

NORTHERN REGION

CENTRAL REGION

SOUTHERN REGION

ERC/PUBLIC NOTICE CHECK LIST

PROJECT# 95057A

MODEM FILE NAME: _____

REQST. COMPL.

- _____ ERC TRANSFER OF PREVIOUSLY BANKED CREDITS
- _____ ERC PRELIMINARY PUBLIC NOTICE
- _____ ERC FINAL PUBLIC NOTICE
- _____ NSR/CEQA PRELIMINARY PUBLIC NOTICE
- _____ NSR/CEQA FINAL PUBLIC NOTICE

ENCLOSED DOCUMENTS REQUIRE:

_____ Enter Correct Date, Print All Documents from Modemed File and Obtain Directors Signature

_____ Send PRELIMINARY/FINAL Notice Letters to CARB, EPA and Applicant; Including the Following Attachments:

- Application Evaluation
- Other _____

_____ Send PRELIMINARY/FINAL Public Notice for Publication to Fresno Bee
(NEWSPAPER)

_____ Send Signed Copies of PRELIMINARY/FINAL Notice Letters to Regional Office
Attn: George Heinen

_____ Director's Signature and District Seal Embossed on ERC Certificates

_____ Director's Signature on Cover Letter and Mail Cover Letter & ERC Certificates by Certified Mail to:

- Applicant: Applicant Address
- Applicant and Additional Addressees (see cover letters)
- Other _____

_____ Send Copies of Signed and Seal Embossed ERC Certificates and Signed cover letter to Regional Office Attn: _____

_____ Other Special Instructions (please specify) _____

Date Completed 2/22/96 / By Martin Keast

Date Added to Seyed Directory: _____

Upon Completion FAX to Regional Office Attn: _____

PROJECT ROUTING FORM

PROJECT NUMBER: 950579 FACILITY ID: 1659 PERMIT NOs: _____

APPLICANT NAME: UNION OIL COMPANY OF CALIFORNIA DBA UNOCAL

PREMISE ADDRESS: CALAVERAS AVENUE SW 1/4 SEC 7 T19S R16E, COALINGA

PRELIMINARY REVIEW	ENGR	DATE	SUPR	DATE
A. Application Deemed Incomplete				
B. Application Deemed Complete <input type="checkbox"/> Awaiting CB Offsets	KT	10/12/95	[Signature]	10/12
C. Application Pending Denial				
D. Application Denied				

ENGINEERING EVALUATION	INIT	DATE
E. Engineering Evaluation Complete	[Signature]	1/30/96
F. Supervising Engineer Approval	MK	2/2/96
G. Compliance Division Approval <input checked="" type="checkbox"/> Not Required		
H. Permit Services Manager Approval		

2/11/96
revised
4/10/96

2/22/96

Director Review: Not Required Required

CLERICAL STAFF: Perform tasks as indicated below. Initial and date when completed.

- PRELIMINARY REVIEW**
- _____ Mail Incompleteness Letter to the Applicant.
 - _____ Mail Completeness Letter to the Applicant.
 - _____ Mail Intent to Deny Letter to the Applicant (Certified Mail).
 - _____ Mail Denial Letter to the Applicant (Certified Mail).

PROJECTS NOT REQUIRING PUBLIC NOTIFICATION

- PRELIMINARY DISPOSITION:** _____ Mail Imminent Denial Letter to the Applicant (Certified Mail).
- FINAL DISPOSITION:** _____ Mail ATC(s) to Distribution.
- _____ Mail Denial Letter to the Applicant (Certified Mail).

PROJECTS REQUIRING PUBLIC NOTIFICATION

- PRELIMINARY DECISION:** _____ Deliver Ad to the Newspaper NOT LATER THAN _____
- _____ Mail copies of Cover Letter and Engineering Evaluation to Distribution.

- FINAL DECISION:** _____ Deliver Ad to the Newspaper NOT LATER THAN _____
- _____ Mail copies of Cover Letter and ATC(s) to Distribution.
- _____ Mail copies of Cover Letter to Distribution.

DISTRIBUTION

- _____ APPLICANT _____ EPA - 75 Hawthorne St., San Francisco, CA 94105 Attn: A-3-4
- _____ ENGINEER _____ ARB - Stationary Source Div. Chief, PO Box 2815, Sacramento, CA 95812
- _____ COMPLIANCE _____ SJVUAPCD - 1999 Tuolumne St., Fresno, CA 93721 Attn: Seyed Sadredin
- _____ PREMISE FILE
- _____ BLDG DEPT _____ _____ OTHER _____
- _____ FIRE DEPT _____ _____ SCHOOL _____

6/7/96

Unocal Energy Resources Division
Unocal Corporation
Calaveras Avenue, P.O. Box 1074
Coalinga, California 93210
Telephone (209) 935-0771



January 19, 1996

RECEIVED

JAN 23 1996

PERMIT SERVICES
SJVUAPCD

Oil & Gas Operations
North San Joaquin, Central California

San Joaquin Valley Unified
Air Pollution Control District
Central Region Office
1999 Tuolumne Street, Suite 200
Fresno, California 93721

Attn: Mr. George Hinen

Dear George:

As required by San Joaquin Valley Unified APCD, Unocal is hereby submitting the additional information for Project # 950579. Requested fuel consumption for the period commencing with August 1990 through September 1991 is as follows;

August 1990	24.960 mmcf
September 1990	25.135 mmcf
October 1990	25.596 mmcf
November 1990	25.590 mmcf
December 1990	27.925 mmcf
January 1991	22.450 mmcf
February 1991	18.135 mmcf
March 1991	20.651 mmcf
April 1991	28.205 mmcf
May 1991	24.793 mmcf
June 1991	25.829 mmcf
July 1991	32.031 mmcf
August 1991	31.231 mmcf
September 1991	34.817 mmcf

If you should have any questions regarding this application, please call me at (209) 935-7225.

Sincerely

UNION OIL COMPANY OF CALIFORNIA
dba UNOCAL

George N. Folks Jr.
Sr. Staff Environmental Specialist

UNOCAL
COALINGA NOSE FIELD
PRODUCTION DEPARTMENT
FAX TRANSMITTAL

TO: GEORGE HINCH AT LOCATION STVUAPCD

FROM: GEORGE FOLKS (UNOCAL - COALINGA)

DATE: 1/19/96

TIME: 11:15 AM

ITEM BEING TRANSMITTED: FUEL USE PROJECT # 950579

NO. OF PAGES (INCLUDING THIS COVER PAGE): 2

CONFIRMATION: YES NO THANK YOU

SENDER: GEORGE FOLKS PHONE NO. (209) 935-7225

Unocal Energy Resources Division
 Unocal Corporation
 Calaveras Avenue, P.O. Box 1074
 Coalinga, California 93210
 Telephone (209) 935-0771



January 19, 1996

Oil & Gas Operations
 North San Joaquin, Central California

San Joaquin Valley Unified
 Air Pollution Control District
 Central Region Office
 1999 Tuolumne Street, Suite 200
 Fresno, California 93721

Attn: Mr. George Hinen

Dear George:

As required by San Joaquin Valley Unified APCD, Unocal is hereby submitting the additional information for Project # 950579. Requested fuel consumption for the period commencing with August 1990 through September 1991 is as follows:

August 1990	24.960 mmcf
September 1990	25.135 mmcf
October 1990	25.596 mmcf
November 1990	25.590 mmcf
December 1990	27.925 mmcf
January 1991	22.450 mmcf
February 1991	18.135 mmcf
March 1991	20.651 mmcf
April 1991	28.205 mmcf
May 1991	24.793 mmcf
June 1991	25.829 mmcf
July 1991	32.031 mmcf
August 1991	31.231 mmcf
September 1991	34.817 mmcf

If you should have any questions regarding this application, please call me at (209) 935-7225.

Sincerely

UNION OIL COMPANY OF CALIFORNIA
 dba UNOCAL

George N. Folks Jr.
 Sr. Staff Environmental Specialist

Unocal Energy Resources Division
Unocal Corporation
Calaveras Avenue, P.O. Box 1074
Coalinga, California 93210
Telephone (209) 935-0771

RECEIVED

JAN 17 1996

PERMIT SERVICES
SJVUAPCD



January 15, 1996

Oil & Gas Operations
North San Joaquin, Central California

San Joaquin Valley Unified
Air Pollution Control District
Central Region Office
1999 Tuolumne Street, Suite 200
Fresno, CA 93721

Attn: Ms. Karen Tani

Dear Karen:

Enclosed you will find all the additional fuel use data that was obtainable from the Unocal archives. 1987 was as far back as our records go on Unocal's Coalinga Nose Unit three (3) natural gas fired solar turbines. All data provided represents the cumulative annual total for the three (3) units in question.

1984 = No data available
1985 = No data available
1986 = No data available
1987 = 321,352 mmcf/yr
1988 = 303,854 mmcf/yr
1989 = 302,372 mmcf/yr
1990 = 325,270 mmcf/yr
1991 = 331,125 mmcf/yr
1992 = 368,846 mmcf/yr
1993 = 195,669 mmcf/yr
1994 = 0
1995 = 0

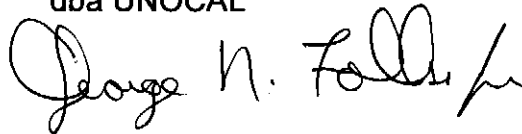
NOTE: PER TELCON w/G. FOLKS, JR., THE DATA SHOULD BE CORRECTED AS INDICATED ABOVE, E.G. 1987 FUEL USE IS 321,352 Million SCF, NOT 321,352 MILLION SCF

George A. Hearn
1/18/96

If you should have any questions in regards to this application, please call me at (209) 935-7225.

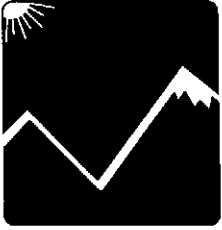
Sincerely,

UNION OIL COMPANY OF CALIFORNIA
dba UNOCAL

A handwritten signature in black ink that reads "George N. Folks Jr." with a stylized flourish at the end.

George N. Folks Jr.
Sr. Staff Environmental Specialist

GNF/ksg
DOC:WORD:#1:1-15-96A



San Joaquin Valley
Unified Air Pollution Control District

October 12, 1995

George Folks Jr.
Unocal
P O Box 1074
Coalinga CA 93210

Re: Project # 950579
Project Description: Emissions Reduction Credits for Shutdown of Gas Turbines

Dear Mr. Folks:

Your application for Emissions Reduction Credits for the above-referenced project has been received by the Air Pollution Control District, and has been reviewed for completeness.

Based on this preliminary review, the application appears to be complete. However, during processing, the District may request additional information to clarify, correct or otherwise supplement the information on file.

Thank you for your cooperation. Should you have any questions, please telephone Ms. Karen Tani of Permit Services at (209) 497-1100.

Sincerely,

Seyed Sadredin
Director of Permit Services

David Warner
Permit Services Manager - Central Region

kt

David L. Crow
Executive Director/Air Pollution Control Officer

1999 Tuolumne Street, Suite 200 • Fresno, CA 93721 • (209) 497-1000 • FAX (209) 233-2057

Northern Region

1230 Kiernan Avenue, Suite 130 • Modesto, CA 95356
(209) 545-7000 • Fax (209) 545-8652

Central Region

1999 Tuolumne Street, Suite 200 • Fresno, CA 93721
(209) 497-1000 • Fax (209) 233-2057

Southern Region

2700 M Street, Suite 275 • Bakersfield, CA 93301
(805) 861-3682 • Fax (805) 861-2060

RECEIVED

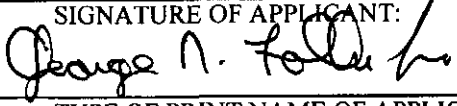
SEP 28 1995

PERMIT SERVICES
SJVUPPCD

APPLICATION FOR:

- EMISSION REDUCTION CREDIT (ERC)
- CONSOLIDATION OF ERC CERTIFICATES

- ERC WITHDRAWAL
- ERC TRANSFER OF OWNERSHIP

1. ERC TO BE ISSUED TO: UNION OIL COMPANY OF CALIFORNIA dba UNOCAL																																				
2. MAILING ADDRESS: Street/P.O. Box: <u>P.O. Box 1074</u> City: <u>Coalinga</u> State <u>CA</u> Zip Code <u>93210</u>																																				
3. LOCATION OF REDUCTION: Street: <u>Calaveras Avenue, SW 1/4 Sec. 7, T19s, R16e</u> City: <u>Coalinga</u>	4. DATE OF REDUCTION: <u>8/01/93</u>																																			
5. PERMIT NO(S): <u>C-1659-39-0, C-1659-40-0, C-1659-41-0</u> EXISTING ERC NO(S):																																				
6. METHOD RESULTING IN EMISSION REDUCTION: <input checked="" type="checkbox"/> SHUTDOWN <input type="checkbox"/> RETROFIT <input type="checkbox"/> PROCESS CHANGE <input type="checkbox"/> OTHER DESCRIPTION: These three Solar Gas Turbines are no longer utilized in the Unocal/CNU Natural Gas Treating Facility operations and have been subsequently shutdown awaiting potential sale. (see attachments) <p style="text-align: right;">(Use additional sheets if necessary)</p>																																				
7. REQUESTED ERC's (In Pounds PEr Calendar Quarter):																																				
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>VOC</th> <th>NOx</th> <th>CO</th> <th>PM10</th> <th>SOx</th> <th>OTHER</th> </tr> </thead> <tbody> <tr> <td>1ST QUARTER</td> <td>2,079</td> <td>27,123</td> <td>10,849</td> <td>negligible</td> <td>negligible</td> <td>6 Mo/Avg</td> </tr> <tr> <td>2ND QUARTER</td> <td>2,106</td> <td>27,470</td> <td>10,988</td> <td>negligible</td> <td>negligible</td> <td>6 Mo/Avg</td> </tr> <tr> <td>3RD QUARTER</td> <td>2,079</td> <td>27,123</td> <td>10,849</td> <td>negligible</td> <td>negligible</td> <td>6 Mo/Avg</td> </tr> <tr> <td>4TH QUARTER</td> <td>1,884</td> <td>24,576</td> <td>9,830</td> <td>negligible</td> <td>negligible</td> <td>6 Mo/Avg</td> </tr> </tbody> </table>			VOC	NOx	CO	PM10	SOx	OTHER	1ST QUARTER	2,079	27,123	10,849	negligible	negligible	6 Mo/Avg	2ND QUARTER	2,106	27,470	10,988	negligible	negligible	6 Mo/Avg	3RD QUARTER	2,079	27,123	10,849	negligible	negligible	6 Mo/Avg	4TH QUARTER	1,884	24,576	9,830	negligible	negligible	6 Mo/Avg
	VOC	NOx	CO	PM10	SOx	OTHER																														
1ST QUARTER	2,079	27,123	10,849	negligible	negligible	6 Mo/Avg																														
2ND QUARTER	2,106	27,470	10,988	negligible	negligible	6 Mo/Avg																														
3RD QUARTER	2,079	27,123	10,849	negligible	negligible	6 Mo/Avg																														
4TH QUARTER	1,884	24,576	9,830	negligible	negligible	6 Mo/Avg																														
8. SIGNATURE OF APPLICANT: 	TYPE OR PRINT TITLE OF APPLICANT: Sr. Staff Environmental Specialist																																			
9. TYPE OF PRINT NAME OF APPLICANT: George N. Folks Jr.	DATE: 9/20/95 TELEPHONE NO: (209)935-7225																																			

FOR APCD USE ONLY:

DATE STAMP	FILING FEE RECEIVED: \$ _____ DATE PAID: <u>9/28/95</u> PROJECT NO: <u>950579 FACID#1659</u>
------------	--

Unocal Energy Resources Division
Unocal Corporation
Calaveras Avenue, P.O. Box 1074
Coalinga, California 93210
Telephone (209) 935-0771

RECEIVED

SEP 28 1995

PERMIT SERVICES
SJVUAPCD



September 20, 1995

Oil & Gas Operations
North San Joaquin, Central California

San Joaquin Valley Unified
Air Pollution Control District
Central Region Office
1999 Tuolumne Street, Suite 200
Fresno, CA 93721

Attn: Mr. Martin Keast

Dear Martin:

Enclosed you will find the application for Emission Reduction Credits on Unocal's Coalinga Nose Unit three (3) natural gas fired solar turbines.

In addition, you will find a check issued to the San Joaquin Valley Unified Air Pollution Control District in the amount of \$470.00 as requested in your June 8, 1994 memo to me referencing application #C-1659-68-0 (see attachment).

If you should have any questions in regards to this application, please call me at (209) 935-7225.

Sincerely,

UNION OIL COMPANY OF CALIFORNIA
dba UNOCAL

George N. Folks Jr.
Sr. Staff Environmental Specialist

GNF/ksg
DOC:WORD:#1:9-20A

RECEIVED

SEP 28 1995

FINANCE
SJVUAPCD

CHK# 0100003559
\$470.00 ERC
PM > 9-25-95
JH

Unocal Corporation

Natural Gas Fired

Solar Turbine Gas Compressors

*Coalinga Nose Unit
Natural Gas Treating Facility*

I. NAME

- A. Business License Name: Unocal Oil & Gas Division
- B. Nature of Business: Oil & Gas Production
- C. Name, Address, and Phone Number of person to contact regarding this application: George N. Folks Jr.
Sr. Staff Environmental Specialist
P.O. Box 1074
Coalinga, CA 93210
(209) 935-7225
- D. Type of Use Entitlement: Fee/Lease
- E. Estimated Construction Date: These units were installed in 1982.

II. TYPE OF APPLICATION

- A. This is an application for Emission Reduction Credits on three (3) natural gas fired 1150 h.p. each solar/saturn turbine gas compressors used for compressing dry commercial grade natural gas.

III. DESCRIPTION OF FACILITY

- A. Location: Unocal Corporation
Coalinga Nose Unit
Natural Gas Treating Facility
Section 7, T20S, R16E, MDB&M

IV. DESCRIPTION OF PROCESS

- A. The three (3) solar gas compressors are used for the compression of dry commercial grade natural gas <2% V.O.C. once fractionation has occurred.
- B. Operations Schedule: Idle

V. BASIC PROCESS EQUIPMENT

- A.
 - 1. Equipment Identification: Three (3) solar/saturn turbine, 1150 h.p. gas compressors
 - 2. Material Entering Equipment: Dry <2% V.O.C. commercial grade natural gas
- B.
 - 1. Fuel Type: Dry natural gas
 - 2. Equipment Manufacturer: Solar Turbines, Division of Caterpillar Mfg.
 - 3. See attachment for emissions calculations.

VI. EQUIPMENT DESCRIPTION:

Three (3) 36.2 MM BTU/hr. solar/saturn natural gas fired turbines 1150 hp each to drive natural gas compressors.

VII. DESCRIPTION OF ACTUAL EMISSION REDUCTION:

The actual emission reduction credits generated by this application will be accomplished by the permanent shutdown of P/O's C-1659-39-0, C-1659-40-0, and C-1659-41-0. Additionally, the units in question are scheduled for sale.

As a result of process changes in Unocal's natural gas treating facility, which occurred in the first half of 1993, it was found that these three natural gas fired turbines were no longer needed to maintain a continuous sales gas flow. With this process change completion on August 1, 1993, the units in question were placed in an idle status, pending eventual sale.

VIII. JUSTIFICATION FOR ALTERNATE 2 YEARS:

Unocal requests that historical actual emissions be calculated from 8/1/91 - 8/1/93 due to the continuous operation of these units during this time period, and not from 8/1/93 - 8/1/95 because each respective unit was in an idle non-use status during this period pending eventual sale.

IX. ACTUAL FUEL USAGE:

The following data represents actual fuel usage for the three natural gas fired 1150 hp solar/saturn gas turbines with associate natural gas compressors. All fuel gas totals are measured in MMSCF.

August 1991	= 31,231	January 1992	= 29,596	January 1993	= 31,829
September 1991	= 29,772	February 1992	= 30,540	February 1993	= 25,770
October 1991	= 31,361	March 1992	= 31,274	March 1993	= 28,028
November 1991	= 27,187	April 1992	= 31,162	April 1993	= 29,075
December 1991	= 31,677	May 1992	= 30,410	May 1993	= 27,137
		June 1992	= 28,665	June 1993	= 27,640
		July 1992	= 31,354	July 1993	= 26,190
		August 1992	= 30,225		
		September 1992	= 30,020		
		October 1992	= 31,281		
		November 1992	= 31,053		
		December 1992	= 33,266		

X. FUEL GAS ANALYSIS:

Enclosed please find the fuel gas analysis for Unocal, Coalinga Nose Unit, during the periods in which the ERC applications are based.

XI. EMISSIONS CALCULATIONS:

See attachment.

NATURAL GAS FIRED TURBINES, 4TH QUARTER AVERAGE

=====

TOTAL FUEL USE(SCF/HR)=	37926
H2S CONCENTRATION IN FUEL(PPMV)=	0
HOW MANY ENGINES AT THIS SITE?	3

LIST HORSEPOWER RATING FOR EACH ENGINE.

- 1 1150 HORSEPOWER
- 2 1150 HORSEPOWER
- 3 1150 HORSEPOWER
- 4 HORSEPOWER
- 5 HORSEPOWER
- 6 HORSEPOWER
- 7 HORSEPOWER

ALL EMISSION FACTORS FROM EPA PUBLICATION AP-42, TABLE 3.2-1

CALCULATION

=====

$$\text{SO}_2 = 1.7 \times 10^{-7} * \text{FUEL USE/HR} * \text{PPMV H}_2\text{S IN FUEL}$$

= 0 LB/HR

$$\text{NOX} = 300 \text{ LB/MMCF} * \text{MMCF/HR FUEL USE}$$

= 11.3778 LB/HR

$$\text{NMHC} = 23 \text{ LB/MMCF} * \text{MMCF/HR FUEL USE}$$

= 0.872298 LB/HR

$$\text{CO} = 120 \text{ LB/MMCF} * \text{MMCF/HR FUEL USE}$$

= 4.55112 LB/HR

$$\text{PM} = 2.5 \text{ LB/MMCF} * \text{MMCF/HR FUEL USE}$$

= 0.094815

*Manufacturers Efficiency < 25% per George
Folke*

NATURAL GAS FIRED TURBINES, 3RD QUARTER AVERAGE

=====

TOTAL FUEL USE(SCF/HR)= 41857
H2S CONCENTRATION IN FUEL(PPMV)= 0
HOW MANY ENGINES AT THIS SITE? 3

LIST HORSEPOWER RATING FOR EACH ENGINE.

- 1 1150 HORSEPOWER
- 2 1150 HORSEPOWER
- 3 1150 HORSEPOWER
- 4 HORSEPOWER
- 5 HORSEPOWER
- 6 HORSEPOWER
- 7 HORSEPOWER

ALL EMISSION FACTORS FROM EPA PUBLICATION AP-42, TABLE 3.2-1

CALCULATION

=====

$$\text{SO}_2 = 1.7 \times 10^{-7} * \text{FUEL USE/HR} * \text{PPMV H}_2\text{S IN FUEL}$$
$$= 0 \text{ LB/HR}$$

$$\text{NOX} = 300 \text{ LB/MMCF} * \text{MMCF/HR FUEL USE}$$
$$= 12.5571 \text{ LB/HR}$$

$$\text{NMHC} = 23 \text{ LB/MMCF} * \text{MMCF/HR FUEL USE}$$
$$= 0.962711 \text{ LB/HR}$$

$$\text{CO} = 120 \text{ LB/MMCF} * \text{MMCF/HR FUEL USE}$$
$$= 5.02284 \text{ LB/HR}$$

$$\text{PM} = 2.5 \text{ LB/MMCF} * \text{MMCF/HR FUEL USE}$$
$$= 0.104643$$

NATURAL GAS FIRED TURBINES, 2ND QUARTER AVERAGE

=====
TOTAL FUEL USE(SCF/HR)= 42392
H2S CONCENTRATION IN FUEL(PPMV)= 0
HOW MANY ENGINES AT THIS SITE? 3
LIST HORSEPOWER RATING FOR EACH ENGINE.

- 1 1150 HORSEPOWER
- 2 1150 HORSEPOWER
- 3 1150 HORSEPOWER
- 4 HORSEPOWER
- 5 HORSEPOWER
- 6 HORSEPOWER
- 7 HORSEPOWER

ALL EMISSION FACTORS FROM EPA PUBLICATION AP-42, TABLE 3.2-1

CALCULATION

=====
 $SO_2 = 1.7 \times 10^{-7} * \text{FUEL USE/HR} * \text{PPMV H}_2\text{S IN FUEL}$
= 0 LB/HR

$NOX = 300 \text{ LB/MMCF} * \text{MMCF/HR FUEL USE}$
= 12.7176 LB/HR

$NMHC = 23 \text{ LB/MMCF} * \text{MMCF/HR FUEL USE}$
= 0.975016 LB/HR

$CO = 120 \text{ LB/MMCF} * \text{MMCF/HR FUEL USE}$
= 5.08704 LB/HR

$PM = 2.5 \text{ LB/MMCF} * \text{MMCF/HR FUEL USE}$
= 0.10598

NATURAL GAS FIRED TURBINES, 1ST QUARTER AVERAGE

=====

TOTAL FUEL USE(SCF/HR)=	41857
H2S CONCENTRATION IN FUEL(PPMV)=	0
HOW MANY ENGINES AT THIS SITE?	3

LIST HORSEPOWER RATING FOR EACH ENGINE.

- 1 1150 HORSEPOWER
- 2 1150 HORSEPOWER
- 3 1150 HORSEPOWER
- 4 HORSEPOWER
- 5 HORSEPOWER
- 6 HORSEPOWER
- 7 HORSEPOWER

ALL EMISSION FACTORS FROM EPA PUBLICATION AP-42, TABLE 3.2-1

CALCULATION

=====

$$\text{SO}_2 = 1.7 \times 10^{-7} * \text{FUEL USE/HR} * \text{PPMV H}_2\text{S IN FUEL}$$
$$= 0 \text{ LB/HR}$$

$$\text{NOX} = 300 \text{ LB/MMCF} * \text{MMCF/HR FUEL USE}$$
$$= 12.5571 \text{ LB/HR}$$

$$\text{NMHC} = 23 \text{ LB/MMCF} * \text{MMCF/HR FUEL USE}$$
$$= 0.962711 \text{ LB/HR}$$

$$\text{CO} = 120 \text{ LB/MMCF} * \text{MMCF/HR FUEL USE}$$
$$= 5.02284 \text{ LB/HR}$$

$$\text{PM} = 2.5 \text{ LB/MMCF} * \text{MMCF/HR FUEL USE}$$
$$= 0.104643$$



(805) 765-2364
 FAX (805) 765-6920

LABORATORY REPORT
STATE CERT. # 1396

CUSTOMER: UNIOCAL - COALINGA
 ATTENTION: JIM BRIXEY

LOG #: 5931-1
 DATE IN: 11-19-92
 DATE COMPLETED: 11-20-92

SAMPLE DESCRIPTION: FUEL GAS - 34A
 COLLECTED ON 11-19-92
 ANALYTICAL PARAMETER: C6+

R E C E I V E D

DEC 11 1992

COALINGA

RESULTS:

CONSTITUENT	Mole %	Liq.Vol %	BTU/Cu.Ft.	Wt. %
Methane	90.765	86.843	918.54	83.561
Ethane	7.928	11.967	140.56	13.680
Propane	0.200	0.311	5.05	0.506
Iso-Butane.....	0.000	0.000	0.00	0.000
N-Butane	0.000	0.000	0.00	0.000
Iso-Pentane	0.000	0.000	0.00	0.000
N-Pentane	0.000	0.000	0.00	0.000
Hexanes Plus	0.000	0.000	0.00	0.000
Non-Hydrocarbons				
Carbon Dioxide	0.513	0.494	0.00	1.296
Hydrogen Sulfide ..	0.000	0.000	0.00	0.000
Nitrogen	0.584	0.361	0.00	0.939
Oxygen	0.010	0.023	0.00	0.018
TOTALS ..	100.000	100.000	1064.14	100.000

F... Factor: 8240.035 DSCF/MMBTU Real BTU: 1066.55 GPM ... 0.05493
 Z... Factor: 0.9977 Wet BTU: 1048.00 SP.GR. 0.60277

%C... 74.26 %H... 21.09 %O... 3.71 %N... 0.94 %S... 0.00

NOTES:

REFERENCES:

- BTU/Cu.Ft. dry 60/60 14.73 psia. 1.) ASTM- Calculating Calorific Value and Specific Gravity of Gaseous Fuels. ASTM-D 3586 1981.
- Specific Gravity dry 60/60 14.73 psia.
- 0.000 Values refer to less than minimum detection limit. 2.) ASTM- Analysis of Natural Gas by Gas Chromatography. ASTM-D 1945

Mayur Shah
 Laboratory Director

MIDWAY LABORATORY

PETROLEUM-INDUSTRY-AGRICULTURE
(805)765-2364

315 Main St. Taft, CA 93268
FAX (805)765-6920

LABORATORY REPORT

STATE CERT. # 1396

CUSTOMER: UNION OIL COALINGA.
ATTENTION: LAB.

LOG #: 4226-1
DATE IN: 09-19-91
DATE COMPLETED:
09/23/91
DATE OUT: 10-01-91

SAMPLE DESCRIPTION: FUEL GAS.

ANALYTICAL PARAMETER: C6+ GENERAL GAS ANALYSIS.

RESULTS:

CONSTITUENT	Mole %	Liq. Vol %	BTU/Cu.Ft.	Wt. %
Methane	92.193	88.892	932.99	85.682
Ethane	6.285	9.561	111.43	10.948
Propane	0.397	0.622	10.02	1.014
Iso-Butane.....	0.007	0.013	0.23	0.024
N-Butane	0.007	0.013	0.23	0.024
Iso-Pentane	0.000	0.000	0.00	0.000
N-Pentane	0.000	0.000	0.00	0.000
Hexanes Plus	0.028	0.066	1.33	0.140
Non-Hydrocarbons				
Carbon Dioxide	0.443	0.430	0.00	1.129
Carbon Monoxide ...	0.000	0.000	0.00	0.000
Hydrogen	0.000	0.000	0.00	0.000
Hydrogen Sulfide ..	0.000	0.000	0.00	0.000
Nitrogen	0.637	0.397	0.00	1.034
Oxygen	0.003	0.007	0.00	0.006
TOTALS ..	100.000	100.000	1056.23	100.000

F... Factor: 8325.768 DSCF/MMBTU Real BTU: 1058.56 GPM ... 17.39207
Z... Factor: 0.9978 Wet BTU: 1040.14 SP.GR. 0.59706

%C... 74.19 %H... 21.75 %O... 3.03 %N... 1.03 %S... 0.00

NOTES:

REFERENCES:

- BTU/Cu.Ft. dry 60/60 14.73 psia.
 - Specific Gravity dry 60/60 14.73 psia.
 - 0.000 Values refer to less than minimum detection limit.
- 1.) ASTM- Calculating Calorific Value and Specific Gravity of Gaseous Fuels. ASTM-D 3588 1981.
 - 2.) ASTM- Analysis of Natural Gas by Gas Chromatography. ASTM-D 1945

Maryann W. Benoit

Maryann W. Benoit
Laboratory Director

PETROLEUM - INDUSTRIAL - AGRICULTURE
315 Main St., P.O. Box 1151 Taft, CA 93268

LABORATORY REPORT
ELAP STATE CERT. #1396

CUSTOMER: Unocal
ATTENTION: Jim Brixey

LOG #: 5334-5
DATE IN: 06/05/92
DATE COMPLETED: 06/24/92

SAMPLE DESCRIPTION: Fuel/Coalinga
Collected on 6/5/92

ANALYTICAL PARAMETER: BTX&E

RESULTS:

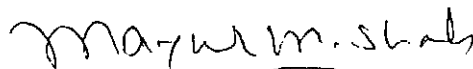
CONSTITUENT	mg/L	PQL mg/L	METHOD #
Benzene.....	0.14	0.005	8020
Toluene.....	0.08	0.005	8020
Ethyl Benzene...	0.42	0.005	8020
Xylene.....	1.89	0.005	8020
Total Volat. Aromatics.	2.53		

NOTES:

- 1.) NA=Not applicable
- 2.) *=Repeated and confirmed
- 3.) N.D.=None detected -Constituent if present would be less than the practical quantitation limit (PQL).

REFERENCES:

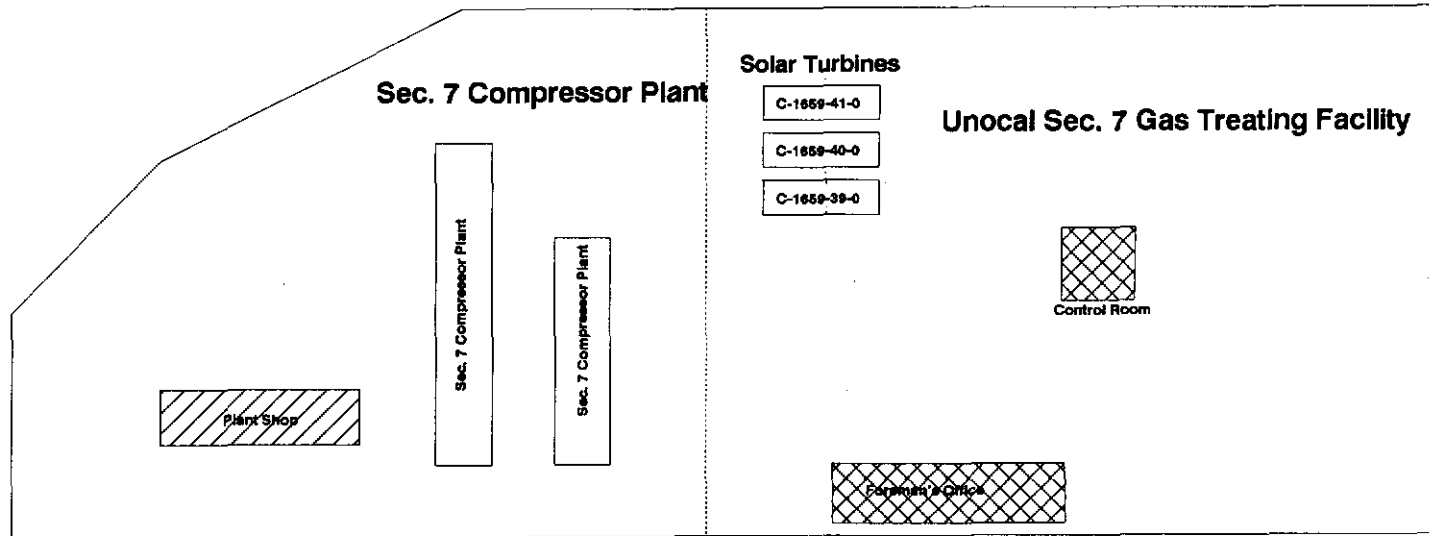
- 1.) APHA-AWWA-WPCF, "Standard Methods for the Examination of Water and Wastewater" copyright 1985.
- 2.) EPA, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", U.S. EPA SW-846, 1987 Edition.



Mayur M. Shah
Laboratory Director

North

Section 7



Calaveras Avenue

Palmer Ave. 1/2 mile to the North

Section 12

Unocal
Coalinga Nose Unit
Sec. 7 Gas Treating Facility
Application for Solar Turbines
Emission Reduction Credit

AIR POLLUTION CONTROL DISTRICT FEES

FACILITY I.D. # 1659

LOCATION: Natural Gas Production, Fresno County

BILLING FOR: FILING FEES

BILLING DATE: June 8, 1994

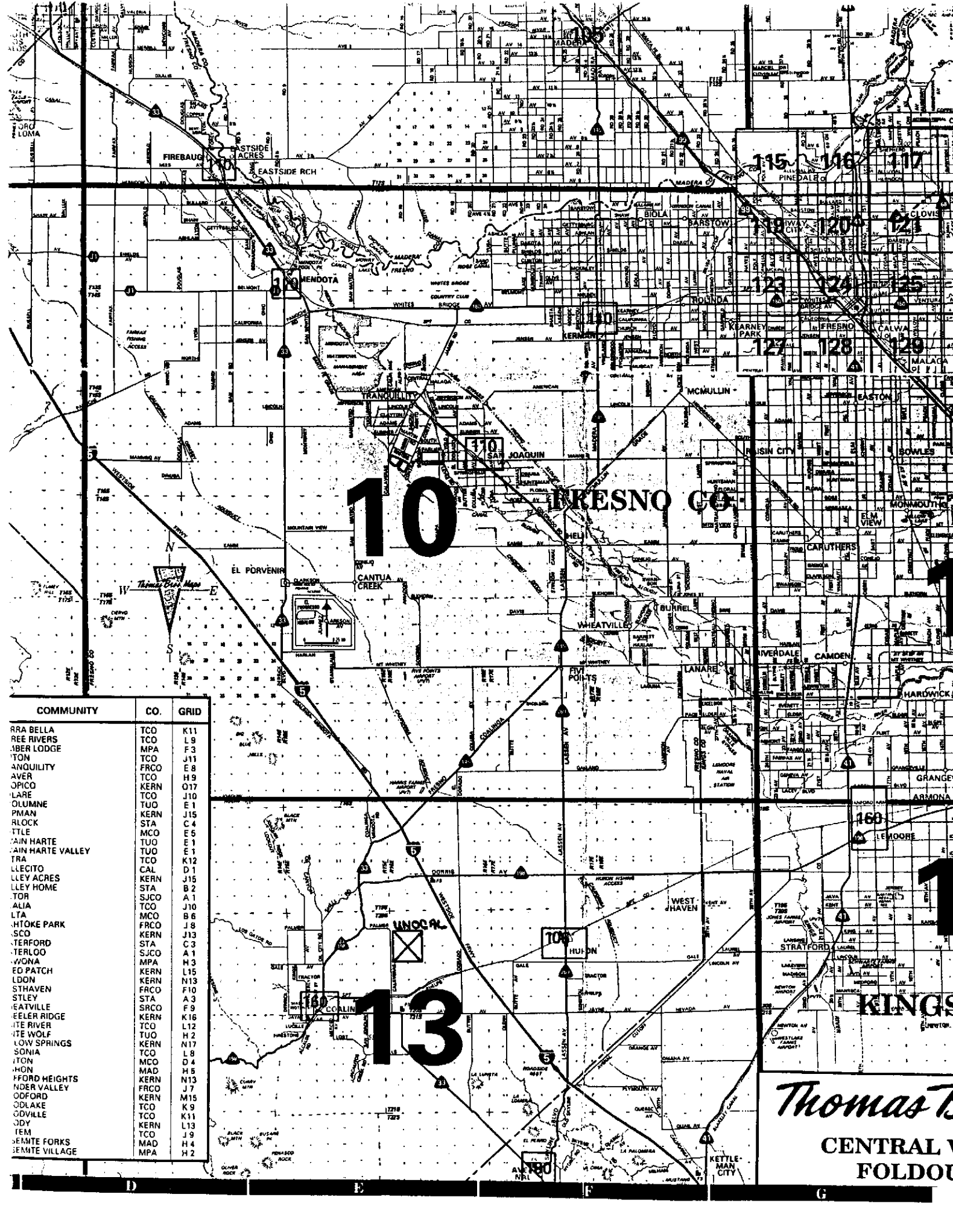
TOTAL FEES	\$	650.00
CREDIT	\$	<u>180.00</u>
BALANCE DUE	\$	470.00

THE ABOVE TOTALS ARE BASED ON THE FOLLOWING ITEMIZED LISTING

APPLICATION	FEE	DESCRIPTION
C-1659-68-0	650.00	Emission Reduction Credit for Shut Down of Three Gas Turbines

PLEASE RETURN A COPY OF THIS BILL WITH THE AMOUNT DUE WITHIN 30 DAYS TO:

SAN JOAQUIN VALLEY UNIFIED APCD
1999 Tuolumne Street, Suite 200
Fresno, CA 93721



COMMUNITY	CO.	GRID
ARRA BELLA	TCO	K11
BER RIVERS	TCO	L9
BER LODGE	MPA	F3
TON	TCO	J11
ANQUILITY	FRCO	E8
AVER	TCO	H9
OPICO	KERN	O17
LARE	TCO	J10
OLUMNE	TUO	E1
PMAN	KERN	J15
LOCK	STA	C4
TILE	MCO	E5
AIN HARTE	TUO	E1
AIN HARTE VALLEY	TUO	E1
TRA	TCO	K12
LECITO	CAL	D1
LEY ACRES	KERN	J15
LEY HOME	STA	B2
TOR	SJCO	A1
ALIA	TCO	J10
HTOKE PARK	MCO	B6
SCO	FRCO	J8
TERFORD	KERN	J13
TERLOO	STA	C3
WONA	SJCO	A1
MPA	MPA	H3
ED PATCH	KERN	L15
LDON	KERN	N13
STHAVEN	FRCO	F10
STLEY	STA	A3
EATVILLE	SRCO	F9
EELER RIDGE	KERN	K16
ITE RIVER	TCO	L12
ITE WOLF	TUO	H2
LOW SPRINGS	KERN	N17
SONIA	TCO	L8
ITON	MCO	D4
IFORD HEIGHTS	MAD	H5
NDER VALLEY	KERN	N13
DOFORD	FRCO	J7
ODLAKE	KERN	M15
ODVILLE	TCO	K9
ODDY	TCO	K11
TEM	KERN	L13
EMITE FORKS	TCO	J9
EMITE VILLAGE	MAD	H4
	MPA	H2

Thomas B
CENTRAL VA
FOLDOUT



San Joaquin Valley
Unified Air Pollution Control District

PERMIT TO OPERATE

PERMIT NO: C-1659-41-0

EXPIRATION DATE: 03/31/1998

LEGAL OWNER OR OPERATOR: UNOCAL CORPORATION

MAILING ADDRESS: P.O. BOX 1074

COALINGA, CA 93210

LOCATION: GAS PRODUCTION, FRESNO COUNTY SECTION 7 TOWNSHIP 19S RANGE 15E

EQUIPMENT DESCRIPTION:

36.2 MMBTU/HR SOLAR/SATURN NATURAL GAS FIRED GAS TURBINE CTO DRIVE A 1150 HP GAS COMPRESSOR.

CONDITIONS

1. No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is dark or darker than Ringelmann 1 or equivalent to 20% opacity.
2. Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration.
3. Natural gas consumption rate shall not exceed 826,500 scf per day.
4. Equipment may only be fueled by natural gas.
5. Emissions shall not exceed 248 lb NOx/day (10.33 lb/hr), 99.2 lb CO day (4.13 lb/hr), nor 19.0 lb VOC/day (0.80 lb/hr).
6. A record of daily fuel consumption shall be maintained, retained on the premises for a period of at least two years and made available for District inspection upon request.

This Permit to Operate remains valid through the permit expiration date listed above, subject to payment of annual permit fees and compliance with permit conditions and all applicable local, state, and federal regulations. This permit is valid only at the location specified above, and becomes void upon any transfer of ownership or location. Any modification of the equipment or operation, as defined in District Rule 2201, will require a new permit. This permit shall be posted as prescribed in District Rule 2010.

DAVID L. CROW

Executive Director/APCO

Central Regional Office * 1999 Tuolumne, Suite 200 * Fresno, California 93721 * (209)497-1000 * FAX (209) 233-2203

1995.9.11 - KEAST



San Joaquin Valley
Unified Air Pollution Control District

PERMIT TO OPERATE

PERMIT NO: C-1659-40-0

EXPIRATION DATE: 03/31/1998

LEGAL OWNER OR OPERATOR: UNOCAL CORPORATION
MAILING ADDRESS: P.O. BOX 1074
COALINGA, CA 93210

LOCATION: GAS PRODUCTION, FRESNO COUNTY SECTION 7 TOWNSHIP 19S RANGE 15E

EQUIPMENT DESCRIPTION:

36.2 MM BTU/HR SOLAR/SATURN NATURAL GAS FIRED TURBINE B TO DRIVE A 1150 HP GAS COMPRESSOR.

CONDITIONS

1. No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is dark or darker than Ringelmann 1 or equivalent to 20% opacity.
2. Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration.
3. Natural gas consumption rate shall not exceed 826,500 scf per day.
4. Equipment may only be fueled by natural gas.
5. Emissions shall not exceed 248 lb NO_x/day (10.33 lb/hr), 99.2 lb CO day (4.13 lb/hr), nor 19.0 lb VOC/day (0.80 lb/hr).
6. A record of daily fuel consumption shall be maintained, retained on the premises for a period of at least two years and made available for District inspection upon request.

This Permit to Operate remains valid through the permit expiration date listed above, subject to payment of annual permit fees and compliance with permit conditions and all applicable local, state, and federal regulations. This permit is valid only at the location specified above, and becomes void upon any transfer of ownership or location. Any modification of the equipment or operation, as defined in District Rule 2201, will require a new permit. This permit shall be posted as prescribed in District Rule 2010.

DAVID L. CROW

Executive Director/APCO

Central Regional Office * 1999 Tuolumne, Suite 200 * Fresno, California 93721 * (209)497-1000 * FAX (209) 233-2203

1999-11-11 REAST



San Joaquin Valley
Unified Air Pollution Control District

PERMIT TO OPERATE

PERMIT NO: C-1659-39-0

EXPIRATION DATE: 03/31/1998

LEGAL OWNER OR OPERATOR: UNOCAL CORPORATION
MAILING ADDRESS: P.O. BOX 1074
COALINGA, CA 93210

LOCATION: GAS PRODUCTION, FRESNO COUNTY

EQUIPMENT DESCRIPTION:

36.2 MM BTU/HR SOLAR/SATURN NATURAL GAS FIRED TURBINE A TO DRIVE A 1150 HP GAS COMPRESSOR.

CONDITIONS

1. No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is dark or darker than Ringelmann 1 or equivalent to 20% opacity.
2. Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration.
3. Natural gas consumption rate shall not exceed 826,500 scf per day.
4. Equipment may only be fueled by natural gas.
5. Emissions shall not exceed 248 lb NO_x/day (10.33 lb/hr), 99.2 lb CO day (4.13 lb/hr), nor 19.0 lb VOC/day (0.80 lb/hr).
6. A record of daily fuel consumption shall be maintained, retained on the premises for a period of at least two years and made available for District inspection upon request.

This Permit to Operate remains valid through the permit expiration date listed above, subject to payment of annual permit fees and compliance with permit conditions and all applicable local, state, and federal regulations. This permit is valid only at the location specified above, and becomes void upon any transfer of ownership or location. Any modification of the equipment or operation, as defined in District Rule 2201, will require a new permit. This permit shall be posted as prescribed in District Rule 2010.

DAVID L. CROW

Executive Director/APCO

Central Regional Office * 1999 Tuolumne, Suite 200 * Fresno, California 93721 * (209)497-1000 * FAX (209) 233-2203

1993-9-11 -- KEAST

AIR POLLUTION CONTROL DISTRICT FEES

FACILITY I.D. # 1659

LOCATION: Natural Gas Production, Fresno County

BILLING FOR: FILING FEES

BILLING DATE: June 8, 1994

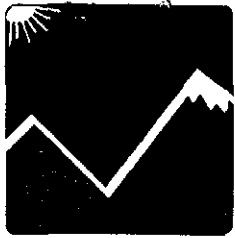
TOTAL FEES	\$	650.00
CREDIT	\$	<u>180.00</u>
BALANCE DUE	\$	470.00

THE ABOVE TOTALS ARE BASED ON THE FOLLOWING ITEMIZED LISTING

APPLICATION	FEE	DESCRIPTION
C-1659-68-0	650.00	Emission Reduction Credit for Shut Down of Three Gas Turbines

PLEASE RETURN A COPY OF THIS BILL WITH THE AMOUNT DUE WITHIN 30 DAYS TO:

SAN JOAQUIN VALLEY UNIFIED APCD
1999 Tuolumne Street, Suite 200
Fresno, CA 93721



San Joaquin Valley
Unified Air Pollution Control District

June 12, 1996

George N. Folks, Jr.
Unocal
P.O. Box 1074
Coalinga, CA 93210

RE: Notice of Final Action - Emissions Reduction Credit Certificates
Project #950579

Dear Mr. Folks:

The District has made its Final Decision to issue Emission Reduction Credit Certificates to Unocal for the shutdown of three natural gas fired turbines located on Calaveras Ave, SW 1/4 Sec 7, T19s, R16e, Coalinga, CA. Certificate #'s C-0110-1, C-0110-2, and C-0110-3 are enclosed.

Also enclosed is a copy of the Notice of Final Action which will be published approximately three days from the date of this letter. All relevant comments received within the 30-day public comment period have been addressed and incorporated into the application review.

Thank you for your cooperation in this matter. Should you have any questions, please contact David Warner, Permit Services Manager - Central Region at (209) 497-1100.

Sincerely,

Seyed Sadredin
Director of Permit Services

JR/ad

Enclosures

Certified Mail # Z 198 113 806

c: David Warner, Permit Services Manager - Central Region

David L. Crow

Executive Director/ Air Pollution Control Officer

1999 Tuolumne Street, Suite 200 Fresno, CA 93721 • (209) 497-1000 • FAX (209) 233-2057

Northern Region

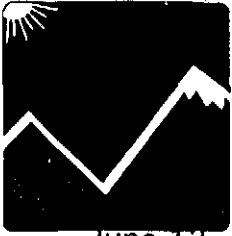
4000 Washington Avenue, Suite 130 • Modesto, CA 95356
(209) 545-7000 • FAX (209) 545-8652

Central Region

1999 Tuolumne Street, Suite 200 • Fresno, CA 93721
(209) 497-1000 • FAX (209) 233-2057

Southern Region

2700 M Street, Suite 275 • Bakersfield, CA 93311
(805) 862-5200 • FAX (805) 862-5201



San Joaquin Valley
Unified Air Pollution Control District

June 12, 1996

Raymond Menebroker, Chief
Project Assessment Branch
Stationary Source Division
California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812-2815

**RE: Notice of Final Action - Emission Reduction Credit Certificates
Project #950579**

Dear Mr. Menebroker:

The District has made its Final Decision to issue Emission Reduction Credit Certificates to Unocal for the shutdown of three natural gas fired turbines located on Calaveras Ave, SW 1/4 Sec 7, T19s, R16e, Coalinga, CA. Copies of Certificate #'s C-0110-1, C-0110-2, and C-0110-3 are enclosed.

Also enclosed is a copy of the Notice of Final Action which will be published approximately three days from the date of this letter. All relevant comments received within the 30-day public comment period have been addressed and incorporated into the application review.

Thank you for your cooperation in this matter. Should you have any questions, please contact David Warner, Permit Services Manager - Central Region at (209) 497-1100.

Sincerely,

Seyed Sadredin
Director of Permit Services

JR/ad

Enclosures

c: David Warner, Permit Services Manager - Central Region

David L. Crow

Executive Director/ Air Pollution Control Officer

1999 Tuolumne Street, Suite 200 Fresno, CA 93721 • (209) 497-1000 • FAX (209) 233-2057

Northern Region

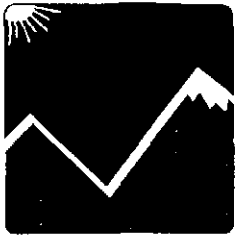
127 Sherman Avenue, Suite 130 • Modesto, CA 95356
(209) 545-7000 • FAX (209) 545-8652

Central Region

1999 Tuolumne Street, Suite 200 • Fresno, CA 93721
(209) 497-1000 • FAX (209) 233-2057

Southern Region

2700 M Street, Suite 275 • Bakersfield, CA 93307
(805) 862-5200 • FAX (805) 862-5201



San Joaquin Valley
Unified Air Pollution Control District

June 12, 1996

Ken Bigos, Chief
New Source Section
U.S. E.P.A. - Region IX
75 Hawthorne Street
San Francisco, CA 94105

**RE: Notice of Final Action - Emission Reduction Credit Certificates
Project #950579**

Dear Mr. Bigos:

The District has made its Final Decision to issue Emission Reduction Credit Certificates to Unocal for the shutdown of three natural gas fired turbines located on Calaveras Ave, SW 1/4 Sec 7, T19s, R16e, Coalinga, CA. Copies of Certificate #'s C-0110-1, C-0110-2, and C-0110-3 are enclosed.

Also enclosed is a copy of the Notice of Final Action which will be published approximately three days from the date of this letter. All relevant comments received within the 30-day public comment period have been addressed and incorporated into the application review.

Thank you for your cooperation in this matter. Should you have any questions, please contact David Warner, Permit Services Manager - Central Region at (209) 497-1100.

Sincerely,

Seyed Sadredin
Director of Permit Services

JR/ad

Enclosures

c: David Warner, Permit Services Manager - Central Region

David L. Crow

Executive Director/ Air Pollution Control Officer

1999 Tuolumne Street, Suite 200 Fresno, CA 93721 • (209) 497-1000 • FAX (209) 233-2057

Northern Region

1230 K Street, Suite 130 • Modesto, CA 95356
(209) 543-7000 • FAX (209) 545-8652

Central Region

1999 Tuolumne Street, Suite 200 • Fresno, CA 93721
(209) 497-1000 • FAX (209) 233-2057

Southern Region

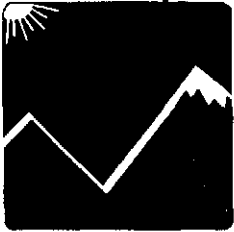
2700 M Street, Suite 275 • Bakersfield, CA 93307
(805) 862-5200 • FAX (805) 862-5200

Fresno Bee

**NOTICE OF FINAL ACTION
FOR THE ISSUANCE OF
EMISSION REDUCTION CREDIT CERTIFICATES**

NOTICE IS HEREBY GIVEN that the San Joaquin Valley Unified Air Pollution Control District has issued Emission Reduction Credit Certificate to Unocal for the shutdown of three natural gas fired turbines located on Calaveras Ave, SW 1/4 Sec 7, T19s, R16e, Coalinga, CA. The quantities of emission reduction are 6,993 lb of VOC/year; 45,257 lb of NOx/year; and 36,487 lb of CO/year.

The analysis of the regulatory basis for Project #950579, and of the resulting effect on ambient air quality, is available for public inspection at SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT, CENTRAL REGION, 1999 TUOLUMNE STREET, SUITE 200, FRESNO, CA 93721.



San Joaquin Valley
Unified Air Pollution Control District

Central Regional Office * 1999 Tuolumne St., Suite 200 * Fresno, CA 93721

Emission Reduction Credit Certificate
C-0110-1

Issued To: Union Oil of California dba UNOCAL
Issue Date: June 12, 1996

Location of Reduction: Calaveras Ave, SW 1/4 Sec 7, T19s, R16e,
Coalinga, CA

For VOC Reduction In The Amount Of:

Quarter 1	Quarter 2	Quarter 3	Quarter 4
1,581 lbs	1,748 lbs	1,909 lbs	1,755 lbs

Conditions Attached

Method Of Reduction

Shutdown of Entire Stationary Source

Shutdown of Emissions Unit

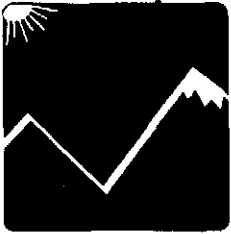
Other: Shutdown of three natural gas fired turbines (PTO #'s C-1659-39-0, C-1659-40-0, & C-1659-41-0).

David L. Crow, APCO

Seyed Sadredin
Director of Permit Services

6/12/96

Date



San Joaquin Valley
Unified Air Pollution Control District

Central Regional Office * 1999 Tuolumne St., Suite 200 * Fresno, CA 93721

Emission Reduction Credit Certificate
C-0110-3

Issued To: Union Oil of California dba UNOCAL
Issue Date: June 12, 1996

Location of Reduction: Calaveras Ave, SW 1/4 Sec 7, T19s, R16e,
Coalinga, CA

For CO Reduction In The Amount Of:

Quarter 1	Quarter 2	Quarter 3	Quarter 4
8,246 lbs	9,122 lbs	9,961 lbs	9,158 lbs

Conditions Attached

Method Of Reduction

- Shutdown of Entire Stationary Source
 Shutdown of Emissions Unit
 Other: Shutdown of three natural gas fired turbines (PTO #'s C-1659-39-0, C-1659-40-0, & C-1659-41-0).

David L. Crow, APCO

Seyed Sadredin
Director of Permit Services

6/12/96
Date



San Joaquin Valley
Unified Air Pollution Control District

Central Regional Office * 1999 Tuolumne St., Suite 200 * Fresno, CA 93721

Emission Reduction Credit Certificate
C-0110-2

Issued To: Union Oil of California dba UNOCAL
Issue Date: June 12, 1996

Location of Reduction: Calaveras Ave, SW 1/4 Sec 7, T19s, R16e,
Coalinga, CA

For NO_x Reduction In The Amount Of:

Quarter 1	Quarter 2	Quarter 3	Quarter 4
10,228 lbs	11,314 lbs	12,355 lbs	11,360 lbs

Conditions Attached

Method Of Reduction

Shutdown of Entire Stationary Source

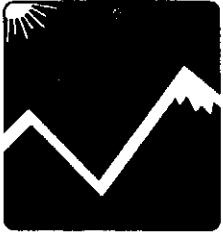
Shutdown of Emissions Unit

Other: Shutdown of three natural gas fired turbines (PTO #'s C-1659-39-0, C-1659-40-0, & C-1659-41-0).

David L. Crow, APCO

Seyed Sadredin
Director of Permit Services

6/12/96
Date



San Joaquin Valley
Unified Air Pollution Control District

April 26, 1996

George N. Folks, Jr.
Unocal
P.O. Box 1074
Coalinga, CA 93210

**Re: Preliminary Public Notice - Emission Reduction Credit Certificates
Project # 950579**

Dear Mr. Folks:

Enclosed for your review and comment is the District's revised analysis of Unocal's request for Emission Reduction Credits resulting from the shutdown of three natural gas fired turbines located on Calaveras Ave, SW 1/4 Sec 7, T19s, R16e, Coalinga, CA. The quantities of emission reduction are 6,993 lb of VOC/year; 45,257 lb of NOx/year; and 36,487 lb of CO/year.

Also enclosed is a copy of the Preliminary Public Notice for this project which will be published approximately three days from the date of this letter. Please submit your written comments on this project within the 30-day public comment period which begins on the date of publication of the public notice.

Thank you for your cooperation in this matter. Should you have any questions, please contact George Heinen of Permit Services at (209) 497-1100.

Sincerely,

Seyed Sadredin
Director of Permit Services

GAH
Enclosures

c: David Warner, Permit Services Manager - Central Region

David L. Crow
Executive Director/Air Pollution Control Officer

1239 Tolumne Street, Suite 200 • Fresno, CA 93721 • (209) 497-1000 • Fax: (209) 233-2057

Northern Region

4230 Kiernan Avenue, Suite 130 • Modesto, CA 95356
(209) 545-7000 • Fax (209) 545-8652

Central Region

1239 Tolumne Street, Suite 200 • Fresno, CA 93721
(209) 497-1000 • Fax (209) 233-2057

Southern Region

2700 W Street, Suite 275 • Bakersfield, CA 93301
(805) 561-3682 • Fax (805) 561-2140



San Joaquin Valley
Unified Air Pollution Control District

April 26, 1996

Ken Bigos, Chief
New Source Section
US EPA - Region IX
75 Hawthorne Street
San Francisco, CA 94105

**Re: Preliminary Public Notice - Emission Reduction Credit Certificates
Project # 950579**

Dear Mr. Bigos:

Enclosed for your review and comment is the District's revised analysis of Unocal's request for Emission Reduction Credits resulting from the shutdown of three natural gas fired turbines located on Calaveras Ave, SW 1/4 Sec 7, T19s, R16e, Coalinga, CA. The quantities of emission reduction are 6,993 lb of VOC/year; 45,257 lb of NOx/year; and 36,487 lb of CO/year.

Also enclosed is a copy of the Preliminary Public Notice for this project which will be published approximately three days from the date of this letter. Please submit your written comments on this project within the 30-day public comment period which begins on the date of publication of the public notice.

Thank you for your cooperation in this matter. Should you have any questions, please contact George Heinen of Permit Services at (209) 497-1100.

Sincerely,

Seyed Sadredin
Director of Permit Services

GAH

Enclosures

c: David Warner, Permit Services Manager - Central Region

David L. Crow
Executive Director/Air Pollution Control Officer

1999 Tolumne Street, Suite 200 • Fresno, CA 93721 • (209) 497-1000 • Fax: (209) 233-2057

Northern Region

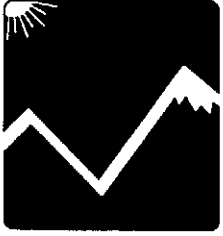
4230 Kiernan Avenue, Suite 130 • Modesto, CA 95356
(209) 545-7000 • Fax: (209) 545-8652

Central Region

1999 Tolumne Street, Suite 200 • Fresno, CA 93721
(209) 497-1000 • Fax: (209) 233-2057

Southern Region

2700 M Street, Suite 275 • Bakersfield, CA 93301
(805) 861-2642 • Fax: (805) 861-0160



San Joaquin Valley
Unified Air Pollution Control District

April 26, 1996

Raymond Menebroker, Chief
Project Assessment Branch
Stationary Source Division
California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812-2815

**Re: Preliminary Public Notice - Emission Reduction Credit Certificates
Project # 950579**

Dear Mr. Menebroker:

Enclosed for your review and comment is the District's revised analysis of Unocal's request for Emission Reduction Credits resulting from the shutdown of three natural gas fired turbines located on Calaveras Ave, SW 1/4 Sec 7, T19s, R16e, Coalinga, CA. The quantities of emission reduction are 6,993 lb of VOC/year; 45,257 lb of NOx/year; and 36,487 lb of CO/year

Also enclosed is a copy of the Preliminary Public Notice for this project which will be published approximately three days from the date of this letter. Please submit your written comments on this project within the 30-day public comment period which begins on the date of publication of the public notice.

Thank you for your cooperation in this matter. Should you have any questions, please contact George Heinen of Permit Services at (209) 497-1100.

Sincerely,

Seyed Sadredin
Director of Permit Services

GAH
Enclosures

c: David Warner, Permit Services Manager - Central Region
David L. Crow
Executive Director/Air Pollution Control Officer

1999 Tujumne Street, Suite 200 • Fresno, CA 93721 • (209) 497-1000 • FAX: (209) 233-2057

Northern Region

4230 Kernan Avenue, Suite 130 • Modesto, CA 95356
(209) 545-7000 • Fax (209) 545-6652

Central Region

1999 Tujumne Street, Suite 200 • Fresno, CA 93721
(209) 497-1000 • Fax (209) 233-2057

Southern Region

2700 M Street, Suite 275 • Bakersfield, CA 93311
(805) 861-3662 • Fax (805) 861-1060

Fresno Bee

**NOTICE OF PRELIMINARY DECISION
FOR THE PROPOSED ISSUANCE OF
EMISSION REDUCTION CREDIT CERTIFICATES**

NOTICE IS HEREBY GIVEN that the San Joaquin Valley Unified Air Pollution Control District solicits public comment on the proposed issuance of Emission Reduction Credit Certificates to Unocal for the shutdown of three natural gas fired turbines located on Calaveras Ave, SW 1/4 Sec 7, T19s, R16e, Coalinga, CA. The quantities of emission reduction are 6,993 lb of VOC/year; 45,257 lb of NOx/year; and 36,487 lb of CO/year.

The analysis of the regulatory basis for these certificates, and of the resulting effect on ambient air quality, is available for public inspection at the District office at the address below. Written comments on Project # 950579 must be submitted within 30 days of the publication date of this notice to SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT, CENTRAL REGION, 1999 TUOLUMNE STREET, SUITE 200, FRESNO, CA 93721.

ERC Application Evaluation

Project # 950579

Engineer: G.A. Heinen

Date: April 22, 1996

Facility: Union Oil Company of California DBA Unocal (Fac # 1659)
Address: P.O. Box 1074
Coalinga, CA 93210

Contact Name: George Folks, Jr
Phone: (209) 935-7225

Date Application Received: September 28, 1995

Date Deemed Complete: October 12, 1995

Note: This evaluation supersedes the evaluation dated January 16, 1996. During the public notice period, the applicant commented that the turbines had been improperly rated on the Permit to Operate (PTO). The PTO rating of 36.2 MMBtu/hr is incorrect and the engines are actually rated 1100 hp or approximately 13.3 MMBtu/hr. The revised rating changes the allowable emission factors for NOx and CO.

Also, Richard Miller, of the California Air Resource Board, commented that the stoichiometric calculations were incorrectly based on percent excess oxygen. District Rule 4703, Stationary Gas Turbines, bases emissions on the percent oxygen in the exhaust gas stream. Therefore, this revised evaluation recalculates the emission reduction credits based on the correct turbine emission factors and stoichiometric calculation.

I. SUMMARY:

The primary business of this facility is natural gas production, treatment and transportation. The applicant permanently shutdown three gas turbines, [Permits To Operate (PTO) C-1659-39-0, C-1659-40-0 and C-1659-41-0 (Appendix A)], and requests Emission Reduction Credit (ERC) certificates for the decreased emissions. The facility was formally shutdown on September 28, 1995 when the PTO were surrendered to the District, in accordance with District Policy NSR/ERC 7.

II. APPLICABLE RULES:

Rule 2301 - Emission Reduction Credit Banking (Adopted Sept 19, 1991; Last Amended Dec 17, 1992)

III. LOCATION OF REDUCTION:

Calaveras Ave, SW 1/4 Sec 7, Township 19S, Range 16E
Coalinga, CA

IV. METHOD OF GENERATING REDUCTION:

The facility was permitted to operate three natural gas-fired turbines to drive natural gas compressors. Emissions from each turbine were created from the combustion of natural gas fuel in the turbines. Unocal permanently ceased operation of this equipment and formally surrendered the PTOs with the application on September 28, 1995.

V. CALCULATIONS:

A. Assumptions and Emission Factors

The PTOs limit each turbine to 826,500 scf of natural gas per day. Each turbine was also limited to 248 lb NOx/day (10.33 lb/hr), 99.2 lb CO/day (4.13 lb/hr), and 19.0 lb VOC/day (0.80 lb/hr). These natural gas and emission limits produce the emission factors shown in Table 1.

Table 1: Emission Factor Calculations

Pollutant	Emission limit (lb/day)	Fuel Limit (kcf/day)	Emission Factor (lb/kcf)
NOx	248	826.5	0.300
CO	99.2	826.5	0.120
VOC	19.0	826.5	0.023

Note: Emissions of PM10 and SOx are negligible and ERC are not requested for these pollutants. Therefore, only the three pollutants indicated will be addressed by this analysis. These turbines have never been source tested but the calculated emission factors match those from AP-42 Table 3.2-1, Heavy Duty Natural Gas Fired Pipeline Compressor Engines, and are therefore considered valid.

Rule 2201, section 6.5, requires a 75% reduction of the Actual Emission Reduction (AER) for early implementation of a Best Available Retrofit Control Technology (BARCT) requirement. This project does not meet the definition of early implementation (section 3.2.2), which requires the ERC application to be deemed complete before the regulatory measure is placed on the annual list of control measures scheduled. In this case, the application was deemed complete on October 12, 1995 which is after the last amendment of Rule 4703 on March 16, 1995. Based on the above, this is not an early implementation of a BARCT requirement and therefore the reductions must be fully discounted as required by Rule 4703, section 5.3.1.

The turbines are each rated at 1100 hp each which converts to a MW rating of

$$\begin{aligned} \text{MW} &= 1,100 \text{ hp} \times 0.746 \text{ kW/hp} \times 1 \text{ MW}/1,000 \text{ kW} \\ &= 0.82 \text{ MW} \end{aligned}$$

Rule 4703, section 5.3.1 limits ERC for 1100 hp Solar Saturn turbines to NOx reductions below those emissions indicated in section 5.1.1. For a turbine rated from 0.3 to 10.0 MW, the required emission limit is 42 ppm NOx @ 15% oxygen (for gas firing). Per section 5.2, the CO limit is 250 ppm CO @ 15% oxygen.

Therefore, only reductions below these levels will be eligible for banking.

B. Baseline Period Determination and Data

The baseline period may consist of either two years immediately preceding the submission of a complete application or at least two consecutive years within the five years prior to that date if deemed more representative of "normal source operations" (Rule 2201, section 3.7). The application was received September 28, 1995, so the five-year period runs from September 28, 1990 to September 28, 1995.

The applicant provided the fuel use data shown in Appendix B. Using this data, the annual fuel use average from 1992 to 1987 is 324,169,333 scf of natural gas/year.

It is reasonable to use the multiple-year average to represent normal source operations. The 1993 data was not included in the calculations since it represents only a partial year's fuel use, and is therefore not representative of normal source operations.

The baseline period which most closely matches the normal source operations is from October 1, 1990 to September 30, 1992. For that period, the average fuel use is 337,840,000 scf/year.

The PTO limits each turbine to 826,500 scf/day. This is equals an annual permitted fuel use limit of

$$\begin{aligned} \text{PTO fuel} &= 3 \text{ turbines} \times 826,500 \text{ scf/day/turbine} \times 365 \text{ days/year} \\ &= 905,017,500 \text{ scf/year} \end{aligned}$$

Therefore, the calculated average actual annual fuel use of 337,840,000 is less than the permitted level and will be used for the Historical Actual Emissions calculations.

C. Historical Actual Emissions (HAE)

Historical Actual Emissions are emissions having actually occurred and are calculated using process data and recognized emission factors (Rule 2201 section 6.2.1). In this case, the actual annual fuel usage is multiplied by the emission limits or factor calculated in Section V.A.

1. Assumptions:

- a. As shown in Appendix C, for every cubic foot of natural gas burned, the amount of exhaust air, at 15% excess O₂, is found to be

$$\text{Exhaust(dry)} = 29.8 \text{ cf total exhaust air}$$

- b. Atmospheric pressure (P) = 14.7 lbf/si x 144 si/sf
= 2,117 lbf/sf

- c. Molecular weight (MW) of NO_x = 46 lb/lb-mol
Molecular weight (MW) of CO = 28 lb/lb-mol

2. VOC emission calculation:

Using the emission factor from Table 1, annual VOC emissions are

$$\begin{aligned} \text{HAE(VOC)} &= 337,840,000 \text{ cf/yr} \times 0.023 \text{ lb VOC/1,000 cf} \\ &= 7,770 \text{ lb VOC/year.} \end{aligned}$$

3. NOx emission calculation:

The annual NOx emissions are based on the allowable exhaust concentration limit of 42 ppm NOx. In this case, the volume of exhaust is equal to 29.8 times the volume of gaseous fuel supplied. This produces a NOx volume of

$$\begin{aligned} \text{NOx} &= (337,840,000 \text{ cf}_{\text{nat gas}}/\text{yr}) \times (29.8 \text{ cf}_{\text{exhaust}}/\text{cf}_{\text{nat gas}}) \\ &\quad \times 0.000042 \text{ cf}_{\text{NOx}}/\text{cf}_{\text{exhaust}} \\ &= 422,840 \text{ cf}_{\text{NOx}}/\text{year} \end{aligned}$$

The mass of the gas (m) can be found by using the Ideal Gas Law, (PV = nRT); setting n = m/MW; and solving for m. This produces

$$\begin{aligned} m &= P \times V \times \text{MW} / (R \times T) \\ &= \frac{2,117 \text{ lbf/sf} \times 422,840 \text{ cf/yr} \times 46 \text{ lb/lb-mol}}{(1,545 \text{ lbf-ft/lb-mol degrees R}) \times 530 \text{ degrees R}} \\ &= 50,286 \text{ lb NOx/year} = \text{HAE}(\text{NOx}) \end{aligned}$$

The PTO NOx emission factor from Table 1 is 0.300 lb NOx/kcf. The calculated emission of 50,286 lb NOx/yr for 337,840 kcf of natural gas is equivalent to 0.149 lb NOx/kcf. The calculated emissions, based on Rule 4703, are less than the permitted NOx emission level and are valid for ERC calculation purposes.

4. CO emission calculation

The annual CO emissions are based on the allowable exhaust concentration limit of 250 ppm CO. In this case, the volume of exhaust is equal to 29.8 times the volume of gaseous fuel supplied. This produces a CO volume of

$$\begin{aligned} \text{CO} &= (337,840,000 \text{ cf}_{\text{nat gas}}/\text{yr}) \times (29.8 \text{ cf}_{\text{exhaust}}/\text{cf}_{\text{nat gas}}) \\ &\quad \times 0.000250 \text{ cf}_{\text{CO}}/\text{cf}_{\text{exhaust}} \\ &= 2,516,908 \text{ cf}_{\text{CO}}/\text{year} \end{aligned}$$

The mass of the gas (m) can be found by using the Ideal Gas Law, (PV = nRT); setting n = m/MW; and solving for m. This produces

$$\begin{aligned} m &= P \times V \times \text{MW} / (R \times T) \\ &= \frac{2,117 \text{ lbf/sf} \times 2,516,908 \text{ cf/yr} \times 28 \text{ lb/lb-mol}}{(1,545 \text{ lbf-ft/lb-mol degrees R}) \times 530 \text{ degrees R}} \\ &= 182,197 \text{ lb CO/year} = \text{HAE}(\text{CO}) \end{aligned}$$

The PTO CO emission factor from Table 1 is 0.120 lb CO/kcf. The calculated emission of 182,197 lb CO/yr for 337,840 kcf of natural gas is equivalent to 0.539 lb CO/kcf. The calculated emission factor, based on Rule 4703, is higher than the permitted emission factor and produces a calculated HAE(CO) greater than the permitted CO emission level. Therefore, the PTO emission factor shall be used for ERC calculation purposes.

Recalculating with the PTO emission factor and the actual average gas usage produces a HAE(CO) of

$$\begin{aligned} \text{HAE (CO)} &= 0.120 \text{ lb CO/kcf} \times 337,840 \text{ kcf/yr} \\ &= 40,541 \text{ lb CO/year} \end{aligned}$$

This amount shall be used for ERC calculation purposes.

D. Actual Emission Reductions (AER)

Per Rule 2201, section 6.5.2, the actual emissions reductions due to shutdown of the permit units is

$$\text{AER} = \text{HAE (for the units prior to shutdown)}$$

E. Air Quality Improvement Deduction (AQID)

On-site AERs which are to be banked must be reduced by a 10% the air quality improvement deduction (Rule 2201, section 6.5).

$$\begin{aligned} \text{AQID(VOC)} &= 7,770 \text{ lb/year} \times 0.1 = 777 \text{ lb/year} \\ \text{AQID(NO}_x\text{)} &= 50,286 \text{ lb/year} \times 0.1 = 5,029 \text{ lb/year} \\ \text{AQID(CO)} &= 40,541 \text{ lb/year} \times 0.1 = 4,054 \text{ lb/year} \end{aligned}$$

F. Adjustments to AER

Since the project is due to the shutdown of this equipment, there were no increased emissions associated with this action so no adjustments are required to the AER, other than those required by Rule 4703, as presented in the calculations section. The facility has no other ERC which would affect the AER.

G. Bankable Emission Reduction Credits

The final ERC amounts are equal to the calculated actual emission reductions minus the air quality improvement deduction:

$$\text{ERC} = \text{AER} - \text{AQID}$$

$$\text{ERC(VOC)} = 7,770 \text{ lb/year} - 777 \text{ lb/year} = 6,993 \text{ lb/year}$$

$$\text{ERC(NOx)} = 50,286 \text{ lb/year} - 5,209 \text{ lb/year} = 45,257 \text{ lb/year}$$

$$\text{ERC(CO)} = 40,541 \text{ lb/year} - 4,054 \text{ lb/year} = 36,487 \text{ lb/year}$$

These credits are based on fuel consumption which varies by calendar quarter. Using baseline data to obtain a ratio of average fuel per quarter to total annual fuel produces the following factors:

$$\text{Q1: } [(91,410,000 + 61,236,000)/2] / 337,840,000 = 0.226$$

$$\text{Q2: } [(90,237,000 + 78,827,000)/2] / 337,840,000 = 0.250$$

$$\text{Q3: } [(91,599,000 + 93,034,000)/2] / 337,840,000 = 0.273$$

$$\text{Q4: } [(90,225,000 + 79,111,000)/2] / 337,840,000 = 0.251$$

Applying these ratios to the annual ERC amounts and correcting for rounding errors produces the ERC quarterly distribution shown in Table 2:

Table 2: ERC Distribution By Quarter

Quarter	ERC factor	VOC (lb/qtr)	NOx (lb/qtr)	CO (lb qtr)
Q1	0.226	1,581	10,228	8,246
Q2	0.250	1,748	11,314	9,122
Q3	0.273	1,909	12,355	9,961
Q4	0.251	1,755	11,360	9,158
Total (lb/yr)		6,993	45,257	36,487

VI. COMPLIANCE:

To comply with the definition of Actual Emissions Reductions (Rule 2201, section 3.2.1) the reductions must be:

Real - The emissions reductions were generated by the shutdown of fuel burning equipment. The equipment has been removed from service and is in the process of being sold. Emission reductions were calculated from actual fuel use data, recognized emission factors, and current Rule 4703 emission limits. Therefore, the reductions are real.

Surplus - Rule 4703 requires emissions from these turbines to be no greater than 42 ppm NOx and 250 ppm CO, and the emissions reductions have been adjusted accordingly. Shutdown of the turbines was voluntary and not required by any law, rule, agreement, or regulation. The emission reduction credits were not used for the approval of an Authority to Construct or as offsets. Therefore, the emissions reductions, as adjusted, are surplus.

Permanent - The turbines have been shutdown and the PTOs have been surrendered. Further operations cannot legally occur without a PTO. Therefore, the reductions are permanent.

Quantifiable - Reduction amounts were calculated from historic fuel use data, PTO emission factors, Rule 4703 emission limits, and with methods according to District Rule 2201. Therefore, the emissions are quantifiable.

Enforceable - The PTOs for these units have been surrendered and they cannot be operated without valid PTOs. Therefore, the reductions are enforceable.

Timely submittal - Rule 2301, section 5.5 requires application submittal within 180 days of the emission reduction. The ERC application was received September 28, 1995. That is also the date on which the permits were surrendered. Although the equipment has been idle, the permits were kept current and the turbines remained operable prior to the date of the application. The date of reduction is therefore the date of the surrender of the permits pursuant to District Policy NSR/ERC 7. Therefore, the application is timely.

Adjustments for RACT and BARCT: The emissions have been adjusted to comply with the BARCT emission requirements of Rule 4703.

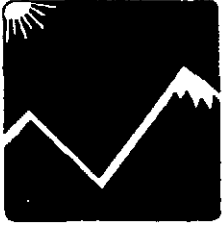
VII. RECOMMENDATION:

Recommend, based on the analysis above, that an Emission Reduction Credit Certificate be issued to UNOCAL in the amounts as shown in Table 2.

Appendices

- A - Permits To Operate
- B - Annual Fuel Use Data
- C - Stoichiometric Calculations

Appendix A



San Joaquin Valley
Unified Air Pollution Control District

PERMIT TO OPERATE

PERMIT NO: C-1659-41-0

EXPIRATION DATE: 03/31/1998

LEGAL OWNER OR OPERATOR: UNOCAL CORPORATION
MAILING ADDRESS: P.O. BOX 1074
COALINGA, CA 93210

LOCATION: GAS PRODUCTION, FRESNO COUNTY SECTION 7 TOWNSHIP 19S RANGE 15E

EQUIPMENT DESCRIPTION:

36.2 MMBTU/HR SOLAR/SATURN NATURAL GAS FIRED GAS TURBINE CTO DRIVE A 1150 HP GAS COMPRESSOR.

CONDITIONS

1. No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is dark or darker than Ringelmann 1 or equivalent to 20% opacity.
2. Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration.
3. Natural gas consumption rate shall not exceed 826,500 scf per day.
4. Equipment may only be fueled by natural gas.
5. Emissions shall not exceed 248 lb NO_x/day (10.33 lb/hr), 99.2 lb CO day (4.13 lb/hr), nor 19.0 lb VOC/day (0.80 lb/hr).
6. A record of daily fuel consumption shall be maintained, retained on the premises for a period of at least two years and made available for District inspection upon request.

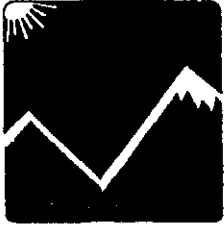
This Permit to Operate remains valid through the permit expiration date listed above, subject to payment of annual permit fees and compliance with permit conditions and all applicable local, state, and federal regulations. This permit is valid only at the location specified above, and becomes void upon any transfer of ownership or location. Any modification of the equipment or operation, as defined in District Rule 2201, will require a new permit. This permit shall be posted as prescribed in District Rule 2010.

DAVID L. CROW

Executive Director/APCO

Central Regional Office * 1999 Tuolumne, Suite 200 * Fresno, California 93721 * (209)497-1000 * FAX (209) 233-2203

1993-11-11-REBAYT



San Joaquin Valley
Unified Air Pollution Control District

PERMIT TO OPERATE

PERMIT NO: C-1659-40-0

EXPIRATION DATE: 03/31/1998

LEGAL OWNER OR OPERATOR: UNOCAL CORPORATION
MAILING ADDRESS: P.O. BOX 1074
COALINGA, CA 93210

LOCATION: GAS PRODUCTION, FRESNO COUNTY SECTION 7 TOWNSHIP 19S RANGE 15E

EQUIPMENT DESCRIPTION:
36.2 MM BTU/HR SOLAR/SATURN NATURAL GAS FIRED TURBINE B TO DRIVE A 1150 HP GAS COMPRESSOR.

CONDITIONS

1. No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is dark or darker than Ringelmann 1 or equivalent to 20% opacity.
2. Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration.
3. Natural gas consumption rate shall not exceed 826,500 scf per day.
4. Equipment may only be fueled by natural gas.
5. Emissions shall not exceed 248 lb NOx/day (10.33 lb/hr), 99.2 lb CO day (4.13 lb/hr), nor 19.0 lb VOC/day (0.80 lb/hr).
6. A record of daily fuel consumption shall be maintained, retained on the premises for a period of at least two years and made available for District inspection upon request.

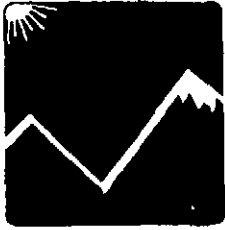
This Permit to Operate remains valid through the permit expiration date listed above, subject to payment of annual permit fees and compliance with permit conditions and all applicable local, state, and federal regulations. This permit is valid only at the location specified above, and becomes void upon any transfer of ownership or location. Any modification of the equipment or operation, as defined in District Rule 2201, will require a new permit. This permit shall be posted as prescribed in District Rule 2010.

DAVID L. CROW

Executive Director/APCO

Central Regional Office * 1999 Tuolumne, Suite 200 * Fresno, California 93721 * (209)497-1000 * FAX (209) 233-2203

1993-11-11-LEAST



San Joaquin Valley
Unified Air Pollution Control District

PERMIT TO OPERATE

PERMIT NO: C-1659-39-0

EXPIRATION DATE: 03/31/1998

LEGAL OWNER OR OPERATOR: UNOCAL CORPORATION
MAILING ADDRESS: P.O. BOX 1074
COALINGA, CA 93210

LOCATION: GAS PRODUCTION, FRESNO COUNTY

EQUIPMENT DESCRIPTION:

36.2 MM BTU/HR SOLAR/SATURN NATURAL GAS FIRED TURBINE A TO DRIVE A 1150 HP GAS COMPRESSOR.

CONDITIONS

1. No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is dark or darker than Ringelmann 1 or equivalent to 20% opacity.
2. Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration.
3. Natural gas consumption rate shall not exceed 826,500 scf per day.
4. Equipment may only be fueled by natural gas.
5. Emissions shall not exceed 248 lb NOx/day (10.33 lb/hr), 99.2 lb CO day (4.13 lb/hr), nor 19.0 lb VOC/day (0.80 lb/hr).
6. A record of daily fuel consumption shall be maintained, retained on the premises for a period of at least two years and made available for District inspection upon request.

This Permit to Operate remains valid through the permit expiration date listed above, subject to payment of annual permit fees and compliance with permit conditions and all applicable local, state, and federal regulations. This permit is valid only at the location specified above, and becomes void upon any transfer of ownership or location. Any modification of the equipment or operation, as defined in District Rule 2201, will require a new permit. This permit shall be posted as prescribed in District Rule 2010.

DAVID L. CROW

Executive Director/APCO

Central Regional Office * 1999 Tuolumne, Suite 200 * Fresno, California 93721 * (209)497-1000 * FAX (209) 233-2203

1999-01-11 - KEAST

Appendix B

ANNUAL FUEL USE DATA

(Total fuel, in 1,000 scf, used by the three turbines)

1995	idle
1994	idle
1993	195,669 (idle for five months)
1992	368,846
1991	323,322
1990	325,270
1989	302,372
1988	303,854
1987	321,352

No data is available for fuel use prior to 1987.

Total fuel used (1992 to 1987, inclusive): 1,945,016,000 scf

Average fuel use = 1,946,016,000 scf / 6 years

= 324,169,333 scf/year

MONTHLY FUEL USE DATA

(Total fuel, in 1,000 scf, used by the three turbines)

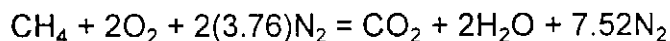
	<u>1993</u>	<u>1992</u>	<u>1991</u>	<u>1990</u>
January	31,829	29,596	22,450	
February	25,770	30,540	18,135	
March	<u>28,028</u>	<u>31,274</u>	<u>20,651</u>	
1st Qtr	85,627	91,410	61,236	
April	29,075	31,162	28,205	
May	27,137	30,410	24,793	
June	<u>27,640</u>	<u>28,665</u>	<u>25,829</u>	
2nd Qtr	83,852	90,237	78,827	
July	26,190	31,354	32,031	
August	idle	30,225	31,231	24,960
September	idle	<u>30,020</u>	<u>29,772</u>	<u>25,135</u>
3rd Qtr		91,599	93,034	
October	idle	31,281	31,361	25,596
November	idle	31,053	27,187	25,590
December	idle	<u>33,266</u>	<u>31,677</u>	<u>27,925</u>
4th Qtr		95,600	90,225	79,111

Appendix C

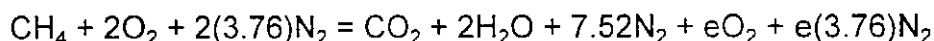
Stoichiometric Calculations

1. Assumptions:
 1. Natural gas is primarily methane, (CH₄)
 2. Ambient atmosphere consists of roughly 79% Nitrogen (N₂) to 21% Oxygen (O₂) or one mole of O₂ to every 3.76 moles of N₂.

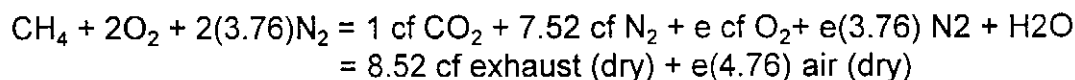
2. Stoichiometric combustion of natural gas:



3. Combustion of gas with "e" amount of excess oxygen in the exhaust



4. A cubic foot (cf) of natural gas burns to produce



5. The turbine emissions must be corrected to 15% oxygen (Rule 4703, section 5.1). This equates to

$$\begin{aligned}e &= 0.15 [\text{total exhaust}] \\ e &= 0.15 [8.52 \text{ cf exhaust (dry)} + e(4.76) \text{ air (dry)}] \\ e &= 1.278 + e(0.714) \\ e &= 4.47\end{aligned}$$

6. Therefore, at 15% oxygen, combustion of one cf of natural gas produces

$$\begin{aligned}\text{Exhaust(dry)} &= 8.52 \text{ cf exhaust} + 4.47 \text{ cf excess O}_2 + 4.47(3.76) \text{ cf excess N}_2 \\ &= 29.8 \text{ cf total exhaust air per cf of natural gas burned}\end{aligned}$$

SJVUAPCD

ATTN: FINANCE DEPARTMENT

1999 TUOLUMNE STREET #200

FRESNO, CA 93721

PROOF OF PUBLICATION

COUNTY OF FRESNO STATE OF CALIFORNIA

EXHIBIT A.

PUBLIC NOTICE

A43031

NOTICE OF PRELIMINARY DECISION FOR THE PROPOSED ISSUANCE OF EMISSION REDUCTION CREDIT CERTIFICATES

NOTICE IS HEREBY GIVEN that the San Joaquin Valley Unified Air Pollution Control District solicits public comment on the proposed issuance of Emission Reduction Credit Certificates Unogal for the shutdown of three natural gas fired furnaces located on Coloveras Ave. SW 1/4 Sec 7, T19s, R14E, Coalinga, CA. The quantities of emission reduction are 6,993 lb of VOC/year; 45,257 lb of NOX/year; and 36,467 lb of CO/year.

The analysis of the regulatory basis for these certificates, and of the resulting effect on ambient air quality, is available for public inspection at the District Office at the address below. Written comments on this notice are to be submitted within 30 days of the publication date of this notice to: SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT, CENTRAL REGION, 1999 TUOLUMNE STREET, SUITE 200, FRESNO, CA 93721

(May 1, 1996)

The undersigned states:

McClatchy Newspapers in and on all dates herein stated was a corporation, and the owner and publisher of The Fresno Bee.

The Fresno Bee is a daily newspaper of general circulation now published, and on all-the-dates herein stated was published in the City of Fresno, County of Fresno, and has been adjudged a newspaper of general circulation by the Superior Court of the County of Fresno, State of California, under the date of November 22, 1994, Action No. 520058-9.

The undersigned is and on all dates herein mentioned was a citizen of the United States, over the age of twenty-one years, and is the principal clerk of the printer and publisher of said newspaper; and that the notice, a copy of which is hereto annexed, marked Exhibit A, hereby made a part hereof, was published in The Fresno Bee in each issue thereof (in type not smaller than nonpareil), on the following dates.

MAY 1, 1996

Beginning on the _____ day of _____, 19____,
to the _____ day of _____, 19____ inclusive.

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Dated _____ MAY _____ 2, 1996

Cathy Aquilera

FROM: RICH MILLER

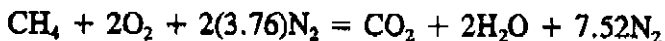
Post-It™ brand fax transmittal memo 7671		# of pages ▶	1
To	George Heinen	From	Rich Miller
Co.	SJV LAMP	Co.	ARB
Dept.	2703	Phone #	(916) 327-5618
Fax #	(209) 233- 5618	Fax #	(916) 327-5618 945-5023

Stoichiometric

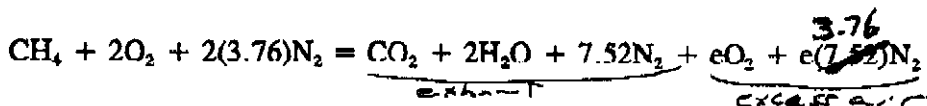
1. Assumptions:

1. Natural gas is primarily methane, (CH₄)
2. Ambient atmosphere consists of roughly 79% Nitrogen (N₂) to 21% Oxygen (O₂) or one mole of O₂ to every 3.76 moles of N₂.

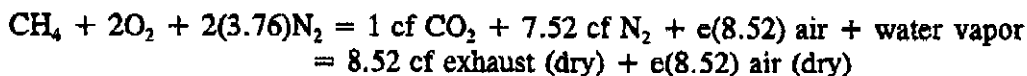
2. Stoichiometric combustion of natural gas:



3. Combustion of gas with e amount of excess air



4. A cubic foot (cf) of natural gas burns to produce



5. The equation must be corrected to 15% excess oxygen (Rule 4703, section 5.1). That requires that

$$\begin{aligned} \text{amount of excess oxygen} &= 0.15 \text{ stoichiometric amount of oxygen} \\ &= (0.15 \times 2 \text{ cf O}_2) \text{ per cf of natural gas} \\ &= 0.30 \text{ cf O}_2 \text{ per cf of natural gas} \end{aligned}$$

6. Since there are 3.76 cf of N₂ per cf of O₂, at 15% excess O₂, the

$$\begin{aligned} \text{amount of excess nitrogen} &= 3.76 \times 0.15 \text{ stoichiometric amount of oxygen} \\ &= (3.76 \times 0.15 \times 2 \text{ cf O}_2) \text{ per cf of natural gas} \\ &= 1.13 \text{ cf N}_2 \text{ per cf of natural gas} \end{aligned}$$

7. Therefore, at 15% excess oxygen, combustion of one cf of natural gas produces

$$\begin{aligned} \text{Exhaust(dry)} &= 8.52 \text{ cf exhaust} + 0.3 \text{ cf excess O}_2 + 1.13 \text{ cf excess N}_2 \\ &= 9.95 \text{ cf total exhaust air per cf of natural gas burned} \end{aligned}$$

To determine what "e" would be to result in 15% oxygen in the exhaust (dry basis - no H₂O)

$$\textcircled{1} \frac{e}{1 + 7.52 + e + 3.76e} = 0.15$$

$$\textcircled{2} e = 0.15 + 1.128 + 0.15e + 0.564e$$

$$\textcircled{3} 0.286e = 1.278$$

$$\textcircled{4} e = 4.47$$

$$\begin{aligned} \textcircled{5} \text{ @ } 15\% \text{ O}_2 \text{ in exhaust, one cf CH}_4 \text{ produces} \\ \frac{1 \text{ cf CO}_2 + 7.52 \text{ cf N}_2}{\text{exhaust}} + \frac{4.47 \text{ cf O}_2 + (4.47)(3.76) \text{ N}_2}{\text{excess air}} \\ \approx 30 \text{ cf of Total exhaust} \end{aligned}$$

Unocal Energy Resources Division
Unocal Corporation
Calaveras Avenue, P.O. Box 1074
Coalinga, California 93210
Telephone (209) 935-0771



RECEIVED

FEB 20 1996

**PERMIT SERVICES
SJVUAPCD**

February 16, 1996

Oil & Gas Operations
North San Joaquin, Central California

**San Joaquin Valley Unified
Air Pollution Control District
Central Region Office
1999 Tuolumne Street, Suite 200
Fresno, California 93721**

Attn: Mr. George Hinen

Dear George:

As requested in our recent telephone conversation, please find the enclosed information which relates to project # 950579.

If you should require any further information, please call me at (209) 935-7225.

Sincerely

**UNION OIL COMPANY OF CALIFORNIA
dba UNOCAL**

**George N. Folks Jr.
Sr. Staff Environmental Specialist**

The operator stated that the efficiency (EFF) of these units is less than 25% so 25% will be used per Rule 4307, section 5.1. Section 5.3.1 limits ERC for 1100 hp Solar Saturn turbines to reductions below those emissions indicated in section 5.1. For a turbine ~~greater~~ ^{less} than 10.0 MW, without SCR, the required emission limits are calculated as

$$\begin{aligned} \text{NOx} &= \overset{42}{15} \times \text{EFF}/25 \quad \overset{42}{15} \\ 42 &= \overset{42}{15} \times 25/25 = \overset{42}{15} \text{ ppm NOx @ 15\% oxygen.} \end{aligned}$$

$$\begin{aligned} \text{CO} &= \overset{250}{42} \times \text{EFF}/25 \quad \overset{250}{42} \quad \text{CO} \\ &= \overset{250}{42} \times 25/25 = \overset{250}{42} \text{ ppm } \overset{250}{42} \text{ @ 15\% oxygen.} \end{aligned}$$

Therefore, only reductions below these levels will be eligible for banking.

B. Baseline Period Determination and Data

The baseline period may consist of either two years immediately preceding the submission of a complete application or at least two consecutive years within the five years prior to that date if deemed more representative of "normal source operations" (Rule 2201, section 3.7). The application was received September 28, 1995, so the five-year period runs from September 28, 1990 to September 28, 1995.

The applicant provided the fuel use data shown in Appendix B. Using this data, the annual fuel use average from 1992 to 1987 is 324,169,333 scf of natural gas/year.

It is reasonable to use the multiple-year average to represent normal source operations. The 1993 data was not included in the calculations since it represents only a partial year's fuel use and is therefore not representative of normal source operations.

The baseline period which most closely matches the normal source operations is from October 1, 1990 to September 30, 1992. For that period, the average fuel use is 337,840,000 scf/year.

The PTO limits each engine to 826,500 scf/day. This is equals an annual permitted fuel use limit of

$$\begin{aligned} \text{PTO fuel} &= 3 \times 826,500 \text{ scf/day/engine} \times 365 \text{ days/year} \\ &= 905,017,500 \end{aligned}$$

The calculated average actual annual fuel use of 337,840,000 is less than permitted and is therefore reasonable to use.

C. Historical Actual Emissions (HAE)

Historical Actual Emissions are emissions having actually occurred and are calculated using process data and recognized emission factors (Rule 2201 section 6.2.1). In this case, the actual annual fuel usage is multiplied by the emission limits or factor calculated in Section V.A.

Assumptions:

1. As shown in Appendix C, for every cubic foot of natural gas burned, the amount of exhaust air, at 15% excess O₂, is found to be

$$\text{Exhaust (dry)} = 9.95 \text{ cf total exhaust air}$$

2. Atmospheric pressure (P) = 14.7 lbf/si x 144 si/sf
= 2,117 lbf/sf

3. Molecular weight (MW) of NO_x = 46 lb/lb-mol
Molecular weight (MW) of CO = 28 lb/lb-mol

VOC emission calculation:

$$\begin{aligned} \text{HAE (VOC)} &= 337,840,000 \text{ cf/yr} \times 0.023 \text{ lb VOC/1,000 cf} \\ &= 7,770 \text{ lb VOC/year.} \end{aligned}$$

NO_x emission calculation:

$$\begin{aligned} \text{NO}_x &= (337,840,000 \text{ cf}_{\text{nat gas}}/\text{yr}) \times (9.95 \text{ cf}_{\text{exhaust}}/\text{cf}_{\text{nat gas}}) \\ &\quad \times 0.000015 \text{ cf}_{\text{NO}_x}/\text{cf}_{\text{exhaust}} \\ &= 50,423 \text{ cf}_{\text{NO}_x} / \text{year} \end{aligned}$$

From the Ideal Gas Law, (PV = nRT), setting n = m/MW and solving for m, the mass of the gas:

$$\begin{aligned} m &= P \times V \times \text{MW} / (R \times T) \quad 141,183 \\ &= \frac{2,117 \text{ lbf/sf} \times 50,423 \text{ cf/yr} \times 46 \text{ lb/lb-mol}}{(1,545 \text{ lbf-ft/lb-mol degrees R}) \times 530 \text{ degrees R}} \\ &= \frac{49,971,183 \text{ NO}_x/\text{year} = \text{HAE (NO}_x)}{16,790.62} \end{aligned}$$

CO emission calculation

$$\begin{aligned} \text{CO} &= (337,840,000 \text{ cf}_{\text{nat gas}}/\text{yr}) \times (9.95 \text{ cf}_{\text{exhaust}}/\text{cf}_{\text{nat gas}}) \\ &\quad \times 0.000042 \text{ cf}_{\text{CO}_x}/\text{cf}_{\text{exhaust}} \\ &= \frac{141,183 \text{ cf}_{\text{CO}_x} / \text{year}}{840,377} \end{aligned}$$

From the Ideal Gas Law, (PV = nRT), setting n = m/MW and solving for m, the mass of the gas:

$$m = P \times V \times \text{MW} / (R \times T)$$

$$m = \frac{2,117 \text{ lbf/sf} \times \overset{840,377}{\cancel{11,710}} \text{ cf/yr} \times 28 \text{ lb/lb-mol}}{(1,545 \text{ lbf-ft/lb-mol degrees R}) \times 530 \text{ degrees R}} = \frac{4.9814^{10}}{818,850}$$

$$= \overset{60,834}{\cancel{50,220}} \text{ lb COx/year} = \text{HAE(CO)}$$

D. Actual Emission Reductions (AER)

Per Rule 2201, section 6.5.2, the actual emissions reductions due to shutdown of the permit units is

$$\text{AER} = \text{HAE (for the units prior to shutdown)}$$

E. Air Quality Improvement Deduction (AQID)

On-site AERs which are to be banked must be reduced by a 10% the air quality improvement deduction (Rule 2201, section 6.5).

$$\begin{aligned} \text{AQID(VOC)} &= \overset{16,790.62}{7,770} \text{ lb/year} \times 0.1 = \overset{1,679}{777} \text{ lb/year} \\ \text{AQID(NOx)} &= \overset{608}{\cancel{600}} \text{ lb/year} \times 0.1 = \overset{60.8}{\cancel{60}} \text{ lb/year} \\ \text{AQID(CO)} &= \overset{60,834}{\cancel{60,220}} \text{ lb/year} \times 0.1 = \overset{6,083.40}{\cancel{6,022}} \text{ lb/year} \end{aligned}$$

F. Adjustments to AER

Since the project is due to the shutdown of this equipment, there were no increased emissions associated with this action so no adjustments are required to the AER, other than those required by Rule 4703, as seen in the calculations section. The facility has no other ERC which would affect the AER.

G. Bankable Emission Reduction Credits

$$\text{ERC} = \text{AER} - \text{AQID}$$

$$\begin{aligned} \text{ERC(VOC)} &= \overset{16,790}{7,770} \text{ lb/year} - \overset{1,679.00}{777} \text{ lb/year} = \overset{15,111}{6,993} \text{ lb/year} \\ \text{ERC(NOx)} &= \overset{608}{\cancel{600}} \text{ lb/year} - \overset{60.8}{\cancel{60}} \text{ lb/year} = \overset{547.2}{\cancel{540}} \text{ lb/year} \\ \text{ERC(CO)} &= \overset{60,834}{\cancel{60,220}} \text{ lb/year} - \overset{6,083.40}{\cancel{6,022}} \text{ lb/year} = \overset{54,750.60}{\cancel{54,198}} \text{ lb/year} \end{aligned}$$

These credits are based on fuel consumption which varies by calendar quarter. Using baseline data to obtain a ratio of average fuel per quarter to total annual fuel produces the following factors:

$$\begin{aligned} \text{Q1: } & [(91,410,000 + 61,236,000)/2] / 337,840,000 = 0.226 \\ \text{Q2: } & [(90,237,000 + 78,827,000)/2] / 337,840,000 = 0.250 \\ \text{Q3: } & [(91,599,000 + 93,034,000)/2] / 337,840,000 = 0.273 \\ \text{Q4: } & [(90,225,000 + 79,111,000)/2] / 337,840,000 = 0.251 \end{aligned}$$

Applying these ratios to the annual ERC amounts and correcting for rounding errors produces the ERC quarterly distribution shown in Table 2:

Table 2: ERC distribution by quarter

Quarter	ERC factor	VOC (lb)	NOx (lb)	CO (lb)
Q1	0.226	1,581	1,220	2,079
Q2	0.250	1,748	1,349	2,299
Q3	0.273	1,909	1,473	2,511
Q4	0.251	1,755	1,355	2,309
	1.000	6,993	5,397	9,198

VI. Compliance:

To comply with the definition of Actual Emissions Reductions (Rule 2201, section 3.2.1) the reductions must be:

Real - The emissions reductions were generated by shutdown of fuel burning equipment. The equipment has been removed from service and is in the process of being sold. Emission reductions were calculated from actual fuel use data, recognized emission factors, and current Rule 4703 emission limits. Therefore, the reductions are real.

Surplus - Rule 4703 requires emissions from these turbines to be no greater than ~~42~~⁴² ppm NOx and ~~250~~²⁵⁰ ppm CO, and the emissions reductions have been adjusted accordingly. Shutdown of the turbines was voluntary and not required by any law, rule, agreement, or regulation. The emission reduction credits were not used for the approval of an Authority to Construct or as offsets. Therefore, the emissions reductions, as adjusted, are surplus.

Permanent - The turbines have been shutdown and the PTOs have been surrendered. Further operations cannot legally occur without a PTO. Therefore, the reductions are permanent.

Quantifiable - Reduction amounts were calculated from historic fuel use data, PTO emission factors, Rule 4703 emission limits, and with methods according to District Rule 2201. Therefore, the emissions are quantifiable.

Enforceable - The PTOs for these units have been surrendered and they cannot be operated without valid PTOs. Therefore, the reductions are enforceable.

Timely submittal - Rule 2301, section 5.5 requires application submittal within 180 days of the emission reduction. The ERC application was received September 28,

1995. That is also the date on which the permits were surrendered. Although the equipment has been idle, the permits were kept current and the turbines remained operable on the date of the application. The date of reduction is therefore the date of the surrender of the permits pursuant to District Policy NSR/BACT 7. Therefore, the application is timely.

Adjustments for RACT and BARCT: The emissions have been adjusted to comply with the BARCT emission requirements of Rule 4703.

VII. Recommendation:

Recommend, based on the analysis above, that an Emission Reduction Credit Certificate be issued to UNOCAL in the amounts as shown in Table 2.

Appendices

- A - Permits To Operate
- B - Annual Fuel Use Data
- C - Stoichiometric Calculations

SOLAR TURBINES INCORPORATED
 ENGINE PERFORMANCE CODE REV. 2.70
 CUSTOMER: UNOCAL / Coalinga
 JOB ID: LA5-710

DATE RUN: 8-MAY-95
 RUN BY: MARKS, GERRIT J

SATURN 10-T1300
 CS/MD
 STANDARD
 GAS
 TSC-2 REV. 0.0

DATA FOR MINIMUM PERFORMANCE

Fuel Type		SD NATURAL GAS						
Elevation	Feet	850						
Inlet Loss	in. H2O	3.0						
Exhaust Loss	in. H2O	3.0						
Accessory on GP Shaft	Hp	3.0						
Ambient Temperature	Deg. F	20.0	40.0	60.0	85.0	100.0	110.0	
Relative Humidity	%	60.0	60.0	60.0	60.0	60.0	60.0	
Elevation Loss	Hp	44	43	41	37	35	33	
Inlet Loss	Hp	20	20	20	19	18	18	
Exhaust Loss	Hp	10	10	10	10	10	10	
Off-Optimum NPT Loss	Hp	10	9	7	3	1	0	
Driven Equipment Speed	RPM	22300	22300	22300	22300	22300	22300	
Optimum Equipment Speed	RPM	24451	24317	24094	23496	23054	22753	
Gas Generator Speed	RPM	22523	22523	22523	22490	22490	22484	
Specified Load	Hp	FULL	FULL	FULL	FULL	FULL	FULL	
Net Output Power	Hp	1340	1291	1232	1123	1048	996	
Fuel Flow	MMBtu/hr	14.93	14.57	14.15	13.30	12.73	12.36	
Heat Rate	Btu/Hp-hr	11147	11289	11480	11844	12151	12406	
Inlet Air Flow	lbm/hr	52360	50713	48940	46292	44541	43264	
Engine Exhaust Flow	lbm/hr	53085	51420	49626	46937	45159	43864	
PCD	psi(g)	80.8	78.5	75.9	71.5	68.4	66.2	
PT Inlet Temp. (T5)	Deg. F	1100	1123	1142	1150	1150	1150	
Compensated PTIT	Deg. F	1100	1123	1142	1150	1150	1150	
Exhaust Temperature	Deg. F	850	875	899	917	926	932	