Appendix G

Suggested Forms for Recording Source Test Data

STATE OF CALIFORNIA
AIR RESOURCES BOARD

SOURCE TEST REPORT

Stationary Source Control Division

ENGINEERING EVALUATION BRANCH

REPORT NO. _____

_____
Project Engineer

Approved:

_____, Chief
Engineering Evaluation Branch

Approved:

_____, Chief
Stationary Source Control Division

SUMMARY

Project engineer _____ Report number _____

Source test conducted at: Date of test _____

Name _____

Address _____

_____

Telephone number (___) _____-_____

Company representative(s)	Title(s)
_____	_____
_____	_____
_____	_____

Source test requested by _____

Form of request _____ Date of request _____

Reason for request _____

_____

_____

Item(s) tested _____

_____

_____

_____

Pollutant(s) measured and measurement method(s) _____

Comparison Between Allowable and Measured Emissions

Air Pollution Control District _____

Rule		Emissions	
Number	Title	Allowable	Measured

TABLE OF CONTENTS

State of California

AIR RESOURCES BOARD

Source Test Report

I. INTRODUCTION

The Air Resources Board staff conducted a source test at _____

_____ on the dates of _____.

All witnesses to the test are identified in Table I.

Table I

Source Test Witnesses

Name	Title	Affiliation

During the testing the staff evaluated emissions from _____

_____

_____

_____.

The purpose of the source test was to _____

_____

_____

_____.

Any other prior source tests conducted at _____

_____are summarized in Table II.

Table II

Prior Source Tests
(if any)

Item tested	Organization performing test	Date of test	ARB report number (if applicable)

II. TEST RESULTS

Table III

Source Test Results

APCD_____ _____	Rule number	Allowable Emissions	Measured emissions			
Test number						Average
Date of test						
Duration of test, minutes						
Process weight rate, lbs/hr						
Gas flow rate SCFM (DRY)						
Stack gas temp. °F						
CO_2 % by volume						
O_2 % by volume						
CO % by volume						
H_2O % by volume						
Particulate concen-tration, gr/scf						
Particulate weight, lbs/hr						
Combustion contami-nants, gr/scf						
Dilution factor (calculated)						
NOx, ppm*						
NOx, lbs/hr						
SO_2, ppm*						
SO_2, lbs/hr						

*Corrected to _____ percent excess air.

Reviewed by _____

Approved by _____
Manager, Testing Section

REMARKS CONCERNING MEASURED EMISSIONS

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

III. PLANT DESCRIPTION

PRODUCT(S) MANUFACTURED OR SERVICE(S) PROVIDED

_____

_____

_____

PLANT CAPACITY (lbs/hr, MW, etc.)

_____

_____

_____

PROCESS DESCRIPTION

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Figure I

Flow Schematic

IV. TEST METHODS

V. TEST CONDITIONS

PLANT OPERATING CONDITIONS

Process weight (include source's strip chart if available): _____.

Operating at _____ percent of capacity.

Other comments: _____

_____

_____.

Results of stack flow check for turbulent and cyclonic conditions: _____

_____.

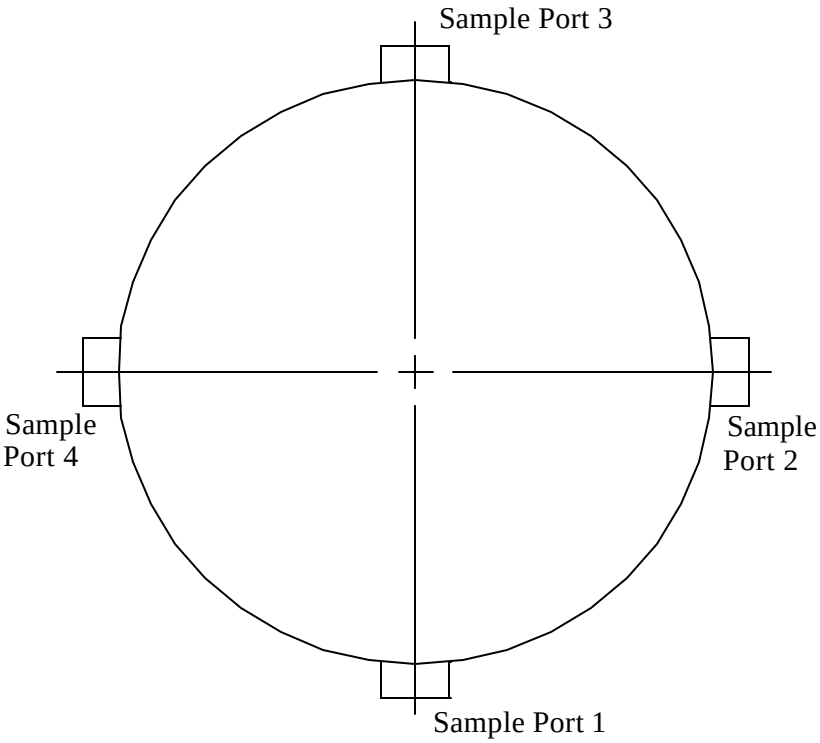
Table IV

Weather Conditions

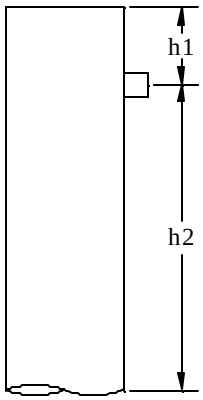
Date	Time	Barometric Pressure	Temperature

Figure II

Round Stack



Sample Port Elevation



Notes:

1. Stack diameter _____.
2. Sampling port in _____ feet upstream (h_1) of any disturbance and _____ feet downstream (h_2) of any disturbance.
3. Sampling port is not 8 diameters downstream and 2 diameters upstream. The following was done to compensate for this: _____ _____ _____.

Table V

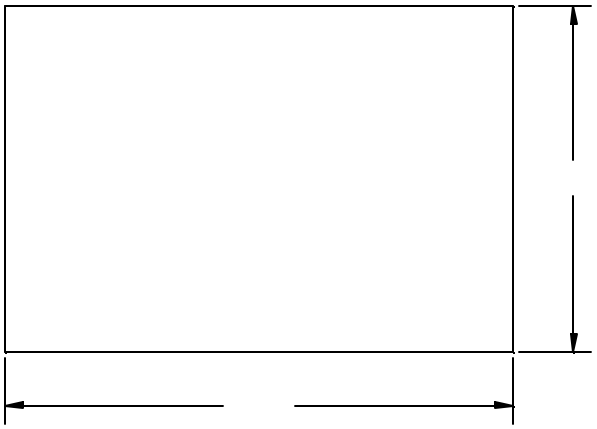
Traverse Point Computations

Traverse point	% of inside diameter	Distance of inside diameter			
		Point A to sample port 1	Point B to sample port 2	Sample port 1 to point A	Sample port 2 to point B

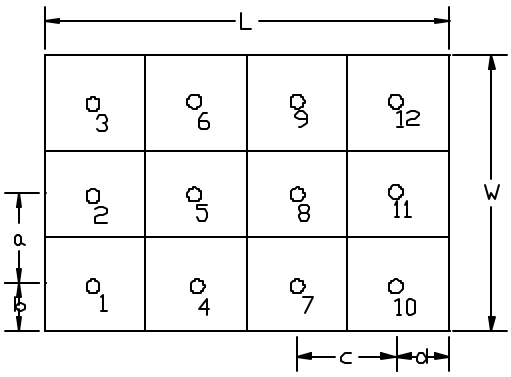
Figure III

Rectangular Stack

Cross section



Example



Example showing rectangular stack cross section divided into 12 equal areas, with a traverse point at centroid of each area.

Equivalent diameter, D_e

$$D_e = 4\left(\frac{\text{area}}{\text{perimeter}}\right) = 4\left(\frac{\qquad}{\qquad}\right)$$

L = _____ a = _____

W = _____ b = _____

c = _____

d = _____

L = length W = width

a = distance between traverse points as measured along the width, W

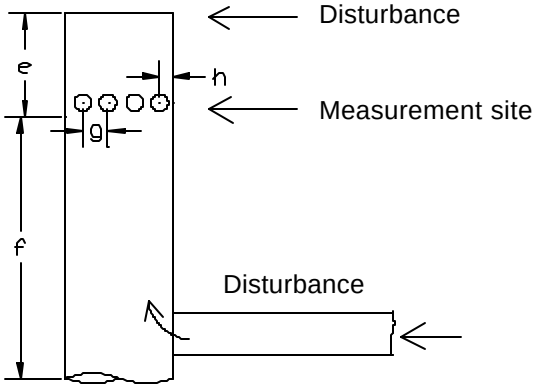
b = distance of traverse point from wall as measured along the width, W

c = distance between traverse points as measured along the length, L

d = distance of traverse point from wall as measured along the length, L

Number of traverse points _____

Elevation



e = _____ g = _____

f = _____ h = _____

e = 2 D_e

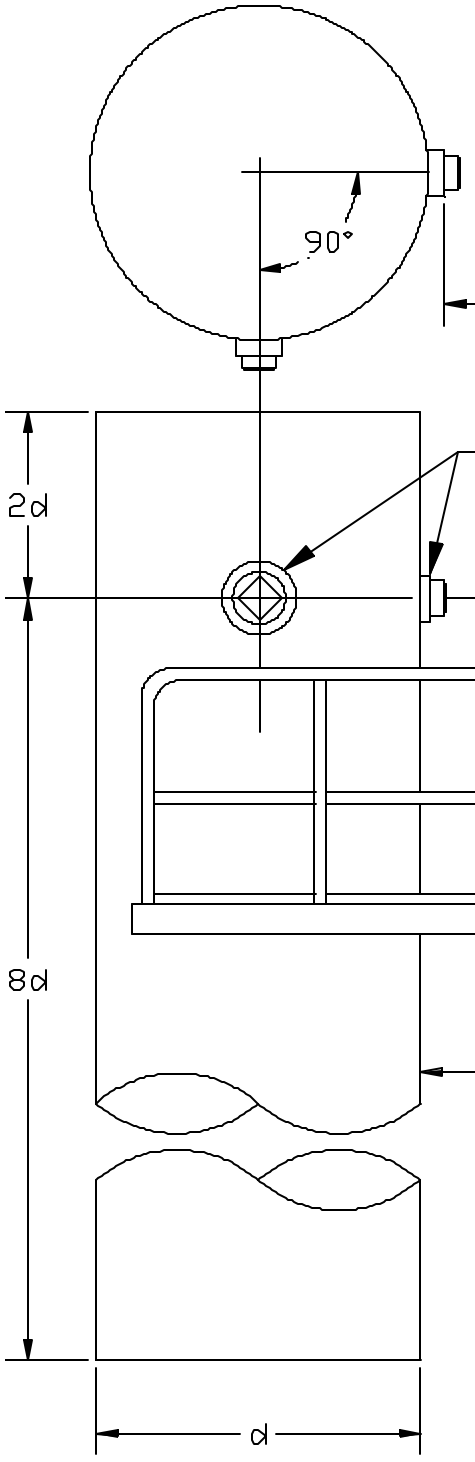
f = 8 D_e

g = a if measurement site is located along the width

= c if measurement site is located along the length

h = b if measurement site is located along the width

= d if measurement site is located along the length



14' MINIMUM CLEARANCE FROM SAMPLING PORT

OBSTRUCTION

SAMPLING PORTS

3" NPT COUPLING. WELD TO STACK. CUT HOLE IN STACK TO I.D. OF COUPLING, INSTALL 3" PIPE PLUG.

FLOOR OF PLATFORM

NOTES:

1. PROVIDE PLATFORM EXTENDING TO A MINIMUM OF 3' ON EACH SIDE OF EACH SAMPLING PORT.
2. PLATFORM & ACCESS TO PLATFORM SHALL CONFORM TO CALIFORNIA INDUSTRIAL SAFETY CODES AND UNIFORM BUILDING CODE.
3. LOCATE PORTS ON WINDWARD SIDE IF POSSIBLE

File No. _____

Date _____

State of California

AIR RESOURCES BOARD

Stationary Source Control Division
Engineering Evaluation Branch

SO_2 SAMPLING TRAIN DATA

Run No. _____ Ambient Temp. °F _____

Location _____ Bar. Press. In. Hg. _____

Sample Station _____ Operator _____

Meter No. _____ Special Instructions _____

_____

CLOCKTIME	METER VOLUME (FT^3)	METER TEMP (°F)	VACUUM (IN. HG.)	SAMPLING RATE (CFM)	ROTA-METER

State of California

AIR RESOURCES BOARD

Stationary Source Control Division
Engineering Evaluation Branch

VELOCITY TRAVERSE DATA

Traverse Point Number	Velocity Head in. H_2O	Distance from inside wall (in.)	Stack Temperature (T_s), °F	Velocity Head in. H_2O	$\sqrt{\Delta P}$	Stack Temperature (T_s), °F
Average						

Plant _____

Sampling Site _____

Remarks _____

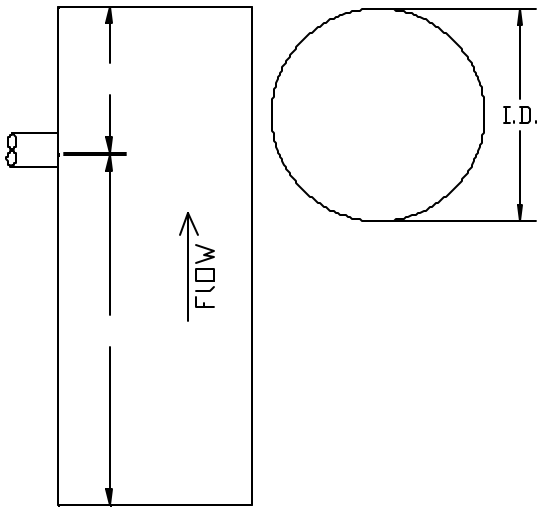
_____

Barometric Pressure, in. Hg _____

Static Pressure in Stack (P_g) in. Hg _____

Operators _____ Date _____

Pitot Tube Factor _____



State of California File No. _____

AIR RESOURCES BOARD

Stationary Source Control Division
Engineering Evaluation Branch

VELOCITY AND FLOW RATE CALCULATIONS

A. Stack Gas Molecular Weight (M_s)

Component	Volume %/100	Factor ($1-B_{wo}$)	Molecular Weight of Component	$\frac{\text{Vol \%}}{100}$ x Factor x M_{s_n}
H_2O (Vol. %)		1.0	18	
CO_2			44	
O_2			32	
CO			28	
N_2			28	
			M_s =	

B. Stack Area (A_s)

A_s = _____

A_s = _____ ft^2

C. Stack Velocity (v_s)

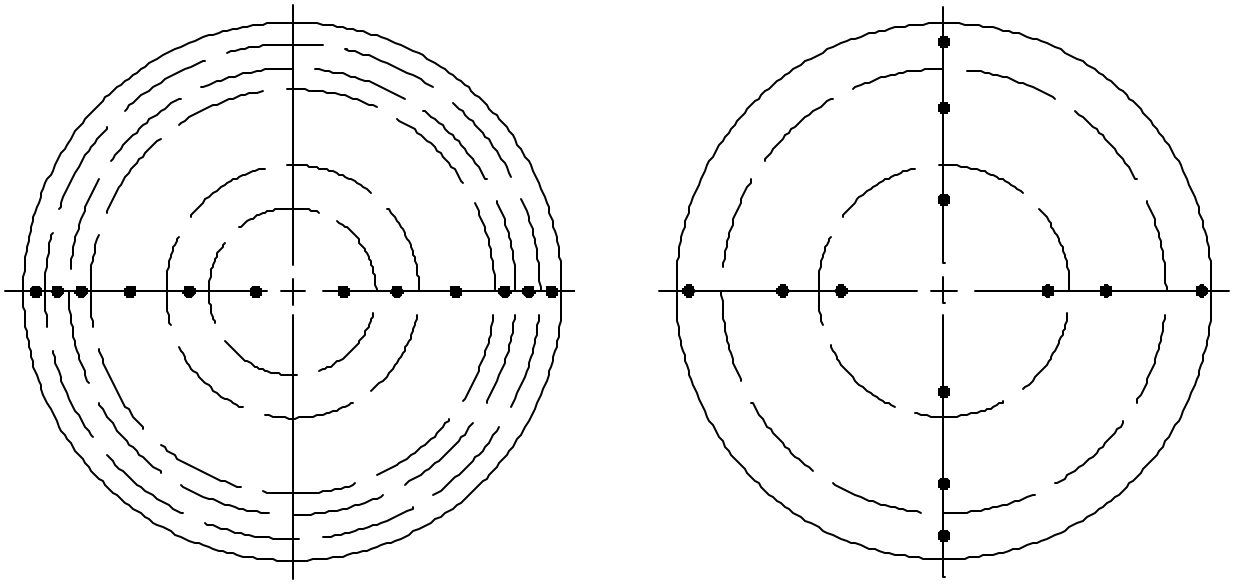
$$v_s = 85.48\, C_p \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_s}{P_s M_s}}$$

v_s = 85.48 ( )( ) $\sqrt{\frac{(\quad)}{(\quad)(\quad)}}$ = _____fps

D. Standard Flow Rate (Dry Basis) (Q_s)

$$Q_s = 60\, \frac{T_{std}}{P_{std}}\, (1-B_{wo})\, v_s A_s\, \frac{P_s}{T_s}$$

Q_s = (60)(17.38)( )( )( ) $\frac{(\quad)}{(\quad)}$ = _____SDCFM



12 Equal Areas Half Annuli

12 Equal Areas Quarter Annuli

FIGURE III-3

CROSS SECTION OF CIRCULAR STACK
DIVIDED INTO 12 EQUAL AREAS WITH A TRAVERSE
POINT AT THE CENTROID OF EACH AREA

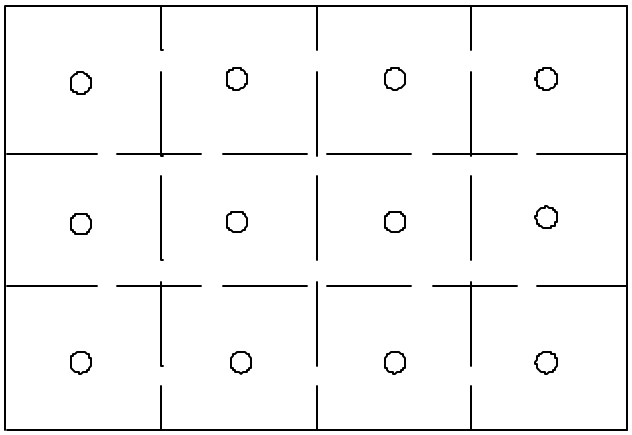


FIGURE III-4

CROSS SECTION OF RECTANGULAR STACK
DIVIDED INTO 12 EQUAL (RECTANGULAR) AREAS,
WITH A TRAVERSE POINT AT THE CENTROID OF EACH AREA

Traverse point number on a diameter	Number of traverse points on a diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.3	2.5	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.7	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.5	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.5	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.3	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.5	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.5	64.5	36.6	28.3	23.6	20.4	18.0	16.1
8				96.7	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.1	23.0
10					97.5	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.9	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

TABLE III-1: LOCATION OF TRAVERSE POINTS IN CIRCULAR STACKS

(Percent of stack diameter from inside wall to traverse point)

State of California File No. _____

AIR RESOURCES BOARD

Division of Implementation & Enforcement
Engineering Evaluation Unit

WATER VAPOR CALCULATIONS
Standard Conditions 60°F and 29.92 in. Hg

Ambient Conditions ___°F and _____ in. Hg

Time	Gas Volume Through Meter (Vm), Ft^3	Impinger Temp. (Ti), °F	Meter Temp. (Tm), °F	Orifice Pressure (Δh), in. H_2O	Volume of Water Collected in Impinger (V_{lc}), ml
					Final
					Initial
					Net (V_{lc})

A. Gas Volume Metered (V_{mstd})

$$P_{ma} = P_{bar} + (\Delta H/13.6) = (\quad) + \frac{(\quad)}{13.6} = \_\_\_\_\_ \text{in. Hg}$$

$$V_{m_{std}} = \frac{520°R}{29.92 \text{ in. Hg}} \bullet \frac{V_m P_{ma}}{T_m} = (17.38)\frac{(\quad)(\quad)}{(\quad)} = \_\_\_\_\_ \text{SDCF}$$

B. Volume of Water Collected (V_{wstd})

$$V_{w_{std}} = \left(0.0464 \ Ft^3/ml\right)\left(V_{l_c}\right) = (0.0464)(\quad) = \_\_\_\_\_ \text{SCF}$$

C. Volume of Water Vapor at Impinger Temp (V_{wvstd})

V.P. = _____ in. Hg at T_i = _____ °F

$$V_{wv_{std}} = \frac{\left(V_{m_{std}}\right)(\text{V.P.})}{\left(P_{ma} - \text{V.P.}\right)} = \frac{(\quad)(\quad)}{(\quad)} = \_\_\_\_\_ \text{SCF}$$

D. Moisture Content in Stack Gas (B_{wo})

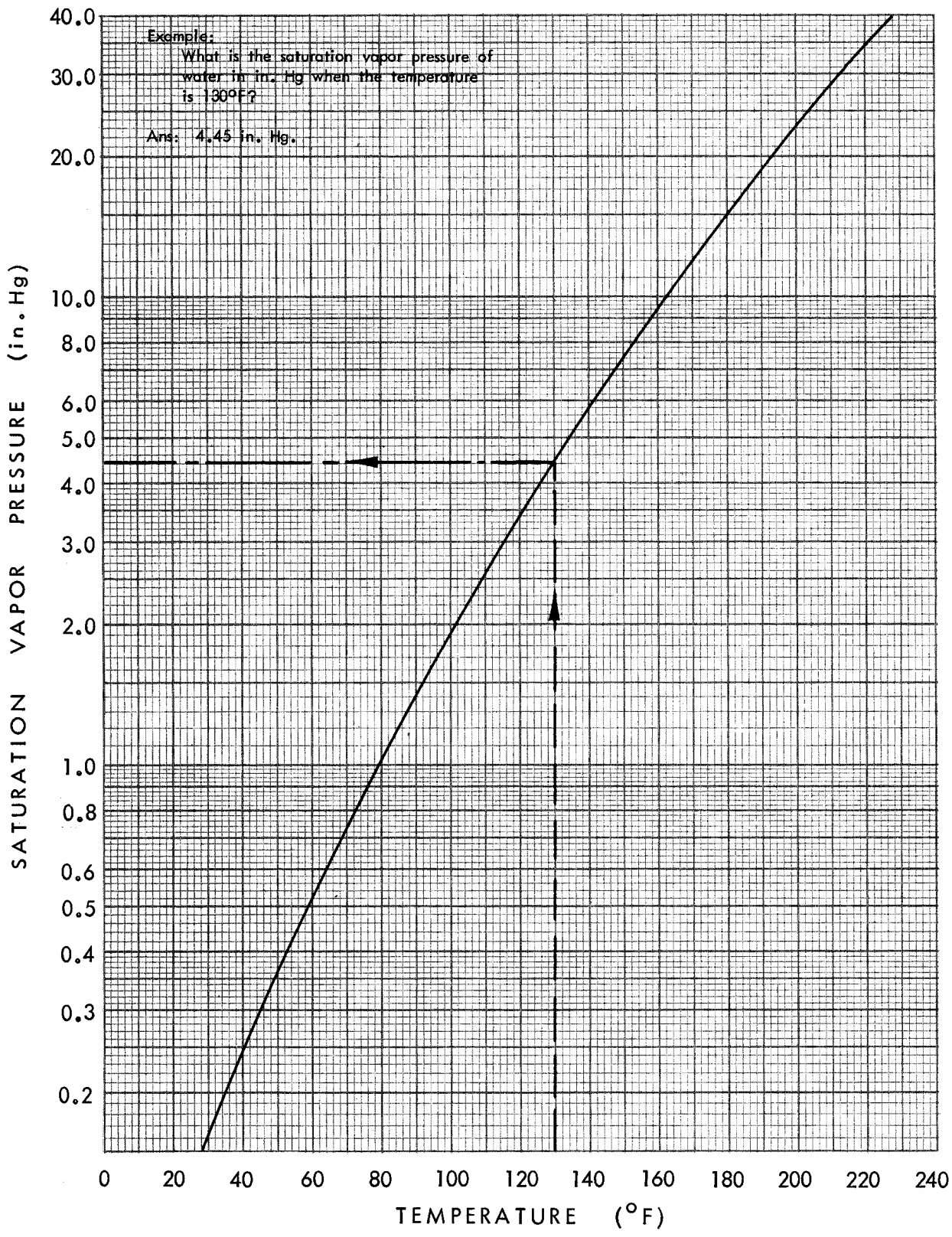
$$B_{wo} = \frac{B + C}{A + B + C} = \frac{(\qquad)}{(\qquad)} = \_\_\_\_\_$$

E. Moisture Content at Saturation at Ts of _____ °F

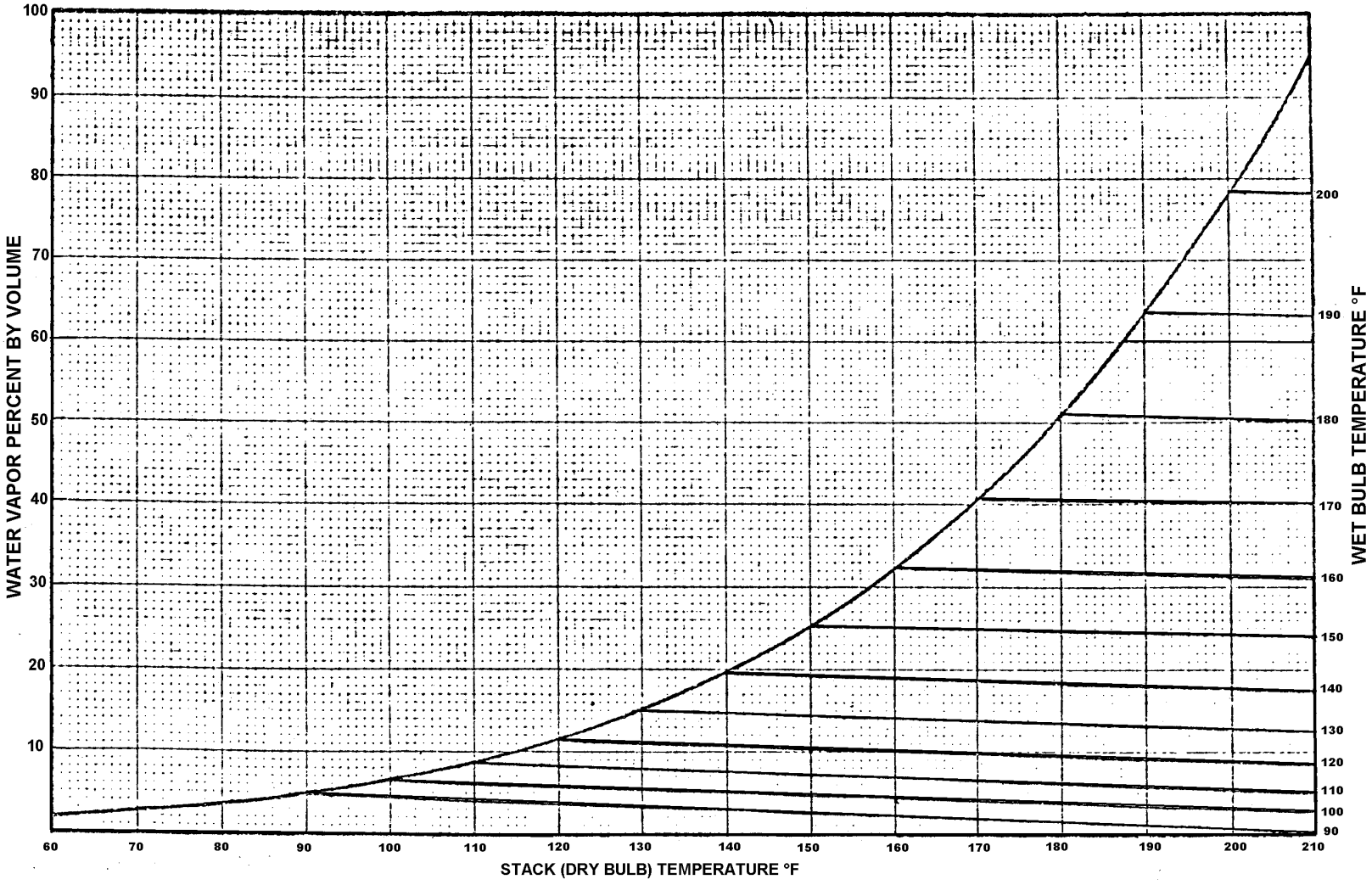
B_{wo} = _____. Use E if D > E.

APPENDIX IV-2

SATURATION VAPOR PRESSURE OVER WATER CURVE



APPENDIX IV-3
PSYCHOMETRIC CHART FOR AIR-WATER VAPOR MIXTURES
(AT 29.92 IN. HG.)



FIELD DATA

Ambient Temp °F ________________

Run No. ____________________

Location ____________________

Date ____________________

Operator ____________________

Sample Box No. ____________

Meter Box No. ______________

VERY IMPORTANT – FILL IN ALL BLANKS

Read and record at the start of each test point.

Leak Test = Before ________ After ________

Pitot Tube Factor ________________

Bar. Press. "Hg ________________

Assumed Moisture % _____________

Heater Box Setting, °F ____________

Probe Tip Dia., In. _______________

Probe Length ____________________

Probe Heater Setting_____________

Point	Clock Time	Dry Gas Meter, CF	Pitot in. H_2O ΔP	Orifice ΔH in H_2O		Dry Gas Temp. °F		Pump Vacuum In. Hg Gauge	Impinger Temp °F	Stack Press In. Hg	Stack Temp. °F
				Desired	Actual	Inlet	Outlet				

ORGANIC ACIDS FIELD DATA

Ambient Temp °F ____________

Run No. ____________

VERY IMPORTANT – FILL IN ALL BLANKS

Bar. Press. "Hg ____________

Location ____________

Read and record at the start of each test point.

Assumed Moisture % ____________

Date ____________

Heater Box Setting, °F ____________

Operator ____________

Probe Tip Dia., In. ____________

Sample Box No. ____________

Probe Length ____________

Meter Box No. ____________

Probe Heater Setting____________

Point	Clock Time	Dry Gas Meter, CF	Pitot in. H_2O ΔP	Orifice ΔH in H_2O		Dry Gas Temp. °F		Pump Vacuum In. Hg Gauge	Impinger Temp °F	Stack Press In. Hg	Stack Temp. °F
				Desired	Actual	Inlet	Outlet				

State of California File No. _____

AIR RESOURCES BOARD

Stationary Source Control Division
Engineering Evaluation Branch

PARTICULATE SAMPLING CALCULATIONS
Standard Conditions 60°F @29.92 in. Hg (Dry Basis)

A. Material Collected (M_n)

_____

_____

_____

_____

_____

Total _____mg.

B. Concentration (C'_s)

$$C'_s = .0154 \frac{gr.}{mg} \bullet \frac{M_n}{V_{m_{std}}} = .0154 \frac{(\quad)}{(\quad)} = \_\_\_\_\_ gr./SDCF$$

C. Emission Rate (M_m)

$$M_m = .00857\ C'_s Q_s$$

$$M_m = .00857 \frac{min/hr}{gr./lb.} (\quad)(\quad) = \_\_\_\_\_ lb/hr.$$

ISOKINETIC VARIATION

D. Total Volume of Stack Gas (V_{tstd})

$V_{m_{std}}$ = _____SCF $V_{wv_{std}}$ = _____SCF

$$V_{w_{std}} = \left[\frac{B_{wo}}{1-B_{wo}}\right]\left[V_{m_{std}}\right] - V_{wv_{std}} = \frac{(\quad)}{(\quad)} (\quad) - (\quad) = \_\_\_\_\_ SCF$$

$$V_{t_{std}} = V_{m_{std}} + V_{w_{std}} + V_{wv_{std}} = (\quad) + (\quad) + (\quad) = \_\_\_\_\_ SCF$$

E. Percent of Isokinetic Sampling (I)

$$I = \frac{v_n}{v_s} \times 100 = \frac{\left[V_{t_{std}} / (60\ \theta\ A_n)\right]\left[(T_s / P_s) x (P_{std} / T_{std})\right]}{v_s} \times 100$$

$$I = \frac{17.58\ V_{t_{std}}\ T_s}{(D_n)^3\ \theta\ P_s v_s} = \frac{(17.58)(\quad)(\quad)}{(\quad)(\quad)(\quad)(\quad)} = \underline{\qquad\qquad}\%$$

File No. _____
Date _____

State of California

AIR RESOURCES BOARD

Stationary Source Control Division
Engineering Evaluation Branch

SO_2 SAMPLING TRAIN DATA

Run No. _____ Ambient Temp. °F_____

Location _____ Bar. Press. In. Hg. _____

Sample Station _____ Operator _____

Meter No. _____ Special Instructions _____

_____

CLOCKTIME	METER VOLUME (FT^3)	METER TEMP (°F)	VACUUM (IN. HG.)	SAMPLING RATE (CFM)	ROTA-METER

File No. _____ State of California

Date _____ AIR RESOURCES BOARD

Stationary Source Control Division – Engineering Evaluation Branch

OXIDES OF NITROGEN AS NO_2 – CALCULATIONS

The dry volume of stack gas sampled is calculated as follows:

$$V_{dg} = \frac{(V_f - V_a)(P_f - P_{H_2O})520}{29.92\ T_f}$$

$$V_{dg_1} = \frac{17.38(\quad)(\quad)}{(\quad)}$$

$$V_{dg_1} = \_\_\_\_\_ ml$$

$$V_{dg_2} = \frac{17.38\ (\quad)(\quad)}{(\quad)}$$

$$V_{dg_2} = \_\_\_\_\_ ml$$

where,

	#1	#2
V_{dg} = volume of dry stack gas samples, milliliters at standard conditions (60 F, 14.7 psia)		
V_f = volume of sampling flask, milliliters	____	____
V_a = volume of absorbing solution milliliters	25	25
P_f = absolute pressure in flask, inches of mercury	____	____
P_{H20} = vapor pressure of water at temperature T_f, inches of mercury	____	____
T_f = temperature in flask, degrees Rankine	____	____

The calculations for oxides of nitrogen concentrations on a dry basis make use of the relation

$$(c_{NOX})_d = 515\ \frac{W_{NOX}}{V_{dg}}$$

$$(c_{NOX})_{d_1} = 515\frac{(\quad)}{(\quad)}$$

$$(c_{NOX})_{d_1} = \_\_\_\_\_ ppm$$

$$(c_{NOX})_{d_2} = 515\frac{(\quad)}{(\quad)}$$

$$(c_{NOX})_{d_2} = \_\_\_\_\_ ppm$$

$$(c_{NOX})_{d_{avg}} = \_\_\_\_\_ ppm$$

where,

$(c_{NOX})_d$ = concentration of oxides of nitrogen (as NO_2), dry basis, parts per million by volume		
w_{NOX} = weight of nitrogen dioxide, from the calibration curve, micrograms	____	____
V_{dg} = dry volume of gas sample, milliliters	____	____

VISIBLE EMISSIONS-FIELD EVALUATOR RECORD

Company _____ Date _____

Location _____

Observer _____ Time Start _____

Sky Condition _____ Time Stop _____

Wind Speed _____ MPH Direction _____

Air Temperature _____ °F Relative Humidity _____

Plume Characteristics (Color, Etc.) _____

Stack Height _____ Feet Observer Location _____ Feet _____ of stack.

Minute	0	¼	½	¾	Remarks	Minute	0	¼	½	¾	Remarks
0						30					
1						31					
2						32					
3						33					
4						34					
5						35					
6						36					
7						37					
8						38					
9						39					
10						40					
11						41					
12						42					
13						43					
14						44					
15						45					
16						46					
17						47					
18						48					
19						49					
20						50					
21						51					
22						52					
23						53					
24						54					
25						55					
26						56					
27						57					
28						58					
29						59					

Vapor Recovery System

Data Sheet

COMPANY: _____ DATE: _____

ADDRESS: _____ BAR. PRESS: _____

ITEM TESTED: _____ DROP VOLUME: _____

EMISSIONS

Vent			Delivery Tank			Remarks
Clock Time	Meter Reading (Ft^3)	Pressure (inch of H_20)	Clock Time	Vapor Temp (°F)	Pressure (inch of H_20)	

FIXED ROOF TANK EMISSION OBSERVATION SHEET

GENERAL INFORMATION OBSERVER _____

OWNER: _____ LOCATION _____

OPERATOR: _____ TANK NO. _____

PLANT PERSONNEL CONTACTED: _____ PERSONNEL CONDUCTING TEST: _____

DATES OF OBSERVATION: _____ _____

MODE OF TANK DURING TESTING: STANDING _____ WORKING _____

TANK PHYSICAL PARAMETERS

1. YEAR OF TANK CONSTRUCTION: _____ MANUFACTURER: _____

2. COLOR OF TANK WALLS: _____ _____ _____ _____ _____ _____
   Black White Lt. Gray Dk. Gray Med. Gray Other
   _____ _____
   Aluminum (Specular) Aluminum (Diffuse)

3. COLOR OF TANK ROOF: _____ _____ _____ _____ _____ _____
   Black White Lt. Gray Dk. Gray Med. Gray Other
   _____ _____
   Aluminum (Specular) Aluminum (Diffuse)

4. PAINT CONDITION: POOR _____ GOOD _____

5. INSULATION: YES _____ NO _____ THICKNESS: _____ INCHES

6. COATING OF INSIDE TANK WALL, IF ANY: _____

7. COATING OF ROOF (OUTSIDE), IF ANY: _____

8. HEIGHT: (STRAIGHT WALL) _____ FEET _____ INCHES

9. DIAMETER: _____ FEET _____ INCHES

10. TANK TYPE: WELDED _____ RIVETED _____ BOLTED _____

11. CAPACITY OF TANK: _____ BBLS

12. ROOF SLOPE: _____ INCHES/FEET

13. INTERNAL HEATERS: YES _____ NO _____ IF YES: STEAM _____ HOT WATER _____

14. VAPOR RECOVERY SYSTEM: YES _____ NO _____
    IF YES, MAKE UP GAS COMPOSITION: INERT GAS _____ HYDROCARBONS _____

15. PRESSURE/VACUUM ROOF VENTS:
    TYPE _____ NUMBER _____ NORMAL SETTINGS _____ IN H_2O VACUUM
    _____ IN H_2O PRESSURE
    TYPE _____ NUMBER _____ NORMAL SETTINGS _____ IN H_2O VACUUM
    _____ IN H_2O PRESSURE

16. GENERAL COMMENTS THAT MAY RELATE TO H-C EMISSIONS: _____

_____

_____

_____

ALL TANK OPERATIONS

1. NAME OF CRUDE: _____
2. OIL FIELD: _____
   (IF THE TESTED TANK CONTAINED DISTILLATE OR FUEL OIL, INDICATE NOT APPLICABLE ON 1 AND 2.)
3. IF TANK WAS NORMALLY ON VAPOR RECOVERY, HOW LONG WAS VAPOR RECOVERY DISCONNECTED PRIOR TO TEST? _____ HOURS
4. IF THERE WAS AN INTERNAL TANK HEATER, WAS IT OPERATING DURING THE TEST? YES _____ NO _____
5. ANALYSES THAT WERE PERFORMED ON LIQUID SAMPLES OBTAINED WITHIN 1 WEEK OF THE TEST DATES (E.G. API GRAVITY, REID VAPOR PRESSURE, ASTM DISTILLATION)

   _____

   _____

STANDING TANK OPERATIONS

1. DESCRIBE THE OPERATION OF THE TESTED TANK DURING TESTING. INCLUDE INFORMATION ON STOCK DEPTHS AND HOW IT CHANGES. _____

   _____

   _____

   _____

   _____

   _____

   _____

2. DESCRIBE IMMEDIATE UPSTREAM OPERATIONS AHEAD OF THE TESTED TANK. INCLUDE THE OPERATING TEMPERATURE AND PRESSURE OF THE UPSTREAM UNIT. EXAMPLES OF UPSTREAM OPERATIONS COULD BE A HEATER TREATER UNIT, IN-LINE HEATER OR A STORAGE TANK. _____

   _____

   _____

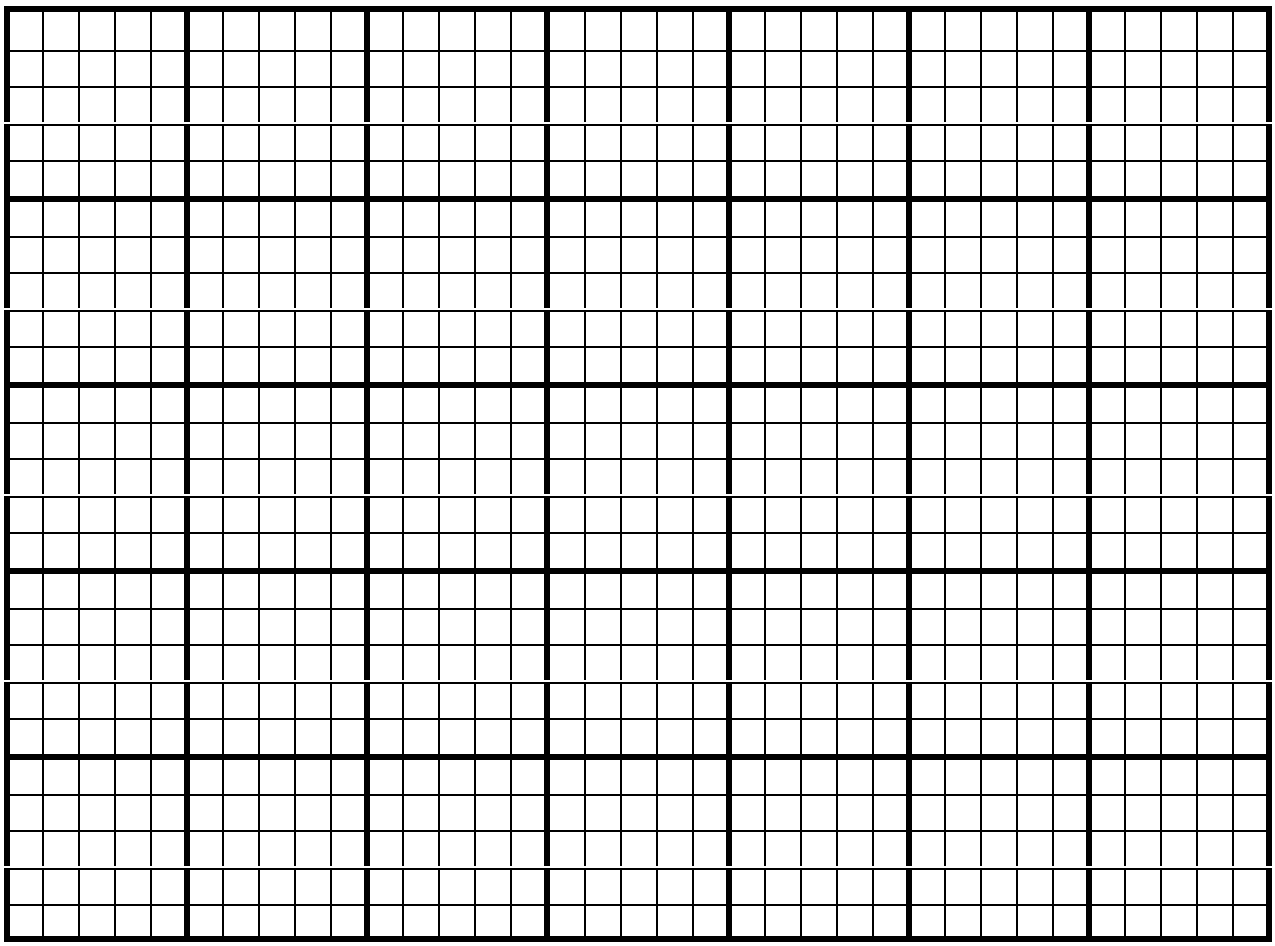
   _____

   _____

_____

_____

3. PROVIDE A SIMPLE PROCESS SCHEMATIC OF THE TESTED TANK AND PROCESS OPERATIONS IMMEDIATELY UPSTREAM. AN EXAMPLE IS SHOWN BELOW. THE SCHEMATIC SHOULD SHOW THE SYSTEM USED DURING THE TEST. SHOW LOCATION OF VAPOR SAMPLING POINTS AND WHERE LIQUID SAMPLE WAS OBTAINED.



4. INDICATE ANY PROCESS CHANGES MADE SPECIFICALLY FOR THE EMISSION TEST WHICH WOULD BE DIFFERENT FROM NORMAL OPERATIONS. _____

_____

_____

_____

_____

_____

_____

EMISSION TEST DATA

1. WAS A TANK LEAK CHECK PERFORMED: YES _____ NO _____
   RESULTS _____
   _____
2. EMERGENCY RELIEF VALVE SETTING AND NUMBER DURING OBSERVATION: _____
   _____
   MAXIMUM PRESSURE OF TANK DURING OBSERVATION: _____
   PRESSURE SETTING OF TEST VALVES DURING OBSERVATION: _____
3. DESCRIBE POTENTIAL SAFETY HAZARDS: _____
   _____
   _____
   WERE THESE REPORTED TO PLANT PERSONNEL: YES _____ NO _____
   WHO WAS IT REPORTED TO: _____
   _____
4. HYDROCARBON ANALYZER USED DURING THE OBSERVATION (NAME AND MODEL NUMBER): _____
   _____
   DESCRIPTION OF CALIBRATION PROCEDURE (TIME, SPAN GAS AND CONCENTRATION, ZERO DRIFT, ETC.). _____
   _____
   _____
5. DESCRIBE VAPOR GRAB SAMPLES COLLECTION DURING OBSERVATION. _____
   _____
   _____
   _____
6. WAS AN OVA ANALYZER USED BY THE OBSERVER TO CHECK THE HYDROCARBON CONCENTRATION. YES _____ NO _____ RESULTS AND COMPARISON WITH TEST RESULTS. _____
   _____
   _____
   _____
7. COMMENTS RELATING TO MEASURING HYDROCARBON CONCENTRATION. (LEAK, CONDENSATION, ERRATIC RESPONSE, ETC.) _____
   _____
   _____
   _____
   _____

8. DESCRIBE LIQUID LEVEL CHANGES, LIQUID FLOW RATES AND THROUGH-PUT INFORMATION DURING OBSERVATION. _____

_____

_____

_____

_____

9. DESCRIBE VAPOR FLOW RATES AND TEST METERING. _____

_____

_____

_____

_____

10. DESCRIBE THE LOCATION AND MANNER IN WHICH LIQUID SAMPLE WAS OBTAINED.

_____

_____

_____

11. IF TANK WAS PREVIOUSLY TESTED BY ENGINEERING-SCIENCE OR OTHERS, LIST THE PREVIOUS TEST RESULTS.

STOCK PARAMETERS:	PREVIOUS TEST	CURRENT TEST (IF AVAILABLE)
TEMP (°F)	_____	_____
RVP (LBS)	_____	_____
GRAVITY (°API)	_____	_____
BBLS/DAY (IN)	_____	_____
BBLS/DAY (OUT)	_____	_____
VAPOR DISCHARGE (SCF/DAY)	_____	_____
AVG. MOLECULAR WT (LB/LB-MOLE)	_____	_____
METHANE CONCENTRATION (LB/1000 SCF)	_____	_____
THC CONCENTRATION (LB/1000 SCF)	_____	_____
METHANE EMISSIONS (LBS/DAY)	_____	_____
THC EMISSIONS (LBS/DAY)	_____	_____

12. REMARKS: _____

_____

_____

_____

_____

_____

_____
_____
_____
_____
_____

SIGNED _____
_____
_____
_____

State of California File No. _____

AIR RESOURCES BOARD

Stationary Source Control Division
Engineering Evaluation Branch

Program 002 Print Out
(Particulate Source Test)

P_{bar}	=	Barometric pressure (in. Hg)
Δh	=	Pressure drop across orifice (in. H_2O)
V_m	=	Volume of gas sample (cu. ft.)
T_m	=	Meter temperature (°F)
V_c	=	Volume of condensate collected (ml)
T_i	=	Impinger temperature (°F)
T_s	=	Stack temperature (°F)
S or $\bar{S}$	=	% H_2O (S-oversat. $\bar{S}$-undersat.)
% CO_2		
% O_2		
% CO		
M_s	=	Molecular weight
$\left(\sqrt{\Delta P}\right)_{AV}$	=	(in. $H_2O)^{1/2}$ X Cp
D_s	=	Stack diameter (in.)
V_s	=	Velocity (fps)
Q_s	=	Flow rate, dry basis (SDCFM)
θ	=	Total sampling time (min.)
D_n	=	Nozzle diameter (in.)
I	=	% Isokinetic
M_n	=	Particulate matter collected (mg)
C′	=	Particulate concentration, dry basis (gr/SDCF)
W_m	=	Particulate emission rate (lb/hr.)
$V_{M_{STD}}$	=	Std. volume of dry gas metered (cu. ft.)
$V_{W_{STD}}$	=	Std. volume of water vapor collected (cu. ft.)
V.P.	=	Vapor pressure (in. Hg)
$V_{WV_{STD}}$	=	Std. volume of water vapor metered (cu. ft.)
S	=	% H_2O (includes free water)

State of California File No. _____

AIR RESOURCES BOARD

Stationary Source Control Division
Engineering Evaluation Branch

SUMMARY OF EMISSIONS TO ATMOSPHERE

NAME OF FIRM: _____

LOCATION: _____

DESCRIPTION OF OPERATION: _____

STANDARD CONDITIONS: _____

ITEM TESTED: _____

	Rule No.	Measured Particulate				Allowable Emissions
Test No.					Average	
Date of Test						
Duration of Test, minutes						
Process Weight Rate, lbs/hr						
Gas Flow Rate, SCFM (DRY)						
Stack Gas Temp., °F						
CO_2 % by Vol.						
O_2 % by Vol.						
CO % by Vol.						
H_2O % by Vol.						
Particulate Concentration, gr/scf						
Particulate Weight, lbs/hr						
Combustion Contaminants, gr/scf						

COMMENTS: _____

_____

Project Engineer _____ Checked by _____

State of California File No. _____

AIR RESOURCES BOARD

Stationary Source Control Division
Engineering Evaluation Branch

SUMMARY OF TEST DATA

Sampling Station: _____

Material Collected: _____

	Test #1	Test #2	Test #3
1. P_{bar}, Barometric Pressure, in. Hg			
2. Δh_{avg}, Average Orifice Pressure, in. H_2O			
3. V_m, Sample Gas Volume (Meter Cond.), cu. ft.			
4. T_m, Average Meter Temperature, °F			
5. V_{wc}, Condensed Water Vapor, ml.			
6. T_i, Average Impinger Temperature, °F			
7. T_s, Average Stack Temperature, °F			
8. Stack Gas Analysis (Dry Basis)			
%CO_2			
% O_2			
% CO			
9. $\left(\sqrt{\Delta P}\right)$ Average (in. $H_2O)^{1/2}$ X CP			
10. D_s, Stack Diameter, in.			
11. q_m, Sampling Time, min.			
12. D_n, Sampling Nozzle Diameter, in.			
13. M_n, Sample Weight Collected, mg.			
A.			
B.			
C.			
D.			
Total Weight, mg			
14. C_p, Pitot Tube Coefficient			
15. P_s, Stack Pressure (absolute) in. Hg			
16. T_a, Ambient Temperature, °F			

17. Additional Data _____

_____

_____

State of California

AIR RESOURCES BOARD

SO_2, Aldehyde, Organic Acid Calculations

File No.: _____

Date: _____

Standard Conditions: 60°F, 29.92 in Hg.
Vm Std. = Gas Volume sampled at standard conditions

Sulfur Dioxide

W_s = Weight Collected (mg) _____, V_m = _____ cu. ft.

$$V_m \text{ std.} = 17.38\, V_m \left(\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right) = 17.38(\quad) \frac{(\quad)}{(\quad)} = \_\_\_\_\_ \text{scf}$$

$$\text{Concn.} = \frac{836\,(W_s)}{(V_m \text{ Std.})}\,(M) = \frac{13.06\, W_s}{V_m \text{ Std.}} = \_\_\_\_\_ \text{ ppm (Vol.)}$$

Organic Acids (as acetic acid)

W_s = _____ mg V_m = _____ cu. ft.

$$V_m \text{ std.} = 17.38\, V_m \left(\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right) = 17.38(\quad) \frac{(\quad)}{(\quad)} = \_\_\_\_\_ \text{scf}$$

$$\text{Concn.} = \frac{13.93\, W_s}{V_m \text{ Std.}} = \frac{13.93\,(\quad)}{(\quad)} = \_\_\_\_\_ \text{ ppm (Vol.)}$$

Aldehydes (as formaldehyde)

W_s = _____ mg V_m = _____ cu. ft.

$$V_m \text{ std.} = 17.38\, V_m \left(\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right) = 17.38(\quad) \frac{(\quad)}{(\quad)} = \_\_\_\_\_ \text{scf}$$

$$\text{Concn.} = \frac{27.87\, W_s}{V_m \text{ Std.}} = \frac{27.87\,(\quad)}{(\quad)} = \_\_\_\_\_ \text{ ppm (Vol.)}$$