NTS

Data Qual = NK.

IN EXHAUST GASES

Data on DE90 for some HAPs. not useable, due to lack of actual feed+R.

San Diego Air Pollution Control District
Monitoring & Technical Services
9150 Chesapeake Dr., San Diego, CA 92123

TO: D. Byrnes, Engr.

REPORT DATE: 6 October 89

APPROVED BY: C. W. Ridenour, Senior Chemist

TEST SITE: Solar Turbines, Incorporated
San Marcos Land Fill
San Marcos, CA.

EQUIPMENT: 2 Solar Turbines Co. Recuperated Gas Turbines, Model GSC 1200 R

LIMITS: Landfill Gas: NOx < 263ppm @ 3% O2
CO < 325 ppm @ 3% O2
SO2 < 17 lbs/day
NMHC < 337 ppm

APPLICATION NO: 870535 & 870536

TEST DATE: 26 & 27 June 1989

TESTED BY: Petrochem Environmental (Long Beach, CA)

TEST WITNESSED BY: C. J. Cooney, Assoc. Chemist

SUMMARY OF RESULTS:

The test report has been reviewed. A copy of the summary is attached. This shows that NOx was 254 ppm (avg) for turbine #1 and 231 ppm (avg) for turbine #2. The limit is 263 ppm as is shown above. The CO results were significantly below the limit, as also were the SO2 results.

The toxic analyses show greater than 99% reduction of the three compounds benzene, vinyl chloride, and vinylidene chloride. The audit sample for the inlet gas was acceptable, although some compounds were more than the usual 30% deviation off from the true assay values; however, the outlet audit sample was in error. For this audit sample, no vinylidene chloride was found, but it was present at the 100 ppb level. This error, as well as some less significant errors delayed acceptance of this report.

I discussed the analysis of a new audit sample with Petrochem on Friday, October 6, 1989. It had been agreed by CCAS on August 31, 1989 that they would analyze a new ARB audit sample. CCAS was to have sent a clean cannister to ARB for another audit gas. However, as of October 6, 1989 CCAS has not received the cannister back from ARB. A chain of custody was to have been instituted for this audit sample.

In view of the fact that it might be several weeks before such an audit sample analysis could now be completed, and in view of the fact that the results of the one sample were acceptable, even though outside normal limits but yet close to them, I suggest that the report be accepted since the NOx, CO, and SO2 limits are acceptable, and since the destruction efficiency is better than 99%. Petrochem has agreed to have the audit sample analysis performed and submit it as an addenda to the report.

TRANSMITTED FROM 10.06.89 08:33 P.01 *

PETRO CHEM ENVIRONMENTAL SERVICES

P.O. Box 5126
3207 Antonino Avenue
Bakersfield, California 93388
(805) 327-7300

P.O. Box 40097
Long Beach, California 90
(213) 439-2217

10-6-89

FAX of supposed audit sample.

TELECOPIER COVER LETTER

However this is not an audit SMP, but the summary sheet of field samples.

PLEASE DELIVER THE FOLLOWING PAGES TO:

TO: Clinton Cooney

CC:

FROM: Michelle Lynch

TOTAL NUMBER OF PAGES 2 INCLUDING THE COVER PAGE.

IF YOU DO NOT RECEIVE ALL OF THE PAGES, PLEASE CALL US AS SOON AS POSSIBLE AT (213) 427-8994.

COMMENTS:

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	10324	3400	0.3416	1400	0.1758	310	0.0479
INLET #2	10175	2600	0.2574	1800	0.2228	200	0.0305
INLET #3	10361	4800	0.484	1900	0.2394	470	0.0729
AVERAGES	300-350	3600	0.3610	1700	0.2127	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	10324	0	0	2.6	0.0003	0	0.0000
OUTLET #2	10175	0	0	1.6	0.0002	0	0.0000
OUTLET #3	10361	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 * .0000001557 * MW * DSCFM

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

pcd
County of San Diego

R. J. Sommerville
Air Pollution Control Officer

September 1, 1988

Mr. James Kennelly
Caterpillar Capital Company, Inc.
P.O. Box 85376
San Diego, CA 92138-5376

Dear Mr. Kennelly:

After examination of Application Nos. 870535 and 870536 for Authority to Construct an electrical generating facility fueled by landfill gas at the San Marcos Landfill, San Marcos, CA, the District has decided on the following actions:

Authority to Construct is granted pursuant to Rules 20 and 20.2 of the Air Pollution Control District Rules and Regulations for:

- Two (2) Solar Turbines Co. Recuperated Gas Turbines, Model GSC 1200R, each with a gross heat input rating of 10.8 MM BTU/HR and 933 kilowatt electrical generator.
- Landfill gas vacuum pump, gas compressor, and water separator.
- Miscellaneous piping, ducting, and instrumentation.

This Authority to Construct is granted with the following conditions:

1. Equipment installation and operation shall be conducted in compliance with all data and specifications submitted as part of the applications under which

this Authority to Construct is issued unless otherwise specifically noted in the following conditions.

2. In the event the District determines that additional monitoring or safety equipment is appropriate to ensure compliance of the gas turbines and/or associated equipment, the applicant shall obtain and promptly install such equipment on either a temporary or permanent basis, as required.

3. A flow indicating device for the landfill gas supply line to the turbines shall be operational and calibrated in accordance with manufacturers specifications such that landfill gas flow rates are measured and recorded to a absolute accuracy of five (5) percent. One turbine will be shutdown during source testing.

4. There shall be no hydrocarbon leaks along the landfill gas transfer path (gas turbines, associated piping and ducting, gas compression and treatment equipment) which result in concentrations of 500 parts per million or greater by volume, measured as propane at a distance of 1.3 cm (1/2 inches) from the transfer path, other than nonrepeatable, momentary readings.

5. The concentration of oxides of nitrogen emissions (as nitrogen dioxide) in the turbine exhaust shall ~~not exceed 263 parts per million by volume~~ (ppmv), dry basis, corrected to three percent oxygen (3% O_2). Mass emissions shall not exceed 4 pounds per hour.

6. The concentration of carbon monoxide emissions in the turbine exhaust shall not exceed 325 ppmv, at 3% O_2, dry basis. Mass emissions shall not exceed 3 pounds per hour.

7. The concentration of non-methane hydrocarbons (as methane) in the turbine exhaust shall not exceed 337 ppmv, at 3% O_2, dry basis. Mass emissions shall not exceed 2 pounds per hour.

8. Emissions of sulfur dioxide shall not exceed 17 pounds per day.

9. The fuel rate to each turbine shall not exceed 1595 pounds per hour at 6627 Btu per hour.

10. The applicant shall provide exhaust stacks, test ports, and platforms for source testing in accordance with requirements of the District.

11. Compliance with emission limitations of this Authority to Construct shall be determined by source tests conducted at the applicant's expense. The turbines shall also be tested for exhaust emission rates and destruction and removal efficiencies of Benzene, Vinyl Chloride, and Vinylidene Chloride. The source test plan shall be submitted to the District, approved, and appropriate test arrangements made prior to the issuance of a startup authorization.

12. If compliance with the subject emission limitations, and emission values used in the screening risk assessments, cannot be demonstrated to the satisfaction of the District, the applicant will take whatever corrective action may be necessary to meet the applicable requirements. If the corrective action requires any physical change or modification to the subject equipment, the applicant shall apply for and obtain an authority to construct for all such modifications.

13. Access, facilities, and utilities for source testing required by the Air Pollution Control Officer shall be provided when such testing is performed by the District.

14. A maintenance plan for the gas turbine and associated gas conditioning equipment shall be submitted to the District, for review and approval, prior to the issuance of a startup authorization.

This Air Pollution Control District Authority to Construct does not relieve the holder from obtaining permits or authorizations which may be required by other governmental agencies.

<u>This is not a Permit to Operate</u>. Please notify the Air Pollution Control District as soon as the equipment is installed in accordance with this Authority to Construct so that it may be evaluated for a Permit to Operate. Operation of this equipment without written authorization to do so will be a violation of Rule 10(b) and will be subject to civil and criminal penalties.

A copy of this Authority to Construct will be posted or kept readily available at the equipment location.

Within ten days after receipt of this Authority to Construct, the applicant may, in accordance with Rule 25, petition the Hearing Board for a hearing on any conditions imposed herein.

This Authority to Construct will expire one year from date of issuance.

If there are any questions regarding this action, or if an inspection is to be scheduled, please contact the undersigned at (619) 694-3318.

Sincerely,

CRAIG D. ANDERSON
Associate Air Pollution Control Engineer

CDA:ap

cc. Eric Swanson, Solid Waste

8-25

apcd

County of San Diego

R. J. Sommerville
Air Pollution Control Officer

August 23, 1989

Letter for correction

Leslie Johnson, Manager
Petro-Chem Environmental Services
3300 Cherry Avenue
Long Beach, CA 90807

CORRECTIONS TO THE SAN MARCOS TEST REPORT

The test report for the two turbines at the San Marcos Landfill has been reviewed. Some corrections to the report are necessary before it can be accepted and the Permits to Operate issued.

The corrected NOx equation has an error in it; all subsequent calculations for the corrected NOx are in numerical error. One way to obtain the correct value of NOx is by adding the corrected NO_2 to the average value of the NO. All tables which use this incorrect value of NOx, which was computed by adding the corrected NO_2 to the total NOx, must be corrected.

The linearity on the NOx instrument was included in the report, but linearities on the O_2, SO_2 and CO instruments are also needed.

The field data is extremely difficult to read on the velocities and pertinent quantities on pages 66, 67, and 68. The information is contradictory as two values of ΔP and ΔH are given, on one line, with only one volume on the same line. This makes it impossible to check. A correction is needed which explains what was meant. A suggestion is to include an explanation of why this occurred, what it means, and to submit, in addition to the original field data sheet, a data sheet with the data "straightened out". Until this is performed, no checks on the volumetric flows can be performed.

In conjunction with the velocity data, the second test on turbine #2 did not pass the leak test. No mention of this in the report was made. This must be mentioned; also mention whether a decision was made to use the velocity for this subtest, and, if so, state the degree of error.

The volumetric flows on Pages 54 and 55 are computed at 60°F; however, San Diego APCD standard conditions are one atmosphere and 68°F. Corrections to the resulting flows and the subsequent mass emissions rates of mass per unit time are required. This difference, though perhaps seemingly small, and the corresponding errors could have been prevented by using documentation in the San Diego Methods 1 through 5.

The hydrocarbon charts, beginning with Page 42, show a very large peak, which is not related to methane, and apparently is not non-methane. This peak must be explained; if it is a "backflush" peak, documentation as to this effect must be clearly stated.

A certificate of the hydrocarbon calibration gas must be included in the report; currently, there is none.

SOLAR TURBINES INCORPORATED

SUBSIDIARY OF CATERPILLAR INC.

P.O. Box 85376, San Diego, CA 92138-5376
TEL: (619) 544-5000, TLX: 695045

August 8, 1989

County of San Diego
Air Pollution Control District
9150 Chesapeake Drive
San Diego, CA 92123-1095

Attn: Mr. Craig D. Anderson

Re: San Marcos Landfill Gas-to-Energy Project AC Nos. 870535 & 870536

Dear Mr. Anderson:

Please find enclosed the compliance test report for the referenced project that was prepared by Petro Chem Environmental Services. If you have any questions during your review of the report, please feel free to contact Ms. Leslie Johnson directly.

We look forward to receipt of the operating permits after your approval of the compliance test.

Please contact me at (619) 544-5446 if you have any questions.

Very truly yours,

Robert J. Anuskiewicz, Manager
Waste Energy Operations & Management

RJA/np
6476p/12
enc.

cc Ms. Leslie Johnson
Petro Chem Environmental Services

Central Coast Analytical Services

Central Coast
Analytical Services, Inc.
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: F-8772
Collected: 06/27/89
Received: 07/01/89
Tested: 07/06/89
Collected by: Clint Cooney

SUBMITTED BY:
San Diego Co. APCD
9150 Chesapeake Dr., Rm. 243
San Diego, CA 92123
Attn: Clint Cooney

SAMPLE DESCRIPTION:
Sample #GP-3
Canister #121

A
SMP

CALDERON TESTING

GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC ANALYSIS REPORT

Compound Analyzed	Detection Limit ppbv	Concentrations ug/cu M	ppbv
Benzene	0.09	0.4	0.1
Carbon Tetrachloride	0.07	not found	not found
Chloroform	0.09	not found	not found
1,2-Dichloroethane	0.1	not found	not found
Ethylene Dibromide	0.06	not found	not found
Methylene Chloride	1.0	not found	not found
Tetrachloroethylene(PCE)	0.1	not found	not found
1,1,1-Trichloroethane(TCA)	0.08	not found	not found
Trichloroethylene(TCE)	0.09	not found	not found
Vinyl Chloride	0.2	not found	not found

Note: Constituents reported as not found would have at or above the listed detection limit.

Calderon samples

Respectfully submitted,
CENTRAL COAST ANALYTICAL

Laurence R. Hilpert, Ph.D
Vice President

MSD #1
F8772air/LRH82
LRH/crr/lrh

AIR, WATER and HAZARDOUS WASTE LABORATORY CERTIFIED by CALIFORNIA DEPT of PUBLIC HEALTH

Central Coast Analytical Services

Central Coast
Analytical Services, Inc.
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: F-8773
Collected: 06/27/89
Received: 07/01/89
Tested: 07/06/89
Collected by: Clint Cooney

SUBMITTED BY:
San Diego Co. APCD
9150 Chesapeake Dr., Rm. 243
San Diego, CA 92123
Attn: Clint Cooney

SAMPLE DESCRIPTION:
Audit Gas #1
Canister #351

A-1
SMP

CALDERON TESTING

GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC ANALYSIS REPORT

Compound Analyzed	Detection Limit ppbv	Concentrations ug/cu M	ppbv
Benzene	0.09	not found	not found
Carbon Tetrachloride	0.07	33.	4.8
Chloroform	0.09	23.	4.2
1,2-Dichloroethane	0.1	21.	4.7
Ethylene Dibromide	0.06	24.	2.8
Methylene Chloride	1.0	10.	2.6
Tetrachloroethylene(PCE)	0.1	24.	3.2
1,1,1-Trichloroethane(TCA)	0.08	30.	5.1
Trichloroethylene(TCE)	0.09	22.	3.7
Vinyl Chloride	0.2	10.	3.7

Note: Constituents reported as not found would have been reported if present at or above the listed detection limit. Sample also contains chlorobenzene at approximately 10 ug/cu M.

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES, INC.

L R Hilpert

Laurence R. Hilpert, Ph.D.
Vice President

MSD #1
F8773air/LRH82
LRH/crr/lrh

Central Coast Analytical Services

Central Coast
Analytical Services, Inc.
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: F-8773dup
Collected: 06/27/89
Received: 07/01/89
Tested: 07/06/89
Collected by: Clint Cooney

SUBMITTED BY:
San Diego Co. APCD
9150 Chesapeake Dr., Rm. 243
San Diego, CA 92123
Attn: Clint Cooney

SAMPLE DESCRIPTION:
Audit Gas #1
Canister #351
Duplicate Analysis

CALDERON TESTING

GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC ANALYSIS REPORT

Compound Analyzed	Detection Limit ppbv	Concentrations ug/cu M	ppbv
Benzene	0.09	not found	not found
Carbon Tetrachloride	0.07	29.	4.2
Chloroform	0.09	22.	4.1
1,2-Dichloroethane	0.1	19.	4.2
Ethylene Dibromide	0.06	24.	2.9
Methylene Chloride	1.0	9.2	2.4
Tetrachloroethylene(PCE)	0.1	23.	3.1
1,1,1-Trichloroethane(TCA)	0.08	26.	4.3
Trichloroethylene(TCE)	0.09	21.	3.6
Vinyl Chloride	0.2	12.	4.3

Note: Constituents reported as not found would have been reported if present at or above the listed detection limit. Sample also contains chlorobenzene at approximately 10 ug/cu M.

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES, INC.

Laurence R. Hilpert, Ph.D.
Vice President

MSD #1
F8773dup/LRH82
LRH/crr/lrh

Central Coast Analytical Services

Central Coast
Analytical Services, Inc.
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: S-070689
Collected:
Received:
Tested: 07/06/89
Collected by: EJAC

SUBMITTED BY:
CCAS

SAMPLE DESCRIPTION:
CERTIFIED REFERENCE STANDARD
Benzene 107, Carbon Tetrachloride 108,
Chloroform 104, Tetrachloroethylene 113,
Vinyl Chloride 97 ppbv.

CALDERON TESTING

GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC ANALYSIS REPORT

Compound Analyzed	Detection Limit ppbv	Concentrations ug/cu M	ppbv
Benzene	0.09	366.	105.
Carbon Tetrachloride	0.07	733.	107.
Chloroform	0.09	537.	101.
1,2-Dichloroethane	0.1	not found	not found
Ethylene Dibromide	0.06	not found	not found
Methylene Chloride	1.0	not found	not found
Tetrachloroethylene(PCE)	0.1	745.	101.
1,1,1-Trichloroethane(TCA)	0.08	not found	not found
Trichloroethylene(TCE)	0.09	not found	not found
Vinyl Chloride	0.2	253.	91.

STATEMENT OF ACCURACY AND PRECISION: The mean percent recovery is 95. The standard deviation is 4.0.

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES, INC.

Laurence R. Hilpert, Ph.D.
Vice President

MSD #1
S070689/LRH82
LRH/ejac/crr

Central Coast Analytical Services

Central Coast
Analytical Services, Inc.
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: B-870689
Collected:
Received:
Tested: 07/06/89
Collected by: CRR

SUBMITTED BY:
CCAS

GC/MS AIR ANALYSIS EPA TO-14
Sample Description:
Zero air Blank

HAZARDOUS SUBSTANCE LIST Compound Analyzed	(CAS RN)	Detection Limit ppbv	Concentration ug/cu M	Concentration ppbv
Acetone	(67641)	1.0	not found	not found
Benzene	(71432)	0.1	not found	not found
Bromodichloromethane	(75274)	0.1	not found	not found
Bromomethane	(74839)	0.2	not found	not found
Bromoform	(75252)	0.1	not found	not found
2-Butanone (MEK)	(78933)	0.1	not found	not found
Carbon Disulfide	(75150)	1.	not found	not found
Carbon Tetrachloride	(56235)	0.5	not found	not found
Chlorobenzene	(108907)	0.1	not found	not found
Chloroethane	(75003)	0.1	not found	not found
2-Chloroethylvinyl Ether	(110758)	0.1	not found	not found
Chloroform	(67663)	0.1	not found	not found
Chloromethane	(107302)	0.1	not found	not found
Dibromochloromethane	(124481)	0.1	not found	not found
1,1-Dichloroethane	(75343)	0.1	not found	not found
1,2-Dichloroethane	(107062)	0.1	not found	not found
1,1-Dichloroethene	(75354)	0.1	not found	not found
t-1,2-Dichloroethene	(156605)	0.1	not found	not found
Dichloromethane	(75092)	0.1	not found	not found
1,2-Dichloropropane	(78875)	0.1	not found	not found
cis-1,3-Dichloropropene	(10061015)	0.1	not found	not found
trans-1,3-Dichloropropene	(10061026)	0.1	not found	not found
Ethylbenzene	(100414)	0.1	not found	not found
2-Hexanone	(591786)	0.1	not found	not found
4-Methyl-2-Pentanone (MIBK)	(624839)	0.1	not found	not found
Styrene	(100425)	1.	not found	not found
1,1,2,2-Tetrachloroethane	(79345)	0.5	not found	not found
Tetrachloroethene (PCE)	(127184)	0.1	not found	not found
Toluene	(108883)	0.1	not found	not found
1,1,1-Trichloroethane (TCA)	(71556)	0.1	not found	not found
1,1,2-Trichloroethane	(79005)	0.1	not found	not found
Trichloroethene (TCE)	(79016)	0.1	not found	not found
Vinyl Acetate	(108054)	0.1	not found	not found
Vinyl Chloride	(75014)	0.5	not found	not found
Xylenes	(1330207)	0.1	not found	not found

Percent Recovery of Sample-Specific Quality Assurance Spike is: 95.

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES

Laurence R. Hilpert, Ph.D.
Vice President

MSD #1
B070689/LRH82
LRH/crr/lrh

Central Coast Analytical Services

Central Coast
Analytical Services, Inc.
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: B-070689
Collected:
Received:
Tested: 07/06/89
Collected by: CRR

SUBMITTED BY:
CCAS

SAMPLE DESCRIPTION:
Zero Air Blank

CALDERON TESTING

GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC ANALYSIS REPORT

Compound Analyzed	Detection Limit ppbv	Concentrations ug/cu M	ppbv
Benzene	0.09	not found	not found
Carbon Tetrachloride	0.07	not found	not found
Chloroform	0.09	not found	not found
1,2-Dichloroethane	0.1	not found	not found
Ethylene Dibromide	0.06	not found	not found
Methylene Chloride	1.0	not found	not found
Tetrachloroethylene(PCE)	0.1	not found	not found
1,1,1-Trichloroethane(TCA)	0.08	not found	not found
Trichloroethylene(TCE)	0.09	not found	not found
Vinyl Chloride	0.2	not found	not found

Note: Constituents reported as not found would have been reported if present at or above the listed detection limit.

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES, INC.

Laurence R. Hilpert, Ph.D.
Vice President

MSD #1
B070689air/RH82
LRH/crr/lrh