

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/](http://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.

<b>AP42 Section:</b>	<b>9.10.1.2</b>
<b>Background Chapter</b>	<b>4</b>
<b>Reference:</b>	<b>19</b>
<b>Title:</b>	<b>Results of a Source Emission Compliance Test on the Sugar Cooler Stack at American Crystal Sugar Company, Crookston, Minnesota, March 11, 1993, Twin City Testing Corporation, St. Paul, MN,  April 16, 1993.</b>

APPENDIX R

REPORT EXCERPTS FROM REFERENCE 19

(American Crystal Sugar Company, March 11, 1993)

Report Number: 4232-93-2259-5

Report Issued: April 16, 1993

**AIR EMISSION TEST REPORT**  
**RESULTS OF A**  
**SOURCE EMISSION COMPLIANCE TEST ON**  
**THE SUGAR COOLER STACK AT**  
**AMERICAN CRYSTAL SUGAR COMPANY**  
**CROOKSTON, MINNESOTA**  
**MARCH 11, 1993**

Submitted to:

AMERICAN CRYSTAL SUGAR COMPANY  
Highway 75, P.O. Box 600  
Crookston, MN 56716

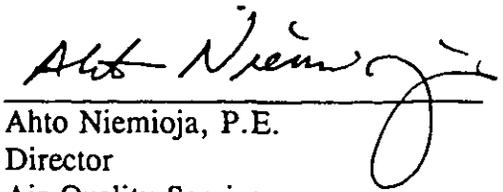
Submitted by:

TWIN CITY TESTING CORPORATION  
Air Quality Services Department  
737 Pelham Blvd.  
St. Paul, Minnesota 55114

Prepared by:

  
Alan L. Trowbridge  
Manager, Source and Ambient Testing  
Air Quality Services

Approved by:

  
Ahto Niemioja, P.E.  
Director  
Air Quality Services

## INTRODUCTION

Twin City Testing Corporation (TCT) was contracted by American Crystal Sugar Company (ACS) to perform a source emission compliance test on the sugar cooler stack at the ACS facility in Crookston, Minnesota. Particulate emissions generated by the sugar cooling process are controlled with a venturi scrubber which is shown schematically in Figure 1. The scrubber exhaust was tested for particulate emissions on March 11, 1993. This report presents the results of the test program along with all substantiating documentation.

American Crystal Sugar Company was represented throughout the test period by Messrs. Dann Hoffman and Larry Carlson. The TCT sampling team consisted of Messrs. Alan Trowbridge, Jim Tryba and Brad Lavold. The Minnesota Pollution Control Agency was invited to witness the test proceedings but declined to do so.

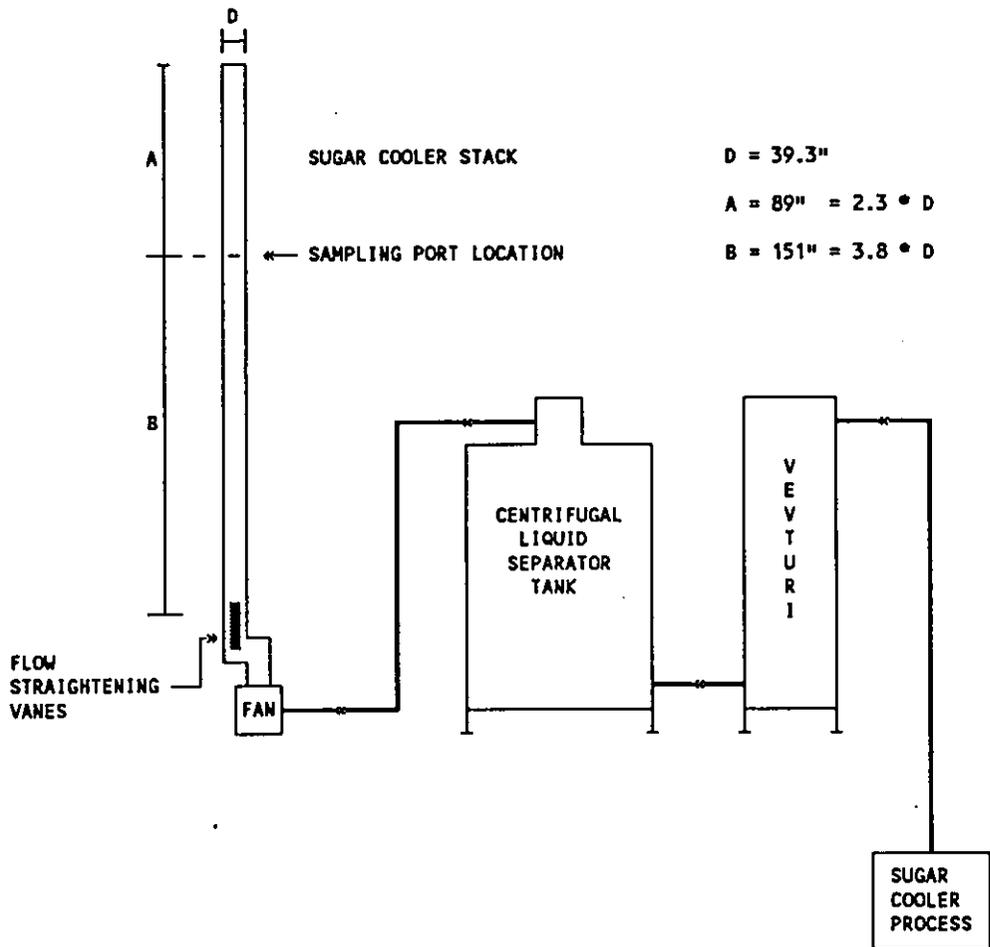
## TEST RESULTS

The results of the particulate emission test are summarized in Table 1. The data indicates an average particulate emission rate of 2.98 pounds per hour and an average particulate concentration of 0.014 grains per dry standard cubic foot.

Minnesota Rule 7005.0480, Subpart 1, Paragraph A states that the industrial process equipment shall not discharge into the atmosphere any gases which contain particulate matter in excess of 31.30 pounds per hour (based on an average process weight rate of 40.55 tons per hour), provided that the owner/operator shall not be required to reduce particulate matter emissions below a concentration of 0.067 grains per dry standard cubic foot (based on a volumetric flow rate of 24,693 dry standard cubic feet per minute), provided that regardless of the mass emission rate, the source shall not be permitted to emit particulate matter in a concentration in excess of 0.30 grains per dry standard cubic foot. Process data is presented in Appendix E and a copy of the Minnesota Rule is presented in Appendix G.

Meteorological conditions did not permit the performance of a visible emission test. Minnesota Rule 7005.0480, Subpart 1, Paragraph B states that the industrial process equipment shall not discharge into the atmosphere any gases which exhibit greater than 20 percent opacity.

FIGURE 1. PROCESS SCHEMATIC WITH SAMPLING PORT LOCATION



**Table 1**  
**Summary of particulate emission test results**  
**American Crystal Sugar Company, Crookston, Minnesota**  
**Sugar Cooler Scrubber Stack**  
**March 11, 1993**

<u>Parameter</u>	<u>Run #1</u>	<u>Run #2</u>	<u>Run #3</u>	<u>Average</u>
<b>Time of Test;</b>				
Start	0945	1137	1313	---
Finish	1050	1242	1420	---
<b>Effluent Temperature, °F</b>	117	113	111	114
<b>Effluent Moisture Content, % v/v</b>	9.0	8.3	7.5	8.3
<b>Effluent Composition, % v/v dry;</b>				
Carbon Dioxide	0.0	0.0	0.0	0.0
Oxygen	20.6	20.5	20.5	20.5
<b>Effluent Volumetric Flow Rate;</b>				
Actual Conditions, acfm	28,154	28,854	30,359	29,122
Standard Conditions, scfm	25,773	26,728	28,224	26,908
Dry Standard Conditions, dscfm	23,453	24,523	26,102	24,693
<b>Isokinetic Variation, %</b>	99.2	98.6	95.3	97.7
<b>Effluent Particulate Concentration;</b>				
Actual Conditions, gr/acf	0.0161	0.0105	0.0098	0.0121
Standard Conditions, gr/scf	0.0176	0.0113	0.0106	0.0132
Dry Standard Conditions, gr/dscf	0.0193	0.0123	0.0114	0.0143
<b>Source Particulate Emission Rate;</b>				
Classical Method, lb/hr	3.89	2.59	2.56	3.01
Ratio of Areas Method, lb/hr	3.85	2.56	2.44	2.95
<b>Process Weight Rate, ton/hr</b>	43.30	41.05	37.30	40.55

Standard Conditions: 68°F, 29.92 in. Hg. Particulate concentration and emission rates are based on analysis of the sampling train front and back catches.

SUMMARY OF PARTICULATE EMISSION TEST LABORATORY DATA

PROJECT NUMBER: 4232-93-2259  
 TEST NUMBER: 5

COMPANY: American Crystal Sugar  
 SOURCE: Sugar Cooler

RUN NUMBER	MASS OF PARTICULATE MATTER COLLECTED, GRAMS						TOTAL PARTICULATE MASS COLLECTED	
	FRONT CATCH			BACK CATCH				
	FRONT WASH	CYCLONE CATCH	FILTER CATCH	FRONT TOTAL	IMPINGER CATCH **	IMPINGER WASH		BACK TOTAL
1	0.0429	0.0000	0.0054	0.0483	0.0031	0.0029	0.0060	0.0543
2	0.0291	0.0000	0.0040	0.0331	0.0015	0.0014	0.0029	0.0360
3	0.0263	0.0000	0.0020	0.0283	0.0025	0.0035	0.0060	0.0343

\* NOT APPLICABLE

\*\* CHLOROFORM/ETHYL ETHER EXTRACTION

**PARTICULATE EMISSION TEST CALCULATIONS**

PROJECT NUMBER: 93-2259    COMPANY: American Crystal Sugar  
 TEST NUMBER: 5    SOURCE: Sugar Cooler  
 RUN NUMBER: 1    TIME: 3/11/93 0945-1050

**TEST DATA**

GAS METER COEFFICIENT	0.9908 Y	VOLUME OF LIQUID COLLECTED, ML	91.0 V1
PITOT TUBE COEFFICIENT	0.840 Cp	GAS COMPOSITION, % V/V DRY;	
NOZZLE DIMENSIONS;		CARBON DIOXIDE	0.00 CD
DIAMETER, IN	0.219 Dn	OXYGEN	20.60 OX
AREA, SF	0.000262 An	CARBON MONOXIDE	0.00 CM
STACK DIMENSIONS;		NITROGEN (BY DIFFERENCE)	79.40 NI
DIAMETER/LENGTH, IN	39.30 S1	AVE. TRAVERSE POINT DATA;	
WIDTH, IN	0.00 Sw	STACK TEMP., DEG F	117 Ts
AREA, SF	8.424 As	METER TEMP., DEG F	92 Tm
BAROMETRIC PRESSURE, IN HG	29.92 Pb	ORIFICE PRESSURE, IN WC	2.092 Po
STACK PRESSURES;		SQRT VELOCITY P., IN WC	0.932 Pv
STATIC, IN WC	0.00 Pg	MASS OF PARTICULATE MATTER	
ABSOLUTE, IN HG	29.92 Ps	COLLECTED, G;	
SAMPLING TIME, MIN	60.00 Ti	FRONT CATCH ( 89.0%)	0.0483 Wf
VOLUME OF GAS SAMPLED AT METER, DCF	45.495 Vm	BACK CATCH ( 11.0%)	0.0060 Wb
		TOTAL CATCH	0.0543 Wt

**CALCULATED RESULTS**

VOLUME OF GAS SAMPLED AT METER, DSCF	43.306 Vms	GAS MOLECULAR WEIGHT;	
EQUIVALENT VOLUME OF WATER VAPOR COLLECTED, SCF	4.283 Vw	DRY BASIS, LB/LB-MOLE	28.82 Md
GAS MOISTURE CONTENT;		WET BASIS, LB/LB-MOLE	27.85 Ms
VOLUME FRACTION	0.0900 Bws	AVERAGE GAS VELOCITY, FPS	55.70 Vs
PERCENT BY VOLUME	9.00 Bwp	GAS VOLUMETRIC FLOW RATE;	
		ACTUAL, ACFM	28154 Qa
		STANDARD, SCFM	25773 Qs
		DRY STANDARD, DSCFM	23453 Qsd
		ISOKINETIC VARIATION, %	99.16 I

<u>PARTICULATE EMISSION PARAMETER</u>	<u>FRONT CATCH</u>	<u>BACK CATCH</u>	<u>TOTAL CATCH</u>
PARTICULATE CONCENTRATION			
ACTUAL, GR/ACF	0.0143 Caf	0.0018 Cab	0.0161 Cat
STANDARD, GR/SCF	0.0157 Cwf	0.0019 Cwb	0.0176 Cwt
DRY STANDARD, GR/DSCF	0.0172 Csf	0.0021 Csb	0.0193 Cst
PARTICULATE EMISSION RATE, LB/HR			
CLASSICAL METHOD	3.46 Rcf	0.43 Rcb	3.89 Rct
RATIO OF AREAS METHOD	3.43 Rrf	0.43 Rrb	3.85 Rrt

STANDARD CONDITIONS: 68 DEG F, 29.92 IN HG      • NON-APPLICABLE DATA

**PARTICULATE EMISSION TEST CALCULATIONS**

PROJECT NUMBER: 93-2259    COMPANY: American Crystal Sugar  
 TEST NUMBER: 5    SOURCE: Sugar Cooler  
 RUN NUMBER: 2    TIME: 3/11/93 1137-1242

**TEST DATA**

GAS METER COEFFICIENT	0.9908 Y	VOLUME OF LIQUID COLLECTED, ML	86.0 V1
PITOT TUBE COEFFICIENT	0.840 Cp	GAS COMPOSITION, % V/V DRY;	
NOZZLE DIMENSIONS;		CARBON DIOXIDE	0.00 CD
DIAMETER, IN	0.219 Dn	OXYGEN	20.50 OX
AREA, SF	0.000262 An	CARBON MONOXIDE	0.00 CM
STACK DIMENSIONS;		NITROGEN (BY DIFFERENCE)	79.50 NI
DIAMETER/LENGTH, IN	39.30 S1	AVE. TRAVERSE POINT DATA;	
WIDTH, IN	0.00 Sw	STACK TEMP., DEG F	113 Ts
AREA, SF	8.424 As	METER TEMP., DEG F	94 Tm
BAROMETRIC PRESSURE, IN HG	30.08 Pb	ORIFICE PRESSURE, IN WC	2.254 Po
STACK PRESSURES;		SQRT VELOCITY P., IN WC	0.963 Pv
STATIC, IN WC	0.00 Pg	MASS OF PARTICULATE MATTER	
ABSOLUTE, IN HG	30.08 Ps	COLLECTED, G;	
SAMPLING TIME, MIN	60.00 Ti	FRONT CATCH ( 91.9%)	0.0331 Wf
VOLUME OF GAS SAMPLED		BACK CATCH ( 8.1%)	0.0029 Wb
AT METER, DCF	47.114 Vm	TOTAL CATCH	0.0360 Wt

**CALCULATED RESULTS**

VOLUME OF GAS SAMPLED AT METER, DSCF	45.003 Vms	GAS MOLECULAR WEIGHT;	
EQUIVALENT VOLUME OF WATER VAPOR COLLECTED, SCF	4.048 Vw	DRY BASIS, LB/LB-MOLE	28.82 Md
GAS MOISTURE CONTENT;		WET BASIS, LB/LB-MOLE	27.93 Ms
VOLUME FRACTION	0.0825 Bws	AVERAGE GAS VELOCITY, FPS	57.09 Vs
PERCENT BY VOLUME	8.25 Bwp	GAS VOLUMETRIC FLOW RATE;	
		ACTUAL, ACFM	28854 Qa
		STANDARD, SCFM	26728 Qs
		DRY STANDARD, DSCFM	24523 Qsd
		ISOKINETIC VARIATION, %	98.55 I

<u>PARTICULATE EMISSION PARAMETER</u>	<u>FRONT CATCH</u>	<u>BACK CATCH</u>	<u>TOTAL CATCH</u>
PARTICULATE CONCENTRATION			
ACTUAL, GR/ACF	0.0096 Caf	0.0008 Cab	0.0105 Cat
STANDARD, GR/SCF	0.0104 Cwf	0.0009 Cwb	0.0113 Cwt
DRY STANDARD, GR/DSCF	0.0113 Csf	0.0010 Csb	0.0123 Cst
PARTICULATE EMISSION RATE, LB/HR			
CLASSICAL METHOD	2.39 Rcf	0.21 Rcb	2.59 Rct
RATIO OF AREAS METHOD	2.35 Rrf	0.21 Rrb	2.56 Rrt

STANDARD CONDITIONS: 68 DEG F, 29.92 IN HG

• NON-APPLICABLE DATA

**PARTICULATE EMISSION TEST CALCULATIONS**

PROJECT NUMBER: 93-2259    COMPANY: American Crystal Sugar  
 TEST NUMBER: 5    SOURCE: Sugar Cooler  
 RUN NUMBER: 3    TIME: 3/11/93 1313-1420

**TEST DATA**

GAS METER COEFFICIENT	0.9908 Y	VOLUME OF LIQUID COLLECTED, ML	80.0 V1
PITOT TUBE COEFFICIENT	0.840 Cp	GAS COMPOSITION, % V/V DRY;	
NOZZLE DIMENSIONS;		CARBON DIOXIDE	0.00 CD
DIAMETER, IN	0.219 Dn	OXYGEN	20.50 OX
AREA, SF	0.000262 An	CARBON MONOXIDE	0.00 CM
		NITROGEN (BY DIFFERENCE)	79.50 NI
STACK DIMENSIONS;		AVE. TRAVERSE POINT DATA;	
DIAMETER/LENGTH, IN	39.30 S1	STACK TEMP., DEG F	111 Ts
WIDTH, IN	0.00 Sw	METER TEMP., DEG F	92 Tm
AREA, SF	8.424 As	ORIFICE PRESSURE, IN WC	2.538 Po
BAROMETRIC PRESSURE, IN HG	30.09 Pb	SQRT VELOCITY P., IN WC	1.016 Pv
STACK PRESSURES;		MASS OF PARTICULATE MATTER COLLECTED, G;	
STATIC, IN WC	0.00 Pg	FRONT CATCH ( 82.5%)	0.0283 Wf
ABSOLUTE, IN HG	30.09 Ps	BACK CATCH ( 17.5%)	0.0060 Wb
SAMPLING TIME, MIN	60.00 Ti	TOTAL CATCH	0.0343 Wt
VOLUME OF GAS SAMPLED AT METER, DCF	48.313 Vm		

**CALCULATED RESULTS**

VOLUME OF GAS SAMPLED AT METER, DSCF	46.321 Vms	GAS MOLECULAR WEIGHT;	
		DRY BASIS, LB/LB-MOLE	28.82 Md
		WET BASIS, LB/LB-MOLE	28.01 Ms
EQUIVALENT VOLUME OF WATER VAPOR COLLECTED, SCF	3.766 Vw	AVERAGE GAS VELOCITY, FPS	60.06 Vs
GAS MOISTURE CONTENT;		GAS VOLUMETRIC FLOW RATE;	
VOLUME FRACTION	0.0752 Bws	ACTUAL, ACFM	30359 Qa
PERCENT BY VOLUME	7.52 Bwp	STANDARD, SCFM	28224 Qs
		DRY STANDARD, DSCFM	26102 Qsd
		ISOKINETIC VARIATION, %	95.30 I

<u>PARTICULATE EMISSION PARAMETER</u>	<u>FRONT CATCH</u>	<u>BACK CATCH</u>	<u>TOTAL CATCH</u>
PARTICULATE CONCENTRATION			
ACTUAL, GR/ACF	0.0081 Caf	0.0017 Cab	0.0098 Cat
STANDARD, GR/SCF	0.0087 Cwf	0.0018 Cwb	0.0106 Cwt
DRY STANDARD, GR/DSCF	0.0094 Csf	0.0020 Csb	0.0114 Cst
PARTICULATE EMISSION RATE, LB/HR			
CLASSICAL METHOD	2.11 Rcf	0.45 Rcb	2.56 Rct
RATIO OF AREAS METHOD	2.01 Rrf	0.43 Rrb	2.44 Rrt

STANDARD CONDITIONS: 68 DEG F, 29.92 IN HG

\* NON-APPLICABLE DATA

Filename: BEET19.WQ1

Date: 19-Dec-94

Facility: American Crystal Sugar

Location: Crookston, Minnesota

Source: Sugar cooler with venturi scrubber (5-7" pressure drop)

Test date: March 11, 1993

D. Emission Data/Mass Flux Rates/Emission Factors

Test ID	Parameter	Units	Values reported			
			Run 1	Run 2	Run 3	Run 4
1	Stack temperature	Deg F	117	113	111	
Sugar cooler	Pressure	in. HG	29.92	30.08	30.09	
	Moisture	%	9.00	8.25	7.52	
	Oxygen	%	20.6	20.5	20.5	
	Volumetric flow, actual	acfm	28154	28854	30359	
	Volumetric flow, standard*	dscfm	23444	24525	26109	
	Isokinetic variation	%	99.2	98.6	95.3	
Sugar cooler throughput rate		TPH	43.30	41.05	37.30	
Pollutant concentrations:						
Total PM		G/dscf	0.0193	0.0123	0.0114	
Filterable PM		G/dscf	0.0172	0.0113	0.00941	
Condensable organic PM		G/dscf	0.00110	0.000513	0.00083	
Condensable inorganic PM		G/dscf	0.00103	0.000478	0.00116	
Pollutant mass flux rates:						
Filterable PM		lb/hr	3.45	2.38	2.10	
Condensable organic PM		lb/hr	0.221	0.108	0.186	
Condensable inorganic PM		lb/hr	0.207	0.101	0.260	
Emission factors (ENGLISH UNITS):						AVERAGE
Filterable PM		lb/ton	0.080	0.058	0.056	0.065
Condensable organic PM		lb/ton	0.0051	0.0026	0.0050	0.0042
Condensable inorganic PM		lb/ton	0.0048	0.0024	0.0070	0.0047
Emission factors (METRIC UNITS):						AVERAGE
Filterable PM		kg/Mg	0.040	0.029	0.028	0.032
Condensable organic PM		kg/Mg	0.0026	0.0013	0.0025	0.0021
Condensable inorganic PM		kg/Mg	0.0024	0.0012	0.0035	0.0024

\*DSCFM BASED ON A STANDARD TEMPERATURE OF 68 DEGREES FAHRENHEIT

## TEST PROCEDURES

The EPA Methods referenced below are described in Appendix A of the Code of Federal Regulations, Title 40, Part 60 (40 CFR 60).

The number of sampling points and their location within the source stack/duct was determined per EPA Method 1 which is entitled "Sample and velocity traverses for stationary sources". In this method the number of sampling points is based on the length of straight, undisturbed flow both before and after the sampling port location. The following data is specific to the source tested:

Stack cross-sectional dimensions, inches:	39.3 diameter
Length of straight undisturbed flow;	
Before sampling ports:	151 inches = 3.84 diameters
After sampling ports:	89 inches = 2.26 diameters
Required number of sampling points:	24
Number of sampling points used:	24
Sampling point distribution;	
Number of sampling ports:	2
Number of sampling points per port:	12
Particulate test sampling time;	
Time at each sampling point, minutes:	2.5
Test run total sampling time, minutes:	60.0

Effluent flow measurements were made per EPA Method 2 which is entitled "Determination of stack gas velocity and volumetric flow rate (Type S pitot tube)". Gas velocity pressure (head) and temperature data were obtained during each EPA Method 5 particulate test run by traversing each of the sampling points defined by EPA Method 1. This data along with gas density (EPA Method 3) and moisture content (EPA Method 4) data was used to calculate the gas velocity at each sampling point. The source volumetric flow rate was calculated by multiplying the average gas velocity by the stack/duct cross-sectional area at the point of measurement. Velocity pressure (head) measurements were made using a Type S pitot tube constructed to the design specifications detailed in EPA Method 2. Such pitot tubes have a base line coefficient of 0.84.

The density of the effluent was determined per EPA Method 3 which is entitled "Gas analysis for the determination of dry molecular weight". A multi-point, integrated gas sample was collected simultaneously with each EPA Method 5 particulate test run. The gas sample was analyzed for carbon dioxide and oxygen concentrations with a standard Orsat analyzer using commercially prepared solutions. For calculations of gas density the balance of the gas was assumed to be nitrogen and carbon monoxide.

The effluent moisture content was determined per EPA Method 4 which is entitled "Determination of moisture content in stack gases". Data for making a gas moisture content determination was collected simultaneously with each EPA Method 5 particulate test run. The gas moisture content was calculated from the mass and/or volume of liquid collected in the Method 5 sampling train cold box impingers and the volume of gas sampled.

The effluent particulate concentration was determined per EPA Method 5 which is entitled "Determination of particulate emissions from stationary sources". For each test run, particulate matter was with drawn from the gas stream at each of the EPA Method 1 defined sampling points and collected on a glass fiber filter which was maintained at  $248 \pm 25$  °F. Water vapor, organic vapors and other matter in vapor form which passed through the filter was collected in an ice-cooled impinger trap who's exit temperature was maintained at less than 68 °F.

Sampling was performed using a Grasby-Nutech Model 2010 Method 5 stack sampling system which employed a five foot inconel lined probe with a 7/32" nominal diameter stainless steel nozzle. Particulate emissions included analyses of both the front and back (condensable organics) catches as specified in section 7005.0490, Minnesota Rules.

FACSIMILE COVER LETTER

DATE: 4/14/93

TO: Al Trowbridge

FROM: Dennis Hoffmann

FIRM NAME: AMERICAN CRYSTAL SUGAR COMPANY - CROOKSTON, MN.

OUR FAX NUMBER IS (218)281-4413 OUR TELEPHONE # IS (218)281-1993

NUMBER OF PAGES (including cover letter) 3

COMMENTS:

MESSAGE:

Regarding test on Sugar Cooler.  
Please review attached drawing for accuracy.  
Need through-put rate (lb/hr thru cooler)  
during the following periods on 3/11/93

Test #1:	0945-1050	866 $\frac{cwt}{hr}$
Test #2:	1135-1240	821 $\frac{cwt}{hr}$
Test #3:	1310-1420	746 $\frac{cwt}{hr}$

NOTE

This message includes this cover sheet and 1 additional page(s). Please contact us if you do not receive all of the pages indicated.

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PROCESS SOURCE DESCRIPTION		
Company: <u>AMERICAN CRYSTAL SUGAR</u>		
Location: <u>CROOKSTON</u>		
Process Number: <u>410</u>		
Process Description: <u>SUGAR COOLER</u>		
Maximum Process Feed Rate, lb/hr: <u>40 TON HR</u>		
Finished Product Rate, lb/hr: <u>40 TON HR</u>		
PROCESS INPUT FEED RATES		
Ingredient/Component	Usage Rate (lbs/hr, gal/hr)	Moisture Content as Used, %
1: <u>SUGAR</u>	<u>40 TON HR</u>	<u>18%</u>
2:		
3:		
4:		
AIR POLLUTION CONTROL EQUIPMENT		
Type: <u>VENTURI SCRUBBER</u>		
Manufacturer/Model: <u>Heil</u>		
Air Pressure Drop Across Control Equipment: <u>5-7" WATER ACROSS THROAT</u>		
Air Flow Through the Control Equipment: <u>37,000 ACFM 100°F (25,000 Qscfm)</u>		
AVAILABLE PROCESS DATA (List all metered and/or recorded parameters)		
<u>SCRUBBING LIQUID FLOW RATE</u>	<u>MONITORING EQUIPMENT</u>	
<u>280 GPM AT 20 PSIG</u>	<u>PSI GAUGES, LIQUID FLOW METERS</u>	
	<u>MFR. RECOMMENDED PSI DROP</u>	
	<u>5-7 IN WATER</u>	
STACK SAMPLING LOCATION DESCRIPTION (attach drawing/sketch if available)		
Stack Cross-Sectional Dimension at Sampling Location: <u>FEED 3.33 feet</u>		
Length of Straight, Undisturbed Flow Before Sampling Ports:		
Length of Straight, Undisturbed Flow After Sampling Ports:		
COMMENTS		

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