SUMMARY SHEET 8
Sulfuric Acid Mist and Sulfur Dioxide

			Run #1	Run #2	Run #3	Avg
Client/Plant Name		FDS 5				
Job No.		FDS 5				
Sampling Location		FDS 5				
Run ID #		FDS 5				
Test Date		FDS 5				
Run Start Time		FDS 5				
Run Finish Time		FDS 5				
Net Traverse Points		FDS 1				
Traverse Matrix (Rectangular)		FDS 1				
Net Run Time, min	θ	FDS 5				
Nozzle Diameter, in.	D_n	FDS 5				
Dry Gas Meter Calibration Factor	Y	CDS 5				
Average ΔH (orifice meter), in. H_2O	ΔH	FDS 5				
Barometric Pressure, in. Hg	P_b	FDS 5				
Stack Static Pressure, in. H_2O	P_g	FDS 5				
Absolute Stack Pressure, in. Hg	P_s	SS 5				
Average Stack Temperature, °F	t_s	FDS 5				
Average Absolute Stack Temperature, R	T_s	FDS 5				
Carbon Dioxide, % dry	$\%CO_2$	FDS 3				
Oxygen, % dry	$\%O_2$	FDS 3				
Carbon Monoxide + Nitrogen, % dry	$\%(CO+N_2)$	FDS 3				
Dry Molecular Weight, lb/lb-mole	M_d	FDS 3				
Average DGM Temperature, °F	t_m	FDS 5				
DGM Sample Volume, dcf	V_m	FDS 5				
DGM Sample Volume, dscf	$V_{m(std)}$	SS 5				
Volume Water Condensed, mL	V_{lc}	FDS 5				
Volume Water Vapor, scf	$V_{w(std)}$	SS 5				
Moisture Content, fraction	B_{ws}	SS 5				
Pitot Tube Coefficient	C_p	CDS 2a				
Average Velocity Pressure, in. H_2O	Δp	FDS 5				
Average $[(t_{si}+460)\,\Delta p]^{1/2}$	$[T_{si}\,\Delta p]^{1/2}$	FDS 5				
Velocity, ft/sec	v_s	SS 5				
Stack Area, ft^2	A	FDS 1				
Volumetric Flow Rate, dscfh	Q_{sd}	SS 5				
Volumetric Flow Rate, wscfh	Q_{sw}	SS 5				
Isokinetic Sampling Rate, %	%I	SS 5				
Normality, Ba Perchlorate Titrant, meq/mL	N	LDS 6				

			Run #1	Run #2	Run #3	Avg
Sulfuric Acid Mist						
Volume of Sample Solution, mL	V_s	LDS 6				
Volume of Sample Aliquot Titrated, mL	V_a	LDS 6				
Average Volume Titrant for Sample, mL	V_t	LDS 6				
Volume Titrant for Blank, mL	V_b	LDS 6				
Acid Mist Concentration, lb/dscf	C_{H2SO4}	SS 8				
Sulfur Dioxide						
Volume of Sample Solution, mL	V_s	LDS 6				
Volume of Sample Aliquot Titrated, mL	V_a	LDS 6				
Average Volume Titrant for Sample, mL	V_t	LDS 6				
Volume Titrant for Blank, mL	V_b	LDS 6				
Sulfur Dioxide Concentration, lb/dscf	C_{SO2}	SS 6				
Audit Relative Error, %	RE	QA1				
Post-test Calibration Checks						
Temperature and Barometer		CDS 2d				
Metering System		CDS 5				

$$C_{H_2SO_4} = 1.081 \times 10^{-4} \frac{N (V_t - V_{tb}) \left(\frac{V_s}{V_a}\right)}{V_{m(std)}}$$

FIELD PROCEDURE 8
Sulfuric Acid Mist and Sulfur Dioxide

Note: This procedure is the same as that in Method 5 with some variations. Follow the procedure in FP 5, except for the obviously inapplicable parts. Some specifics are given below:

A. Pre-test Preparation

1. Inspect the filters, but do not desiccate, weigh, or identify.
2. If the effluent gas can be considered dry, i.e., moisture free, do not weigh the silica gel.
3. Prepare the collection train (Figure F8-1.) as follows:
   a. Place 100 mL 80% isopropanol in the first impinger.
   b. Place 100 mL 3% hydrogen peroxide in both the second and third impingers.
   c. Retain a portion of each reagent for use as a blank solution.
   d. Place about 200 g silica gel in the fourth impinger.
   e. For moisture content, weigh each of the first three impingers (plus absorbing solution) to the nearest 0.5 g, and record these weights. Weigh also the silica gel (or silica gel plus container) to the nearest 0.5 g, and record.
4. *Optional:* Leak-check the sampling train (see FP 5a) from the inlet to the first impinger. Adjust the probe heater to the minimum temperature required to prevent condensation.

B. Sampling

1. Do not exceed 1.0 cfm during the run.
2. Periodically check the connecting line between the probe and first impinger for signs of condensation. Adjust probe heater as necessary to minimum temperature required to prevent condensation.
3. If component changes are made during a run, leak-check immediately before each change, and record all leak rates. Immediately after component changes, leak-checks are optional.
4. At conclusion of run, drain the ice bath and, with the probe disconnected, purge the remaining part of the train with clean ambient air for 15 min at the average flow rate used for sampling. Either pass the air through a charcoal filter or use ambient air (without cleaning).

C. Sample Recovery

1. Container No. 1 (Sulfuric Acid Mist)
   a. Transfer the contents of the first impinger to a 250-mL graduated cylinder.
   b. Rinse the probe, first impinger, all connecting glassware before the filter, and the front half of the filter holder with 80% isopropanol. Add the rinse solution to the cylinder. Dilute to 250 mL with 80% isopropanol.
   c. Add the filter to the solution, mix, and transfer to the storage container. Protect the solution against evaporation.
   d. Mark the level of liquid on the container, and identify the sample container.
2. Container No. 2 (SO_2)
   a. Transfer the solutions from the second and third impingers to a 1 L graduated cylinder.
   b. Rinse all connecting glassware (including back half of filter holder) between the filter and silica gel impinger with water, and add this rinse water to the cylinder.
   c. Dilute to 1 L with water.
   d. Transfer the solution to a storage container.
   e. Mark the level of liquid on the container. Seal and identify the sample container.
3. Container No. 3 (Silica Gel)

If moisture is to be determined, see FP 5, step E5.

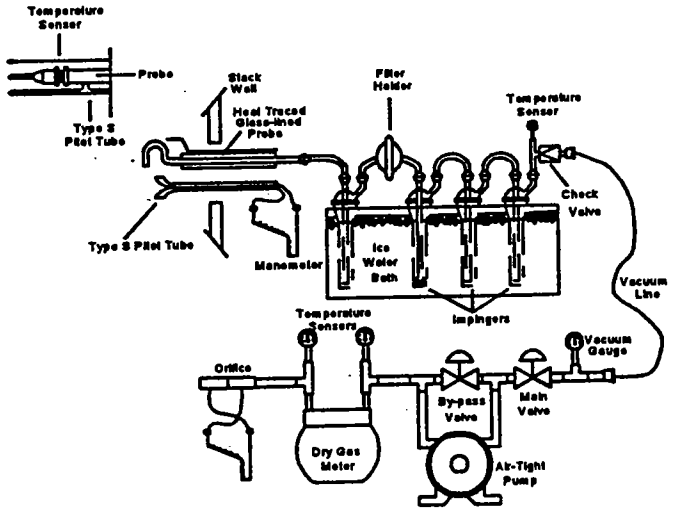

Figure F8-1. Sulfuric Acid Mist Sampling Train.

LABORATORY PROCEDURE 8
Sulfuric Acid Mist and Sulfur Dioxide

Note: *LP 8 is the same as LP 6, except for the following variations to handle the larger samples. Use LDS 6 for the analysis.*

1. Container No. 1
   a. Shake the container. If the filter breaks up, allow the fragments to settle for a few minutes before removing a sample.
   b. Pipette a 100-mL aliquot of this solution into a 250-mL Erlenmeyer flask and titrate for sulfates.

2. Container No. 2.
   a. Thoroughly mix the solution in the container.
   b. Pipette a 10-mL aliquot of sample into a 250-mL Erlenmeyer flask and add 40 mL 100% isopropanol.
   c. Titrate for sulfates (see LP 6).