

## **APPENDIX B**

### **Field Data Sheets**

## FIELD DATA RECORD

PAGE 1 of 2

RUN NO. 142 of 3  
 LOCATION Stack  
 DATE 6/10/01  
 OPERATOR Stadel  
 METER BOX NO. 20004204  
 LOCAL TIME 0430  
 START/STOP 0730  
 STACK DIAMETER 6"  
 Ym: 1.011  
 H@: 1.561

PITOT TUBE FACTOR 0.84  
 NOZZLE DIAMETER 1/4 in.  
 PROBE LENGTH 344 ft.

SAMPLE TRAIN LEAK TEST  
 BEFORE 15 in. H<sub>2</sub>O  
 AFTER 15 in. H<sub>2</sub>O  
 PITOT TUBE LEAK TEST  
 BEFORE 4 1/2" AFTER     

PROJECT NO.       
 PLANT NAME Sand / Lapstone  
 AMBIENT TEMP (F) 60  
 METER TEMP (F) 60  
 BAR. PRESS ("Hg) 29.98  
 STATIC PRESSURE ("H<sub>2</sub>O) -0.69  
 ASSUMED MOISTURE (%)       
 ASSUMED O<sub>2</sub> (%) 18  
 ASSUMED CO<sub>2</sub> (%)       
 ASSUMED MW (WET, %)       
 ASSUMED MW (DRY, %)     

POINT	CLOCK TIME	DRY GAS METER (cu. ft.)	VELOCITY dP (in. H <sub>2</sub> O)	ORIFICE dH (in. H <sub>2</sub> O)		TEMPERATURES (F)				PUMP VAC (in. Hg)
				DESIRED	ACTUAL	STACK	PROBE	FILTER	RESIN	
100% = 28.0 kW	START	0	407.22	1.4	2.1	428	58	58	45	6
	5	411.23	2.0	1.4	2.1	528	58	58	45	6
	15	419.27	1.9	1.6	1.7	529	59	59	45	6
75% = 21.0 kW	~30	427.21	1.9	1.6	1.7	529	59	59	45	6
	35	435.16	1.1		2.0	493	59	59	45	6
	45	443.25	1.1		2.0	486	59	59	45	6
50% = 14.0 kW	~60	451.27	1.1		2.0	486	59	59	45	6
	65	459.29	0.76		2.0	447	58	58	45	6
	75	467.30	0.76		2.0	444	57	57	45	6
50% = 14.0 kW	90	475.35	0.76		2.0	443	58	58	45	6
	95	483.42	0.76		2.0	443	58	58	45	6
	105	491.53	0.76		2.0	443	58	58	45	6
21.0 kW	115	499.64	0.76		2.0	443	58	58	45	6
75% = 21.0 kW	120									
	125	507.63	1.1		2.0	484	58	58	46	6
	135	516.	1.1		2.0	486	58	58	46	6
	145	523.71	1.1		2.0	486	58	58	46	6
28.0 kW = 100%	150									
	155	531.75	1.6		2.0	527	58	58	46	6
	165	540	1.6		2.0	527	62	62	46	6
28.0 kW = 100%	175	547.79	1.6		2.0	528	60	60	46	6
END H <sub>2</sub> O Flow	180									
Theta:		Vm:	avg dP:	avg dH:		avg Ts				

## FIELD DATA RECORD

PAGE 2 of 3

RUN NO. 3  
 LOCATION stack  
 DATE 6/10/01  
 OPERATOR Budd  
 METER BOX NO. 20004204  
 LOCAL TIME 0430  
 START/STOP 0905 - for power test  
 STACK DIAMETER 6.0"  
 Ym: 1.011  
 H@: 1.561

PITOT TUBE FACTOR 0.84  
 NOZZLE DIAMETER N/A in.  
 PROBE LENGTH 3 1/4 ft.

SAMPLE TRAIN LEAK TEST:  
 BEFORE 15 in. H<sub>2</sub>O  
 AFTER 15 in. H<sub>2</sub>O  
 PITOT TUBE LEAK TEST  
 BEFORE 4 1/2 OK AFTER 4 1/2 OK

PROJECT NO. 01-040  
 PLANT NAME SHUO/Leptone  
 AMBIENT TEMP (F) 60  
 METER TEMP (F) 60  
 BAR. PRESS ("Hg) 29.94  
 STATIC PRESSURE ("H<sub>2</sub>O) -0.69  
 ASSUMED MOISTURE (%)  
 ASSUMED O<sub>2</sub> (%) 18  
 ASSUMED CO<sub>2</sub> (%)  
 ASSUMED MW (WET, %)  
 ASSUMED MW (DRY, %)

POINT	CLOCK TIME	DRY GAS METER (cu. ft.)	VELOCITY dP (in. H <sub>2</sub> O)	ORIFICE dH (in. H <sub>2</sub> O)		TEMPERATURES (F)					PUMP VAC (in. Hg)
				DESIRED	ACTUAL	STACK	PROBE	FILTER	RESIN	IMPGR	
Kio	START	—	—	—	—	—	—	Am b	—	—	—
100% = 28.0	180			E	W						
	185		1.6			532		60			
	195		1.6			528		61			
	205		1.6			528		61			
75% = 21.0	210		1.1	75% vol from 1.6 = 0.93	75% vol	498		60			
	215		1.1	1.1	1.1	489		63			
	225		1.1	1.1	1.1	490		62			
50% = 14.0	240		0.76	50% vol from 1.6 = 0.80	50% vol	448		63			
	245		0.76	0.76	0.76	448		62			
	255		0.76	0.76	0.76	448		65			
	265		0.76	0.76	0.76	448		64			
15.4 kW	270s - start 1st hand @ 280		0.82	0.82	0.82	455		72.08			
16.8 kW	280		0.90	0.90	0.90	468		68			
18.2 kW	290		0.98	0.98	0.98	479		66			
19.4 kW	300		1.0	1.0	1.0	502		68			
21.0 kW	310 (switch to 75% vol @ 310)		1.1	1.1	1.1	508		67			
22.4 kW	325		1.3	1.3	1.3	517		70			
23.8 kW	335		1.4	1.4	1.4	527		71			
25.2 kW	345		1.5	1.5	1.5	527		71			
26.6 kW	355		1.55	1.55	1.55	527		72			
28.0 kW	365		1.6	1.6	1.6	527		72			
26.6 kW	375 - wound 28.0 Got 28.0		1.6	1.6	1.6	527		72			
26.0 kW	385 - system fault & reset		1.6	1.6	1.6	527		72			
26.0 kW	395		1.6	1.6	1.6	527		72			
Thetal 395	Vm:	avg dP:			avg dH:	avg Ts					

Project Log & Special Data

OSCAR @ 7:41:24  
ME - 7:39:42

Project: <i>SMUD Capston</i>	Page #: <i>1 of 2</i>
Project #:	Date: <i>6/10/01</i>
Project Leader: <i>B. Todd</i>	

Time	Barometric	Temperatures			Power Output		Fuel Flow	
	Pressure, in. hg.	Ambient F	Inlet (dry) F	Inlet (wet) F	Capstone kWatts	SMUD kWatts	PG&E cu. ft.	SMUD cu. ft.
<i>Pre-start</i> 2:33:38	29.90	58	61	54	28.0		1395685.0	
<i>54 sec</i> 4:36:15					27.7-28.1		1396195.0	
<i>100%</i> 4:47:00	29.91	58	58	54	28.0		1396195.0	
<i>100</i> 4:59:23		59			27.7-28.1		6240.0	
<i>75%</i> 5:01:47	<i>Time adjust</i>				27.7-28.1		6275.0	
<i>75%</i> 5:12:01	29.91	58	58	53	20.7-21.0		6310.0	
<i>75</i> 5:23:03					20.7-21.1		6343.0	
<i>8</i> 5:33:08	29.91	58	58	53	20.8-21.1		6376.0	
<i>50%</i> 5:43:59					13.8-14.1		6406.0	
<i>50%</i> 5:53:02	29.91	58	57	52	13.8-14.0		6427.0	
<i>11</i> 6:03:05					13.9-14.0		6450.0	
<i>12</i> 6:13:18	29.91	58	57	53	13.9-14.0		6474.0	
<i>50</i> 6:23:01					13.9-14.0		6497.0	
<i>14</i> 6:33:00	29.91	58	54	53	13.9-14.0		6520.0	
<i>15</i> 6:42:55					20.8-21.0		6548.0	
<i>77</i> 6:53:01	29.92	59	58	53	20.8-21.0		6580.0	
<i>17</i> 7:03:00					20.8-21.0		6613.0	
<i>180</i> 7:13:00	29.92	60	58	54	27.9-28.0		6651.0	
<i>180</i> 7:23:00					27.8-28.0		6694.0	
<i>20</i> 7:33:01	29.92	61	59	54	27.8-28.0		6737.0	
<i>21</i> 7:43:00					27.8-28.0		6779.0	
<i>180</i> 7:53:03	29.92	61	60	54	27.8-28.1		6822.0	

Project Log & Special Data

Project: <u>SMUD CAPSTONE</u>	Page #: <u>2 of 2</u>
Project #:	Date: <u>6/10/01</u>
Project Leader: <u>D. TODD &amp; O. LOPEZ</u>	

Time	Barometric	Temperatures			Power Output		Fuel Flow	
	Pressure,	Ambient	Inlet (dry)	Inlet (wet)	Capstone	SMUD	PG&E	SMUD
	in. hg.	F	F	F	kWatts	kWatts	cu. ft.	cu. ft.
1 8:03:00					27.8-28.0		139	6864.0
2 8:13:00	29.925	65	61	55	20.8-21.1		"	6902.0
3 8:23:00					20.8-21.1		"	6935.0
4 8:33:01	29.93	67	61	55	20.8-21.0			6969.0
5 8:43:27					20.8-21.0			7003.0
6 8:53:00	29.93	65	63	56	13.8-14.0			7028.0
7 9:03:00								7052.0
8 : :								
9 : :								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								

Project No. T-01-040Date 6/10/01Time 0430 - 0630WATER VAPOR CALCULATIONS

Standard Conditions: 68°F and 29.92 in. Hg

Ambient Conditions 60°F and 29.91 in. Hg

$$Y = 1.011$$

Time	Gas Volume Through Meter (Vm), Ft <sup>3</sup>	Impinger Temp. (Ti), °F	Meter Temp. (Tm), °F	Orifice Pressure (ΔH), in. H <sub>2</sub> O	Volume of Water Collected in Impinger (V <sub>1c</sub> ), ml
0	407.22	45	60	2.0	Final 367
25					Initial 300
55					Final 1207.2
85					Initial 1182.0
115					
175	547.79				Net (V <sub>1c</sub> ) 87.2

$$V_m = 140.57$$

$$45$$

$$T_m = 60^\circ\text{F} \text{ Assume } 1 \text{ gram H}_2\text{O} \approx 1 \text{ ml H}_2\text{O}$$

A. Gas Volume Metered (V<sub>mstd</sub>)

$$P_{ma} = P_{bar} + (\Delta H / 13.6) = (29.91) + \left( \frac{2.0}{13.6} \right) = 30.057 \text{ in. Hg}$$

$$V_{mstd} = \frac{(Y) 528 \text{ OR}}{29.92 \text{ in. Hg}} \frac{V_m P_{ma}}{T_m} = (Y) \frac{(17.65)(140.57)(30.057)}{(520)} = 144.962 \text{ S DCF}$$

B. Volume of Water Collected (V<sub>wstd</sub>)

$$V_{wstd} = (0.04707 \frac{\text{ft}^3}{\text{ml}}) (V_{1c}) = (0.04707) (87.2) = 4.105 \text{ SCF}$$

C. Moisture Content in Stack Gas (B<sub>w</sub>) in Percent

$$B_w = \frac{B}{A + B} \times 100 = \frac{(4.105)}{(144.962 + 4.105)} \times 100 = 2.753 \% \text{ H}_2\text{O}$$

- D. If calculated moisture content (c) is greater than at saturation temperature (e.g. 212°F or below) use the table for moisture content.

% OF H<sub>2</sub>O AT SATURATION

Temp. °F	% H <sub>2</sub> O	Temp. °F	% H <sub>2</sub> O	Temp. °F	% H <sub>2</sub> O
50	1.2	130	15.1	180	51.1
60	1.7	140	19.7	185	57.0
70	2.5	150	25.3	190	63.6
80	3.5	155	28.7	195	70.8
90	4.8	160	32.3	200	78.6
100	6.5	165	36.4	205	87.0
110	8.7	170	40.8	210	96.2
120	11.5	175	45.7	212	100.0

