -H20 above grate

2/26/93

NUMBER 2 DRYER (South)

TIME OF DAY		0830	0900	0930	1000		1030
SLICE RATE, TPH		235	141	247	200		205
TOTAL PULP FLOW, TPH		55	58	61	62		56 ~~[illegible]~~
GRATE SPEED, %		64.21	79.92	83.93	66.09		63.51
DRYER EXIT, °C		99.8	99.9	99.8	100.2		99.6
ID FAN SPEED, %		72.0	72.0	72.0	72.0		72.0
PULP FEED SCROLL, %		44.4	103.0	103.3	103.3		103.3
PULP GATE, % CLOSED		-3.34	60.0	60.0	67.65		60.0
FD DAMPER, % OPEN		16.48	29.17	32.42	17.16		13.57
RECYCLE DAMPERS, % OPEN		45.0	45.0	45.0	45.0		45.0
RATIO SETUP	S	Manual	Manual	Manual	Manual	S	Manual
DRYER THROAT		372	431	486	466		391
DRYER EXIT, °C	O	100	100	100	100	O	100
FURNACE PRESS, IN H2O		-1.4	-1.1	-1.1	-1.3		-1.4
EXIT PRESS, INC H2O	T	-0.9	-1.1	-1.2	-1.1	T	-1.1
DRYER ΔP, IN H2O		1.3	1.1	1.2	1.2		1.3
DRUM AMPS	#1	25.5	26.5	26.5	26.0	#2	26.0
ID FAN, AMPS		156	155	155	156		156
ID FLOW	@	37	36	36	36	@	36.5
REC. FLOW		9.3	9.4	9.3	9.4		9.35
M.C. ΔP	0805	4.05	4.05	4.05	4.05	1020	4.05
BAGHOUSE ΔP		4.76	4.78	4.78	4.77		4.80
ASP		6.9	6.7	7.0	6.7		7.1
FD FLOW, ΔP		1.03	1.03	1.03	1.03		1.03
#1 PULP FEED, TPH		34	33	35	34		33
#2 PULP FEED, TPH		24	25	25	23		23
O, % ..		12.0	10.9	10.2	11.1		12.0
BH in, °C ..		102.8	102.6	102.8	102.8		102.7
out, °C ..		92.9	93.4	93.4	93.1		93.1
		0423 furnace seal: above grate -0.16 to -0.14 in-H2O		0934/0937 64.02/65.15/ /66.87 8" in 96 sec.			

Note ID Fan Damper From .. → 72%

Wheel @ 3.5

time/wp51

02/26/93

NUMBER 2 DRYER (South)

TIME OF DAY	1100		1130	1200		1230	1300
SLICE RATE, TPH	210	50	220	226		183	200
TOTAL PULP FLOW, TPH	55		53	54		58	52
GRATE SPEED, %	71.53		68.67	69.16		75.52	64.65
DRYER EXIT, °C	99.9	3 3/8	99.7	99.8		99.8	99.8
ID FAN SPEED, %	72.0		72.0	72.0		72.0	72.0
PULP FEED SCROLL, %	103.3		103.3	103.3		103.3	103.3
PULP GATE, % CLOSED	60.0	3 3/8	60.0	60.0	S	64.01	60.0
FD DAMPER, % OPEN	22.47		18.96	20.13		22.45	14.84
RECYCLE DAMPERS, % OPEN	45.0		45.0	45.0	O	45.0	45.0
RATIO SETUP	Manual	3 3/8	Manual	Manual		Manual	Manual
DRYER THROAT	404		428	442	T	452	399
DRYER EXIT, °C	100		100	100		100	100
FURNACE PRESS, IN H20	-1.2	3 3/8	-1.3	-1.3	# 3	-1.2	-1.4
EXIT PRESS, INC H20	1.1		-1.1	-1.0		-1.0	-1.0
DRYER ΔP, IN H20	1.3		1.2	1.3	@	1.2	1.4
DRUM AMPS	26.5	3 3/8	26.5	26		26.5	26.0
ID FAN, AMPS	157		156	156	1230	157	156
ID FLOW	36.5		37	36.5		36.5	37
REC. FLOW	9.3	3	9.2	9.3		9.6	9.3
M.C. ΔP	4.05		4.05	4.05		4.05	4.05
BAGHOUSE ΔP	4.80		4.74	4.75		4.79	4.73
ASP	6.9	3 3/8	6.8	6.8		6.8	6.6
FD FLOW, ΔP	1.03		1.03	1.03		1.03	1.03
#1 PULP FEED, TPH	31	3 1/4	30	32		34	31
#2 PULP FEED, TPH	24	3	24	25		23	23
O_2, %	11.4	3 1/4	11.3	11.1		11.3	12.1
BH in, °C	102.7	3 3/8	102.7	102.8		103.1	103.0
out, °C	93.1		93.4	93.5		93.5	93.4
	1123/1126	3 1/4					
	69.27/72.47/73.48	3 3/8					1305/1308
	8" in 92 sec.						63.25/67.16/65.15
							8" in 95 sec.

Time/up51

02/26/93

NUMBER 2 DRYER (South)

TIME OF DAY	1330	1400	1430	1500			
SLICE RATE, TPH	200	204	218	215			
TOTAL PULP FLOW, TPH	56	51	57	57			
GRATE SPEED, %	71.19	72.03	92.89	80.72			
DRYER EXIT, °C	99.8	99.9	100.0	99.9			
ID FAN SPEED, %	72.0	72.0	72.0	72.0			
PULP FEED SCROLL, %	103.3	103.3	103.3	103.3			
PULP GATE, % CLOSED	60.0	60.0	60.0	60.0			
FD DAMPER, % OPEN	20.96	19.11	42.76	28.59			
RECYCLE DAMPERS, % OPEN	45.0	45.0	45.0	45.0			
RATIO SETUP	Manual	Manual	Manual	Manual			
DRYER THROAT	385	427	485	478			
DRYER EXIT, °C	100	100	100	100			
FURNACE PRESS, IN H20	-1.3	-1.3	-1.0	-1.2			
EXIT PRESS, INC H20	-1.1	-1.1	-1.3	-1.3			
DRYER ΔP, IN H20	1.3	1.2	1.2	1.2			
DRUM AMPS	26.5	26.5	27	26.5			
ID FAN, AMPS	156	156	155	156			
ID FLOW.	34.5	36.5	33	33.5			
REC. FLOW	9.6	9.5	9.5	9.6			
M.C. ΔP	4.05	4.05	4.05	4.05			
BAGHOUSE ΔP	4.71	4.66	4.60	4.61			
ASP	6.8	6.9	6.8	7.0			
FD FLOW, ΔP	1.03	1.03	1.03	1.03			
#1 PULP FEED, TPH	29	30	33	34			
#2 PULP FEED, TPH	24	24	27	24			
O_2, %	11.9	11.2	10.0	11.0			
BH in, °C	102.8	103.2	103.6	103.6			
out, °C	93.5	93.8	94.2	93.9			
	Furnace Static -0.04" above grate						

time/wp51

Filename: BEET22.WQ1
Date: 19-Jan-95
Facility: American Crystal Sugar
Location: Crookston, Minnesota
Source: No. 1 pulp dryer (coal-fired) w/multiclones and stack filter system
Test date: February 22, 1993

D. Emission Data/Mass Flux Rates/Emission Factors

Test ID	Parameter	Units	Values reported					
			Run 1	Run 2	Run 3	Run 4	Run 5	
1	Stack temperature	Deg F	209	210	207	208	209	
No. 1	Pressure	in. HG	29.30	29.30	29.40	29.40	29.40	
pulp	Moisture	%	48.29	48.80	39.17	38.53	37.93	
dryer	Oxygen	%	10.42	9.765	13.15	13.86	13.93	
	Volumetric flow, actual	acfm	58413	58464	62418	62273	62355	
	Volumetric flow, standard*	dscfm	23345	23101	29534	29731	30016	
	Isokinetic variation	%	106.67	102.61	103.65	100.06	100.57	
Pulp dryer feed rate NEED TO CHECK W/PLANT!!		TPH	31.0	31.0	26.0	26.0	26.0	
	Pollutant concentrations:							
	Total PM	G/dscf	0.0953	0.1191	0.0663	0.0754	0.0712	
	Filterable PM	G/dscf	0.0656	0.0908	0.0480	0.0577	0.0579	
	Condensible organic PM	G/dscf	0.0297	0.0283	0.0183	0.0177	0.0133	
	CO2	% vol	9.03	9.67	6.71	6.12	6.05	
	Pollutant mass flux rates:							
	Filterable PM	lb/hr	13.1	18.0	12.2	14.7	14.9	
	Condensible organic PM	lb/hr	5.94	5.60	4.63	4.51	3.41	
	CO2	lb/hr	14447	15309	13581	12470	12445	
	Emission factors (ENGLISH UNITS):							AVERAGE
	Filterable PM	lb/ton	0.42	0.58	0.47	0.57	0.57	0.52
	Condensible organic PM	lb/ton	0.19	0.18	0.18	0.17	0.13	0.17
	CO2	lb/ton	466	494	522	480	479	488
	Emission factors (METRIC UNITS):							AVERAGE
	Filterable PM	kg/Mg	0.21	0.29	0.23	0.28	0.29	0.26
	Condensible organic PM	kg/Mg	0.096	0.090	0.089	0.087	0.066	0.086
	CO2	kg/Mg	233	247	261	240	239	244

*DSCFM BASED ON A STANDARD TEMPERATURE OF 68 DEGREES FAHRENHEIT

Filename: BEET22A.WQ1
Date: 19-Jan-95
Facility: American Crystal Sugar
Location: Crookston, Minnesota
Source: No. 2 pulp dryer (coal-fired) w/multiclones and stack filter system
Test date: February 24-25, 1993

D. Emission Data/Mass Flux Rates/Emission Factors

Test ID	Parameter	Units	Values reported									
			Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	
2	Stack temperature	Deg F	195	195	195	193	194	194	195	194	196	
No. 2	Pressure	in. HG	29.43	29.43	29.43	29.40	29.40	29.40	29.52	29.52	29.52	
pulp	Moisture	%	35.64	34.54	32.64	25.88	29.35	28.81	28.58	27.78	26.94	
dryer	Oxygen	%	14.45	15.1	15.63	17.25	16.59	16.56	16.37	16.76	16.93	
	Volumetric flow, actual	acfm	45571	45475	45322	43538	43872	44437	45293	43647	45191	
	Volumetric flow, standard*	dscfm	23256	23603	24207	25640	24589	25096	25728	25109	26219	
	Isokinetic variation	%	102.72	98.7	97.55	93.42	102.32	98.12	101.4	102.33	99.57	
Pulp dryer feed rate NEED TO CHECK W/PLANT!!		TPH	28.0	27.0	26.8	23.2	22.0	22.0	24.3	24.0	23.5	
	Pollutant concentrations:											
	Total PM	G/dscf	0.0806	0.0753	0.0682	0.0532	0.0452	0.0478	0.0557	0.0552	0.0584	
	Filterable PM	G/dscf	0.0681	0.0594	0.0554	0.0425	0.0355	0.0395	0.0460	0.0459	0.0482	
	Condensible organic PM	G/dscf	0.0125	0.0159	0.0128	0.0107	0.0097	0.008278	0.009726	0.009332	0.0102	
	CO2	% vol	5.57	5.02	4.55	3.18	3.74	3.75	3.92	3.6	3.46	
	Pollutant mass flux rates:											
	Filterable PM	lb/hr	13.6	12.0	11.5	9.3	7.5	8.5	10.1	9.9	10.8	
	Condensible organic PM	lb/hr	2.49	3.21	2.66	2.35	2.04	1.78	2.14	2.01	2.29	
	CO2	lb/hr	8877	8120	7548	5588	6303	6450	6912	6195	6217	
	Emission factors (ENGLISH UNITS):											AVERAGE
	Filterable PM	lb/ton	0.48	0.45	0.43	0.40	0.34	0.39	0.42	0.41	0.46	0.42
	Condensible organic PM	lb/ton	0.089	0.12	0.10	0.10	0.093	0.081	0.088	0.084	0.097	0.095
	CO2	lb/ton	317	301	282	241	286	293	285	258	265	281
	Emission factors (METRIC UNITS):											AVERAGE
	Filterable PM	kg/Mg	0.24	0.22	0.21	0.20	0.17	0.19	0.21	0.21	0.23	0.21
	Condensible organic PM	kg/Mg	0.044	0.059	0.050	0.051	0.046	0.040	0.044	0.042	0.049	0.047
	CO2	kg/Mg	159	150	141	120	143	147	143	129	132	140

*DSCFM BASED ON A STANDARD TEMPERATURE OF 68 DEGREES FAHRENHEIT

Bay West Analytical Laboratory

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FAX 291-0099

LAB NO: 3425
SOURCE: 2 Dryer stack
SITE: Crookston
LOCATION: ACS

TEST NO: 5
RUN NO: 3
DATE: 3-9-93
ANALYST: R. Hessler
Reviewed: 3-12-93 SWP

FILTERS

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33999	0.6313	-	0.5804	=	0.0509

TOTAL 0.0509

Probe & Front Half Wash

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33998	21.2981	-	21.1313	=	0.1668

BLANK 0.158 (l) * 0.0079 (g/l) = -0.0012 (g)

CORRECTED TOTAL 0.1656

IMPINGER CATCH

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
34000	135.4257	-	135.3790	=	0.0467

BLANK 0.730 (l) * 0.0013 (g/l) = -0.0010

CORRECTED TOTAL 0.0457

SUMMARY OF CORRECTED TOTALS (g)

RUN NO.	FILTER		PROBE WASH		IMP. CATCH		TOTAL
3	0.0509	+	0.1656	+	0.0457	=	0.2622

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LAB NO: 3425
SOURCE: 2 Dryer stack
SITE: Crookston
LOCATION: ACS

TEST NO: 5
RUN NO: 2
DATE: 3-9-93
ANALYST: R. Hessler
Reviewed: 3-12-93 SWP

FILTERS

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33996	0.6250	-	0.5798	=	0.0452

TOTAL 0.0452

Probe & Front Half Wash

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33995	21.1627	-	21.0042	=	0.1585

BLANK 0.158 (l) * 0.0079 (g/l) = -0.0012 (g)

CORRECTED TOTAL 0.1573

IMPINGER CATCH

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33997	140.7792	-	140.7370	=	0.0422

BLANK 0.740 (l) * 0.0013 (g/l) = -0.0010

CORRECTED TOTAL 0.0412

SUMMARY OF CORRECTED TOTALS (g)

RUN NO.	FILTER		PROBE WASH		IMP. CATCH		TOTAL
2	0.0452	+	0.1573	+	0.0412	=	0.2437

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LAB NO: 3425
SOURCE: 2 Pwr Stack
SITE: Crookston
LOCATION: ACS

TEST NO: 5
RUN NO: 1
DATE: 3-9-93
ANALYST: R. Hesse
Reviewed: 3-12-93 SWD

FILTERS

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33993	0.6248	-	0.5768	=	0.0480

TOTAL 0.0480

Probe & Front Half Wash

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33992	21.2666	-	21.1075	=	0.1591

BLANK 0.130 (l) * 0.0079 (g/l) = -0.0010 (g)

CORRECTED TOTAL 0.1581

IMPINGER CATCH

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33994	134.8221	-	134.7775	=	0.0446

BLANK 0.800 (l) * 0.0013 (g/l) = -0.0010

CORRECTED TOTAL 0.0436

SUMMARY OF CORRECTED TOTALS (g)

RUN NO.	FILTER		PROBE WASH		IMP. CATCH		TOTAL
1	0.0480	+	0.1581	+	0.0436	=	0.2497

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LAB NO: 3425
SOURCE: 2 Dryer stack
SITE: Crookston
LOCATION: ACS

TEST NO: 4
RUN NO: 3
DATE: 3-9-93
ANALYST: R. Hessler
Reviewed: 3-12-93 SWP

FILTERS

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33990	0.6197	-	0.5767	=	0.0430

TOTAL 0.0430

Probe & Front Half Wash

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33989	21.3167	-	21.1917	=	0.1250

BLANK 0.116 (l) * 0.0079 (g/l) = -0.0009 (g)

CORRECTED TOTAL 0.1241

IMPINGER CATCH

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33991	142.8937	-	142.8577	=	0.0360

BLANK 0.750 (l) * 0.0013 (g/l) = -0.0010

CORRECTED TOTAL 0.0350

SUMMARY OF CORRECTED TOTALS (g)

RUN NO.	FILTER		PROBE WASH		IMP. CATCH		TOTAL
3	0.0430	+	0.1241	+	0.0350	=	0.2021

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LAB NO: 3425
SOURCE: 2 Dryer stack
SITE: Crookston
LOCATION: ACS

TEST NO: 4
RUN NO: 2
DATE: 3-9-93
ANALYST: R. Hessler
Reviewed: 3-12-93 SWP

FILTERS

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33987	0.6317	-	0.5796	=	0.0521

TOTAL 0.0521

Probe & Front Half Wash

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33986	21.1446	-	21.0421	=	0.1025

BLANK 0.106 (l) * 0.0079 (g/l) = -0.0008 (g)

CORRECTED TOTAL 0.1017

IMPINGER CATCH

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33988	136.5129	-	136.4699	=	0.0430

BLANK 0.770 (l) * 0.0013 (g/l) = -0.0010

CORRECTED TOTAL 0.0420

SUMMARY OF CORRECTED TOTALS (g)

RUN NO.	FILTER		PROBE WASH		IMP. CATCH		TOTAL
2	0.0521	+	0.1017	+	0.0420	=	0.1958

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LAB NO: 3425
SOURCE: 2 Dryer Stack
SITE: Crookston
LOCATION: ACS

TEST NO: 4
RUN NO: 1
DATE: 3-9-93
ANALYST: K. Hessler
Reviewed: 3-12-93 SWP

FILTERS

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33984	0.6164	-	0.5774	=	0.0390

TOTAL 0.0390

Probe & Front Half Wash

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33983	21.5310	-	21.3938	=	0.1372

BLANK 0.156 (l) * 0.0079 (g/l) = -0.0012 (g)

CORRECTED TOTAL 0.1360

IMPINGER CATCH

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33985	137.8034	-	137.7586	=	0.0448

BLANK 0.660 (l) * 0.0013 (g/l) = -0.0008

CORRECTED TOTAL 0.0440

SUMMARY OF CORRECTED TOTALS (g)

RUN NO.	FILTER		PROBE WASH		IMP. CATCH		TOTAL
1	0.0390	+	0.1360	+	0.0440	=	0.2190

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LAB NO: 3425
SOURCE: #2 Dryer stack
SITE: Crookston
LOCATION: ACS

TEST NO: 3
RUN NO: 3
DATE: 3-9-93
ANALYST: R. Hessler
Reviewed: 3-12-93 SWP

FILTERS

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33981	0.6449	-	0.5802	=	0.0647

TOTAL 0.0647

Probe & Front Half Wash

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33980	21.6041	-	21.4429	=	0.1612

BLANK 0.164 (l) * 0.0079 (g/l) = -0.0013 (g)

CORRECTED TOTAL 0.1599

IMPINGER CATCH

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33982	139.8264	-	139.7732	=	0.0532

BLANK 0.830 (l) * 0.0013 (g/l) = -0.0011

CORRECTED TOTAL 0.0521

SUMMARY OF CORRECTED TOTALS (g)

RUN NO.	FILTER		PROBE WASH		IMP. CATCH		TOTAL
3	0.0647	+	0.1599	+	0.0521	=	0.2767

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LAB NO: 3425
SOURCE: #2 Dryer Stack
SITE: Crookston
LOCATION: ACS

TEST NO: 3
RUN NO: 2
DATE: 3-9-93
ANALYST: R. Hessler
Reviewed: 3-12-93 SWD

FILTERS

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33978	0.6466	-	0.5802	=	0.0664

TOTAL 0.0664

Probe & Front Half Wash

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33977	21.6810	-	21.5082	=	0.1728

BLANK 0.184 (l) * 0.0079 (g/l) = -0.0014 (g)

CORRECTED TOTAL 0.1714

IMPINGER CATCH

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33979	140.6425	-	140.5779	=	0.0646

BLANK 0.870 (l) * 0.0013 (g/l) = -0.0011

CORRECTED TOTAL 0.0635

SUMMARY OF CORRECTED TOTALS (g)

RUN NO.	FILTER		PROBE WASH		IMP. CATCH		TOTAL
2	0.0664	+	0.1714	+	0.0635	=	0.3013

Bay West Analytical Laboratory

Bay West Inc
Five Empire Drive
St Paul Minnesota
55103-1867

612-291-0456
FAX 291-0099

LAB NO: 3425
SOURCE: #2 Dryer stack
SITE: Crookston
LOCATION: ACS

TEST NO: 3
RUN NO: 1
DATE: 3-9-93
ANALYST: R. Hessler
Reviewed: 3-12-93 SWP

FILTERS

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33975	0.6330	-	0.5828	=	0.0502

TOTAL 0.0502

Probe & Front Half Wash

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33974	21.1795	-	21.0674	=	0.1121

BLANK 0.126 (l) * 0.0079 (g/l) = -0.0010 (g)

CORRECTED TOTAL 0.1111

IMPINGER CATCH

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33976	136.6337	-	136.6033	=	0.0304

BLANK 0.640 (l) * 0.0013 (g/l) = -0.0008

CORRECTED TOTAL 0.0296

SUMMARY OF CORRECTED TOTALS (g)

RUN NO.	FILTER		PROBE WASH		IMP. CATCH		TOTAL
1	0.0502	+	0.1111	+	0.0296	=	0.1909

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LAB NO: 3425
SOURCE: 1 Dryer Stack
SITE: Crookston
LOCATION: ACS

TEST NO: 2
RUN NO: 3
DATE: 3-9-93
ANALYST: R. Hessler
Reviewed: 3-12-93 SWP

FILTERS

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33972	0.6501	-	0.5816	=	0.0685

TOTAL 0.0685

Probe & Front Half Wash

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33971	21.6865	-	21.5654	=	0.1211

BLANK 0.164 (l) * 0.0079 (g/l) = -0.0013 (g)

CORRECTED TOTAL 0.1198

IMPINGER CATCH

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33973	140.1096	-	140.0654	=	0.0442

BLANK 0.840 (l) * 0.0013 (g/l) = -0.0011

CORRECTED TOTAL 0.0431

SUMMARY OF CORRECTED TOTALS (g)

RUN NO.	FILTER		PROBE WASH		IMP. CATCH		TOTAL
3	0.0685	+	0.1198	+	0.0431	=	0.2314

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LAB NO: 3425
SOURCE: 1 Dryer stack
SITE: Crookston
LOCATION: ACS

TEST NO: 2
RUN NO: 2
DATE: 3-9-93
ANALYST: R. Hessler
Reviewed: 3-12-93 SWP

FILTERS

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33969	0.6673	-	0.5786	=	0.0887

TOTAL 0.0887

Probe & Front Half Wash

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33968	21.6283	-	21.5309	=	0.0974

BLANK 0.168 (l) * 0.0078 (g/l) = -0.0013 (g)

CORRECTED TOTAL 0.0961

IMPINGER CATCH

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33970	138.5096	-	138.4518	=	0.0578

BLANK 0.850 (l) * 0.0013 (g/l) = -0.0011

CORRECTED TOTAL 0.0567

SUMMARY OF CORRECTED TOTALS (g)

RUN NO.	FILTER		PROBE WASH		IMP. CATCH		TOTAL
2	0.0887	+	0.0961	+	0.0567	=	0.2415

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LAB NO: 3425
SOURCE: 1 Pulp Dryer Stack
SITE: Crookston
LOCATION: ACS

TEST NO: 2
RUN NO: 1
DATE: 3-9-93
ANALYST: R. Hessler
Reviewed: 3-12-93 SWP

FILTERS

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33966	0.6240	-	0.5762	=	0.0478

TOTAL 0.0478

Probe & Front Half Wash

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33965	21.6543	-	21.5425	=	0.1118

BLANK 0.154 (l) * 0.0079 (g/l) = -0.0012 (g)

CORRECTED TOTAL 0.1106

IMPINGER CATCH

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33967	141.6480	-	141.5864	=	0.0616

BLANK 0.910 (l) * 0.0013 (g/l) = -0.0012

CORRECTED TOTAL 0.0604

SUMMARY OF CORRECTED TOTALS (g)

RUN NO.	FILTER		PROBE WASH		IMP. CATCH		TOTAL
1	0.0478	+	0.1106	+	0.0604	=	0.2188

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LAB NO: 3425
SOURCE: 1 Pulp Dryer stack
SITE: Crookston
LOCATION: ACS

TEST NO: 1
RUN NO: 2
DATE: 3-9-93
ANALYST: R. Hessler
Reviewed: 3-12-93 SWD

FILTERS

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33962	0.7806	-	0.6469	=	0.1337

TOTAL 0.1337

Probe & Front Half Wash

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33961	20.7114	-	20.6118	=	0.0996

BLANK 0.154 (l) * 0.0079 (g/l) = -0.0012 (g)

CORRECTED TOTAL 0.0984

IMPINGER CATCH

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33963	136.8678	-	136.7943	=	0.0735

BLANK 1.010 (l) * 0.0013 (g/l) = -0.0013

CORRECTED TOTAL 0.0722

SUMMARY OF CORRECTED TOTALS (g)

RUN NO.	FILTER		PROBE WASH		IMP. CATCH		TOTAL
2	0.1337	+	0.0984	+	0.0722	=	0.3043

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LAB NO: 3425
SOURCE: 1 Pulp Dryer stack
SITE: Crookston
LOCATION: ACS

TEST NO: 1
RUN NO: 1
DATE: 3-9-93
ANALYST: R. Hessler
Reviewed: 3-12-93 SWP

FILTERS

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33958	0.6985	-	0.6233	=	0.0752

TOTAL 0.0752

Probe & Front Half Wash

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33957	21.5134	-	21.4022	=	0.1112

BLANK 0.144 (l) * 0.0079 (g/l) = -0.0011 (g)

CORRECTED TOTAL 0.1101

IMPINGER CATCH

Lab No.	Final Wt. (g)		Tare Wt. (g)		Gain (g)
33959	135.7372	-	135.6656	=	0.0716

BLANK 1.020 (l) * 0.0013 (g/l) = -0.0013

CORRECTED TOTAL 0.0703

SUMMARY OF CORRECTED TOTALS (g)

RUN NO.	FILTER		PROBE WASH		IMP. CATCH		TOTAL
1	0.0752	+	0.1101	+	0.0703	=	0.2556

2.0 INTRODUCTION

Bay West personnel conducted particulate emission compliance testing on the Unit Nos. 1 and 2 Pulp Dryer Stacks at the American Crystal Sugar Company located in Crookston, Minnesota. On-site testing was performed on Feburary 22-26, 1993 by a two-member Bay West team consisting of Dwayne Smith and Dan Phipps. Coordination between the facility operations and testing activities was provided by Dave Noble of the Crookston facility through direct contact with the test team leader. The testing consisted of multiple independent 96-minute determinations for particulate with concurrent integrated gas sampling for Orsat analyses at each site.

The objectives of this project were to quantify particulate emissions and compare them to applicable air emissions regulations stipulated by state and federal guidelines. Special provisions for this testing included, but were not limited to, operating the facility at or near maximum capacity.

Results are reported in the next section followed by an explanation of the test procedures used and a description of the process under investigation. All supporting information is included in the appendices.

3.0 RESULTS

Results of particulate determinations and gas composition are found in Tables 1 through 10. The results of additional air flow profiles taken at the Dryer Aspiration Ducts and the Recycle Ducts are found in Appendix 6.

Test No. 1, Run No. 3, was cancelled due to dryer disturbances but no problems were encountered in the sampling or analyses of emission samples on the other tests. After complete review of the test results, we believe that the values reported herein are an accurate representation of the actual source conditions during the time of testing.

The wet catch was analyzed for condensible organic particulate via a chloroform/diethyl ether extraction. Three 25-ml portions of diethyl ether were used in the extraction which were then evaporated at room temperature and desiccated to a constant weight. Gravimetric results were then added to the dry catch results (filter and probe wash explained above) to calculate the final particulate concentrations.

5.0 PROCESS DESCRIPTION

Pulp Dryers Nos. 1 and 2 at the American Crystal Sugar facility in Crookston, Minnesota are of rotary drum design and are used to dry sugar-beet pulp. The drums are heated by coal-fired furnaces. Pollution control is facilitated by multiclones and stack filter systems. A portion of the exhaust gas from the multiclones may be recycled to the rotary drums to maintain proper operating temperatures. Schematics are included in Figures 1 and 2.