PETRO CHEM ENVIRONMENTAL SERVICES

SUMMARY

COMPANY: SOLAR TURBINES, INC.
REPORT NO.: 89-017
UNIT: Turbine #1 AC870535; San Marcos Landfill

SELECTED RESULTS

RUN #:	#1	#2	#3	AVERAGE
TIME:	1225-1255	1405-1435	1550-1611	
%O2:	17.68 ✓	17.50 ✓	17.39 ✓	
DSCFM:	10162	10013	10197	
NOx RESULTS:*				
ppm:	47.13 error in NO2 corr	49.74 error	46.73 error	47.87
ppm@3%O2:	262.0	261.9	238.3	254.1
ppm@15%O2:	86.36	86.31	78.55	83.74
lb/hr:	3.48	3.62	3.47	3.52
CO RESULTS:				
ppm:	4.49 ✓	4.65 ✓	4.90 ✓	4.68
ppm@3%O2:	25	24	25	25
ppm@15%O2:	8.2	8.1	8.2	8.2
lb/hr:	0.20	0.21	0.22	0.21
SO2 RESULTS:				
ppm:	0.8 ✓	0.9 ✓	0.8 ✓	0.8
ppm@3%O2:	4.4	4.5	4.1	4.4
ppm@15%O2:	1.5	1.5	1.4	1.4
lb/hr:	0.08	0.09	0.08	0.08
HYDROCARBON RESULTS:				
NMHC ppm:	0.0	0.0	0.0	0.0
NMHC (CH4;ppm):	0.0	0.0	0.0	0.0
NMHC lb/hr:	0.0	0.0	0.0	0.0
NMHC (CH4;lb/hr):	0.0	0.0	0.0	0.0

* NOx results corrected for NO2 adsorption.

p-21 Should include C_1 to show safe or nonsafe.

PETRO CHEM ENVIRONMENTAL SERVICES

COMPANY: SOLAR TURBINES, INC.
REPORT NO.: 89-017
UNIT: Turbine #2 AC870535; San Marcos Landfill

SELECTED RESULTS

RUN #:	#1	#2	#3	AVERAGE
TIME:	0935-1005	1155-1225	1335-1405	
%O2:	17.4	17.62	17.54	
DSCFM:	10526	11104	10423	
NOx RESULTS: *				
ppm:	44.87	44.41	41.47	43.58
ppm@3%O2:	229.4	242.3	221.5	231.1
ppm@15%O2:	75.6	79.9	73.0	76.2
lb/hr:	3.43	3.59	3.14	3.39
CO RESULTS:				
ppm:	5.56	-	-	5.56
ppm@3%O2:	28	-	-	28
ppm@15%O2:	9.4	-	-	9.4
lb/hr:	0.26	-	-	0.26
SO2 RESULTS:				
ppm:	0.7	1.7	2.7	1.7
ppm@3%O2:	3.4	9.4	15	9.3
ppm@15%O2:	1.1	3.1	4.8	3.0
lb/hr:	0.07	0.19	0.29	0.18
HYDROCARBON RESULTS:				
NMHC ppm:	0.0	0.0	2.3	0.8
NMHC (CH4;ppm):	0.0	0.0	9.2	3.1
NMHC lb/hr:	0.0	0.0	0.22	0.7
NMHC (CH4;lb/hr):	0.0	0.0	0.24	0.8

*NOx results corrected for NO2 adsorption.

COMPANY: SOLAR TURBINE, INC.
STE: SAN MARCOS LANDFILL
REPORT #: 89-017

VINYL CHLORIDE, BENZENE AND VINYLIDENE CHLORIDE RESULTS

TURBINE #1:

RUN #	DSCFM	VINYL CHLORIDE ppbv	VINYL CHLORIDE lb/hr	BENZENE ppbv	BENZENE lb/hr	1,1-DCE ppbv	1,1-DCE lb/hr
INLET #1	10162	3400	0.3414	1400	0.1757	310	0.0479
INLET #2	10013	2600	0.2572	1800	0.2226	200	0.0304
INLET #3	10197	4800	0.4836	1900	0.2393	470	0.0728
AVERAGES		3600	0.3607	1700	0.2125	327	0.0504

RUN #	DSCFM	VINYL CHLORIDE ppbv	VINYL CHLORIDE lb/hr	BENZENE ppbv	BENZENE lb/hr	1,1-DCE ppbv	1,1-DCE lb/hr
OUTLET #1	10162	0	0	2.6	0.0003	0	0.0000
OUTLET #2	10013	0	0	1.6	0.0002	0	0.0000
OUTLET #3	10197	0	0	2.3	0.0003	0	0.0000
AVERAGES		0	0.0000	2.2	0.0003	0	0.0000
% DESTRUCTION EFF.			100		99.9		100

lb/hr = ppbv * 1/1000 * .0000001581 * MW * DSCFM

MW of Vinyl Chloride = 62.5
MW of Benzene = 78.12
MW of 1,1-DCE = 96.14

SAME AS P 24

II. INTRODUCTION

INTRODUCTION

June 26 and 27, 1989, at the request of SOLAR TURBINES INC., Petro-Chem Environmental Services (PCES) conducted emission measurements on two 933kw recuperated gas turbines; The turbine specifications were as follows:

TURBINE NO.	MODEL NO.	ASSEMBLY NO.	SERIAL NO.	APCD NO.
1	301-SB-MA	2-60591	SG88726	AC870535
2	301-SB-MA	2-60591	SG88725	AC870536

Both units have a gross heat input rating of 10.8 MMBtu/hr. The facility is used to generate power for San Marcos landfill. Turbine No. 1 was tested on June 26, 1989; Turbine No. 2 on June 27, 1989.

Both Turbines were monitored for the following parameters using the following methods:

PARAMETERS	METHOD	TEST RUNS / TURBINE #1	#2
NOx	A	3	3 - 1/2 hr runs
CO	B	3	1 - 1/2 hr runs
SO2	C	3	3 - 1/2 hr runs
O2	D	3	3 - 1/2 hr runs
Volume Flow	E	3	3
NMHC	F	3	3
Benzene Vinyl Chloride Vinylidene Chloride	G	6	-

METHODS

A.	(NOX)	CARB Method 1-100; Chemiluminescent NO/NOx analyzer; Thermo Electron Model 10
B.	(CO)	CARB Method 1-100; NDIR Gas correlation CO Analyzer; Thermo Electron Model 48
C.	(SO2)	CARB Method 1-100; Spectrophometric SO2 Analyzer; Western Research Model 721AT
D.	(%O2)	CARB Method 1-100; Fuel cell O2 analyzer; Teledyne model 320ax
E.	(Volume Flow)	EPA Method 1,2,3,4; pitot tube traverse, condensation method
F.	(NMHC)	EPA Method 18; integrated bag sample, G.C. FID analysis
G.	(C6H6,CH2:CHCl Vinylidene Cl)	Treated cannister sampling method, 0.2ppbv low level detection

INTRODUCTION (cont.)

During run #2 Turbine #2, June 27, 1989, an apparent power fluctuation created problems with PCES' CO analyzer. The CO data present for Turbine #2 is not an average it is the results from run #1.

All sampling was performed on-site by Leslie A. Johnson, project supervisor, Russ P. Logan, sample leader, and Pam Penn, sample assistant of PCES. All analysis was performed in-house at PCES Bakersfield laboratory with the exception of the Toxics analysis which was done by Central Coast Analytical Services in San Luis Obispo, CA. Testing procedures were observed by Dr. Clinton Cooney from the County of San Diego APCD. Jim Kennelly of Solar Turbine Inc. was on-site coordinating the testing efforts.

NTAL

III. NOX, CO, SO2, O2 RESULTS