Table "D"

EMISSION AND FUEL USE MONITORING INSTRUMENTS AND PROCEDURES

The analyzers, instruments, meters, and related procedures used in the determination of emissions from refinery sources according to the procedures set forth in Table "C" are identified herein. The location of each instrument is cross-referenced, where appropriate, to the emission source group and identification number listed in Table "A". Instruments not currently in existence but which will be installed prior to start-up of the No. 3 HDS Unit are identified by an asterisk (*). In the following tabulation, the symbol F-#xx indicates furnace number xx, and FR-xxx or FE-xxx or FG-xxx indicates meter number xxx.

SO2 MONITORS

In-stack monitors, consisting of instruments which measure SO2 concentrations and stack gas flow rates, shall be located at the following units.

GROUP H	SOURCE I.D. (1)
FCCU-CO Boiler	S-901
Coker-CO Boiler	S-902
No. 6 Boiler	S-904
GROUP J	
Sulfur Plant	Plant #14, S-1
Sulfuric Acid Plant	Plant #14, S-11

NOx MONITORS

In stack monitors, consisting of instruments which measure NOx concentrations and stack gas flow rates, shall be located at the following units.

GROUP A	SOURCE I.D. (1)
*No. 3 HDS, F-#56	S-973
*No. 3 HDS, F-#55	S-974
*FCCU, F-#57	S-991
GROUP H	
FCCU-CO Boiler	S-901
Coker-CO Boiler	S-902
No. 6 Boiler	S-904

(1 See notes at end of table.

H2S MONITOR

An instrument for measuring the H2S concentration of refinery fuel gas shall be located at the following unit.

	Source I.D.
100 psi Fuel Gas Mix Pot	

BTU MONITORS

Instruments for measuring the heating value of refinery fuel gas shall be located at the following units.

*100 psi Fuel Gas Mix Pot
*No.1 Gas Plant Discharge Line

NATURAL GAS METERING SYSTEM

Meters for measuring the flow rate of input sources and end uses of natural gas shall be located at the following units.

Sources

PG&E 12" line to Plant #13, FR-55-2	
PG&E 4" line to Plant #13, FR-73	---
PG&E line to Plant #224, see Note (2)	---

Uses - Group E

Amorco Wharf Heater, See Note (2)	Plant 224,S-52

Uses - Group F, see Note (6)

*No.1 Gas Plant, FR-XXX,	S-952 to 954
No.4 Gas Plant, FR-256,	S-955 to 960

Uses - Group G

Alkylation Plant, FR-73	S-963

Uses - Group I

Pilots and Purges, see Note (3)

Uses - Other

Hydrogen Plant Feed, FR-574	---
100 psi Fuel Gas Input, FR-4005	---
Vapor Recovery Repressure, FR-398	---
*Foul Water Tanks Repressure, FR-XXX	---
FCCU Purge, FR-110	---
Coker Purge, FR-2683	

100 PSI FUEL GAS METERING SYSTEM

Meters for measuring the flow rate of input sources and end uses of 100 psi refinery fuel gas shall be located at the following units.

Sources	Source I.D.
Natural Gas, FR-4005	
No.4 Gas Plant, FR-7	
No.5 Gas Plant, FR-3915	---
LPG from Vaporizer, FR-3177	---
*Hydrogen Plant Bleed, FR-XXX	
Uses - Group A	
*No.3 HDS, FR-XXX	S-973
*No.3 HDS, FR-XXX	S-974
*FCCU, FR-XXX	S-991
Uses - Group B	
No. 3 Reformer, FE-63	S-1020
No. 3 Reformer, FG-242	S-1021
Uses - Group C	
No. 5 Gas Plant, FR-3441	S-922
No. 50 Crude Unit, FR-330	S-950
Uses - Group D	
*No.2 HDS, FR-XXX, see Note (4)	S-918
*No.2 HDS, FR-XXX	S-919
*No.2 HDS, FR-XXX	S-920
*No.2 HDS, FR-XXX	S-921
HDN, FR-34A	S-928
HDN, FR-34B	S-929
HDN, FR-34C	S-930
Isocracker, FR-122A	S-931
Isocracker, FR-122B	S-932
Isocracker, FR-122C	S-933
Isocracker, FR-226	S-934
Isocracker, FR-289	S-935
Hydrogen Plant, FR-91 & 147	S-937
HDN Prefrac., FR-14	S-938

100 PSI FUEL GAS METERING SYSTEM (CONTINUED)

Uses - Group E	Source I.D.
Coker, FR-2659	S-924
Coker, FR-2657	S-925
*No. 2 Reformer, FR-XXX, see Note (4)	S-926
No.2 Reformer, FR-6581	S-927
Propane Heater, FR-118	S-939
No.2 Reformer, FR-860	S-951

Uses - Group H	
FCCU-CO Boiler, FR-406A	S-901
Coker-CO Boiler, FR-2652	S-903
No.6 Boiler, FR-111	S-904

Uses - Group I

Pilots and Purges, see Note (3)

Uses - Other

PG&E, FR-56-11
Monsanto, FR-55-3
40 psi Fuel Gas Input, FR-15

40 PSI FUEL GAS METERING SYSTEM

Meters for measuring the flow rate of input sources and end uses of 40 psi refinery fuel gas shall be located at the following units.

Sources

100 psi Fuel Gas, FR-15
No.1 Gas Plant, FR-288

Uses - Group D	
No.3 Crude Unit, FR-214	S-906
No.3 Crude Unit, FR-23	S-907
No.3 Crude Unit, FR-9	S-908
No.1 Feed Prep, FR-152	S-909
No.4 Gas Plant, FR-1602 & 1603	S-910
No.4 Gas Plant, FR-15	S-911
No.1 Feed Prep, FR-153	S-912
No.2 Feed Prep, FR-136	S-913
No.1 HDS, FR-111 & 112	S-916
No.1 HDS, FR-653	S-917

100 PSI FUEL GAS METERING SYSTEM (CONTINUED)

Uses - Group E	Source I.D.
*No.1 Reformer, FR-XXX	S-914
*No.1 Reformer, FR-XXX	S-915
*HDN, FR-XXX, see Note (4)	S-936
*No.4 Boiler, FR-XXX	S-940 to 942

Uses - Group I

Pilots and Purges, see Note (3)

OXYGEN ANALYZERS

Instruments for measuring the oxygen concentration of furnace combustion gases shall be located at the following units.

Group C

No.5 Gas Plant, F-#22	S-922
No.50 Crude Unit, F-#50	S-950

Group D

No.3 Crude Unit, F-#6 to #8	S-906 to 908
Feed Preps, F-#9, #12, #13	S-909,912,913
No.4 Gas Plant, F-#10, #11	S-910,911
No. 1 HDS, F-#16, #17	S-916,917
No.2 HDS, F-#18 to #21,see Note (4)	S-918 to 921
HDN-Isocracker, F-#28 to #35	S-928 to 935
Hydrogen Plant, F-#37	S-937
HDN Prefrac., F-#38	S-938

FUEL OIL SYSTEM

The quantity of fuel oil burned in refinery furnaces and boilers shall be measured by gauging the level of fuel oil stored in tanks having the dedicated service shown below. Transfers of oil to these tanks shall be determined by gauging the tank level before and after filling. Following each oil transfer, a sample of the oil shall be analyzed for sulfur content.

Group C

No. 50 Crude Unit, Tank A-602	S-950

Group D

No. 3 Crude Unit, Tanks A-403 and A-510	S-906 to 908
No. 1 Feed Prep, Tanks A-403 and A-510	S-909, 912

FUEL OIL SYSTEM (CONTINUED)

Group E	Source I.D.
4 Boiler, Tanks A-403 and A-510	S-940 to 942

Group H, See Note (5)

FCCU-CO Boiler, Tanks A-403 and A-510	S-901
Coker-CO Boiler, Tank A-672	S-903
No. 6 Boiler, Tank A-672	S-904

FLARE SYSTEM

An instrument for measuring flare gas flow rate (Meter No. FR-1000) and a bleed type sampler*, operating on flow ratio control, for collecting composite flare gas samples for sulfur analysis shall be located at the following unit.

Flare Header line	S-944, 945, 1012

COKE BURNING

Coke burned in No. 6 Boiler shall be determined by energy balance using the following formula:

$$Q_{Coke} = (W_{STM} (H_{STM} - H_{BFW})/EFF) (10^{-9}) - Q_{GAS} - Q_{OIL}$$

terms in this formula have the following meaning:

Q_{Coke} is thecalculated amount of coke burned in BBTU's.

W_{STM} is the measured gross steam generated in pounds.

H_{STM} is the enthalpy of generated steam in BTU/lbs

H_{BFW} is the enthalpy of boiler feed water in BTU/lbs.

is the average boiler efficiency as determined by periodic test runs (0.85 nominal valve).

is the measured fuel gas consumption in BBTU's.

Q_{OIL} is the measured fuel oil consumption in BBTU's.

NOTES

(1 Source numbers for Plant #13 except where noted

(2) All of the natural gas supplied to Plant #224 is burned in one heater and is measured by an existing PG&E meter.

(3) Pilots and purges are believed to represent about 3 to 5% of the total gas used. The quantity is not currently measured, but is calculated as the difference between the total metered input to the system and the total output of metered used. This procedure could change in the future pending the results of ongoing energy conservation programs.

NOTES (CONTINUED)

Furnaces F-#18, F-#26, and F-#36 may not be used in future operations. The indicated instrument, therefore, will not be installed until such time as furnace is placed in operation.

Group H units shall be equipped with flow meters or equivalent devices capable of establishing the quantity of fuel oil burned separately at each unit.

Tosco may submit to the APCO a correlation of metered fuel use with calculated fuel use based on hours of operation and respective loadings, together with verified supporting data. The APCO may, at his discretion, revise the applicable limits set forth in Section 2 of the Permit Conditions based on the verified data contained in any such submittal.