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**ENVIRONMENTAL BASELINE MONITORING IN THE AREA OF GENERAL CRUDE OIL -
DEPARTMENT OF ENERGY PLEASANT BAYOU NUMBER 2--
A GEOPRESSURED GEOTHERMAL TEST WELL--1979**

by

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**APPENDIX I:
AIR QUALITY MONITORING
RADIAN CORPORATION
AUSTIN, TEXAS**

**APPENDIX II:
MICROSEISMIC MONITORING
TELEDYNE GEOTECH
GARLAND, TEXAS**

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MASTER

1980

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APPENDIX I

I. GENERAL DESCRIPTION OF AIR MONITORING PROGRAM

Radian Corporation is under contract to the University of Texas, Bureau of Economic Geology, to provide ambient air quality monitoring at one site near Chocolate Bayou, Texas. This site measures and records concentrations for sulfur dioxide, hydrogen sulfide, methane, and particulates. A bag sample is collected bi-weekly and returned to Radian's Austin facilities and analyzed for methane.

Figure I shows the configuration of this type of monitoring station. The trailer provides a sturdy and protective covering as well as mobility. Figure II shows the air monitoring site.

FIGURE I
AMBIENT AIR MONITORING SYSTEM I

FIGURE II
AIR MONITORING SITE

II. DESCRIPTION OF INSTRUMENT SYSTEMS (JAN.-AUG.)

The ambient air monitoring station is equipped to monitor the parameters shown below:

Sulfur Dioxide
Particulates
Methane
Hydrogen Sulfide

A. Air Quality Instrumentation

1. Description

Sulfur dioxide is measured with a Meloy Model SA185-2A sulfur analyzer, which is an EPA-approved analyzer. This automated analyzer utilizes the flame photometric principle to measure sulfur levels with a minimum detectable sensitivity of 5 ppb, and a linearity of $\pm 1\%$. The analyzer is operated with an H_2S scrubber to make it specific to SO_2 concentrations.

Hydrogen sulfide is measured using a Meloy Model SA185-2 analyzer equipped with an SO_x scrubber. Specifications for this analyzer are the same as for the SA185-2A.

Methane is monitored with a Bendix Model 8200 gas chromatograph. This instrument uses a flame ionization detector and has a minimum detectable sensitivity of 5 ppb. The Model 8200 works on a five-minute cycle, i.e., one air sample is analyzed every five minutes.

The air sample is drawn in through a glass cane and manifold supplied by the Ace Glass Company. The system has a 25 mm diameter, and a constant air flow through the system is

provided by an air pump rated at 60 cfm at 0" head pressure. The manifold has sampling ports to which $\frac{1}{8}$ " Teflon lines to the instruments are connected. All joints in the sampling system are secured by O-ring compression fittings. The manifold is contained in a heated (100°F) chamber to prevent condensation of moisture.

The trailer has two heavy duty high volume particulate samplers (Hi-Vols). Fiberglass filter paper is brought to a controlled humidity before weighing. Each Hi-Vol has a flow recorder to permit correction for changes in air flow runs for a 24-hour period (midnight to midnight), and is turned on and off by the computer. The Hi-Vols were designed following guidelines recommended by the Environmental Protection Agency and were manufactured by Radian.

2. Calibration

The trailer contains a Meloy Model RAD-1 calibration unit. This unit provides a zero air supply and SO₂ span gas from an SO₂ permeation tube. The calibration is automatically performed once a day, and is controlled by the computer. The SO₂ channel is first switched to zero. Then the computer monitors the output of each analyzer and takes a new zero reading after a stable zero signal has been reached. This zero reading is compared by the computer to the zero reading obtained 24 hours before, and if a drift in excess of 10 ppb has occurred, an excess zero drift light on the System Status Panel is turned on. The instruments are then returned to the monitor mode, and after two minutes the computer resumes data taking.

The SO₂ permeation tubes were manufactured by Metronics Association, Inc. These tubes were then individually calibrated for Radian by the National Bureau of Standards.

The Model 8200 methane analyzer is calibrated with undiluted span gas. This span gas contains methane in air. The Model 8200 is zeroed with air from a Bendix Model 8834 zero air unit. In addition, the instrument is electronically re-zeroed at the start of every five-minute cycle.

In addition to the daily instrument zero/spans, all instruments are multipoint calibrated monthly. Calibration standards and equipment used in the monthly multipoints is distinct from the equipment used for daily zero/span operations.

Quality assurance audits are performed on each instrument once a quarter. These audits are performed by Radian's Quality Assurance personnel using instrumentation and standards different from those used in the monthly multipoint calibrations.

A General Metals Calibration Kit is used to calibrate the Hi-Vol particulate samplers.

B. Data Acquisition System

The basis of the data acquisition system is a Data General NOVA 1200 minicomputer. The NOVA, which has a basic cycle time of 1.2 μ sec, is equipped with automatic program load and power fail/automatic restart features. The computer utilizes 8K 16-bit words of core memory. Analog-to-digital conversion is accomplished via an ADC built by Radian Corporation. The input/output unit for system 034 is Texas Instruments' KSR 733 keyboard/printer. This model provides keyboard entry and hard copy printed output. The data are also recorded on a cassette magnetic tape unit with three drives. The cassette unit is utilized for program storage and loading as well as recording. To reduce wear on mechanical parts, the power to the teletype and cassette units is turned on only when the

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unit(s) is to be used. Several important functions in the instruments as well as in the computer and the trailer are monitored by means of lights on a System Status Panel. The information displayed by these lights is written onto cassette tape to monitor the complete status of the system every five minutes.

III. BAG SAMPLING PROGRAM

Grab-bag samples are collected bi-weekly and analyzed for methane. The ambient air samples are collected in tedlar bags using a metal bellows pump connected to the ambient sample manifold. Each bag sample is collected over a three-hour period.

The bag samples are returned to Austin for analysis for methane concentration. The analysis is performed on either a Bendix 8202 or a Baseline Industries Model 1030 gas chromatograph using a flame ionization detector. The minimum detectable limit using this technique is less than 1 ppm.

Results of the bag sampling analyses are given below:

<u>Date</u>	<u>Time</u>	<u>Methane Concentration (ppm)</u>
1-3-79	0600-0900	3.0
1-18-79	0600-0900	2.3

IV. OPERATING TIME ANALYSIS

This section presents the operating statistics for each of the major subsystems contained in the monitoring station. Table I shows the specific number of hours that each of these subsystems was inoperative for the month. The column labeled "DIGITIZING SYSTEM" refers to the entire data acquisition system, and downtime hours appearing in this column are hours of total data loss. These instances include, in addition to computer downtime, power failures, no power available, and self-automated shutdown periods such as during air conditioner malfunctions.

Calibration time is not considered to be downtime and is not included in the downtime figures. The amount of time used in calibrating the instruments is given at the bottom of the downtime analysis table and is reported as total calibration hours for each channel for the entire month. As is evident in the calibration figures, channels can be calibrated independently of one another. No calibration time is given for particulate monitoring since Hi-Vol calibration occurs infrequently and only during the off-duty cycle for each Hi-Vol while another Hi-Vol is taking data.

TABLE I.
DOWNTIME HOURS FOR CHOCOLATE BAYOU

SITE 033

DIGITIZING					
DATE	SYSTEM	SO2	H2S	CH4	PART*
1/ 1/79	0.	0.	0.	0.	24.
1/ 2/79	0.	0.	0.	1.	24.
1/ 3/79	0.	0.	0.	9.	0.
1/ 4/79	0.	0.	0.	0.	0.
1/ 5/79	0.	0.	0.	0.	24.
1/ 6/79	0.	0.	0.	0.	0.
1/ 7/79	1.	0.	0.	0.	24.
1/ 8/79	9.	0.	0.	0.	24.
1/ 9/79	0.	0.	0.	0.	0.
1/10/79	0.	0.	0.	0.	24.
1/11/79	0.	0.	0.	0.	24.
1/12/79	0.	0.	0.	0.	24.
1/13/79	0.	0.	0.	0.	24.
1/14/79	0.	0.	0.	0.	24.
1/15/79	0.	0.	0.	0.	0.
1/16/79	0.	0.	0.	0.	24.
1/17/79	0.	0.	0.	0.	24.
1/18/79	0.	0.	0.	0.	24.
1/19/79	1.	0.	0.	0.	24.
1/20/79	0.	0.	0.	0.	0.
1/21/79	3.	0.	0.	0.	24.
1/22/79	0.	0.	0.	0.	24.
1/23/79	0.	0.	0.	0.	24.
1/24/79	0.	0.	0.	0.	24.
1/25/79	0.	0.	0.	0.	24.
1/26/79	0.	0.	0.	0.	24.
1/27/79	2.	0.	0.	0.	24.
1/28/79	0.	0.	1.	0.	24.
1/29/79	0.	0.	15.	0.	0.
1/30/79	0.	0.	24.	0.	24.
1/31/79	17.	0.	7.	7.	24.
CAL TIME		10.	10.	20.	

*Particulate sampling is performed on a once every six day basis.

Downtime Summary for January 1979

No significant data loss occurred during this reporting period.

V. DATA PRESENTATION AND SUMMARY

This section includes summaries for various recorded data at the monitoring sites. The data presentations indicate the variability of pollutant concentrations and parameters with time. All parameters, except suspended particulates (24-hour samples), are sampled once each second, but recorded as five-minute arithmetic averages of the one-second samples. This averaging technique tends to smooth instantaneous maximum values.

Inherent in any data acquisition system is random noise, both from the recording instruments and quantization in the analog-to-digital conversion. The lower threshold for all analytical instruments is twice the maximum noise level generated by the instruments. This lower threshold is 5 ppb for all of these instruments. Therefore, any values appearing in the data presentations that are less than 5 ppb indicate only a trace of pollutant in question and should not be construed to be absolute levels. In addition, when concentration levels drop below the lower threshold, the recorded quantity is simply random noise and averages tend toward zero. If a zero concentration appears in the data presentation, this does not indicate absolute zero concentration.

All pollutant data (except for particulate data) are taken at the monitoring site in integer parts per billion (ppb) but are presented here in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) assuming standard temperature and pressure of 25°C and 760 mm Hg (1013.2 millibars), respectively. The scale factors required to convert $\mu\text{g}/\text{m}^3$ at standard conditions back to ppb for the various pollutants are given in the following table.

PollutantTo Convert $\mu\text{g}/\text{m}^3$ at 25°C and
760 mm Hg to ppb Multiply by

SO_2	.384
H_2S	.723
CH_4	1.536

The units of the air quality parameters are given at the top of each table. It should be noted here that inside temperature is monitored and recorded as a functional part of the system but is not presented in this report.

It should be noted that the SO_x scrubber was installed on the H_2S analyzer on 16 August at 9:35. Data from that analyzer from 9:35 on that date are H_2S data. Prior to 16 August, the data represented total sulfur measurements.

Table II presents the national ambient air quality standards (NAAQS) for criteria pollutants.

Table III displays the monthly statistics for the monitoring station for the month. To insure statistical significance, and to reduce the possibility of introducing a bias in the presentation, averages are computed only when at least 50 percent of the samples are present. If less than the required samples are present for a particular parameter, that entry will be blank. The number of samples present for a particular parameter is defined as the total possible number of five-minute samples for the averaging time less the computer downtime less the channel downtime less the channel calibration time. The averages in Table III are arithmetic averages with the following exception:

- Particulate averages are computed as the geometric mean.

Table IV displays the daily averages. Again, 50 percent of the five-minute samples are required in order to compute an average. A blank entry indicates an insufficient number of five-minute samples present for that day. Particulate averages are computed the same way as described in Table III.

Table V presents the maximum daily five-minute averages retained in the data base as well as the times of occurrence. For each parameter, a five-minute maximum average is printed if any samples are present for that day. Therefore, the maximum five-minute average when a given channel has experienced considerable downtime or calibration time during the day in question may be misrepresentative of the maximum expected for that parameter on that day.

Table VI indicates the five largest averages for various averaging times. The table shows the period of time covered by the average. Maxima are chosen so that time segments are independent. The maximum averages reported are found using a 'sliding average' technique with the exception of the 24-hour particulate average, which is computed from midnight to midnight. For averaging times less than or equal to three hours, the sliding average is stepped one five-minute sample at a time. For longer averaging times, the step size is twelve samples or one hour. For averaging times less than or equal to one hour, 100 percent of the five-minute samples must be present to compute an average. Averaging times greater than one hour require 90 percent. Whether or not a sliding average is computed is solely determined by the number of samples present in that averaging time and is independent of daily or monthly averaging criteria.

Table VII demonstrates the diurnal variation of various recorded parameters. Hourly averages are determined by arithmetically averaging five-minute samples. For all parameters, a blank entry in the diurnal variation table indicates that less than half (i.e., less than 6) of the five-minute samples for that hour are present.

Times given in the data presentations correspond to the appropriate local times, i.e., Central Daylight Savings Time or Central Standard Time, depending on the time of the year.

TABLE II
NATIONAL AMBIENT AIR QUALITY STANDARDS

	<u>Primary</u>	<u>Secondary</u>
<u>Particulate</u>		
Annual G.M.**	75 $\mu\text{g}/\text{m}^3$	60 $\mu\text{g}/\text{m}^3$
24 Hr. Max.*	260	150
<u>Sulfur Oxides</u>		
Annual	80 (.03 ppm)	
24 Hr. Max.*	365 (.14 ppm)	
3 Hr. Max.*	--	1300 (.5 ppm)
<u>Oxidant</u>		
1 Hr. Max.*	240* (.12 ppm)	240
<u>Hydrocarbons</u>		
3 Hr. Max.*	160 (.24 ppm)	160
6-9 a.m.		
<u>Carbon Monoxide</u>		
$\mu\text{g}/\text{m}^3$		
Max. 8 Hrs.*	10000 (9 ppm)	10000
Max. 1 Hr.*	40000 (35 ppm)	40000
<u>Nitrogen Dioxide</u>		
Annual	100 (.05 ppm)	100

Units are micrograms per cubic meter and ppm in parentheses.

*Not to be exceeded more than once per year.

**Geometric Mean.

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TABLE III. AVERAGES FOR JAN 1 THRU 31 1979

(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO₂)

HYDROGEN SULFIDE

METHANE

SITE 033
7.8033
.0033
1076.2

PARTICULATE

SITE 033
28.8

TABLE IV. DAILY AVERAGES FOR JAN 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO2)		HYDROGEN SULFIDE		METHANE	
DATE	SITE 033	033		033	
1/ 1	.0	.0		981.4	
1/ 2	.3	.0		913.9	
1/ 3	8.4	.0		1054.2	
1/ 4	.1	.0		1053.6	
1/ 5	10.2	.3		1172.0	
1/ 6	6.5	.1		1245.5	
1/ 7	4.2	.0		1131.5	
1/ 8	42.3	.0		1145.2	
1/ 9	20.2	.0		1141.0	
1/10	1.5	.0		1158.3	
1/11	10.6	.0		1070.7	
1/12	8.0	.0		1155.3	
1/13	.0	.0		1094.4	
1/14	2.4	.0		1119.9	
1/15	32.4	.0		1203.7	
1/16	5.5	.0		1161.1	
1/17	.0	.2		987.1	
1/18	.0	.0		1038.7	
1/19	.0	.0		900.4	
1/20	.0	.2		956.2	
1/21	.0	.0		1000.3	
1/22	.1	.2		1130.5	
1/23	.0	.0		951.6	
1/24	.0	.0		990.0	
1/25	.2	.0		1121.6	
1/26	8.3	.0		1061.7	
1/27	1.4	.0		1056.2	
1/28	41.0	.0		1079.4	
1/29	1.4			1037.7	
1/30	29.2			1177.8	
1/31					

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TABLE IV. DAILY AVERAGES FOR JAN 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

PARTICULATE

SITE 033
DATE

1/ 1	
1/ 2	
1/ 3	30.0
1/ 4	55.0
1/ 5	
1/ 6	15.0
1/ 7	
1/ 8	
1/ 9	27.0
1/10	

1/11	
1/12	
1/13	
1/14	
1/15	36.0
1/16	
1/17	
1/18	
1/19	
1/20	17.0

1/21	
1/22	
1/23	
1/24	
1/25	
1/26	
1/27	
1/28	
1/29	40.0
1/30	

1/31

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TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR JAN 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO2)

SITE 033
DATE

1/ 1	. 0(0:00)
1/ 2	39.1(9:15)
1/ 3	112.0(10:50)
1/ 4	15.6(22:20)
1/ 5	164.1(16:50)
1/ 6	109.4(1:15)
1/ 7	114.6(12:00)
1/ 8	174.5(14:20)
1/ 9	80.8(10:40)
1/10	46.9(11:20)

1/11	80.8(5:45)
1/12	67.7(11:05)
1/13	. 0(0:00)
1/14	49.5(21:30)
1/15	164.1(12:20)
1/16	72.9(8:15)
1/17	. 0(0:00)
1/18	. 0(0:00)
1/19	5.2(10:25)
1/20	. 0(0:00)

1/21	. 0(3:25)
1/22	26.0(8:00)
1/23	. 0(0:00)
1/24	. 0(0:00)
1/25	20.8(9:10)
1/26	78.1(22:45)
1/27	62.5(0:10)
1/28	130.2(8:25)
1/29	62.5(5:15)
1/30	153.7(0:00)

1/31	109.4(17:30)
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RADIAN CORPORATION

TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR JAN 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

HYDROGEN SULFIDE

DATE	SITE	033
1/ 1		. 0(0:00)
1/ 2		. 0(0:00)
1/ 3		1. 4(10:25)
1/ 4		. 0(0:00)
1/ 5		1. 4(11:15)
1/ 6		2. 8(4:50)
1/ 7		. 0(0:00)
1/ 8		. 0(0:00)
1/ 9		. 0(0:00)
1/10		. 0(0:00)
1/11		. 0(0:00)
1/12		. 0(0:00)
1/13		. 0(0:00)
1/14		. 0(0:00)
1/15		. 0(0:00)
1/16		. 0(0:00)
1/17		66. 4(23:35)
1/18		. 0(0:00)
1/19		4. 2(10:25)
1/20		1. 4(18:05)
1/21		. 0(3:15)
1/22		41. 5(8:00)
1/23		. 0(0:00)
1/24		. 0(0:00)
1/25		. 0(0:00)
1/26		. 0(0:00)
1/27		1. 4(19:45)
1/28		. 0(0:00)
1/29		. 0(0:05)
1/30		
1/31		

RADIAN
CORPORATION

TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR JAN 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

METHANE

SITE 033
DATE

1/ 1	1107.1(0:05)
1/ 2	1139.0(21:20)
1/ 3	1116.9(11:00)
1/ 4	2325.5(22:35)
1/ 5	2500.7(6:00)
1/ 6	1622.2(14:10)
1/ 7	1215.2(7:20)
1/ 8	1552.5(23:00)
1/ 9	1635.2(6:10)
1/10	2099.6(1:30)

1/11	1336.3(23:40)
1/12	1568.2(9:00)
1/13	1266.0(11:00)
1/14	1867.7(23:55)
1/15	1746.6(0:00)
1/16	2147.8(7:45)
1/17	6009.6(9:25)
1/18	1466.6(9:40)
1/19	970.3(7:35)
1/20	1122.7(5:55)

1/21	1927.6(20:05)
1/22	4011.6(5:45)
1/23	1393.6(5:05)
1/24	1402.7(18:35)
1/25	3149.3(9:15)
1/26	1473.1(17:05)
1/27	1139.7(22:55)
1/28	1239.3(23:55)
1/29	1243.8(0:00)
1/30	1591.6(20:20)

1/31	941.0(16:45)
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RADIAN
CORPORATIONTABLE VI. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR JAN 1-31 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METERSULFUR DIOXIDE
30-MINUTE

SITE	033	
1	1/ 8(13:50-14:20)	151.5
2	1/15(12:05-12:35)	138.1
3	1/15(12:40-13:10)	137.6
4	1/ 8(16:55-17:25)	137.2
5	1/ 5(16:40-17:10)	132.4

SULFUR DIOXIDE
3-HOUR

SITE	033	
1	1/ 8(11:50-14:50)	125.8
2	1/15(11:40-14:40)	114.7
3	1/28(11:25-14:25)	98.8
4	1/ 5(15:15-18:15)	79.6
5	1/30(19:45-22:45)	79.1

SULFUR DIOXIDE
24-HOUR

SITE	033	
1	1/28- 1/29(6:00)	42.0
2	1/ 8- 1/ 9(11:00)	40.6
3	1/14- 1/15(16:00)	34.6
4	1/30- 1/31(2:00)	30.3
5	1/ 5- 1/ 6(15:00)	16.1

RADIAN
CORPORATION

TABLE VI. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR JAN 1-31 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER

HYDROGEN SULFIDE
1-HOUR

SITE

033

1	1/17(22:35-23:35)	5.5
2	1/22(7:10- 8:10)	3.6
3	1/ 5(20:15-21:15)	1.4
4	1/ 6(3:55- 4:55)	1.4
5	1/ 5(17:50-18:50)	1.0

TABLE VI. THE FIVE MAXIMUM AVERAGES FOR JAN 1-31 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER

SITE 033 METHANE
3-HOUR (6-9AM)

1	1/ 9(6:00- 9:00)	1434.1
2	1/22(6:00- 9:00)	1427.0
3	1/16(6:00- 9:00)	1420.8
4	1/12(6:00- 9:00)	1368.8
5	1/30(6:00- 9:00)	1268.9

RADIAN CORPORATION

26

DIURNAL VARIATION OF SULFUR DIOXIDE(UG/M**3) TRAILER NO. - 33 PERIOD(1/ 1/79 TO 1/31/79)

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0:	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	34:	6	0	0	1	0	6	97	73	31	0	0	0	0	0	0	0	0	0	0	0	8
4	0	0	0	0:	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
5	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	5	107	102	25	0	0	0	0	0	10
6	37	81	13	0:	0	0	0	0	0	0	0	0	0	7	2	2	2	1	0	2	2	2	3	0	7
7	0	0	0	0:	0	0	0	0	0	0	0	57	39	0	0	0	0	0	0	0	0	0	0	0	4
8	0	13	0	:							111	129	135	44	39	108	20	5	5	5	5	5	5	5	42
9	5	5	5	9:	0	0	50	69	33	58	70	2	0	0	12	61	26	0	0	26	52	0	0	0	20
10	0	0	0	0:	0	0	0	0	0	0	0	24	4	0	0	0	0	0	0	0	0	0	0	7	2
11	1	0	0	0:	0	26	7	0	15	12	24	0	0	0	30	39	30	61	7	0	0	0	0	0	11
12	0	0	0	11:	0	0	0	0	5	47	59	62	10	0	0	0	0	0	0	0	0	0	0	0	8
13	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	28	9	2
15	46	0	0	58:	53	42	0	4	12	41	73	92	132	108	102	21	0	0	0	0	0	0	0	4	32
16	14	0	0	0:	20	15	0	28	50	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
17	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0:	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0:	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	44	43	60	8
27	31	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
28	0	0	0	0:	0	9	43	37	74	66	93	94	99	98	93	31	64	71	10	10	10	14	51	18	41
29	0	0	0	0:	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
30	22	10	10	16	10	10	10	14	82	22	10	10	19	10	10	10	10	10	74	70	67	97	70	18	29
31																	76	101	74	13	14	28	10	10	37
MEAN	5	4	1	5	3	5	4	5	9	9	14	14	15	12	13	7	11	14	7	4	6	7	7	4	

TOTAL NUMBER OF OBSERVATIONS = 8390. MEAN = 8.

: INDICATES CALIBRATION DURING THE HOUR

RADIAN

CORPORATION

DIURNAL VARIATION OF HYDROGEN SULFIDE (UG/M**3)
TRAILER NO. - 33 PERIOD(1/ 1/79 TO 1/31/79)

	HOUR																								MEAN
DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0
6	0	0	0	1:	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	:								0:	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0
18	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0
21				0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0:	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0															0
30																									
31																									
MEAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL NUMBER OF OBSERVATIONS = 7827. MEAN = 0.

: INDICATES CALIBRATION DURING THE HOUR

RADIAN

CORPORATION

28

DIURNAL VARIATION OF METHANE(UG/M**3 X 10**-1)
TRAILER NO. - 33 PERIOD(1/ 1/79 TO 1/31/79)

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	109	106	104	:	100	101	100	100	100	99	97	97	98	97	98	99	96	97	96	96	95	93	91	89	98
2	88	87	87	:	85	76	91	98	100	97	86	96	93	90	88	88	87	87	88	88	89	109	104	99	91
3				:							:	108	104	105	104	105	106	107	106	104	105	106	105	105	105
4	104	106	105	:	96	98	99	99	100	99	101	101	100	113	104	103	99	102	97	98	101	117	177	107	106
5	104	129	102	:	95	104	123	99	92	92	95	95	108	142	141	167	144	132	124	124	120	118	121	120	117
6	121	123	117	:	119	122	124	122	120	127	129	136	140	138	157	144	115	108	115	120	118	118	117	116	125
7	110	110	112	117:	113	110	110	118	117	115	114	116	114	115	114		111	112	112	115	115	115	111	109	113
8	108	107	105	:								110	111	110	107	107	107	109	118	119	107	119	144	138	115
9	119	121	127	:	123	129	153	135	142	124	117	103	101	101	101	106	103	101	102	106	109	107	98	97	114
10	99	123	97	:	113	119	127	120	125	129	130	130	120	118	116	114	111	109	106	106	113	111	116	115	116
11	108	105	105	:	105	104	103	101	108	105	107	104	102	102	103	104	107	111	111	111	108	110	118	124	107
12	112	107	107	:	111	121	127	134	149	147	127	121	109	105	106	103	108	111	108	109	110	110	111	102	116
13	99	100	100	:	104	109	112	106	113	112	110	120	111	112	117	113	111	111	110	110	111	110	109	109	110
14	109	110	107	:	108	107	109	108	107	104	108	106	108	107	104	103	102	102	104	115	125	129	125	172	112
15	157	132	110	:	128	145	124	125	128	128	125	129	122	115	124	109	106	109	106	108	107	106	106	120	120
16	145	115	109	:	136	133	117	162	147	107	105	124	125	101	111	113	107	103	102	102	118	108	93	92	116
17	93	92	93	:	94	94	94	95	109	149	102	96	98	97	98	97	96	95	95	98	97	96	98	98	99
18	96	97	97	:	95	95	102	117	106	108	118	118	106	107	104	100	104	119	110	108	103	95	94	91	104
19	91	91	90	:	91	90	90	95	91	90	90	90	89	90	89	89	89	89	90	91	91	92	89	89	90
20	90	88	89	:	91	97	98	95	96	98	97	96	95	94	95	97	105	101	98	97	98	98	97	96	96
21				:	99	98	98	98	99	98	98	97	97	97	98	97	98	99	104	103	108	102	107	110	100
22	129	131	126	:	123	259	139	132	158	98	96	94	94	93	93	93	96	100	92	91	93	91	91	90	113
23	91	88	89	:	92	122	110	105	100	93	92	92	92	93	92	92	93	94	95	95	92	92	93	93	95
24	94	99	103	:	98	98	101	104	101	98	95	96	96	95	95	93	93	95	108	101	106	103	102	107	99
25	106	103	133	:	117	140	115	101	97	187	98	96	101	106	108	112	117	111	113	108	105	99	104	105	112
26	96	88	88	:	87	88	87	87	87	87	89	89	87	91	127	138	138	138	138	135	138	124	113	110	107
27	111	111	111	:	103	104	109	110	112	109	107	105	101	100	98	98	98				107	104	111	110	106
28	115	108	111	106	109	109	106	112	110	109	115	111	113	110	105	102	101	101	101	102	108	110	106	113	108
29	118	112	110	111	111	106	105	107	104	102	100	100	101	100	99	98	98	104	101	100	100	99	98	107	104
30	112	111	114	115	116	117	117	126	139	123	115	113	115	107	103	103	103	110	125	139	145	123	125	116	118
31																	79								79
MEAN	108	107	105	112	106	114	110	111	113	112	106	106	105	105	107	106	104	106	106	107	108	107	109	108	

TOTAL NUMBER OF OBSERVATIONS = 8009. MEAN = 108.

: INDICATES CALIBRATION DURING THE HOUR

III. BAG SAMPLING PROGRAM

Grab-bag samples are collected bi-weekly and analyzed for methane. The ambient air samples are collected in tedlar bags using a metal bellows pump connected to the ambient sample manifold. Each bag sample is collected over a three-hour period.

The bag samples are returned to Austin for analysis for methane concentration. The analysis is performed on either a Bendix 8202 or a Baseline Industries Model 1030 gas chromatograph using a flame ionization detector. The minimum detectable limit using this technique is less than 1 ppm.

Results of the bag sampling analyses are given below:

<u>Date</u>	<u>Time</u>	<u>Methane Concentration (ppm)</u>
2-1-79	0600-0900	2.6
2-14-79	0600-0900	2.2
2-27-79	0600-0900	2.1

TABLE I.
DOWNTIME HOURS FOR CHOCOLATE BAYOU

SITE 033

DIGITIZING						
DATE	SYSTEM	SO2	H2S	VOLT	CH4	PART
2/ 1/79	0.	1.	14.	0.	24.	0.
2/ 2/79	0.	1.	2.	0.	11.	24.
2/ 3/79	10.	1.	1.	0.	1.	24.
2/ 4/79	24.	0.	0.	0.	0.	24.
2/ 5/79	12.	1.	1.	0.	1.	24.
2/ 6/79	0.	1.	1.	0.	1.	0.
2/ 7/79	0.	1.	1.	0.	1.	24.
2/ 8/79	0.	1.	1.	0.	1.	0.
2/ 9/79	0.	1.	1.	0.	1.	24.
2/10/79	0.	1.	1.	0.	1.	0.
2/11/79	0.	1.	1.	0.	1.	0.
2/12/79	0.	1.	1.	0.	1.	0.
2/13/79	0.	1.	1.	0.	1.	24.
2/14/79	0.	1.	1.	0.	1.	0.
2/15/79	0.	1.	1.	0.	1.	0.
2/16/79	11.	1.	1.	0.	1.	24.
2/17/79	24.	0.	0.	0.	0.	24.
2/18/79	24.	0.	0.	0.	0.	24.
2/19/79	10.	0.	0.	0.	0.	24.
2/20/79	0.	1.	1.	0.	1.	24.
2/21/79	0.	1.	1.	0.	1.	0.
2/22/79	0.	0.	0.	0.	0.	0.
2/23/79	0.	0.	0.	0.	0.	24.
2/24/79	0.	0.	0.	0.	0.	0.
2/25/79	0.	0.	0.	0.	0.	0.
2/26/79	0.	0.	0.	0.	0.	0.
2/27/79	0.	0.	0.	0.	0.	24.
2/28/79	2.	1.	1.	0.	1.	0.
CAL TIME		3.	3.	0.	3.	

The two periods of data loss for the month occurred from the 3rd through the 5th and the 16th through the 19th. Both downtime episodes occurred as a result of power failures at the site. The system was brought back on-line at the next station visit.

TABLE II
NATIONAL AMBIENT AIR QUALITY STANDARDS

	<u>Primary</u>	<u>Secondary</u>
<u>Particulate</u>		
Annual G.M.**	75 $\mu\text{g}/\text{m}^3$	60 $\mu\text{g}/\text{m}^3$
24 Hr. Max.*	260	150
<u>Sulfur Oxides</u>		
Annual	80 (.03 ppm)	
24 Hr. Max.*	365 (.14 ppm)	
3 Hr. Max.*	--	1300 (.5 ppm)
<u>Oxidant</u>		
1 Hr. Max.*	240* (.12 ppm)	240
<u>Hydrocarbons</u>		
3 Hr. Max.*	160 (.24 ppm)	160
6-9 a.m.		
<u>Carbon Monoxide</u>		
$\mu\text{g}/\text{m}^3$		
Max. 8 Hrs.*	10000 (9 ppm)	10000
Max. 1 Hr.*	40000 (35 ppm)	40000
<u>Nitrogen Dioxide</u>		
Annual	100 (.05 ppm)	100

Units are micrograms per cubic meter and ppm in parentheses.

*Not to be exceeded more than once per year.

**Geometric Mean.

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TABLE III. AVERAGES FOR FEB 1 THRU 28 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO₂)

HYDROGEN SULFIDE

METHANE

SITE 033
5.7

033
1.1

033
997.8

PARTICULATE

SITE 033
39.8

TABLE IV. DAILY AVERAGES FOR FEB 1 THRU 28 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO2)		HYDROGEN SULFIDE		METHANE	
DATE	SITE 033		033		033
2/ 1	14.4				
2/ 2	.0		.0		981.9
2/ 3	.0		.0		1212.4
2/ 4					
2/ 5					
2/ 6	.0		.0		1068.6
2/ 7	.0		.0		1108.5
2/ 8	.0		.0		1047.6
2/ 9	40.5		.0		1067.9
2/10	11.0		14.1		1195.2
2/11	.0		.0		1024.5
2/12	.0		.0		904.9
2/13	.0		.0		909.3
2/14	.0		.0		874.3
2/15	.0		.0		891.9
2/16	46.5		.0		1183.5
2/17					
2/18					
2/19	35.7		.0		1104.8
2/20	.4		.0		1037.2
2/21	.0		.0		969.8
2/22	1.1		.0		842.3
2/23	.0		.0		883.6
2/24	.0		.0		943.8
2/25	.9		.0		948.2
2/26	17.2		.0		1038.7
2/27	.0		.0		967.5
2/28	.0		12.8		946.6

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TABLE IV. DAILY AVERAGES FOR FEB 1 THRU 28 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

PARTICULATE

SITE 033
DATE

2/ 1	36.0
2/ 2	
2/ 3	
2/ 4	
2/ 5	
2/ 6	13.0
2/ 7	
2/ 8	50.0
2/ 9	
2/10	40.0

2/11	39.0
2/12	68.0
2/13	
2/14	30.0
2/15	46.0
2/16	
2/17	
2/18	
2/19	
2/20	

2/21	30.0
2/22	55.0
2/23	
2/24	24.0
2/25	23.0
2/26	127.0
2/27	
2/28	63.0

RADIAN
CORPORATION

SC

TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR FEB 1 THRU 28 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO2)

SITE 033
DATE

2/ 1	125.0(7:55)
2/ 2	.0(0:00)
2/ 3	.0(0:00)
2/ 4	
2/ 5	.0(12:55)
2/ 6	.0(0:00)
2/ 7	.0(0:00)
2/ 8	.0(0:00)
2/ 9	304.8(3:40)
2/10	75.5(10:45)

2/11	.0(0:00)
2/12	.0(0:00)
2/13	.0(0:00)
2/14	.0(0:00)
2/15	.0(0:00)
2/16	192.8(3:40)
2/17	
2/18	
2/19	88.6(10:55)
2/20	10.4(1:00)

2/21	.0(0:00)
2/22	156.3(13:00)
2/23	.0(0:00)
2/24	.0(0:00)
2/25	99.0(12:00)
2/26	148.5(8:10)
2/27	.0(0:00)
2/28	.0(0:00)

RADIAN
CORPORATION

TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR FEB 1 THRU 28 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

HYDROGEN SULFIDE

DATE	SITE	033
2/ 1		. 0(14:05)
2/ 2		. 0(0:00)
2/ 3		. 0(0:00)
2/ 4		
2/ 5		. 0(12:55)
2/ 6		. 0(0:00)
2/ 7		. 0(0:00)
2/ 8		. 0(0:00)
2/ 9		. 0(0:00)
2/10	153.6	(3:40)
2/11		. 0(0:00)
2/12		. 0(0:00)
2/13		. 0(0:00)
2/14		. 0(0:00)
2/15		. 0(0:00)
2/16		. 0(0:00)
2/17		
2/18		
2/19		. 0(10:25)
2/20		. 0(0:00)
2/21		. 0(0:00)
2/22		. 0(0:00)
2/23		. 0(0:00)
2/24		. 0(0:00)
2/25		. 0(0:00)
2/26		. 0(0:00)
2/27		. 0(0:00)
2/28	157.8	(3:40)

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TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR FEB 1 THRU 28 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

METHANE

SITE 033
DATE

2/ 1	
2/ 2	1719.2(11:00)
2/ 3	1536.9(13:25)
2/ 4	
2/ 5	1424.9(12:55)
2/ 6	1314.2(21:30)
2/ 7	1455.5(1:45)
2/ 8	1260.1(21:10)
2/ 9	1393.6(20:35)
2/10	2138.6(3:40)

2/11	1293.3(6:30)
2/12	1135.1(8:50)
2/13	1039.4(7:25)
2/14	997.7(7:45)
2/15	1205.4(23:00)
2/16	1271.9(4:05)
2/17	
2/18	
2/19	1185.2(18:40)
2/20	1331.8(11:40)

2/21	1187.2(4:40)
2/22	1040.0(0:25)
2/23	1809.1(6:35)
2/24	1564.3(3:40)
2/25	1030.9(17:55)
2/26	1656.1(3:40)
2/27	1409.3(6:25)
2/28	1823.4(7:10)

TABLE VI. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR FEB 1-28 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER

SITE		033	SULFUR DIOXIDE 30-MINUTE
1	2/26(8:00- 8:30)	134.6	
2	2/ 1(7:40- 8:10)	115.1	
3	2/ 9(10:00-10:30)	96.4	
4	2/ 9(11:55-12:25)	92.0	
5	2/ 9(20:45-21:15)	90.7	

SITE		033	SULFUR DIOXIDE 3-HOUR
1	2/ 9(9:30-12:30)	86.9	
2	2/ 1(7:00-10:00)	85.3	
3	2/19(10:30-13:30)	81.1	
4	2/26(7:00-10:00)	80.2	
5	2/16(10:00-13:00)	77.8	

SITE		033	SULFUR DIOXIDE 24-HOUR
1	2/ 8- 2/ 9(0:00)	40.5	
2	2/15- 2/16(14:00)	25.5	
3	2/19- 2/20(9:00)	22.6	
4	2/25- 2/26(16:00)	17.2	
5	2/ 1- 2/ 2(1:00)	14.4	

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TABLE VI. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR FEB 1-28 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER

SITE		033		HYDROGEN SULFIDE	
				1-HOUR	
1	2/28(3:35- 4:35)	26.1			
2	2/10(3:35- 4:35)	25.4			
3	2/28(11:15-12:15)	14.8			
4	2/28(0:30- 1:30)	14.6			
5	2/28(12:45-13:45)	14.6			

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CORPORATIONTABLE VI. THE FIVE MAXIMUM AVERAGES FOR FEB 1-28 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER

SITE		033		METHANE 3-HOUR (6-9AM)	
1	2/10	6:00-	9:00)	1480.3	
2	2/26	6:00-	9:00)	1316.8	
3	2/16	6:00-	9:00)	1187.6	
4	2/ 6	6:00-	9:00)	1150.1	
5	2/ 3	6:00-	9:00)	1148.2	

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DIURNAL VARIATION OF SULFUR DIOXIDE(UG/M**3)
TRAILER NO. - 33 PERIOD(2/ 1/79 TO 2/28/79)

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	0	0	0	:	0	0	27	89	92	75	49	0	0	0	0	0	0	0	0	0	0	0	0	0	15
2	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4																									0
5																									0
6	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	21	13	13	:	13	13	19	75	75	82	90	83	82	54	51	25	25	13	13	13	51	66	13	13	40
10	14	13	13	:	13	13	13	41	21	60	51	0	0	0	0	0	0	0	0	0	0	0	0	0	11
11	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	13	13	13	:	22	13	43	58	79	71	72	82	78												46
17																									
18																									
19											70	84	81	72	47	28	13	24	13	13	13	13	15	29	36
20	0	10	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	:	0	0	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	1
23	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	:	0	0	0	80	116	44	39	40	13	13	30	25	0	0	0	0	0	0	0	0	1
27	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17
28	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	2	2	2	0	2	2	5	15	17	15	14	12	12	7	6	3	2	2	1	1	3	4	1	2	0

TOTAL NUMBER OF OBSERVATIONS = 6344. MEAN = 6.

: INDICATES CALIBRATION DURING THE HOUR

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DIURNAL VARIATION OF HYDROGEN SULFIDE (UG/M**3)
TRAILER NO. - 33 PERIOD(2/ 1/79 TO 2/28/79)

DAY	HOUR																								MEAN	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1															0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	:	0	0	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	:	0	0	0	0	0	0	0	0	0	0												0
4																										
5														0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	14	14	14	:	14	14	14	14	14	14	14	14	13	12	13	12	14	14	14	14	14	14	14	14	14	14
11	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	:	0	0	0	0	0	0	0	0	0													0
17																										
18																										
19											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	15	15	14	:	14	14	14	14	14	14	14	14	14	15	14	14	14	14	14	14		0	0	0		12
MEAN	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

TOTAL NUMBER OF OBSERVATIONS = 6181. MEAN = 1.

: INDICATES CALIBRATION DURING THE HOUR

TRAILER NO. - 33 PERIOD(2/ 1/79 TO 2/28/79)

TOTAL NUMBER OF OBSERVATIONS = 5958. MEAN = 100.

: INDICATES CALIBRATION DURING THE HOUR

III. BAG SAMPLING PROGRAM

Grab-bag samples are collected bi-weekly and analyzed for methane. The ambient air samples are collected in tedlar bags using a metal bellows pump connected to the ambient sample manifold. Each bag sample is collected over a three-hour period.

The bag samples are returned to Austin for analysis for methane concentration. The analysis is performed on either a Bendix 8202 or a Baseline Industries Model 1030 gas chromatograph using a flame ionization detector. The minimum detectable limit using this technique is less than 1 ppm.

The bag samples collected in March were invalidated when it was determined that they had been damaged in shipment and the samples contaminated.

TABLE I.
DOWNTIME HOURS FOR CHOCOLATE BAYOU

SITE 033

DIGITIZING					
DATE	SYSTEM	SO2	H2S	CH4	PART
3/ 1/79	2.	0.	0.	0.	0.
3/ 2/79	10.	0.	0.	1.	-
3/ 3/79	13.	0.	0.	0.	-
3/ 4/79	3.	0.	0.	0.	-
3/ 5/79	10.	0.	3.	0.	-
3/ 6/79	11.	0.	0.	1.	-
3/ 7/79	15.	0.	0.	0.	-
3/ 8/79	2.	0.	0.	0.	0.
3/ 9/79	0.	0.	0.	0.	0.
3/10/79	0.	0.	0.	0.	-
3/11/79	0.	0.	0.	0.	-
3/12/79	14.	0.	0.	0.	-
3/13/79	8.	0.	0.	1.	-
3/14/79	0.	0.	0.	0.	0.
3/15/79	0.	0.	0.	0.	0.
3/16/79	0.	0.	0.	0.	-
3/17/79	0.	0.	0.	0.	0.
3/18/79	0.	0.	0.	0.	0.
3/19/79	0.	0.	0.	0.	0.
3/20/79	0.	0.	0.	0.	-
3/21/79	0.	0.	0.	0.	0.
3/22/79	0.	0.	1.	0.	-
3/23/79	1.	0.	1.	0.	-
3/24/79	0.	0.	0.	0.	-
3/25/79	0.	0.	0.	0.	0.
3/26/79	0.	0.	0.	0.	0.
3/27/79	0.	0.	0.	0.	0.
3/28/79	0.	0.	0.	0.	-
3/29/79	0.	0.	0.	0.	0.
3/30/79	0.	0.	0.	0.	0.
3/31/79	0.	0.	0.	0.	0.
CAL TIME		21.	27.	20.	
DATA CAPTURE RATE (%)		88	87	88	100

Most data loss during March resulted from power failures, which caused the computer to go into a "hold" mode until the data processing program could be reloaded. Most of the power failures occurred from the 1st through the 7th, with the remainder of the month being relatively free of data loss.

On March 9th, quality assurance audits of the continuous monitors caused each analyzer to lose seven hours of data.

Particulate samples were collected in excess of the one every sixth-day requirement.

TABLE II
NATIONAL AMBIENT AIR QUALITY STANDARDS

	<u>Primary</u>	<u>Secondary</u>
<u>Particulate</u>		
Annual G.M.**	75 $\mu\text{g}/\text{m}^3$	60 $\mu\text{g}/\text{m}^3$
24 Hr. Max.*	260	150
<u>Sulfur Oxides</u>		
Annual	80 (.03 ppm)	
24 Hr. Max.*	365 (.14 ppm)	
3 Hr. Max.*	--	1300 (.5 ppm)
<u>Oxidant</u>		
1 Hr. Max.*	240* (.12 ppm)	240
<u>Hydrocarbons</u>		
3 Hr. Max.*	160 (.24 ppm)	160
6-9 a.m.		
<u>Carbon Monoxide</u>		
$\mu\text{g}/\text{m}^3$		
Max. 8 Hrs.*	10000 (9 ppm)	10000
Max. 1 Hr.*	40000 (35 ppm)	40000
<u>Nitrogen Dioxide</u>		
Annual	100 (.05 ppm)	100

Units are micrograms per cubic meter and ppm in parentheses.

*Not to be exceeded more than once per year.

**Geometric Mean.

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TABLE III. AVERAGES FOR MAR 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO₂)

HYDROGEN SULFIDE

METHANE

SITE 033
1.0033
.1033
1026.5

PARTICULATE

SITE 033
45.6

TABLE IV. DAILY AVERAGES FOR MAR 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

DATE	SULFUR DIOXIDE(SO ₂)		HYDROGEN SULFIDE		METHANE	
	SITE	033		033		033
3/ 1		.0		.0		1129.5
3/ 2		.0		.0		967.3
3/ 3						
3/ 4		11.0		.0		1085.2
3/ 5		16.6				
3/ 6						
3/ 7						
3/ 8		4.9		.0		1110.6
3/ 9		.0		.0		917.9
3/10		1.4		.0		1066.6
3/11		.0		.0		1114.3
3/12						
3/13		.0		.0		927.2
3/14		.3		.4		1046.6
3/15		.0		.0		1027.7
3/16		.3		.8		1122.6
3/17		.0		.0		1133.4
3/18		.0		.0		922.0
3/19		.0		.0		961.7
3/20		.0		.0		1142.9
3/21		.0		.0		1025.3
3/22		.0		.4		990.7
3/23		.0		2.1		1018.6
3/24		.0		.0		1065.8
3/25		.0		.0		1137.3
3/26		.0		.0		971.1
3/27		.3		.0		962.3
3/28		.4		.0		926.6
3/29		.0		.0		936.4
3/30		.0		.0		915.0
3/31		.0		.0		941.3

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TABLE IV. DAILY AVERAGES FOR MAR 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

PARTICULATE

SITE 033
DATE

3/ 1	50.0
3/ 2	
3/ 3	
3/ 4	
3/ 5	
3/ 6	
3/ 7	
3/ 8	56.0
3/ 9	41.0
3/10	
3/11	
3/12	
3/13	
3/14	53.0
3/15	45.0
3/16	
3/17	90.0
3/18	72.0
3/19	49.0
3/20	
3/21	23.0
3/22	
3/23	
3/24	
3/25	37.0
3/26	31.0
3/27	32.0
3/28	
3/29	49.0
3/30	54.0
3/31	40.0

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TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR MAR 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO2)

DATE	SITE	033
3/ 1		. 0(0:55)
3/ 2		. 0(0:00)
3/ 3		. 0(0:00)
3/ 4		138. 1(23:00)
3/ 5		130. 2(0:20)
3/ 6		. 0(0:10)
3/ 7		. 0(1:00)
3/ 8		80. 8(10:15)
3/ 9		. 0(0:00)
3/10		57. 3(9:55)
3/11		. 0(0:00)
3/12		. 0(0:00)
3/13		. 0(8:30)
3/14		70. 3(11:00)
3/15		. 0(0:00)
3/16		86. 0(17:00)
3/17		. 0(0:00)
3/18		. 0(0:00)
3/19		. 0(0:00)
3/20		. 0(0:00)
3/21		. 0(0:00)
3/22		. 0(0:00)
3/23		. 0(0:00)
3/24		. 0(0:00)
3/25		. 0(0:00)
3/26		. 0(0:00)
3/27		86. 0(12:15)
3/28		86. 0(10:00)
3/29		. 0(0:00)
3/30		. 0(0:00)
3/31		. 0(0:00)

RADIAN
CORPORATION

TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR MAR 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

HYDROGEN SULFIDE

DATE	SITE	033
3/ 1		. 0(0:55)
3/ 2		. 0(0:00)
3/ 3		. 0(0:00)
3/ 4		. 0(0:00)
3/ 5		. 0(0:05)
3/ 6		. 0(0:10)
3/ 7		. 0(1:00)
3/ 8		. 0(0:05)
3/ 9		. 0(0:00)
3/10		. 0(0:00)
3/11		. 0(0:00)
3/12		. 0(0:00)
3/13		. 0(8:30)
3/14		1. 4(0:15)
3/15		. 0(0:00)
3/16		106. 6(3:40)
3/17		. 0(0:00)
3/18		. 0(0:00)
3/19		. 0(0:00)
3/20		. 0(0:00)
3/21		. 0(0:00)
3/22		72. 0(10:45)
3/23		22. 1(10:40)
3/24		. 0(0:00)
3/25		. 0(0:00)
3/26		. 0(0:00)
3/27		. 0(0:00)
3/28		. 0(0:00)
3/29		. 0(0:00)
3/30		. 0(0:00)
3/31		. 0(0:00)

RADIAN
CORPORATION

TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR MAR 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

METHANE

DATE	SITE	033
3/ 1	2314.5	(4:55)
3/ 2	1577.9	(8:50)
3/ 3	1014.0	(6:05)
3/ 4	1740.1	(20:40)
3/ 5	1570.1	(0:45)
3/ 6	2261.1	(7:20)
3/ 7	1363.7	(23:25)
3/ 8	1980.4	(4:35)
3/ 9	1014.6	(19:15)
3/10	1697.8	(1:40)
3/11	1447.7	(6:00)
3/12	1420.3	(2:45)
3/13	1007.5	(9:40)
3/14	1893.8	(18:25)
3/15	1677.6	(3:40)
3/16	2464.3	(23:40)
3/17	2542.4	(5:25)
3/18	1529.1	(3:40)
3/19	1562.3	(3:40)
3/20	2642.0	(1:15)
3/21	3343.4	(8:25)
3/22	1707.5	(19:05)
3/23	2061.1	(7:35)
3/24	2194.0	(3:40)
3/25	2233.1	(3:40)
3/26	2236.3	(3:40)
3/27	2020.1	(3:40)
3/28	1006.8	(3:40)
3/29	1175.5	(3:40)
3/30	955.4	(17:10)
3/31	1378.7	(3:40)

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CORPORATIONTABLE VI. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR MAR 1-31 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METERSULFUR DIOXIDE
30-MINUTE

SITE	033	
1	3/ 4(22:55-23:25)	138.1
2	3/ 5(0:00- 0:30)	125.5
3	3/ 5(0:35- 1:05)	83.4
4	3/ 8(11:50-12:20)	53.0
5	3/ 8(10:05-10:35)	49.5

SULFUR DIOXIDE
3-HOUR

SITE	033	
1	3/ 4(21:55- 0:55)	114.7
2	3/ 8(9:50-12:50)	31.6
3	3/ 5(5:05- 8:05)	23.0
4	3/10(9:50-12:50)	6.2
5	3/10(18:45-21:45)	3.3

SULFUR DIOXIDE
24-HOUR

SITE	033	
1	3/ 8- 3/ 9(9:00)	4.5
2	3/ 9- 3/10(22:00)	1.4
3	3/27- 3/28(11:00)	.7
4	3/13- 3/14(13:00)	.3
5	3/15- 3/16(18:00)	.3

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TABLE VI. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR MAR 1-31 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER

HYDROGEN SULFIDE
1-HOUR

SITE	033	
1	3/16(3:35- 4:35)	8.9
2	3/23(22:45-23:45)	6.3
3	3/23(20:55-21:55)	5.3
4	3/16(10:05-11:05)	4.8
5	3/23(18:35-19:35)	4.7

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TABLE VI. THE FIVE MAXIMUM AVERAGES FOR MAR 1-31 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER

METHANE
3-HOUR (6-9AM)

SITE	033
1	3/25(6:00- 9:00) 1455.1
2	3/21(6:00- 9:00) 1300.7
3	3/20(6:00- 9:00) 1276.3
4	3/11(6:00- 9:00) 1238.9
5	3/12(6:00- 9:00) 1177.9

RADIAN

CORPORATION

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DIURNAL VARIATION OF SULFUR DIOXIDE (UG/M**3)
TRAILER NO. - 33 PERIOD(3/ 1/79 TO 3/31/79)

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1		0	0	:	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
2	0	0	0	:	0	0	0	0	0	0				0	0						0		0		0
3	0	0		0			0			0	0			0		0				0			0	0	0
4	0	0	0	:		0	0	0	0		0	0		0	0	0	0	0	0	0	0	0	91	138	11
5	113	25	12	:		13	14	40				0		0			0	0	0			0		0	17
6	0	0	0	:	0	0	0	0	0				0			0						0	0		0
7		0	0					0	0				0			0	0		0					0	0
8	0	0	0		0	0	0	0		:	35	19	40	0	0	0	0	0	0	0	0	0	0	0	4
9	0	0	0	:	0	0	0	0	0	0	0	:		:	:	:	:	:	:	0	0	0	0	0	0
10	0	0	0	:	0	0	0	0	0	6	6	0	11	0	0	0	0	0	0	0	0	10	0	0	1
11	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	:	0	0	0	0	0	0															0
13									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	:	0	0	0	0	0	1	0	6	2	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	:	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	:	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	:	0	0	0	0	0	0	8	0		0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	4	1	0	0	0	0	1	1	0	0	2	1	3	0	0	0	0	0	0	0	0	0	3	5	

TOTAL NUMBER OF OBSERVATIONS = 7272. MEAN = 1.

: INDICATES CALIBRATION DURING THE HOUR

DIURNAL VARIATION OF HYDROGEN SULFIDE(UG/M**3)
TRAILER NO. - 33 PERIOD(3/ 1/79 TO 3/28/79)

DAY	HOUR																								MEAN	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1		0	0	:	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
2	0	0	0	:	0	0	0	0	0	0				0	0	0					0		0	0	0	0
3	0	0		0			0			0	0			0	0	0				0			0	0	0	0
4	0	0	0	:		0	0	0	0		0	0		0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	:								0		0			0	0	0			0		0	0	0
6	0	0	0	:	0	0	0	0	0				0			0						0	0			0
7		0	0					0	0				0			0	0		0					0		0
8	0	0	0		0	0	0	0		:	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	:	0	0	0	0	0	0	0	0:	:	:	:	:	:	:	:	0	0	0	0	0	0	0
10	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	:	0	0	0	0	0	0																0
13									0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	1	1	0	:	1	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	:	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	:	0	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	:	0	0	0	0	0	0	13		0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	:	0	0	0	0	0	0		2	4	1	0	2	4	4	4	5	4	6	6	7		2
24	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	:	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	:	0	0	0	0	0	0	0:	:	:	:	:	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	:	0	0	0	0	0	0	0:	:	:	:	:	0	0	0	0	0	0	0	0	0	0	0
MEAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL NUMBER OF OBSERVATIONS = 6282. MEAN = 0.

: INDICATES CALIBRATION DURING THE HOUR

RADIAN

CORPORATION

09

DIURNAL VARIATION OF METHANE(UG/M**3 X 10**-1)
TRAILER NO. - 33 PERIOD(3/ 1/79 TO 3/31/79)

DAY	HOUR																								MEAN	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1		135	132		: 171	152	112	115	103	101	100	99	100	95	99	100		95	103	103	104	121	106	104	112	
2	104	95	94		: 100	107	111	114	113	91					86						70		79		98	
3	68	73		72			89			82	78			71		79				90			95	81	80	
4	87	99	100			104	101	101	102		95	102		89	98	98		99	106	105	116	154	160	135	129	109
5	144	140	124			113	112	87				98		75				96	108	92			87		93	106
6	109	113	115		: 158	146	145	169	124				89									85	91		122	
7		92	101					108	106				85			81	77		99					108	96	
8	123	104	126		: 128	144	142	144			: 103	: 101	100	102	101	102	101	100	101	125	101	98	95	94	111	
9	93	93	92		: 92	91	91	91	91	91	91	91							91	92	91	91	92	93	92	
10	92	119	119		: 91	91	93	109	112	118	113	111	109	111	117	111	107	100	98	100	106	107	111	113	107	
11	117	110	111		: 116	135	139	121	111	104	106	103	100	102	101	101	101	102	110	105	109	117	124	118	112	
12	120	125	135		: 115	112	123	118	113	107															119	
13											: 96	96	95	95	94	93	93	92	93	92	92	91	93	92	93	
14	91	91	92		: 97	97	99	101	115	113	104	102	100	99	99	97	97	101	139	102	108	109	111	140	105	
15	121	99	96		: 102	106	106	106	100	100	99	98	99	103	101	101	103	104	104	102	103	103	103	103	103	
16	102	104	124		: 109	105	106	104	104	107	106	105	106	107	108	110	110	109	112	110	110	117	123	182	112	
17	197	178	137		: 144	176	113	102	102	99	101	100	96	93	94	96	97	97	98	104	98	95	95	93	113	
18	98	97	95		: 91	91	91	91	91	92	92	92	91	91	92	91	91	93	92	91	91	92	91	91	92	
19	91	93	95		: 97	101	102	100	94	99	98	94	94	93	97	91	94	94	101	104	99	92	94	91	96	
20	94	153	127		: 97	96	127	138	119	101	104	97	104	116	125	116	102	113	104	119	125	105	107	139	114	
21	106	98	97		: 97	104	92	113	185	94	91	92	91	92	97	106	117	129	91	92	91	91	94	102	103	
22	97	99	97		: 93	98	97	95	92	91	95	96	96	94	98	95	91	91	107	108	105	108	117	118	99	
23	114	110	123		: 116	100	97	102	100	99	98		93	95	96	96	95	96	97	97	98	102	100	103	101	
24	113	117	128		: 121	111	103	106	103	100	99	98	98	97	96	97	98	96	100	98	99	124	122	118	106	
25	111	111	113		: 137	153	188	131	118	104	99	99	105	102	100	100	103	104	103	99	101	103	110	109	113	
26	117	109	118		: 107	99	95	94	94	94	93	92	92	92	92	92	92	92	92	92	92	92	92	92	96	
27	92	92	92		: 92	93	96	100	94	93	93	94	95	94	94	96	96	97	100	99	107	103	98	95	96	
28	95	92	92		: 91	91	91	92	92	92	91	93	93	93	93	96	93	92	92	92	93	93	93	93	93	
29	92	93	92		: 92	92	92	92	93	93	93	93	92	92	92	93	97	98	105	93	96	92	91	92	94	
30	92	92	92		: 92	93	93	92	92	92	92	91	92	91	91	91	91	92	91	91	91	91	91	91	92	
31	91	91	91		: 95	96	92	96	95	94	92	92	99	93	94	95	95	96	97	97	95	91	91	91	94	
MEAN	107	107	109	72	109	110	108	108	106	98	97	97	97	96	98	98	98	100	101	101	101	103	102	106		

TOTAL NUMBER OF OBSERVATIONS = 7242. MEAN = 103.

: INDICATES CALIBRATION DURING THE HOUR

III. BAG SAMPLING PROGRAM

Grab-bag samples are collected bi-weekly and analyzed for methane. The ambient air samples are collected in tedlar bags using a metal bellows pump connected to the ambient sample manifold. Each bag sample is collected over a three-hour period.

The bag samples are returned to Austin for analysis for methane concentration. The analysis is performed on either a Bendix 8202 or a Baseline Industries Model 1030 gas chromatograph using a flame ionization detector. The minimum detectable limit using this technique is less than 1 ppm.

Results of the bag sampling analyses are given below:

<u>Date</u>	<u>Time</u>	<u>Methane Concentration (ppm)</u>
4/12/79	0600-0900	2.00
4/26/79	0600-0900	1.65

TABLE I.
DOWNTIME HOURS FOR CHOCOLATE BAYOU

SITE 033

DIGITIZING					
DATE	SYSTEM	SO2	H2S	CH4	PART
4/ 1/79	0.	0.	0.	0.	-
4/ 2/79	0.	0.	0.	0.	0.
4/ 3/79	9.	0.	0.	0.	-
4/ 4/79	11.	0.	0.	0.	-
4/ 5/79	0.	0.	0.	0.	0.
4/ 6/79	0.	0.	0.	0.	-
4/ 7/79	0.	0.	0.	0.	0.
4/ 8/79	0.	0.	0.	0.	0.
4/ 9/79	0.	0.	0.	0.	0.
4/10/79	0.	0.	0.	0.	-
4/11/79	0.	0.	0.	0.	0.
4/12/79	0.	0.	0.	0.	0.
4/13/79	0.	0.	0.	0.	0.
4/14/79	0.	0.	0.	0.	-
4/15/79	0.	0.	0.	0.	0.
4/16/79	0.	0.	0.	0.	0.
4/17/79	0.	0.	0.	0.	0.
4/18/79	0.	0.	0.	0.	-
4/19/79	6.	0.	0.	0.	-
4/20/79	0.	0.	0.	0.	0.
4/21/79	0.	0.	0.	0.	0.
4/22/79	0.	0.	0.	0.	-
4/23/79	0.	0.	0.	0.	0.
4/24/79	0.	0.	0.	0.	0.
4/25/79	1.	0.	0.	0.	0.
4/26/79	0.	0.	0.	0.	-
4/27/79	0.	0.	0.	0.	0.
4/28/79	0.	0.	0.	0.	0.
4/29/79	0.	0.	0.	0.	0.
4/30/79	1.	0.	0.	0.	-
CAL TIME		15.	15.	14.	
DATA CAPTURE RATE (%)		96	96	96	100

Data capture exceeded 90 percent for all parameters. The system downtime on the 3rd and 4th was caused by a power failure during heavy electrical storm activities in the area. Six hours of downtime occurred on the 19th as a result of a data system malfunction. No other major downtime occurred during the month.

TABLE II
NATIONAL AMBIENT AIR QUALITY STANDARDS

	<u>Primary</u>	<u>Secondary</u>
<u>Particulate</u>		
Annual G.M.**	75 $\mu\text{g}/\text{m}^3$	60 $\mu\text{g}/\text{m}^3$
24 Hr. Max.*	260	150
<u>Sulfur Oxides</u>		
Annual	80 (.03 ppm)	
24 Hr. Max.*	365 (.14 ppm)	
3 Hr. Max.*	--	1300 (.5 ppm)
<u>Oxidant</u>		
1 Hr. Max.†	235 (.12 ppm)	235
<u>Hydrocarbons</u>		
3 Hr. Max.*	160 (.24 ppm)	160
6-9 a.m.		
<u>Carbon Monoxide</u>		
$\mu\text{g}/\text{m}^3$		
Max. 8 Hrs.*	10000 (9 ppm)	10000
Max. 1 Hr.*	40000 (35 ppm)	40000
<u>Nitrogen Dioxide</u>		
Annual	100 (.05 ppm)	100

Units are micrograms per cubic meter and ppm in parentheses.

*Not to be exceeded more than once per year.

**Geometric Mean.

†Not to be exceeded on more than one day per calendar year.

TABLE III. AVERAGES FOR APR 1 THRU 30 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO2)

HYDROGEN SULFIDE

METHANE

SITE 033
.1

033
.0

033
1083.5

PARTICULATE

SITE 033
40.3

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TABLE IV. DAILY AVERAGES FOR APR 1 THRU 30 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO2)		HYDROGEN SULFIDE		METHANE	
DATE	SITE 033	033		033	
4/ 1	.0	.0		918.1	
4/ 2	.0	.0		1006.7	
4/ 3	.0	.0		1055.9	
4/ 4	.0	.0		1250.7	
4/ 5	.6	.0		1269.1	
4/ 6	.0	.0		1220.8	
4/ 7	.0	.0		997.0	
4/ 8	.0	.0		924.6	
4/ 9	.4	.2		1038.1	
4/10	.3	.0		942.5	
4/11	.0	.0		912.6	
4/12	.0	.0		974.9	
4/13	.0	.0		1108.5	
4/14	.3	.0		1306.1	
4/15	.0	.0		1154.0	
4/16	.6	.0		1139.6	
4/17	.7	.0		988.8	
4/18	.0	.0		1028.0	
4/19	.0	.0		973.7	
4/20	.0	.0		957.0	
4/21	.0	.0		1154.8	
4/22	.0	.0		1043.1	
4/23	.0	.0		1039.7	
4/24	.0	.0		1150.8	
4/25	.3	.2		1048.3	
4/26	.0	.0		1039.6	
4/27	.0	.0		1119.1	
4/28	.0	.0		1164.6	
4/29	.3	.0		1077.2	
4/30	.0	.0		1556.5	

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TABLE IV. DAILY AVERAGES FOR APR 1 THRU 30 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

PARTICULATE

SITE 033
DATE

4/ 1	
4/ 2	46.0
4/ 3	
4/ 4	
4/ 5	33.0
4/ 6	
4/ 7	49.0
4/ 8	46.0
4/ 9	33.0
4/10	
4/11	65.0
4/12	46.0
4/13	60.0
4/14	
4/15	67.0
4/16	91.0
4/17	24.0
4/18	
4/19	
4/20	27.0
4/21	27.0
4/22	
4/23	20.0
4/24	34.0
4/25	18.0
4/26	
4/27	59.0
4/28	62.0
4/29	32.0
4/30	

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TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR APR 1 THRU 30 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO2)

SITE 033
DATE

4/ 1	.0(0:00)
4/ 2	.0(0:00)
4/ 3	.0(0:00)
4/ 4	.0(11:05)
4/ 5	132.9(11:40)
4/ 6	.0(0:00)
4/ 7	.0(0:00)
4/ 8	.0(0:00)
4/ 9	86.0(8:25)
4/10	86.0(19:00)

4/11	.0(0:00)
4/12	.0(0:00)
4/13	.0(0:00)
4/14	70.3(5:00)
4/15	.0(0:00)
4/16	91.2(17:00)
4/17	91.2(22:00)
4/18	.0(0:00)
4/19	.0(0:00)
4/20	.0(0:00)

4/21	.0(0:00)
4/22	.0(0:00)
4/23	.0(0:00)
4/24	.0(0:00)
4/25	18.2(12:40)
4/26	.0(0:00)
4/27	.0(0:00)
4/28	.0(0:00)
4/29	7.8(15:00)
4/30	.0(0:00)

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TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR APR 1 THRU 30 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

HYDROGEN SULFIDE

DATE	SITE	033
4/ 1		. 0(0: 00)
4/ 2		. 0(0: 00)
4/ 3		. 0(0: 00)
4/ 4		. 0(11: 05)
4/ 5		. 0(0: 00)
4/ 6		. 0(0: 00)
4/ 7		. 0(0: 00)
4/ 8		. 0(0: 00)
4/ 9	27. 7	(12: 05)
4/10		. 0(0: 00)
4/11		. 0(0: 00)
4/12		. 0(0: 00)
4/13		. 0(0: 00)
4/14		. 0(0: 00)
4/15		. 0(0: 00)
4/16		. 0(0: 00)
4/17		. 0(0: 00)
4/18		. 0(0: 00)
4/19		. 0(0: 00)
4/20		. 0(0: 00)
4/21		. 0(0: 00)
4/22		. 0(0: 00)
4/23		. 0(0: 00)
4/24		. 0(0: 00)
4/25	49. 8	(12: 40)
4/26		. 0(0: 00)
4/27		. 0(0: 00)
4/28		. 0(0: 00)
4/29		. 0(0: 00)
4/30		. 0(0: 00)

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TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR APR 1 THRU 30 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

METHANE

SITE 033
DATE

4/ 1	1054. 3(11:35)
4/ 2	1142. 3(11:30)
4/ 3	1170. 9(10:50)
4/ 4	1984. 3(23:45)
4/ 5	2285. 8(3:40)
4/ 6	2230. 5(5:05)
4/ 7	1257. 5(7:55)
4/ 8	1005. 5(22:15)
4/ 9	1299. 9(6:05)
4/10	1205. 4(18:45)

4/11	1043. 3(19:10)
4/12	1129. 9(7:20)
4/13	1891. 2(23:40)
4/14	2129. 5(20:35)
4/15	1605. 9(6:45)
4/16	1718. 6(20:00)
4/17	1648. 9(4:25)
4/18	2032. 5(19:45)
4/19	1128. 6(5:00)
4/20	1462. 7(18:00)

4/21	1781. 1(2:10)
4/22	1251. 0(17:05)
4/23	1206. 1(0:20)
4/24	1955. 6(4:35)
4/25	1574. 7(7:05)
4/26	1297. 3(23:15)
4/27	1667. 8(5:20)
4/28	1706. 9(19:35)
4/29	2160. 8(12:30)
4/30	2021. 4(10:45)

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UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METERSULFUR DIOXIDE
30-MINUTE

SITE	033	
1	4/16(16:30-17:00)	15.2
2	4/17(21:30-22:00)	15.2
3	4/ 9(7:55- 8:25)	14.3
4	4/10(18:30-19:00)	14.3
5	4/16(12:35-13:05)	14.3

SULFUR DIOXIDE
3-HOUR

SITE	033	
1	4/17(7:00-10:00)	3.0
2	4/29(12:55-15:55)	2.6
3	4/16(14:00-17:00)	2.5
4	4/17(19:00-22:00)	2.5
5	4/ 9(5:25- 8:25)	2.4

SULFUR DIOXIDE
24-HOUR

SITE	033	
1	4/16- 4/17(11:00)	1.0
2	4/ 4- 4/ 5(13:00)	.6
3	4/ 8- 4/ 9(15:00)	.4
4	4/29- 4/30(11:00)	.4
5	4/17- 4/18(12:00)	.3

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TABLE VI. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR APR 1-30 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER

SITE		033	HYDROGEN SULFIDE 1-HOUR
1	4/25(12:35-13:35)	4.2	
2	4/ 9(11:05-12:05)	4.0	
3	4/25(10:35-11:35)	.1	

TABLE VI. THE FIVE MAXIMUM AVERAGES FOR APR 1-30 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER

SITE		033		METHANE 3-HOUR (6-9AM)	
1	4/ 6(	6:00-	9:00)	1469.4	
2	4/24(	6:00-	9:00)	1384.7	
3	4/14(	6:00-	9:00)	1362.7	
4	4/15(	6:00-	9:00)	1332.9	
5	4/ 5(	6:00-	9:00)	1325.3	

DIURNAL VARIATION OF SULFUR DIOXIDE(UG/M**3)
TRAILER NO. - 33 PERIOD(4/ 1/79 TO 4/30/79)

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4				:								0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	:	0	0	0	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	:	0	0	0	0	7	0	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0
10	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0
11	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	:	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	:	0	0	0	0	0	0	0	0	0	7	0	0	0	8	0	0	0	0	0	0	1
17	0	0	0	:	0	0	0	0	0	3	6	0	0	0	0	0	0	0	0	0	0	0	8	0	1
18	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	:	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0
20	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0
30	0	0	0	:	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL NUMBER OF OBSERVATIONS = 7924. MEAN = 0.

: INDICATES CALIBRATION DURING THE HOUR

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DIURNAL VARIATION OF HYDROGEN SULFIDE (UG/M**3)
TRAILER NO. - 33 PERIOD(4/ 1/79 TO 4/30/79)

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4				:																					
5	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL NUMBER OF OBSERVATIONS = 7924. MEAN = 0.

: INDICATES CALIBRATION DURING THE HOUR

RADIAN CORPORATION

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DIURNAL VARIATION OF METHANE(UG/M**3 X 10**-1)
TRAILER NO. - 33 PERIOD(4/ 1/79 TO 4/30/79)

DAY	HOUR																								MEAN	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1	91	91	91	:	91	91	91	92	91	92	92	93	93	91	92	92	92	92	91	92	93	93	92	91	92	
2	91	91	94	:	91	93	93	96	102	102	107	111	110	112	108	107	109	102	101	103	100	101	98	98	101	
3	97	100	100	:	102	102	104	110	107	108	111	110	109	112	109										106	
4												110	111	112	110	108	107	109	112	119	132	147	155	193	125	
5	202	187	179	:	140	141	135	139	125	112	108		106	106	104	105	106	110	106	118	121	118	107	104	126	
6	106	103	110	:	157	202	172	154	115	118	118	110	108	108	118	116	118	113	113	117	114	109	105	104	122	
7	108	100	99	:	100	105	105	105	103	100	102	99	99	101	102	99	98	102	98	98	95	93	94	92	100	
8	94	93	93	:	92	92	92	92	91	92	93	92	92	91	92	92	91	92	92	92	92	93	95	95	92	
9	99	98	101	:	104	114	117	107	106	107	106	105	103	102	103	102	103	105	102	103	102	100	100	103	104	
10	101	101	98	:	94	96	101	99	101	98	93	91	91	91	91	91	92	91	95	91	91	91	90	91	94	
11	90	91	90	:	89	88	90	90	91	91	93	92	94	95	93	91	92	92	96	92	92	91	90	90	91	
12	90	90	91	:	91	91	99	108	108	102	103	102	102	99	104	102	102	103	95	97	94	91	91	92	98	
13	93	94	97	:	102	99	96	98	109	110	110	101	102	107	105	102	103	106	114	116	122	141	151	179	111	
14	176	200	201	:	174	162	144	138	128	109	108	106	103	103	102	103	104	105	112	113	140	129	113	117	130	
15	114	114	109	:	116	126	143	133	124	124	119	110	107	110	108	111	107	112	120	119	120	105	102	105	116	
16	108	109	106	:	114	110	109	114	103	104	111	113	111	112	110	108	123	111	131	147	144	120	104	103	114	
17	103	114	103	:	120	116	102	102	99	91	91	91	91	93	92	91	92	94	99	97	96	98	97	102	99	
18	101	103	102	:	100	107	100	102	104	110	105	96	96	95	98	98	103	104	98	116	123	98	111	96	103	
19	96	95	93	:	102	100	98	96	94							99	100	107	106	99	97	94	88	94	97	
20	94	108	100	:	93	96	92	106	101	91	91	92	94	92	92	92	92	95	102	99	91	92	99	97	96	
21	103	156	166	:	138	121	122	123	103	104	102	102	101	104	114	111	107	111	112	112	115	107	108	105	115	
22	106	107	111	:	107	109	108	110	111	105	101	101	100	100	100	101	101	106	102	100	101	101	101	110	104	
23	111	110	106	:	106	102	102	108	106	106	109	111	100	97	95	96	102	102	101	100	103	103	106	110	104	
24	108	111	115	115:	157	160	164	135	117	113	105	102	102	101	104	104	103	102	101	111	104	105	110	115	115	
25	113	111	111	113:	114	123	133	126	116	113	103	100		97	96	96	95	95	94	94	96	93	95	94	105	
26	100	95	96	97:	98	98	102	98	101	101	99	100	100	102	100	100	103	102	102	113	116	125	123	123	104	
27	109	113	113	140:	146	158	131	121	112	101	99	99	99	99	99	100	102	100	101	102	103	106	116	131	112	
28	138	128	127	130:	129	138	125	114	106	104	107	108	104	106	107	106	111	109	106	139	127	110	113	111	117	
29	104	100	100	104:	101	118	109	97	106	111	110	108	129	106	99	104	101	101	105	110	112	117	117	119	108	
30	117	114	112	113:	114	115	116	116			117	139	199	197	194	192	189	187	184	182	178	176	173	172	168	156
MEAN	109	111	111	116	113	116	114	111	106	105	105	105	105	105	105	104	105	106	106	110	111	108	108	112	.	

TOTAL NUMBER OF OBSERVATIONS = 7971. MEAN = 108.

: INDICATES CALIBRATION DURING THE HOUR

III. BAG SAMPLING PROGRAM

Grab-bag samples are collected bi-weekly and analyzed for methane. The ambient air samples are collected in tedlar bags using a metal bellows pump connected to the ambient sample manifold. Each bag sample is collected over a three-hour period.

The bag samples are returned to Austin for analysis for methane concentration. The analysis is performed on either a Bendix 8202 or a Baseline Industries Model 1030 gas chromatograph using a flame ionization detector. The minimum detectable limit using this technique is less than 1 ppm.

Results of the bag sampling analyses are given below:

<u>Date</u>	<u>Time</u>	<u>Methane Concentration (ppm)</u>
5/10/79	0600-0900	1.73
5/22/79	0600-0900	2.09

TABLE I.
DOWNTIME HOURS FOR CHOCOLATE BAYOU

SITE 033

DIGITIZING					
DATE	SYSTEM	S02	H2S	CH4	PART
5/ 1/79	0.	0.	0.	0.	0
5/ 2/79	0.	0.	0.	15.	0.
5/ 3/79	0.	0.	0.	15.	0.
5/ 4/79	0.	0.	0.	0.	-
5/ 5/79	0.	0.	0.	0.	0.
5/ 6/79	0.	0.	0.	0.	0.
5/ 7/79	2.	0.	0.	0.	0.
5/ 8/79	0.	0.	0.	0.	-
5/ 9/79	0.	0.	0.	0.	0.
5/10/79	0.	0.	0.	0.	0.
5/11/79	0.	0.	0.	0.	0.
5/12/79	0.	0.	0.	0.	-
5/13/79	0.	0.	0.	0.	0.
5/14/79	0.	0.	0.	0.	0.
5/15/79	0.	0.	0.	0.	0.
5/16/79	0.	3.	0.	0.	-
5/17/79	0.	0.	0.	0.	0.
5/18/79	0.	0.	0.	0.	0.
5/19/79	0.	0.	0.	0.	0.
5/20/79	0.	0.	0.	0.	-
5/21/79	0.	0.	0.	0.	0.
5/22/79	0.	0.	0.	0.	0.
5/23/79	0.	0.	0.	0.	0.
5/24/79	0.	0.	0.	0.	-
5/25/79	0.	0.	0.	0.	0.
5/26/79	0.	0.	0.	0.	0.
5/27/79	0.	0.	0.	0.	0.
5/28/79	0.	0.	0.	0.	-
5/29/79	0.	0.	0.	0.	0.
5/30/79	3.	0.	0.	0.	-
5/31/79	7.	0.	0.	0.	-
CAL TIME		22.	16.	8.	
DATA CAPTURE RATE (%)		98	98	94	100

TABLE II

FEDERAL AND TEXAS STATE AMBIENT AIR QUALITY STANDARDS

Agency	Pollutant	Special Conditions		$\mu\text{g}/\text{m}^3$ Primary	(PPM)	$\mu\text{g}/\text{m}^3$ Secondary	(PPM)
Federal and Texas	SO ₂		Annual	80	.03		
			24-Hour*	365	.14		
			3-Hour*	---		1300	.5
Texas	SO ₂	All Counties Except	30-Minute**	1061	.4	----	
		Harris, Galveston	30-Minute**	743	.28	----	
		Orange, Jefferson	30-Minute**	849	.32	----	
Federal and Texas	Particulate		Annual***	75		60	
			24-Hour*	260		150	
Texas	Particulate		5-Hour**	100		---	
			3-Hour**	200		---	
			1-Hour**	400		---	
Federal and Texas	CO		8-Hour*	10,000	9.	10,000	9.
			1-Hour*	40,000	35.	40,000	35.
Federal and Texas	Photochemical Oxidant	6-9 a.m. (Non-Methane)	1-Hour†	235	.12	235	.12
			3-Hour*	160	.24	160	.24
	NO ₂		Annual	100	.05	100	.05

*Not to be exceeded more than once per year.

**Texas special regulations. Single plant source may not exceed these ambient levels in Texas at any point, at any time.

***Geometric Mean.

†The expected number of exceedances not to occur on more than one calendar day per year.

RADIAN
CORPORATION

TABLE III. AVERAGES FOR MAY 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO2)

HYDROGEN SULFIDE

METHANE

SITE 033
.6

033
.0

033
1038.6

PARTICULATE

SITE 033
36.7

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CORPORATION

TABLE IV. DAILY AVERAGES FOR MAY 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO2)		HYDROGEN SULFIDE		METHANE
SITE	033	033	033	
DATE				
5/ 1	.0	.0		1341.9
5/ 2	.0	.0		
5/ 3	.0	.0		
5/ 4	.0	.0		1015.8
5/ 5	.0	.0		1044.8
5/ 6	.0	.0		1004.7
5/ 7	.0	.0		936.7
5/ 8	.0	.0		937.5
5/ 9	.0	.0		982.9
5/10	.0	.0		923.4
5/11	.0	.0		968.1
5/12	.0	.0		1149.1
5/13	.0	.0		1093.8
5/14	.0	.0		1172.5
5/15	.0	.0		1110.5
5/16	4.7	.0		1261.0
5/17	3.8	.0		1339.7
5/18	1.3	.0		1068.7
5/19	.0	.0		932.7
5/20	.0	.0		926.8
5/21	.1	.0		923.1
5/22	.0	.0		913.9
5/23	.1	.0		1052.6
5/24	4.2	.0		1150.1
5/25	5.1	.0		1169.7
5/26	.0	.0		1083.0
5/27	.0	.0		959.4
5/28	.0	.0		938.0
5/29	.9	.0		909.4
5/30	.0	.0		940.7
5/31	.0	.0		940.7

RADIAN
CORPORATION

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TABLE IV. DAILY AVERAGES FOR MAY 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

PARTICULATE

SITE 033
DATE

5/ 1	44.0
5/ 2	33.0
5/ 3	32.0
5/ 4	
5/ 5	42.0
5/ 6	43.0
5/ 7	24.0
5/ 8	
5/ 9	48.0
5/10	72.0

5/11	33.0
5/12	
5/13	31.0
5/14	44.0
5/15	30.0
5/16	
5/17	66.0
5/18	60.0
5/19	20.0
5/20	

5/21	59.0
5/22	22.0
5/23	19.0
5/24	
5/25	53.0
5/26	43.0
5/27	19.0
5/28	
5/29	33.0
5/30	

5/31

RADIAN
CORPORATION

TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR MAY 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO2)

DATE	SITE	033
5/ 1		.0(0:00)
5/ 2		.0(0:00)
5/ 3		.0(0:00)
5/ 4		.0(0:00)
5/ 5		.0(0:00)
5/ 6		.0(0:00)
5/ 7		.0(0:00)
5/ 8		.0(0:00)
5/ 9		.0(0:00)
5/10		.0(0:00)
5/11		.0(0:00)
5/12		.0(0:00)
5/13		.0(0:00)
5/14		.0(0:00)
5/15		.0(0:00)
5/16		15.6(14:40)
5/17		78.1(13:00)
5/18		10.4(7:00)
5/19		.0(0:00)
5/20		.0(0:00)
5/21		23.4(11:10)
5/22		5.2(4:00)
5/23		18.2(17:00)
5/24		26.0(13:40)
5/25		18.2(2:55)
5/26		.0(0:00)
5/27		.0(0:00)
5/28		.0(0:00)
5/29		39.1(14:55)
5/30		.0(0:00)
5/31		.0(7:10)

RADIAN
CORPORATION

TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR MAY 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

HYDROGEN SULFIDE

SITE 033
DATE

5/ 1	. 0(0:00)
5/ 2	. 0(0:00)
5/ 3	4. 2(14:10)
5/ 4	. 0(0:00)
5/ 5	. 0(0:00)
5/ 6	. 0(0:00)
5/ 7	. 0(0:00)
5/ 8	. 0(0:00)
5/ 9	. 0(0:00)
5/10	. 0(0:00)

5/11	. 0(0:00)
5/12	. 0(0:00)
5/13	. 0(0:00)
5/14	. 0(0:00)
5/15	. 0(0:00)
5/16	. 0(0:00)
5/17	. 0(0:00)
5/18	1. 4(11:35)
5/19	. 0(0:00)
5/20	. 0(0:00)

5/21	. 0(0:00)
5/22	. 0(0:00)
5/23	. 0(0:00)
5/24	. 0(0:00)
5/25	. 0(0:00)
5/26	. 0(0:00)
5/27	. 0(0:00)
5/28	. 0(0:00)
5/29	. 0(0:00)
5/30	. 0(0:00)

5/31	. 0(7:10)
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RADIAN
CORPORATION

TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR MAY 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

METHANE

DATE	SITE	033
5/ 1	1668. 5(0: 05)	
5/ 2	1040. 0(0: 00)	
5/ 3	1171. 6(18: 10)	
5/ 4	2429. 1(8: 45)	
5/ 5	1495. 9(19: 50)	
5/ 6	4167. 2(2: 20)	
5/ 7	2658. 3(13: 00)	
5/ 8	2694. 8(13: 20)	
5/ 9	2378. 9(20: 15)	
5/10	1383. 2(8: 05)	
5/11	2017. 5(7: 05)	
5/12	1337. 0(3: 25)	
5/13	1368. 9(3: 25)	
5/14	1521. 3(5: 00)	
5/15	1392. 3(3: 25)	
5/16	2758. 6(21: 20)	
5/17	3751. 1(6: 40)	
5/18	1509. 6(7: 45)	
5/19	1711. 4(3: 25)	
5/20	1701. 7(3: 25)	
5/21	1703. 6(3: 25)	
5/22	2003. 8(3: 25)	
5/23	1313. 5(1: 25)	
5/24	1725. 1(7: 45)	
5/25	1936. 8(3: 25)	
5/26	1909. 4(6: 15)	
5/27	1893. 8(3: 25)	
5/28	1831. 9(3: 25)	
5/29	1798. 0(3: 25)	
5/30	1609. 8(20: 55)	
5/31	1706. 9(9: 15)	

RADIAN
CORPORATIONTABLE VI. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR MAY 1-31 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER

SITE 033

SULFUR DIOXIDE
30-MINUTE

1	5/24(13:20-13:50)	23.9
2	5/24(8:15- 8:45)	23.4
3	5/17(12:45-13:15)	19.1
4	5/24(8:50- 9:20)	19.1
5	5/24(9:25- 9:55)	18.2

SITE 033

SULFUR DIOXIDE
3-HOUR

1	5/24(6:55- 9:55)	19.6
2	5/25(3:25- 6:25)	13.2
3	5/16(15:40-18:40)	11.7
4	5/24(10:55-13:55)	10.1
5	5/25(6:30- 9:30)	9.7

SITE 033

SULFUR DIOXIDE
24-HOUR

1	5/24- 5/25(7:00)	7.0
2	5/16- 5/17(14:00)	6.9
3	5/25- 5/26(8:00)	1.8
4	5/17- 5/18(16:00)	1.7
5	5/29- 5/30(12:00)	.9

RADIAN

CORPORATION

TABLE VI. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR MAY 1-31 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER

SITE	HYDROGEN SULFIDE	
	1-HOUR	
	033	
1	5/ 3(13:10-14:10)	.3
2	5/18(11:30-12:30)	.1

RADIAN
CORPORATION

TABLE VI. THE FIVE MAXIMUM AVERAGES FOR MAY 1-31 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER

METHANE
3-HOUR (6-9AM)

SITE

033

1	5/17(6:00- 9:00)	2205.7
2	5/16(6:00- 9:00)	1606.1
3	5/24(6:00- 9:00)	1595.1
4	5/26(6:00- 9:00)	1485.8
5	5/ 1(6:00- 9:00)	1462.2

DIURNAL VARIATION OF SULFUR DIOXIDE(UG/M**3)
TRAILER NO. - 33 PERIOD(5/ 1/79 TO 5/31/79)

	HOUR																								MEAN
DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	:	0	0	0	0	0	0:	:	:	:	:	:	0	0	0	0	0	0	0	0	0	0
16	0	0	0	:	0	0	0	0	0	:	:	:	:	:	10	11	11	11	12	9	8	7	6	3	5
17	2	3	1	:	3	3	3	8	9	8	8	9	6	12	4	3	2	2	1	2	1	1	2	2	4
18	1	1	1	:	1	1	1	4	3	2	2:	:	0	0	7	6	1	0	0	0	0	0	0	0	1
19	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	:	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
24	0	0	0	:	0	0	2	18	22	18	6	1	9	20	0	0	0	0	0	0	0	0	0	3	4
25	0	10	14	:	15	12	10	12	11	4	1	6	2	2	0	0	0	2	11	1	0	0	0	0	5
26	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	:	0	0	0	0	0	0	0	0	0	0	6	2	4	8	0	0	0	0	0	0	1
30	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	0	1	1	0	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0

TOTAL NUMBER OF OBSERVATIONS = 8248 MEAN = 1.

: INDICATES CALIBRATION DURING THE HOUR

RADIAN

CORPORATION

06

DIURNAL VARIATION OF HYDROGEN SULFIDE(UG/M**3)
TRAILER NO. - 33 PERIOD(5/ 1/79 TO 5/31/79)

	HOUR																								
DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL NUMBER OF OBSERVATIONS = 8373. MEAN = 0.

: INDICATES CALIBRATION DURING THE HOUR

RADIAN CORPORATION

DIURNAL VARIATION OF METHANE(UG/M**3 X 10**-1)
TRAILER NO. - 33 PERIOD(5/ 1/79 TO 5/31/79)

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	165	163	160	156	154	152	149	146	143	142	139	136	133	132	128	126	115	121	113	117	113	112	109	106	134
2	103	102	98	94	92	91	88	85	82																93
3																82	85	82	87	82	81	84	81	81	83
4	81	81	83	91	91	104	107	126	147	102	98	109	108	104	104	100	106	105	105	103	103	101	101	101	102
5	101	98	97	98	99	100	105	105	113	107	103	100	100	100	104	102	105	106	105	111	112	111	112	111	105
6	109	108	138	114	119	116	114	107	106	97	94	93	92	92	94	95	92	91	91	92	93	90	93	90	101
7	90	95	88	87	90	88	87	89	84	86	86			122	95	93	94	93	96	96	97	102	99	100	94
8	94	92	91	111	91	91	93	91	91	91	91	91	91	109	91	93	93	93	93	93	95	94	95	100	94
9	95	91	91	95	91	91	93	92	91	91	92	92	92	92	91	92	98	125	120	124	134	96	98	92	98
10	92	92	91	95	91	90	90	90	101	89	90	91	90	92	91	92	94	94	91	95	98	92	93	97	92
11	94	101	95	94	89	88	89	109	92	92	96	97	93	93	92	93	97	92	101	98	109	107	106	107	97
12	109	111	109	112	109	111	110	117	123	123	119	118	123	124	120	121	114	112	108	108	109	116	119	112	115
13	111	108	107	115	123	121	129	129	117	104	103	105	104	106	105	105	104	103	105	102	104	106	105	110	109
14	113	111	115	124	136	149	139	128	124	117	112	116	117	105	104	106	107	108	105	104	113	131	130	106	117
15	105	103	106	120	119	123	129	133	121	118	113	107	105	105	104	108	106	103	104	107	107	111	106	108	111
16	105	111	119	133	124	125	139	176	167	146	131	137	125	111	107	106	106	108	115	115	132	157	122	111	126
17	123	124	125	150	175	219	295	184	180	147	112	103	112	103	102	102	102	102	103	114	110	113	113	116	134
18	114	113	124	121	123	124	127	139	124	107	110	106	99	96	94	94	94	95	95	95	95	95	94	94	107
19	93	93	93	104	92	96	102	104	93	91	91	91	91	91	92	92	91	91	91	92	94	91	91	91	93
20	91	92	94	104	94	94	95	96	94	92	92	91	91	92	91	92	91	91	91	91	91	91	92	91	93
21	91	91	92	103	92	93	93	93	92	94	93	91	91	91	91	91	92	91	92	91	93	92	91	92	92
22	92	91	91	107	87	91	94	86	92	96	89	94	91	91	87	82	91	91	91	92	91	92	95	95	91
23	96	114	103	111	117	112	114	113	106	104	101	99	101	99	99	99	100	100	101	108	109	109	109	107	105
24	107	107	110	113	122	138	161	171	148	118	106	104	106	106	105	102	99	98	100	99	97	101	116	132	115
25	128	139	129	151	144	139	149	142	128	120	107	102	102	102	103	105	103	104	106	104	111	103	102	101	117
26	102	102	105	113	113	155	165	140	141	98	98	98	97	98	97	98	98	97	97	98	98	98	99	99	108
27	104	103	102	117	104	101	101	100	104	94	94	92	92	92	91	92	91	91	91	91	91	91	91	91	96
28	92	95	94	109	98	98	99	93	91	91	91	92	91	92	91	91	91	91	91	91	91	93	98	101	94
29	103	102	91	103	91	89	88	88	88	87	87	88	89	94	99	95	94	90	90	87	87	89	87	86	91
30	85	85	85	85	86	88	91	89	86	86	85	92	94	95	96	91	95	91	102	123	144				94
31								136	117	110	88	88	87	89	89	92	89	89	91	90	89	88	89	90	94
MEAN	103	104	104	112	109	113	119	117	112	105	100	101	100	101	99	98	98	98	99	100	103	102	101	101	

TOTAL NUMBER OF OBSERVATIONS = 8241. MEAN = 104.

: INDICATES CALIBRATION DURING THE HOUR

III. BAG SAMPLING PROGRAM

Grab-bag samples are collected bi-weekly and analyzed for methane. The ambient air samples are collected in tedlar bags using a metal bellows pump connected to the ambient sample manifold. Each bag sample is collected over a three-hour period.

The bag samples are returned to Austin for analysis for methane concentration. The analysis is performed on either a Bendix 8202 or a Baseline Industries Model 1030 gas chromatograph using a flame ionization detector. The minimum detectable limit using this technique is less than 1 ppm.

Results of the bag sampling analyses are given below:

<u>Date</u>	<u>Time</u>	<u>Methane Concentration (ppm)</u>
6/ 7/79	0600-0900	1.67
6/19/79	0600-0900	1.65

TABLE I.
DOWNTIME HOURS FOR CHOCOLATE BAYOU

SITE 033

DIGITIZING					
DATE	SYSTEM	SO2	H2S	CH4	PART
6/ 1/79	0.	0.	0.	0.	0.
6/ 2/79	0.	0.	0.	0.	-
6/ 3/79	0.	0.	0.	0.	0.
6/ 4/79	0.	0.	0.	0.	0.
6/ 5/79	0.	0.	0.	0.	0.
6/ 6/79	2.	0.	0.	0.	-
6/ 7/79	0.	0.	0.	0.	0.
6/ 8/79	0.	0.	0.	0.	0.
6/ 9/79	0.	0.	0.	0.	0.
6/10/79	0.	0.	0.	0.	-
6/11/79	0.	0.	0.	0.	0.
6/12/79	0.	0.	0.	0.	0.
6/13/79	2.	0.	0.	0.	0.
6/14/79	0.	0.	0.	0.	-
6/15/79	0.	0.	0.	0.	0.
6/16/79	0.	0.	0.	0.	0.
6/17/79	0.	0.	0.	0.	0.
6/18/79	1.	0.	0.	0.	-
6/19/79	0.	0.	0.	0.	0.
6/20/79	3.	0.	0.	0.	0.
6/21/79	0.	0.	0.	0.	0.
6/22/79	0.	0.	0.	0.	-
6/23/79	0.	0.	0.	0.	0.
6/24/79	0.	0.	0.	0.	0.
6/25/79	0.	0.	0.	0.	0.
6/26/79	7.	0.	0.	0.	-
6/27/79	13.	0.	0.	0.	-
6/28/79	0.	0.	0.	0.	0.
6/29/79	0.	0.	0.	0.	0.
6/30/79	0.	0.	0.	0.	0.
CAL TIME		26.	19.	12.	
DATA CAPTURE RATE (%)		96	96	96	100

Downtime Summary for June 1979

There was no significant data loss during June. Data capture exceeded 95 percent for all parameters.

TABLE II

FEDERAL AND TEXAS STATE AMBIENT AIR QUALITY STANDARDS

Agency	Pollutant	Special Conditions		$\mu\text{g}/\text{m}^3$ Primary	(PPM)	$\mu\text{g}/\text{m}^3$ Secondary	(PPM)
Federal and Texas	SO ₂		Annual	80	.03		
			24-Hour*	365	.14		
			3-Hour*	---		1300	.5
Texas	SO ₂	All Counties Except	30-Minute**	1061	.4	----	
		Harris, Galveston	30-Minute**	743	.28	----	
		Orange, Jefferson	30-Minute**	849	.32	----	
Federal and Texas	Particulate		Annual***	75		60	
			24-Hour*	260		150	
Texas	Particulate		5-Hour**	100		---	
			3-Hour**	200		---	
			1-Hour**	400		---	
Federal and Texas	CO		8-Hour*	10,000	9.	10,000	9.
			1-Hour*	40,000	35.	40,000	35.
Federal and Texas	Photochemical Oxidant HC (Non-Methane) NO ₂	6-9 a.m.	1-Hour†	235	.12	235	.12
			3-Hour*	160	.24	160	.24
			Annual	100	.05	100	.05

*Not to be exceeded more than once per year.

**Texas special regulations. Single plant source may not exceed these ambient levels in Texas at any point, at any time.

***Geometric Mean.

†The expected number of exceedances not to occur on more than one calendar day per year.

RADIAN
CORPORATION

TABLE III. AVERAGES FOR JUNE 1 THRU 30 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO2)

HYDROGEN SULFIDE

METHANE

SITE 033
.5

033
.0

033
974.8

PARTICULATE

SITE 033
35.6

TABLE IV. DAILY AVERAGES FOR JUNE 1 THRU 30 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO2)		HYDROGEN SULFIDE		METHANE
DATE	SITE 033	033		033
6/ 1	.0	.0		938.3
6/ 2	.0	.0		885.3
6/ 3	.0	.0		957.3
6/ 4	.0	.0		936.1
6/ 5	.0	.0		856.5
6/ 6	.0	.0		851.1
6/ 7	.0	.0		859.2
6/ 8	.0	.0		883.6
6/ 9	.0	.0		936.4
6/10	6.2	.0		1201.5
6/11	8.4	.0		1076.3
6/12	.0	.0		1099.1
6/13	.0	.0		1170.7
6/14	.0	.0		1092.8
6/15	.0	.0		1179.0
6/16	.0	.0		1029.7
6/17	.0	.0		908.0
6/18	.4	.0		867.5
6/19	.0	.0		839.1
6/20	.0	.0		860.0
6/21	.0	.0		879.1
6/22	.0	.0		924.1
6/23	.0	.0		881.5
6/24	.0	.0		903.8
6/25	.0	.0		966.6
6/26	.0	.0		1171.2
6/27	.0	.0		
6/28	.0	.0		1076.0
6/29	.0	.0		1015.6
6/30	.0	.0		1033.6

RADIAN
CORPORATION

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TABLE IV. DAILY AVERAGES FOR JUNE 1 THRU 30 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

PARTICULATE

SITE 033
DATE

6/ 1	22.0
6/ 2	
6/ 3	20.0
6/ 4	20.0
6/ 5	13.0
6/ 6	
6/ 7	25.0
6/ 8	36.0
6/ 9	47.0
6/10	

6/11	54.0
6/12	53.0
6/13	61.0
6/14	
6/15	86.0
6/16	42.0
6/17	24.0
6/18	
6/19	37.0
6/20	35.0

6/21	32.0
6/22	
6/23	37.0
6/24	26.0
6/25	45.0
6/26	
6/27	
6/28	49.0
6/29	47.0
6/30	46.0

RADIAN

CORPORATION

TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR JUNE 1 THRU 30 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO2)

DATE	SITE	033
6/ 1		.0(0:00)
6/ 2		.0(0:00)
6/ 3		.0(0:00)
6/ 4		2.6(0:00)
6/ 5		7.8(8:10)
6/ 6		5.2(23:00)
6/ 7		5.2(7:00)
6/ 8		7.8(2:00)
6/ 9		2.6(23:40)
6/10		23.4(23:30)
6/11		28.7(1:10)
6/12		5.2(6:40)
6/13		.0(0:00)
6/14		.0(0:00)
6/15		.0(0:00)
6/16		.0(0:00)
6/17		.0(0:05)
6/18		28.7(9:10)
6/19		.0(0:00)
6/20		.0(0:00)
6/21		.0(0:00)
6/22		.0(0:00)
6/23		.0(0:00)
6/24		.0(0:00)
6/25		.0(0:00)
6/26		.0(0:00)
6/27		.0(13:05)
6/28		.0(0:00)
6/29		.0(0:00)
6/30		.0(0:00)

RADIAN
CORPORATION

TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR JUNE 1 THRU 30 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

HYDROGEN SULFIDE

SITE 033
DATE

6/ 1	.0(0:00)
6/ 2	.0(0:00)
6/ 3	.0(0:00)
6/ 4	.0(0:00)
6/ 5	.0(0:00)
6/ 6	.0(0:00)
6/ 7	.0(0:00)
6/ 8	.0(0:00)
6/ 9	.0(0:00)
6/10	.0(0:00)

6/11	.0(0:00)
6/12	.0(0:00)
6/13	.0(0:00)
6/14	.0(0:00)
6/15	.0(0:00)
6/16	.0(0:00)
6/17	.0(0:00)
6/18	2.8(10:00)
6/19	.0(0:00)
6/20	.0(0:00)

6/21	.0(0:00)
6/22	.0(0:00)
6/23	.0(0:00)
6/24	.0(0:00)
6/25	.0(0:00)
6/26	5.5(14:00)
6/27	.0(13:05)
6/28	.0(0:00)
6/29	.0(0:00)
6/30	.0(0:00)

RADIAN CORPORATION

TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR JUNE 1 THRU 30 1979.
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

METHANE

SITE 033	
DATE	
6/ 1	1403.4(0:05)
6/ 2	1219.1(3:25)
6/ 3	1534.3(7:00)
6/ 4	2904.5(11:00)
6/ 5	1236.0(3:25)
6/ 6	1206.7(3:25)
6/ 7	1286.8(3:25)
6/ 8	1101.9(3:25)
6/ 9	1273.2(18:25)
6/10	2909.0(8:15)
6/11	1680.8(9:10)
6/12	1631.3(2:25)
6/13	2195.9(9:05)
6/14	1441.8(3:25)
6/15	2163.4(7:10)
6/16	2152.3(3:25)
6/17	2095.7(3:25)
6/18	2104.1(3:25)
6/19	907.8(18:05)
6/20	2385.5(22:05)
6/21	2052.0(3:25)
6/22	2019.5(3:25)
6/23	2061.1(3:25)
6/24	2069.0(3:25)
6/25	2130.8(3:25)
6/26	2269.5(8:05)
6/27	1123.4(23:10)
6/28	2070.3(3:25)
6/29	2094.4(3:25)
6/30	2056.6(8:05)

RADIAN
CORPORATIONTABLE VI. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR JUN 1-30 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER

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SITE		033	SULFUR DIOXIDE 30-MINUTE
1	6/11(1:05- 1:35)	28.7	
2	6/11(1:40- 2:10)	28.7	
3	6/11(2:15- 2:45)	26.9	
4	6/11(3:55- 4:25)	24.7	
5	6/11(7:30- 8:00)	19.5	

SITE		033	SULFUR DIOXIDE 3-HOUR
1	6/11(0:10- 3:10)	26.9	
2	6/11(3:55- 6:55)	19.5	
3	6/11(7:00-10:00)	17.9	
4	6/10(9:05-12:05)	12.5	
5	6/ 9(23:25- 2:25)	9	

SITE		033	SULFUR DIOXIDE 24-HOUR
1	6/10- 6/11(10:00)	11.7	
2	6/17- 6/18(10:00)	.4	
3	6/ 6- 6/ 7(8:00)	.0	
4	6/ 7- 6/ 8(9:00)	.0	
5	6/11- 6/12(11:00)	.0	

RADIAN

CORPORATION

TABLE VI. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR JUN 1-30 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER

HYDROGEN SULFIDE 1-HOUR

SITE	033	
1	6/26(13:45-14:45)	.5
2	6/18(9:00-10:00)	.2

RADIAN
CORPORATION

TABLE VI. THE FIVE MAXIMUM AVERAGES FOR JUN 1-30 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER

METHANE
3-HOUR (6-9AM)

SITE	033
1	6/10(6:00- 9:00) 2084.0
2	6/26(6:00- 9:00) 1867.4
3	6/15(6:00- 9:00) 1669.0
4	6/16(6:00- 9:00) 1453.0
5	6/28(6:00- 9:00) 1372.3

RADIAN

CORPORATION

DIURNAL VARIATION OF SULFUR DIOXIDE(UG/M**3)
TRAILER NO. - 33 PERIOD(6/ 1/79 TO 6/30/79)

	HOUR																								MEAN
DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	:	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	1	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
10	1	1	1	:	7	9	12	11	9	12	13	12	4	0	0	0	0	0	0	0	3	10	16	22	6
11	24	29	28	:	22	18	18	19	18	17	4	0	0	0	0	0	0	0	0	0	0	0	0	0	9
12	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	:	0	0	0	0	0	0	:	:	:	:	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	:	0	0	0	0	0	17	:	:	0	0	0	0	0	0	0	0	0	0	0	0	1
19	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	:	0	0	0	0	0	0	0	0	0	:	0	0	0	:	:	:	:	:	:	:	0
21	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	1	1	1	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	

TOTAL NUMBER OF OBSERVATIONS = 7778. MEAN = 1.

: INDICATES CALIBRATION DURING THE HOUR

DIURNAL VARIATION OF HYDROGEN SULFIDE(UG/M**3)
TRAILER NO. - 33 PERIOD(6/ 1/79 TO 6/30/79)

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27																									
28	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL NUMBER OF OBSERVATIONS = 7680. MEAN = 0.

: INDICATES CALIBRATION DURING THE HOUR

RADIAN

CORPORATION

DIURNAL VARIATION OF METHANE(UG/M**3 X 10**-1)
TRAILER NO. - 33 PERIOD(6/ 1/79 TO 6/30/79)

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	106	99	94	99	107	112	118	111	94	91	84	89	91	89	90	89	86	88	86	85	86	85	86	90	94
2	87	87	87	91	86	86	86	86	88	91	91	88	88	86	86	87	88	88	88	89	91	94	95	95	89
3	93	98	100	106	99	117	135	115	86	87	86	88	93	93	89	87	86	88	88	89	98	95	92	97	96
4	94	97	101	109	106	105	106	112	106	91	89	104	86	86	86	85	85	85	85	88	86	87	91	94	
5	91	87	87	93	87	86	88	86	85	84	84	84	85	85	85	84	84	84	84	84	84	85	86	87	86
6	87	86	85	90	85	85	85			85	86	86	85	85	85	85	85	85	85	85	84	84	84	84	85
7	84	85	84	90	88	85	88	84	83	84	84	84	88	86	86	87	86	87	87	87	87	87	87	88	86
8	87	86	86	90	86	86	86	87	88	87	88	88	87	87	87	87	88	88	90	91	91	92	96	94	88
9	89	89	89	94	91	91	90	94	91	92	90	89	90	92	93	92	93	92	97	97	97	100	105	113	94
10	112	101	104	99	96	127	165	231	229	123	109	110	108	104	103	102	101	101	103	103	114	107	109	115	120
11	118	118	126	132	111	105	105	105	101	105	97	97	97	100	99	99	101	98	97	97	102	118	132	134	108
12	117	133	155	128	122	120	121	119	112	106	103	99	99	100	99	99	99	98	102	101	102	106	103	106	110
13	125	141	138	130	130	137	156			183	130	102	100	100	99	100	103	101	100	101	101	108	103	101	117
14	106	121	126	126	121	121	120	119	123	112	105	112	109	109	104	102	97	96	97	97	99	103	102	106	109
15	106	111	113	119	173	163	173	193	134	106	97	101	100	99	101	100	101	101	102	100	106	100	104	127	118
16	112	105	104	126	112	127	146	159	131	100	91	91	91	91	91	91	89	83	90	91	91	91	91	91	103
17	93	91	91	107	91	91	91	88	87	89	90	91	91	91	91	92	91	91	91	91	92	91	90	89	91
18	89	88	88	105	88	88		87	87	87	78	82	88	89	87	86	85	85	86	85	86	88	88	86	87
19	85	84	84	83	83	83	83	84	83	83	82	83	84	84	85	85	84	84	85	84	85	84	85	85	84
20	85	85	84	86	88	87	88	87			85	85	84	85	84	85			84	84			100	86	86
21	86	88	86	103	87	92	93	91	88	86	86	87	88	86	86	86	86	87	87	87	87	87	90	90	88
22	95	103	94	107	93	100	106	103	102	92	87	88	88			87	87	87	86	87	87	88	88	90	93
23	90	91	91	106	90	87	87	88	87	87	88	87	87	88	88	87	87	86	86	87	87	88	89	88	88
24	89	88	89	107	100	96	101	103	96	87	87	90	94	92	89	87	85	86	86	86	86	85	86	87	90
25	89	92	112	122	108	115	119	115	110	91	88	88	89	89	92	88	86	88	86	85	86	86	87	122	97
26	93	92	98	121	105	117	181	193	187	115	106	108	99	91	91	96	96								117
27														92	105	103	99	100	97	97	100	99	102	109	100
28	110	111	112	122	123	158	153	141	119	111	98	94	97	96	90	95	93	94	96	91	94	95	96	101	108
29	105	106	120	128	122	128	123	117	107	99	92	93	92	92	92	92	91	90	89	89	91	95	96	102	102
30	116	119	108	115	108	128	133	137	136	101	91	92	92	91	89	91	88	88	91	91	94	95	94	98	103
MEAN	98	99	101	108	103	108	115	116	109	98	92	92	92	92	91	91	91	90	91	91	93	94	95	98	

TOTAL NUMBER OF OBSERVATIONS = 8075. MEAN = 98.

: INDICATES CALIBRATION DURING THE HOUR

III. BAG SAMPLING PROGRAM

Grab-bag samples are collected bi-weekly and analyzed for methane. The ambient air samples are collected in tedlar bags using a metal bellows pump connected to the ambient sample manifold. Each bag sample is collected over a three-hour period.

The bag samples are returned to Austin for analysis for methane concentration. The analysis is performed on either a Bendix 8202 or a Baseline Industries Model 1030 gas chromatograph using a flame ionization detector. The minimum detectable limit using this technique is less than 1 ppm.

Results of the bag sampling analyses are given below:

<u>Date</u>	<u>Time</u>	<u>Methane Concentration (ppm)</u>
7/17/79	0600-0900	2.26
7/31/79	0600-0900	1.64

TABLE I.
DOWNTIME HOURS FOR CHOCOLATE BAYOU

SITE 033

DIGITIZING					
DATE	SYSTEM	SO2	H2S	CH4	PART
7/ 1/79	0.	0.	0.	0.	-
7/ 2/79	0.	0.	0.	0.	0.
7/ 3/79	0.	0.	0.	0.	0.
7/ 4/79	0.	0.	0.	0.	0.*
7/ 5/79	6.	0.	0.	0.	-
7/ 6/79	0.	0.	0.	0.	0.
7/ 7/79	0.	0.	0.	0.	0.
7/ 8/79	0.	0.	0.	0.	0.
7/ 9/79	0.	0.	0.	0.	-
7/10/79	0.	0.	0.	0.	0.
7/11/79	0.	0.	0.	0.	0.
7/12/79	0.	0.	0.	0.	0.
7/13/79	0.	0.	0.	0.	-
7/14/79	0.	0.	0.	0.	0.
7/15/79	0.	0.	0.	0.	0.
7/16/79	0.	0.	0.	0.	0.
7/17/79	0.	0.	0.	18.	-
7/18/79	0.	0.	0.	24.	0.
7/19/79	0.	0.	0.	11.	0.
7/20/79	3.	0.	0.	0.	-
7/21/79	24.	0.	0.	0.	-
7/22/79	24.	0.	0.	0.	-
7/23/79	10.	0.	0.	0.	-
7/24/79	13.	0.	0.	0.	-
7/25/79	9.	0.	0.	0.	-
7/26/79	0.	0.	0.	0.	-
7/27/79	0.	0.	0.	0.	0.
7/28/79	4.	0.	0.	0.	-
7/29/79	23.	0.	0.	0.	-
7/30/79	10.	0.	0.	0.	-
7/31/79	0.	0.	0.	0.	0.
CAL TIME		15.	12.	9.	
DATA CAPTURE					
RATE (%)		83	83	76	100

*Run time $\neq$ 24 hrs (± 1 hr)

Downtime Summary for July 1979

Methane data were lost from the 17th to the 19th due to an inoperative sample valve. The problem was diagnosed on the 18th and repaired the following day.

A series of power outages from the 20th through the 25th caused the computer to fail repeatedly. However, the station operator reloaded the software on the 23rd, 24th, and 25th to minimize data loss during the interval.

The computer's cassette drive broke on the 28th resulting in data loss through the 30th when a new drive was received from Austin and installed.

TABLE II

FEDERAL AND TEXAS STATE AMBIENT AIR QUALITY STANDARDS

Agency	Pollutant	Special Conditions		ug/m ³ Primary	(PPM)	ug/m ³ Secondary	(PPM)
Federal and Texas	SO ₂		Annual	80	.03		
			24-Hour*	365	.14		
			3-Hour*	---		1300	.5
Texas	SO ₂	All Counties Except	30-Minute**	1061	.4	----	
		Harris, Galveston	30-Minute**	743	.28	----	
		Orange, Jefferson	30-Minute**	849	.32	----	
Federal and Texas	Particulate		Annual***	75		60	
			24-Hour*	260		150	
Texas	Particulate		5-Hour**	100		---	
			3-Hour**	200		---	
			1-Hour**	400		---	
Federal and Texas	CO		8-Hour*	10,000	9.	10,000	9.
			1-Hour*	40,000	35.	40,000	35.
Federal and Texas	Photochemical Oxidant HC (Non-Methane)	6-9 a.m.	1-Hour†	235	.12	235	.12
			3-Hour*	160	.24	160	.24
	NO ₂		Annual	100	.05	100	.05

*Not to be exceeded more than once per year.

**Texas special regulations. Single plant source may not exceed these ambient levels in Texas at any point, at any time.

***Geometric Mean.

†The expected number of exceedances not to occur on more than one calendar day per year.

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TABLE III. AVERAGES FOR JULY 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO2)		HYDROGEN SULFIDE	METHANE
SITE	033	033	033
	.0	.0	964.1
<hr/>			
PARTICULATE			
SITE	033		
	40.9		
<hr/>

TABLE IV. DAILY AVERAGES FOR JULY 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO2)		HYDROGEN SULFIDE		METHANE	
DATE	SITE 033	DATE	SITE 033	DATE	SITE 033
7/ 1	.0	7/ 1	.0	7/ 1	929.1
7/ 2	.0	7/ 2	.0	7/ 2	862.2
7/ 3	.0	7/ 3	.0	7/ 3	822.4
7/ 4	.0	7/ 4	.0	7/ 4	906.3
7/ 5	.0	7/ 5	.0	7/ 5	927.6
7/ 6	.0	7/ 6	.0	7/ 6	1022.6
7/ 7	.0	7/ 7	.0	7/ 7	961.3
7/ 8	.0	7/ 8	.0	7/ 8	880.4
7/ 9	.0	7/ 9	.0	7/ 9	944.5
7/10	.0	7/10	.0	7/10	1080.2
7/11	.0	7/11	.0	7/11	1124.7
7/12	.0	7/12	.0	7/12	939.2
7/13	.0	7/13	.0	7/13	867.7
7/14	.0	7/14	.0	7/14	836.8
7/15	.0	7/15	.0	7/15	850.1
7/16	.0	7/16	.0	7/16	1032.3
7/17	.0	7/17	.0		
7/18	.0	7/18	.0		
7/19	.0	7/19	.0	7/19	1124.4
7/20	.0	7/20	.0	7/20	1349.2
7/21		7/21		7/21	
7/22		7/22		7/22	
7/23	.0	7/23	.0	7/23	980.8
7/24		7/24		7/24	
7/25	.0	7/25	.0	7/25	935.3
7/26	.0	7/26	.0	7/26	888.4
7/27	.0	7/27	.0	7/27	1063.7
7/28	.0	7/28	.0	7/28	988.3
7/29		7/29		7/29	
7/30	.0	7/30	.0	7/30	859.5
7/31	.0	7/31	.0	7/31	897.9

TABLE IV. DAILY AVERAGES FOR JULY 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

PARTICULATE

SITE 033
DATE

7/ 1	
7/ 2	43.0
7/ 3	44.0
7/ 4	54.0*
7/ 5	
7/ 6	32.0
7/ 7	23.0
7/ 8	23.0
7/ 9	
7/10	57.0

7/11	51.0
7/12	28.0
7/13	
7/14	33.0
7/15	56.0
7/16	42.0
7/17	
7/18	52.0
7/19	57.0
7/20	

7/21	
7/22	
7/23	
7/24	
7/25	
7/26	
7/27	52.0
7/28	
7/29	
7/30	

7/31	37.0
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*Run time $\neq$ 24 hrs ($\pm$ 1 hr)

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TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR JULY 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO2)

DATE	SITE	033
7/ 1		. 0(0:00)
7/ 2		. 0(0:00)
7/ 3		. 0(0:00)
7/ 4		. 0(0:00)
7/ 5		. 0(0:00)
7/ 6		. 0(0:00)
7/ 7		. 0(0:00)
7/ 8		. 0(0:00)
7/ 9		5. 2(13:00)
7/10		2. 6(19:40)
7/11		. 0(0:00)
7/12		5. 2(9:10)
7/13		. 0(0:00)
7/14		. 0(0:00)
7/15		. 0(0:00)
7/16		. 0(0:00)
7/17		. 0(0:00)
7/18		. 0(0:00)
7/19		5. 2(0:00)
7/20		. 0(0:00)
7/21		
7/22		
7/23		. 0(10:05)
7/24		. 0(0:00)
7/25		. 0(9:30)
7/26		. 0(0:00)
7/27		. 0(0:00)
7/28		. 0(0:00)
7/29		. 0(17:00)
7/30		. 0(10:50)
7/31		. 0(0:00)

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TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR JULY 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

HYDROGEN SULFIDE

SITE 033
DATE

7/ 1	.0(0:00)
7/ 2	4.2(13:25)
7/ 3	.0(0:00)
7/ 4	.0(0:00)
7/ 5	.0(0:00)
7/ 6	.0(0:00)
7/ 7	.0(0:00)
7/ 8	.0(0:00)
7/ 9	.0(0:00)
7/10	.0(0:00)

7/11	.0(0:00)
7/12	.0(0:00)
7/13	.0(0:00)
7/14	.0(0:00)
7/15	.0(0:00)
7/16	.0(0:00)
7/17	.0(0:00)
7/18	.0(0:00)
7/19	.0(0:00)
7/20	.0(0:00)

7/21	
7/22	
7/23	.0(10:05)
7/24	.0(0:00)
7/25	.0(9:30)
7/26	.0(0:00)
7/27	.0(0:00)
7/28	.0(0:00)
7/29	.0(17:00)
7/30	.0(10:50)

7/31	.0(0:00)
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TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR JULY 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

METHANE

DATE	SITE	033
7/ 1	2031.8	(3:25)
7/ 2	2035.1	(3:25)
7/ 3	862.9	(6:30)
7/ 4	1416.4	(18:50)
7/ 5	1374.1	(18:30)
7/ 6	1798.7	(3:25)
7/ 7	1959.6	(15:20)
7/ 8	2671.3	(23:10)
7/ 9	1449.0	(9:15)
7/10	2042.3	(7:50)
7/11	1785.7	(3:25)
7/12	2120.4	(3:25)
7/13	1938.7	(3:25)
7/14	1608.5	(3:25)
7/15	1595.5	(3:25)
7/16	3635.2	(16:50)
7/17	1710.1	(0:20)
7/18		
7/19	2567.1	(10:40)
7/20	2532.0	(7:25)
7/21		
7/22		
7/23	1585.1	(10:05)
7/24	1325.9	(4:05)
7/25	2819.8	(19:15)
7/26	2941.6	(16:25)
7/27	3133.7	(7:20)
7/28	3120.0	(19:30)
7/29	872.0	(17:10)
7/30	910.4	(18:15)
7/31	2955.9	(7:35)

TABLE VI. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR JUL 1-31 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER

SITE		033	SULFUR DIOXIDE 30-MINUTE
1	7/ 9(12:30-13:00)	.9	
2	7/12(8:40- 9:10)	.9	
3	7/18(23:30- 0:00)	.9	

SITE		033	SULFUR DIOXIDE 3-HOUR
1	7/10(17:25-20:25)	.2	
2	7/12(6:30- 9:30)	.2	
3	7/ 9(10:00-13:00)	.1	
4	7/18(21:00- 0:00)	.1	

SITE		033	SULFUR DIOXIDE 24-HOUR
1	7/10- 7/11(17:00)	.0	
2	7/11- 7/12(18:00)	.0	
3	7/ 8- 7/ 9(14:00)	.0	
4	7/18- 7/19(1:00)	.0

TABLE VI. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR JUL 1-31 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER

HYDROGEN SULFIDE
1-HOUR

SITE

033

1 7/ 2(12:25-13:25) . 3

119

0	0000	0000	0000
1	0001	0001	0001
2	0010	0010	0010
3	0011	0011	0011
4	0100	0100	0100
 

[illegible]

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TABLE VI. THE FIVE MAXIMUM AVERAGES FOR JUL 1-31 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER

METHANE
3-HOUR (6-9AM)

SITE	033
1	7/20(6:00- 9:00) 2135.2
2	7/10(6:00- 9:00) 1644.3
3	7/16(6:00- 9:00) 1577.8
4	7/11(6:00- 9:00) 1361.5
5	7/ 9(6:00- 9:00) 1139.5

DIURNAL VARIATION OF SULFUR DIOXIDE(UG/M**3)
TRAILER NO. - 33 PERIOD(7/ 1/79 TO 7/31/79)

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	:	0	0	0	0	0	0	0	0	:	:	:	0	0	0	0	0	0	0	0	0	0
3	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21																									
22																									
23									:	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29																		0							0
30											:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL NUMBER OF OBSERVATIONS = 7040. MEAN = 0.

: INDICATES CALIBRATION DURING THE HOUR

DIURNAL VARIATION OF HYDROGEN SULFIDE(UG/M**3)
TRAILER NO. - 33 PERIOD(7/ 1/79 TO 7/31/79)

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL NUMBER OF OBSERVATIONS = 7073. MEAN = 0.

: INDICATES CALIBRATION DURING THE HOUR

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DIURNAL VARIATION OF METHANE(UG/M**3 X 10**-1)
TRAILER NO. - 33 PERIOD(7/ 1/79 TO 7/31/79)

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	99	99	98	113:	101	107	109	102	91	88	88	88	87	88	88	88	89	88	89	89	89	91	87	87	93
2	86	86	87	107:	93	92	92	94	86	84	84	84	84	84	86	84	82	82	83	82	83	83	85	83	86
3	83	83	82	83:	84	84	85	84	82	82	82	82	82	82	82	82	81	81	81	82	82	82	82	81	82
4	81	81	83	87:	80	84	83	82	84	84	82	83	91	87	90	92	103	103	117	113	103	91	95	92	91
5	84							90	97	107	98	98	87	85	85	86	84	86	104	95	87	95	102	101	93
6	116	138	137	161:	156	157	108	83	83	83	87	86	89	87	83	84	85	85	84	91	92	102	98	105	102
7	89	88	86	90:	86	103	103	105	107	101	95	89	87	89	87	112	90	91	91	94	104	110	105	104	96
8	107	88	85	91:	86	94	90	91	88	82	82	82	84	83	83	82	87	89	84	84	83	84	95	111	88
9	86	88	93	102:	106	106	113	111	119	117	90	86	90	96	91	84	84	82	85	88	86	88	90	90	95
10	93	109	127	134:	132	135	149	195	149	100	99	88	88	88	91	92	93	92	92	88	84	92	93	95	108
11	99	103	104	116:	107	107	117	143	149	136	125	117	107	101	96	99	91	100	103	109	115	121	117	116	113
12	123	115	105	126:	107	105	100	100	104	90	91	91	84	83	86	88	84	84	84	82	82	82	82	91	94
13	84	85	84	102:	87	89	87	87	93	98	92	83	83	83	83	91	90	84	82	82	83	84	89	84	87
14	82	82	83	95:	84	85	88	92	86	88	84	83	82	81	82	82	81	81	82	82	84	81	81	82	84
15	82	83	82	94:	85	90	90	89	93	86	83	83	82	83	83	83	83	83	83	84	86	86	87	83	85
16	83	84	92	108:	105	114	168	168	138	101	89	87	28:	99	122	84	118	91	89	90	92	98	120	102	103
17	105	122	127	136:																					121
18																									
19																									
20	129	124	137	153:	149	152	189	244	208	168	139	117	110	100	98	102	98	103	111	103	109				135
21																									
22																									
23																									
24	100	105	107		126	119	118	113	109	108	105														111
25																									
26	85	84	84	81	88	84	88	82	88	90	87	88	92	85	93	89	110	92	89	107	86	85	91	86	89
27	102	84	89	94:	96	115	83	132	89	91	99	114	129	86	143	104	128	104	102	100	101	142	103	117	106
28	103	112	98	103:	85	103	109	106	126	89	118	90	87	83	85	106	105	86	85	105					99
29																									
30																									
31	86	86	88	103:	87	88	112	111	88	86	87	87	87	86	86	86	86	86	86	86	86	86	86	86	86
MEAN	95	97	98	108	102	105	109	114	107	98	95	92	89	89	92	91	93	89	91	94	93	95	96	96	

TOTAL NUMBER OF OBSERVATIONS = 6581. MEAN = 96.

: INDICATES CALIBRATION DURING THE HOUR

III. BAG SAMPLING PROGRAM

Grab-bag samples are collected bi-weekly and analyzed for methane. The ambient air samples are collected in tedlar bags using a metal bellows pump connected to the ambient sample manifold. Each bag sample is collected over a three-hour period.

The bag samples are returned to Austin for analysis for methane concentration. The analysis is performed on either a Bendix 8202 or a Baseline Industries Model 1030 gas chromatograph using a flame ionization detector. The minimum detectable limit using this technique is less than 1 ppm.

Results of the bag sampling analyses are given below:

<u>Date</u>	<u>Time</u>	<u>Methane Concentration (ppm)</u>
8/14/79	0600-0900	1.97
8/28/79	0600-0900	3.09

TABLE I.
DOWNTIME HOURS FOR CHOCOLATE BAYOU

SITE 033

DIGITIZING					
DATE	SYSTEM	SO2	H2S	CH4	PART
8/ 1/79	0.	0.	0.	0.	0.
8/ 2/79	0.	0.	0.	0.	0.
8/ 3/79	0.	0.	0.	0.	-
8/ 4/79	0.	0.	0.	0.	0.
8/ 5/79	0.	0.	0.	0.	0.
8/ 6/79	0.	0.	0.	0.	0.
8/ 7/79	0.	0.	0.	0.	-
8/ 8/79	9.	0.	0.	0.	-
8/ 9/79	11.	0.	0.	0.	-
8/10/79	8.	0.	0.	0.	0.
8/11/79	0.	0.	0.	0.	0.
8/12/79	0.	0.	0.	0.	-
8/13/79	0.	0.	0.	0.	0.
8/14/79	0.	0.	0.	0.	0.
8/15/79	0.	1.	1.	0.	0.
8/16/79	0.	0.	0.	0.	-
8/17/79	0.	0.	0.	0.	0.
8/18/79	0.	0.	0.	0.	0.
8/19/79	0.	0.	0.	0.	0.
8/20/79	1.	0.	0.	0.	-
8/21/79	0.	0.	0.	0.	0.
8/22/79	0.	0.	0.	0.	0.
8/23/79	0.	0.	0.	0.	0.
8/24/79	5.	0.	0.	0.	-
8/25/79	0.	0.	0.	0.	0.
8/26/79	0.	0.	0.	0.	0.
8/27/79	0.	0.	0.	0.	0.
8/28/79	0.	0.	0.	0.	-
8/29/79	0.	3.	1.	0.	0.
8/30/79	0.	4.	16.	0.	0.
8/31/79	0.	14.	21.	0.	0.
CAL TIME		19.	18.	9.	
DATA CAPTURE RATE (%)		92	90	95	100

Downtime Summary for August 1979

Data capture was excellent at T033 in August. The rate of data capture was 90 percent or better for all parameters.

Some data were lost from the 8th through the 10th because of a malfunctioning power supply in the computer.

Finally, the H₂S and SO₂ analyzers suffered data loss at the end of August (29th - 31st) when a contaminated hydrogen bottle was installed as the fuel source. The hydrogen was replaced on the 31st.

TABLE II

FEDERAL AND TEXAS STATE AMBIENT AIR QUALITY STANDARDS

Agency	Pollutant	Special Conditions		$\mu\text{g}/\text{m}^3$ Primary	(PPM)	$\mu\text{g}/\text{m}^3$ Secondary	(PPM)
Federal and Texas	SO ₂		Annual	80	.03		
			24-Hour*	365	.14		
			3-Hour*	---		1300	.5
Texas	SO ₂	All Counties Except	30-Minute**	1061	.4	----	
		Harris, Galveston	30-Minute**	743	.28	----	
		Orange, Jefferson	30-Minute**	849	.32	----	
Federal and Texas	Particulate		Annual***	75		60	
			24-Hour*	260		150	
Texas	Particulate		5-Hour**	100		---	
			3-Hour**	200		---	
			1-Hour**	400		---	
Federal and Texas	CO		8-Hour*	10,000	9.	10,000	9.
			1-Hour*	40,000	35.	40,000	35.
Federal and Texas	Photochemical Oxidant HC (Non-Methane) NO ₂	6-9 a.m.	1-Hour†	235	.12	235	.12
			3-Hour*	160	.24	160	.24
			Annual	100	.05	100	.05

*Not to be exceeded more than once per year.

**Texas special regulations. Single plant source may not exceed these ambient levels in Texas at any point, at any time.

***Geometric Mean.

†The expected number of exceedances not to occur on more than one calendar day per year.

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TABLE III. AVERAGES FOR AUG 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO2)

SITE 033
.1

HYDROGEN SULFIDE

033
.0

METHANE

033
1068.3

PARTICULATE

SITE 033
29.5

TABLE IV. DAILY AVERAGES FOR AUG 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO2)		HYDROGEN SULFIDE		METHANE
SITE	033	033	033	
DATE				
8/ 1	.0	.0		948.6
8/ 2	.0	.0		991.5
8/ 3	.0	.0		934.6
8/ 4	.0	.0		977.1
8/ 5	.0	.0		1189.4
8/ 6	.1	.1		1240.5
8/ 7	.0	.1		1283.7
8/ 8	.0	.0		1205.6
8/ 9				853.4
8/10	.0	.0		885.8
8/11	.0	.0		941.6
8/12	.0	.0		1050.8
8/13	.0	.0		910.3
8/14	.0	.0		895.0
8/15	.0	.0		963.5
8/16	.0	.0		1225.4
8/17	.6	.2		1198.4
8/18	.5	.0		933.2
8/19	.0	.0		934.7
8/20	.0	.0		938.6
8/21	.0	.0		1159.3
8/22	.0	.0		1098.2
8/23	.0	.0		1100.6
8/24	.0	.0		1127.5
8/25	.5	.0		1297.1
8/26	.1	.0		1044.8
8/27	.3	.0		1017.5
8/28	.2	.0		1154.3
8/29	.0	.0		1162.7
8/30	.0			1260.5
8/31				1077.6

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TABLE IV. DAILY AVERAGES FOR AUG 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

PARTICULATE

SITE 033
DATE

8/ 1	42.0
8/ 2	48.0
8/ 3	
8/ 4	29.0
8/ 5	32.0
8/ 6	59.0
8/ 7	
8/ 8	
8/ 9	
8/10	27.0

8/11	24.0
8/12	
8/13	28.0
8/14	51.0
8/15	34.0
8/16	
8/17	65.0
8/18	29.0
8/19	17.0
8/20	

8/21	24.0
8/22	23.0
8/23	21.0
8/24	
8/25	17.0
8/26	13.0
8/27	19.0
8/28	
8/29	27.0
8/30	49.0

8/31	30.0
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TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR AUG 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

SULFUR DIOXIDE(SO2)

DATE	SITE	033
8/ 1		. 0(0:00)
8/ 2		. 0(0:00)
8/ 3		. 0(0:00)
8/ 4		. 0(0:00)
8/ 5		. 0(0:00)
8/ 6		23. 4(12:25)
8/ 7		. 0(0:00)
8/ 8		. 0(0:00)
8/ 9		. 0(10:40)
8/10		. 0(0:00)
8/11		. 0(0:00)
8/12		5. 2(9:00)
8/13		7. 8(10:00)
8/14		. 0(0:00)
8/15		7. 8(8:00)
8/16		. 0(0:00)
8/17		130. 2(20:00)
8/18		143. 3(1:00)
8/19		5. 2(0:00)
8/20		2. 6(6:45)
8/21		2. 6(3:40)
8/22		2. 6(3:40)
8/23		2. 6(0:00)
8/24		7. 8(21:30)
8/25		70. 3(16:35)
8/26		36. 5(18:00)
8/27		70. 3(17:05)
8/28		36. 5(0:35)
8/29		. 0(0:00)
8/30		. 0(0:00)
8/31		. 0(0:05)

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CORPORATION

TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR AUG 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

HYDROGEN SULFIDE

DATE	SITE	033
8/ 1		.0(0:00)
8/ 2		.0(0:00)
8/ 3		.0(0:00)
8/ 4		.0(0:00)
8/ 5		.0(0:00)
8/ 6		40.1(12:25)
8/ 7		41.5(0:15)
8/ 8		.0(0:00)
8/ 9		2.8(12:15)
8/10		.0(0:00)
8/11		.0(0:00)
8/12		.0(0:00)
8/13		.0(0:00)
8/14		.0(0:00)
8/15		.0(0:00)
8/16		.0(0:00)
8/17		49.8(10:30)
8/18		.0(0:00)
8/19		.0(0:00)
8/20		.0(0:00)
8/21		1.4(3:40)
8/22		1.4(3:40)
8/23		1.4(3:40)
8/24		1.4(3:40)
8/25		.0(0:00)
8/26		.0(0:00)
8/27		.0(0:00)
8/28		.0(0:00)
8/29		.0(0:00)
8/30		4.2(19:15)
8/31		.0(0:10)

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CORPORATION

TABLE V. MAXIMUM FIVE MINUTE AVERAGES AND TIME OF OCCURRENCE FOR AUG 1 THRU 31 1979
(UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER; WIND SPEED-MILES PER HOUR;
TEMPERATURE-DEGREES FAHRENHEIT; WIND DIRECTION-DEGREES WITH RESPECT TO THE NORTH;)

METHANE

DATE	SITE 033
8/ 1	3273. 1(19:25)
8/ 2	3236. 6(12:40)
8/ 3	3267. 2(18:20)
8/ 4	3022. 4(23:15)
8/ 5	3197. 5(6:25)
8/ 6	1904. 2(5:10)
8/ 7	2370. 5(9:00)
8/ 8	2233. 7(0:30)
8/ 9	1057. 6(14:25)
8/10	1181. 3(13:25)
8/11	1252. 3(19:35)
8/12	1582. 5(0:35)
8/13	3338. 2(11:20)
8/14	1751. 8(19:00)
8/15	2461. 6(1:15)
8/16	3353. 2(13:05)
8/17	3801. 2(13:55)
8/18	1766. 1(18:15)
8/19	2283. 2(7:25)
8/20	3200. 1(4:10)
8/21	4755. 9(6:50)
8/22	4122. 3(7:05)
8/23	3394. 2(17:35)
8/24	4117. 1(22:40)
8/25	3120. 0(11:50)
8/26	2318. 4(16:05)
8/27	3662. 5(20:25)
8/28	2675. 9(11:35)
8/29	2674. 6(13:10)
8/30	2439. 5(1:30)
8/31	3486. 7(12:50)

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CORPORATIONTABLE VI. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR AUG 1-31 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METERSULFUR DIOXIDE
30-MINUTE

SITE	033	
1	8/18(0:30- 1:00)	23.9
2	8/17(19:30-20:00)	21.7
3	8/27(16:50-17:20)	12.6
4	8/25(16:20-16:50)	11.7
5	8/25(16:55-17:25)	6.1

SULFUR DIOXIDE
3-HOUR

SITE	033	
1	8/18(0:10- 3:10)	4.3
2	8/17(17:05-20:05)	3.7
3	8/25(15:30-18:30)	3.6
4	8/27(16:20-19:20)	2.2
5	8/28(0:10- 3:10)	1.1

SULFUR DIOXIDE
24-HOUR

SITE	033	
1	8/17- 8/18(2:00)	1.1
2	8/24- 8/25(19:00)	.5
3	8/27- 8/28(12:00)	.4
4	8/ 5- 8/ 6(14:00)	.1
5	8/12- 8/13(13:00)	.0

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CORPORATIONTABLE VI. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR AUG 1-31 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER

SITE	033	HYDROGEN SULFIDE	
		1-HOUR	
1	8/17(9:30-10:30)	4.2	
2	8/ 6(23:15- 0:15)	3.5	
3	8/ 6(11:25-12:25)	3.3	
4	8/21(3:35- 4:35)	.1	
5	8/22(3:35- 4:35)	.1	

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TABLE VI. THE FIVE MAXIMUM AVERAGES FOR AUG 1-31 1979
UNITS: CONCENTRATIONS-MICROGRAMS PER CUBIC METER

METHANE
3-HOUR (6-9AM)

SITE	033
1	8/25(6:00- 9:00) 2087.8
2	8/17(6:00- 9:00) 1944.2
3	8/ 7(6:00- 9:00) 1920.0
4	8/ 5(6:00- 9:00) 1902.2
5	8/28(6:00- 9:00) 1763.3

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CORPORATION

DIURNAL VARIATION OF SULFUR DIOXIDE (UG/M**3)
TRAILER NO. - 33 PERIOD(8/ 1/79 TO 8/31/79)

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	:	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9											0:	0:		:		0	0	0	0	0	0	0	0	0	0
10	0	0	0	:	0									0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	:	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	:	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	:	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	12	0	0	0	1
18	0	12	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
19	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	:	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
25	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	6	3	2	0	0	0	0	0	1
26	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
27	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0
28	3	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
29	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL NUMBER OF OBSERVATIONS = 7766. MEAN = 0.

: INDICATES CALIBRATION DURING THE HOUR

RADIAN

CORPORATION

DIURNAL VARIATION OF HYDROGEN SULFIDE (UG/M**3)
TRAILER NO. - 33 PERIOD(8/ 1/79 TO 8/31/79)

138

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	4	0	0	:	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9				:																					
10	0	0	0	:	0								0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	:	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	:	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	:	0		0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30		0	0	:	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31			0	:				0																	0
MEAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL NUMBER OF OBSERVATIONS = 7590. MEAN = 0.

: INDICATES CALIBRATION DURING THE HOUR

RADIAN

CORPORATION

DIURNAL VARIATION OF METHANE(UG/M**3 X 10**-1)
TRAILER NO. - 33 PERIOD(8/ 1/79 TO 8/31/79)

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	88	94	93	94:	92	92	97	110	116	90	87	91	88	87	88	92	88	87	107	110	110	94	92	90	95
2	92	99	114	95:	97	116	98	96	103	90	107	112	122	86	86	89	106	106	88	97	90	92	92	108	99
3	98	129	91	93:	95	96	97	95	114	87	87	86	86	86	86	86	85	85	106	86	89	94	92	95	94
4	95	115	103	106:	114	96	103	119	102	88	107	88	88	85	84	85	86	85	87	87	90	96	109	135	98
5	100	89	108	130:	165	221	246	177	148	115	100	97	96	92	91	101	92	92	94	101	104	100	96	105	119
6	106	119	127	135:	142	161	143	150	149	126	117	109	110	119	128	114	111	110	111	122	111	113	126	125	124
7	130	129	136	139:	132	140	159	200	217	168	99	107	107	105	108	116	106	104	110	109	114	111	111	130	128
8	130	133	179		144	101	112	112	114	109	98	105	115	107	101										119
9												83	81	84	86	83	85	87	85	83	84	88	90	89	85
10	89	96	102		103									86	82	82	84	83	82	83	85	88	90	95	88
11	96	94	93	98:	97	97	102	96	88	84	86	84	85	84	86	88	90	94	97	103	107	106	107	101	94
12	138	98	115	112:	123	140	144	138	121	91	87	93	92	87	86	86	85	90	88	92	98	100	108	113	105
13	103	95	92	98:	101	97	99	113	101	88	106	102	81	82	81	80	80	80	81	81	82	94	84	88	91
14	88	87	95	95:	93	116	103	106	102	87	82	81	82	83	85	81	81	81	84	92	86	95	84	82	90
15	84	107	89	135:	148	121	96	126	97	106	85	84	82	81	81	83	80	81	82	98	87	91	102	100	96
16	112	122	122	123:	126	143	130	167	204	178	137	132	123	127	95	94	97	98	99	100	105	103	104	102	123
17	102	104	143	148:	155	171	202	201	180	147	124	105	104	128	90	85	84	84	84	84	84	101	87	88	120
18	101	107	106	136:	126	113	149	146	94	81	84	77	75	77	76	76	77	77	85	77	79	86	78	76	93
19	89	105	98	112:	97	136	155	172	112	98	86	80	72	76	78	74	74	73	73	74	73	77	77	87	94
20	110	130	125	125:	123	110		89	88	79	72	82	71:		83	91	80	83	79	80	86	97	101	95	94
21	102	148	143	175:	177	217	205	169	137	84	104	107	80	106	74	74	80	81	83	82	86	89	117	89	116
22	122	97	96	102:	128	106	115	146	124	93	82	108	129	98	98	91	111	88	120	121	117	102	111	128	110
23	129	121	118	159:	123	123	140	120	102	104	119	98	97	85	89	87	116	116	106	95	120	95	97	105	110
24	115	129	113	143:	222						113	112	117	102	100	107	88	95	91	96	93	94	124	125	113
25	129	135	131	174:	163	239	237	217	173	138	105	125	101	95	88	90	86	90	87	90	121	105	101	113	130
26	109	103	111	125:	133	160	164	128	97	90	99	92	90	88	109	85	106	91	90	82	89	86	101	90	105
27	104	95	99	115:	101	103	108	115	84	98	95	113	113	119	108	90	99	91	87	90	112	126	86	98	102
28	89	104	107	126:	140	170	189	177	162	134	113	122	94	96	87	102	89	93	98	88	91	101	114	94	116
29	127	154	175	184:	178	162	126	110	99	97	91	92	104	120	89	95	93	100	98	97	96	100	107	128	116
30	154	171	179	186:	161	113	123	119	132	136	142	138	131	101	108	108	106	93	101	107	106	105	125	113	126
31	127	133	132	150:	127	130	127	136	127	131	133	87	109	86	89	83	85	81	81	84	84	92	77	118	108
MEAN	109	115	118	129	131	136	140	137	125	108	102	100	98	95	91	90	91	90	92	93	96	97	100	103	

TOTAL NUMBER OF OBSERVATIONS = 8279. MEAN = 107.

: INDICATES CALIBRATION DURING THE HOUR

II. DESCRIPTION OF INSTRUMENT SYSTEMS (SEPT.-DEC.)

The ambient air monitoring station is equipped to monitor the parameters shown below:

Sulfur Dioxide
Particulates
Methane
Hydrogen Sulfide

A. Air Quality Instrumentation

1. Description

Sulfur dioxide is measured with a Meloy Model SA185-2A sulfur analyzer, which is an EPA-approved analyzer. This automated analyzer utilizes the flame photometric principle to measure sulfur levels with a minimum detectable sensitivity of 5 ppb, and a linearity of $\pm 1\%$. The analyzer is operated with an H_2S scrubber to make it specific to SO_2 concentrations.

Hydrogen sulfide is measured using a Meloy Model SA185-2 analyzer equipped with an SO_x scrubber. Specifications for this analyzer are the same as for the SA185-2A.

Methane is monitored with a Bendix Model 8200 gas chromatograph. This instrument uses a flame ionization detector and has a minimum detectable sensitivity of 5 ppb. The Model 8200 works on a five-minute cycle, i.e., one air sample is analyzed every five minutes.

The air sample is drawn in through a glass cane and manifold supplied by the Ace Glass Company. The system has a 25 mm diameter, and a constant air flow through the system is

provided by an air pump rated at 60 cfm at 0" head pressure. The manifold has sampling ports to which $\frac{1}{4}$ " Teflon lines to the instruments are connected. All joints in the sampling system are secured by O-ring compression fittings. The manifold is contained in a heated (100°F) chamber to prevent condensation of moisture.

The trailer has two heavy duty high volume particulate samplers (Hi-Vols). Fiberglass filter paper is brought to a controlled humidity before weighing. Each Hi-Vol has a flow recorder to permit correction for changes in air flow runs for a 24-hour period (midnight to midnight), and is turned on and off by the computer. The Hi-Vols were designed following guidelines recommended by the Environmental Protection Agency and were manufactured by Radian.

2. Calibration

The trailer contains a Meloy Model RAD-1 calibration unit. This unit provides a zero air supply and SO₂ span gas from an SO₂ permeation tube. The calibration is automatically performed once a day, and is controlled by the computer. The SO₂ channel is first switched to zero. Then the computer monitors the output of each analyzer and takes a new zero reading after a stable zero signal has been reached. This zero reading is compared by the computer to the zero reading obtained 24 hours before, and if a drift in excess of 10 ppb has occurred, an excess zero drift light on the System Status Panel is turned on. The instruments are then returned to the monitor mode, and after two minutes the computer resumes data taking.

The SO₂ permeation tubes were manufactured by Metronics Association, Inc. These tubes were then individually calibrated for Radian by the National Bureau of Standards.

The Model 8200 methane analyzer is calibrated with undiluted span gas. This span gas contains methane in air. The Model 8200 is zeroed with air from a Bendix Model 8834 zero air unit. In addition, the instrument is electronically re-zeroed at the start of every five-minute cycle.

In addition to the daily instrument zero/spans, all instruments are multipoint calibrated monthly. Calibration standards and equipment used in the monthly multipoints is distinct from the equipment used for daily zero/span operations.

Quality assurance audits are performed on each instrument once a quarter. These audits are performed by Radian's Quality Assurance personnel using instrumentation and standards different from those used in the monthly multipoint calibrations.

A General Metals Calibration Kit is used to calibrate the Hi-Vol particulate samplers.

B. Data Acquisition System

Radian's DART II data collection system is designed around a Motorola M6800 microprocessor. The use of a microprocessor allows a variety of sophisticated data collection schemes with virtually no hardware expansion. Radian's standard system uses 32K (expandable to 65K) of semiconductor random access memory. A built-in floppy disk unit is used for program storage and loading. As a result, by simply changing the diskette an entirely different system configuration can be implemented. System parameters, such as sampling times, averaging times, input voltage ranges, printout formats, and recording techniques are under software control using the General Application Program (GAP) provided with each system.

The DART II system consists of an MPU (M6800) with 32K static RAM, auto-start ROM, serial interfaces, parallel interfaces, A/D converters with display, floppy disk, power supply, battery clock with display, on/off relay panel, terminal rear panel, cables, and rack-mountable front panel.

The microprocessor is a general-purpose computer which, with appropriate software loaded from the floppy disk, can perform any programmable function. Using Radian's Relocatable Assembler and Relocatable Loader, Radian's standard General Acquisition Program (GAP) can be modified to include new averaging times or data reduction techniques. For example, equations to correct non-linear input values or data reduction routines to calculate vector averages for wind parameters can be added to the system software. Various line protocols for telecommunications, new operator key-ins, and changes to report formats are other features that can be changed or incorporated into the data acquisition system with only software changes.

The DART II has 32K (8-bit bytes) of static RAM with battery back-up. The battery preserves the contents of memory for approximately 24 hours after power loss. A trickle charger charges the batteries back to capacity after the line voltage is restored.

Radian's standard data collection program generally is configured with key-ins to take one sample every second from each data channel and then use this data to form five-minute averages for each channel. These five-minute averages form the basis for further data reduction. On the hour, the microprocessor energizes through relay control the teleprinter, and prints a hardcopy of the collected data, as well as recording the data on floppy disk or the optional magnetic tape. Since the teleprinter and disk

are mechanical devices, the microprocessor turns power off to them after each function is completed. This greatly enhances the lifetime of each.

III. BAG SAMPLING PROGRAM

Grab-bag samples are collected bi-weekly and analyzed for methane. The ambient air samples are collected in tedlar bags using a metal bellows pump connected to the ambient sample manifold. Each bag sample is collected over a three-hour period.

The bag samples are returned to Austin for analysis for methane concentration. The analysis is performed on either a Bendix 8202 or a Baseline Industries Model 1030 gas chromatograph using a flame ionization detector. The minimum detectable limit using this technique is less than 1 ppm.

Results of the one bag sample analysis from September is given below:

<u>Date</u>	<u>Time</u>	<u>Methane Concentration (ppm)</u>
9/18/79	0600-0900	1.90

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TABLE 1.
DOWNTIME HOURS FOR CHOCOLATE BAYOU 1979

SITE 033 DIGITIZING						
DATE	SYSTEM	SO2	H2S	CH4	TSP	
9/ 1	0	0	0	0	-	
9/ 2	0	0	0	0	-	
9/ 3	0	0	0	0	-	
9/ 4	0	0	0	0	0	
9/ 5	0	0	1	0	-	
9/ 6	0	0	0	1	-	
9/ 7	0	0	0	0	0	
9/ 8	11	0	4	4	-	
9/ 9	1	12	12	23	-	
9/10	1	23	0	23	0	
9/11	0	11	0	23	0	
9/12	0	0	0	24	0	
9/13	0	0	0	24	-	
9/14	0	0	0	24	0	
9/15	0	0	0	24	0	
9/16	0	0	0	24	0	
9/17	1	0	0	11	-	
9/18	0	0	0	0	0	
9/19	1	0	0	5	-	
9/20	2	1	0	11	-	
9/21	0	0	0	0	0	
9/22	0	0	0	9	-	
9/23	0	0	0	0	0	
9/24	0	0	0	0	0	
9/25	0	0	0	0	-	
9/26	0	0	0	1	-	
9/27	0	0	0	0	0	
9/28	0	0	0	0	-	
9/29	0	0	0	0	0	
9/30	0	0	0	0	0	
CAL TIME		30	45	26		
DATA CAPTURE RATE (%)		91	95	66	100	

Downtime Summary for September 1979

On September 8th, the UT/BEG data acquisition system was upgraded from the NOVA minicomputer to a Radian DART II system. This change required modifications to the SO₂ analyzer, the H₂S analyzer, and the CH₄ analyzer (which was done from September 9 to September 11). Once the entire system was back on line, the power supply was found to have failed in the CH₄ instrument. A replacement was ordered from the vendor and installed on the 17th.

A second power supply failure on the 19th caused the CH₄ instrument to be marked down until the 20th when a rebuilt power supply was installed.

V. DATA PRESENTATION AND SUMMARY

This section includes summaries for various recorded data at the monitoring sites. The data presentations indicate the variability of pollutant concentrations with time. All parameters, except suspended particulates (24-hour samples), are sampled once each second, but recorded as five-minute arithmetic averages of the one-second samples. The master data base from which the data tables in this report were generated consists of hourly averages computed from the 12 five-minute averages recorded for each hour. This averaging technique tends to smooth instantaneous maximum values.

Inherent in any data acquisition system is random noise, both from the recording instruments and quantization in the analog-to-digital conversion. The lower threshold for all analytical instruments is twice the maximum noise level generated by the instruments. This lower threshold is 5 ppb for all of these instruments. Therefore, any values appearing in the data presentations that are less than 5 ppb indicate only a trace of pollutant in question and should not be construed to be absolute levels. In addition, when concentration levels drop below the lower threshold, the recorded quantity is simply random noise and averages tend toward zero. If a zero concentration appears in the data presentation, this does not indicate absolute zero concentration.

All pollutant data (except for particular data) are taken at the monitoring site in integer parts per billion (ppb) but are presented here in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) assuming standard temperature and pressure of 25°C and 760 mm Hg (1013.2 millibars), respectively. The scale factors required to convert $\mu\text{g}/\text{m}^3$ at standard conditions back to ppb for the various pollutants are given in the following table.

<u>Pollutant</u>	<u>To Convert $\mu\text{g}/\text{m}^3$ at 25°C and 760 mm Hg to ppb Multiply by</u>
SO ₂	.384
H ₂ S	.723
CH ₄	1.536

The units of the air quality parameters are given at the top of each table. It should be noted here that inside temperature is monitored and recorded as a functional part of the system but is not presented in this report.

It should be noted that the SO₂ scrubber was installed on the H₂S analyzer on 16 August 1978 at 0935. Data from that analyzer from 0935 on that date are H₂S data. Prior to 16 August, the data represented total sulfur measurements.

Table II presents the national ambient air quality standards (NAAQS) for criteria pollutants.

Table III displays the daily and monthly statistics for the monitoring station for the month. To insure statistical significance, and to reduce the possibility of introducing a bias in the presentation, averages are computed only when at least 50 percent of the hourly averages subject to averaging are present. If less than the required number of hourly values are present for a particular parameter, that entry will be blank. The number of values present for a particular parameter is defined as the total possible number of hourly values for the averaging period less the computer downtime less the channel downtime less the channel calibration time. A blank entry indicates an insufficient number of hourly values present for that day. The averages in Table III are arithmetic averages of the hourly averages with the following exception:

Particulate monthly averages are computed as the geometric mean.

Table IV indicates the five largest averages for various averaging times. The table shows the period of time covered by the average. Maxima are chosen so that time segments are independent. The maximum averages reported are found using a 'sliding average' technique with the exception of the 24-hour particulate average, which is computed from midnight to midnight. For all averaging times, the sliding average is stepped one sample at a time. For averaging times less than or equal to 8 hours, 100 percent of the hourly averages must be present to compute a sliding average. Averaging times greater than 8 hours require 90 percent. Whether or not a sliding average is computed is solely determined by the number of samples present in that averaging time and is independent of daily or monthly averaging criteria. This sliding average technique conforms to the methodology described in the EPA Guideline Series, OAQPS No. 1.2-008, revised February 1977, entitled "Guidelines for the Interpretation of Air Quality Standards."

Table V presents hourly averages of the recorded parameters. All daily (right-hand column), diurnal (bottom line), and monthly (bottom) averages are arithmetic averages of the associated hourly averages. For all parameters, a blank entry in the hourly average table indicates that less than one-third (i.e., less than 4) of the five-minute averages for that hour are present.

Times given in the data presentations correspond to the appropriate local times, i.e., Central Daylight Savings Time or Central Standard Time, depending on the time of the year.

FEDERAL AND TEXAS STATE AMBIENT AIR QUALITY STANDARDS

Agency	Pollutant	Special Conditions		$\mu\text{g}/\text{m}^3$ Primary	(PPM)	$\mu\text{g}/\text{m}^3$ Secondary	(PPM)
Federal and Texas	SO ₂		Annual	80	.03		
			24-Hour*	365	.14		
			3-Hour*	---		1300	.5
Texas	SO ₂	All Counties Except	30-Minute**	1061	.4	----	
		Harris, Galveston	30-Minute**	743	.28	----	
		Orange, Jefferson	30-Minute**	849	.32	----	
Federal and Texas	Particulate		Annual***	75		60	
			24-Hour*	260		150	
Texas	Particulate		5-Hour**	100		---	
			3-Hour**	200		---	
			1-Hour**	400		---	
Federal and Texas	CO		8-Hour*	10,000	9.	10,000	9.
			1-Hour*	40,000	35.	40,000	35.
Federal and Texas	Photochemical Oxidant HC (Non-Methane) NO ₂	6-9 a.m.	1-Hour†	235	.12	235	.12
			3-Hour*	160	.24	160	.24
			Annual	100	.05	100	.05

*Not to be exceeded more than once per year.

**Texas special regulations. Single plant source may not exceed these ambient levels in Texas at any point, at any time.

***Geometric Mean.

†The expected number of exceedances not to occur on more than one calendar day per year.

TABLE III. DAILY AVERAGES FOR SEP 1 1979 THRU SEP 30 1979

SULFUR DIOXIDE (UG/M**3)		HYDROGEN SULFIDE (UG/M**3)		METHANE (UG/M**3)X10**-1)
SITE	033	033	033	
DATE				
SEP 01	0.0	0.0	96.8	
SEP 02	0.0	0.0	111.8	
SEP 03	0.0	0.0	114.4	
SEP 04	0.0	0.0	116.1	
SEP 05	0.0	0.0	147.5	
SEP 06	0.0	0.0	128.8	
SEP 07	0.0	0.0	134.1	
SEP 08	0.0			
SEP 09				
SEP 10		0.0		
SEP 11	0.0	0.5		
SEP 12	3.5	0.0		
SEP 13	1.3	0.0		
SEP 14	4.7	0.0		
SEP 15	0.7	0.0		
SEP 16	1.0	0.0		
SEP 17	0.6	0.4		
SEP 18	0.0	0.0	112.3	
SEP 19	0.0	0.0	103.4	
SEP 20	0.0	0.0		
SEP 21	0.0	0.0	110.6	
SEP 22	0.0	0.0	108.3	
SEP 23	0.0	0.0	141.0	
SEP 24	0.3	0.0	140.0	
SEP 25	0.0	0.0	145.7	
SEP 26	0.0	0.0	129.7	
SEP 27	0.0	0.0	128.1	
SEP 28	0.0	0.0	100.2	
SEP 29	0.0	0.0	101.6	
SEP 30	0.0	0.0	102.5	
SEP 01 -30	0.4	0.0	122.2

TABLE III. DAILY AVERAGES FOR SEP 1 1979 THRU SEP 30 1979

TOTAL SUSPENDED PARTICULATE(UG/M**)

SITE 033	
DATE	
SEP 01	
SEP 02	
SEP 03	
SEP 04	21.0
SEP 05	
SEP 06	
SEP 07	56.0
SEP 08	
SEP 09	
SEP 10	62.0
SEP 11	56.0
SEP 12	66.0
SEP 13	
SEP 14	66.0
SEP 15	53.0
SEP 16	44.0
SEP 17	
SEP 18	18.0
SEP 19	
SEP 20	
SEP 21	25.0
SEP 22	
SEP 23	52.0
SEP 24	43.0
SEP 25	
SEP 26	
SEP 27	55.0
SEP 28	
SEP 29	66.0
SEP 30	52.0
SEP 01 -30	45.7

TABLE IV. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR SEP 1, 1979 - SEP 30, 1979

SULFUR DIOXIDE (UG/M**3)
3-HOUR

SITE 033

1. 9/13(23:00- 2:00)	36.3
2. 9/12(12:00-15:00)	20.6
3. 9/12(8:00-11:00)	6.0
4. 9/13(20:00-23:00)	6.0
5. 9/16(12:00-15:00)	4.3

SULFUR DIOXIDE (UG/M**3)
24-HOUR

SITE 033

1. 9/13(3:00- 3:00)	6.0
2. 9/11(15:00-15:00)	3.3
3. 9/15(15:00-15:00)	1.3
4. 9/16(15:00-15:00)	0.6
5. 9/23(17:00-17:00)	0.1

TOTAL SUSPENDED PARTICULATE (UG/M**3)
24-HOUR

SITE 033

1. 9/12(0:00- 0:00)	66.0
2. 9/14(0:00- 0:00)	66.0
3. 9/29(0:00- 0:00)	66.0
4. 9/10(0:00- 0:00)	62.0
5. 9/11(0:00- 0:00)	56.0

TABLE IV. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR SEP 1, 1979 - SEP 30, 1979

HYDROGEN SULFIDE (UG/M**3)
1-HOUR

SITE	033
1. 9/11(10:00-11:00)	11.0
2. 9/17(12:00-13:00)	7.0
3. 9/ 1(2:00- 3:00)	0.0
4. 9/ 1(4:00- 5:00)	0.0
5. 9/ 1(1:00- 2:00)	0.0

METHANE (UG/M**3)X10**-1)
6-9 AM

SITE	033
1. 9/ 8(6:00- 9:00)	244.0
2. 9/27(6:00- 9:00)	214.0
3. 9/ 5(6:00- 9:00)	198.6
4. 9/ 6(6:00- 9:00)	184.3
5. 9/23(6:00- 9:00)	183.3

SULFUR DIOXIDE (UG/M**3)
1-HOUR

SITE	033
1. 9/14(0:00- 1:00)	65.0
2. 9/12(13:00-14:00)	36.0
3. 9/14(1:00- 2:00)	31.0
4. 9/12(14:00-15:00)	26.0
5. 9/13(22:00-23:00)	18.0

RADIAN CORPORATION

TABLE V. HOURLY AVERAGES OF SULFUR DIOXIDE (UG/M**3)
TRAILER NO. - 33 PERIOD(9/ 1/79 TO 9/30/79)

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	:	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	:	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	:	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0
14	65	31	13	0	:	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	18	13	1
15	0	0	0	0	:	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	5
16	3	0	0	0	:	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	1
17	0	0	0	5	:	0	3	3	3	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	1
18	0	0	0	0	:	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	1
19	0	0	0	0	:	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	:	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	:	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	:	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	:	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	:	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	:	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	:	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	:	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	:	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	:	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	:	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	3	1	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	1	1	

TOTAL NUMBER OF OBSERVATIONS = 636 MEAN = 0.4
: INDICATES CALIBRATION FOR THE HOUR

RADIAN CORPORATION

TABLE V. HOURLY AVERAGES OF HYDROGEN SULFIDE (UG/M**3)
TRAILER NO. - 33 PERIOD(9/ 1/79 TO 9/30/79)

DAY	HOUR																								MEAN	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9														0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	:	:	:	:	:	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	:	:	:	:	:	0	0	0	0	0	0	0	7:	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	:	:	:	:	:	0	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	:	:	:	:	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL NUMBER OF OBSERVATIONS = 650 MEAN = 0.0
: INDICATES CALIBRATION FOR THE HOUR

RADIAN CORPORATION

TABLE V. HOURLY AVERAGES OF METHANE(UG/M**3)X10**-1)
TRAILER NO. - 33 PERIOD(9/ 1/79 TO 9/30/79)

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	100	108	85	113:	93	113	114	92	107	98	93	84	101	86	74	84	99	105	87	86	112	90	86	113	97
2	101	136	296	167:	121	94	95	91	74	120	96	84	87	84	97	80	105	86	92	110	101	142	104	119	112
3	107	109	117	179:	167	112	100	99	112	120	123	133	110	115	101	129	112	99	94	103	90	100	98	116	114
4	119	136	122	127:	120	115	206	123	141	106	98	90	97:	90	114	87	128	124	85	92	110	127	106	123	116
5	127	170	150	244:	262	177	204	225	167	175	153	129	107	115	112	119	88	115	109	103	93	112	156	127	147
6	105	141	135	165:	162	116	213	193	147	112	120	144	138	131		107	71	55	141	76	126	120	102	143	129
7	99	157	152		:221	206	187	157	131	115	123	130	138	99	96	94	84	116	125	104	115	121	129	186	134
8	191	221	251	227:	209	228	241	253	238																229
9																									
10																									
11																									
12																									
13																									
14																									
15																									
16																									
17																									
18	108	110	113	120		:130	130	128	104	98	110	106:	97	102	115	113	113	114	118	122	120	109	103	100	119
19	100	100	102	98		:104	106	110	108	108	113	103	98	96	99	107	104	102							112
20															96	114	95	95	93	96	113	115	127	76	103
21	155	100	122	104		:106	93	128	134	99	102	129	99	103	99	112	81	121	132	87	110	198	157	180	103
22						:					118	106	106:	114	109	107	98	110	103	116	101	99	106	123	108
23	145	140	130	169		:152	141	159	250	224	160	125	133	111	142	107	122	111	107	126	106	119	118	147	141
24	115	174	169	168		:202	178	201	167	147	156	94	98	107	98	106	133	90	135	131	118	127	157	148	140
25	148	159	189	174		:188	155	200	191	164	147	137	113	101	107	115	99	96	101	91	121	151	201	203	146
26	199	136	150	311		:152	179	178	137	120	121		94	94	91	90	90	89	90	93	105	102	113	119	130
27	145	153	148	143		:274	252	215	175	137	109	90	87	87	88	91	92	88	90	89	90	100	104	99	128
28	107	103	95	97		:108	107	106	116	103		: 96	96	96	95	94	94	94	94	94	97	99	105	101	100
29	103	104	100	101		:118	123	118	115	98	95	94	96	95	94	94	94	94	94	94	94	96	100	108	109
30	107	109	111	111		:113	115	115	125	115	99	95	97	96	96	94	91	89	89	90	94	98	105	103	102
MEAN	125	135	144	157	169	148	155	152	144	126	119	109	105	101	103	102	101	101	105	102	108	119	117	129	

TOTAL NUMBER OF OBSERVATIONS = 456 MEAN = 122.2
: INDICATES CALIBRATION FOR THE HOUR

III. BAG SAMPLING PROGRAM

Grab-bag samples are collected bi-weekly and analyzed for methane. The ambient air samples are collected in tedlar bags using a metal bellows pump connected to the ambient sample manifold. Each bag sample is collected over a three-hour period.

The bag samples are returned to Austin for analysis for methane concentration. The analysis is performed on either a Bendix 8202 or a Baseline Industries Model 1030 gas chromatograph using a flame ionization detector. The minimum detectable limit using this technique is less than 1 ppm.

Results of the bag sampling analyses are given below:

<u>Date</u>	<u>Time</u>	<u>Methane Concentration (ppm)</u>
10/2/79	0600-0900	1.97
10/16/79	0600-0900	1.68

TABLE 1.
DOWNTIME HOURS FOR CHOCOLATE BAYOU 1979

SITE 033
DIGITIZING

DATE	SYSTEM	SO2	H2S	CH4	TSP
10/ 1	0	0	0	0	0
10/ 2	0	0	0	0	-
10/ 3	0	0	0	0	0
10/ 4	0	0	0	0	-
10/ 5	0	0	0	0	-
10/ 6	0	0	0	0	0
10/ 7	0	0	0	1	-
10/ 8	0	2	2	4	-
10/ 9	0	1	4	0	-
10/10	0	0	0	0	0
10/11	0	1	2	0	-
10/12	0	0	0	0	0
10/13	0	0	0	0	-
10/14	0	0	0	0	0
10/15	0	0	0	0	-
10/16	0	0	2	0	-
10/17	0	0	0	0	-
10/18	0	0	0	0	0
10/19	0	0	0	0	-
10/20	0	0	0	0	0
10/21	0	0	0	0	-
10/22	0	0	0	6	0
10/23	0	0	0	11	-
10/24	0	0	0	1	-
10/25	0	0	0	0	-
10/26	0	0	0	0	0
10/27	0	0	0	0	-
10/28	0	0	0	0	0
10/29	0	0	1	0	-
10/30	6	0	0	0	-
10/31	9	1	1	1	-

CAL TIME

33 32 36

DATA CAPTURE
RATE (%)

97 96 95 100

Downtime Summary for October 1979

Data capture for October was excellent at T033 with all parameters achieving a rate of 95 percent or better.

The CH₄ analyzer was down for 17 hours from October 22 through October 23 due to a faulty span solenoid valve.

The only other significant data loss occurred on October 30 through October 31. This was caused by an air conditioner relay malfunction. Fifteen hours of data were lost before the relay was replaced.

TABLE II

FEDERAL AND TEXAS STATE AMBIENT AIR QUALITY STANDARDS

Agency	Pollutant	Special Conditions		µg/m ³ Primary	(PPM)	µg/m ³ Secondary	(PPM)
Federal and Texas	SO ₂		Annual	80	.03		
			24-Hour*	365	.14		
			3-Hour*	---		1300	.5
Texas	SO ₂	All Counties Except	30-Minute**	1061	.4	----	
		Harris, Galveston	30-Minute**	743	.28	----	
		Orange, Jefferson	30-Minute**	849	.32	----	
Federal and Texas	Particulate		Annual***	75		60	
			24-Hour*	260		150	
Texas	Particulate		5-Hour**	100		---	
			3-Hour**	200		---	
			1-Hour**	400		---	
Federal and Texas	CO		8-Hour*	10,000	9.	10,000	9.
			1-Hour*	40,000	35.	40,000	35.
Federal and Texas	Photochemical Oxidant IIC (Non-Methane) NO ₂	6-9 a.m.	1-Hour†	235	.12	235	.12
			3-Hour*	160	.24	160	.24
			Annual	100	.05	100	.05

*Not to be exceeded more than once per year.

**Texas special regulations. Single plant source may not exceed these ambient levels in Texas at any point, at any time.

***Geometric Mean.

†The expected number of exceedances not to occur on more than one calendar day per year.

TABLE III. DAILY AVERAGES FOR OCT 1 1979 THRU OCT 31 1979

SULFUR DIOXIDE (UG/M**3)		HYDROGEN SULFIDE (UG/M**3)		METHANE (UG/M**3)X10**-1)
SITE	033	033	033	
DATE				
OCT 01	0.0	0.0	105.0	
OCT 02	0.0	0.2	103.3	
OCT 03	0.0	0.0	106.9	
OCT 04	0.0	0.0	115.9	
OCT 05	0.0	0.0	138.4	
OCT 06	0.0	0.7	108.3	
OCT 07	0.0	0.2	107.5	
OCT 08	0.2	0.0	98.4	
OCT 09	1.0	0.0	96.9	
OCT 10	23.9	10.3	107.2	
OCT 11	9.1	1.9	125.5	
OCT 12	0.3	1.1	101.1	
OCT 13	0.0	0.0	109.8	
OCT 14	10.3	0.0	110.4	
OCT 15	0.0	0.1	106.4	
OCT 16	0.0	0.0	100.9	
OCT 17	0.0	0.0	109.2	
OCT 18	0.0	0.0	112.1	
OCT 19	0.0	0.0	99.4	
OCT 20	0.0	0.0	96.7	
OCT 21	0.0	0.0	96.0	
OCT 22	6.0	0.0	95.2	
OCT 23	20.2	0.0	129.6	
OCT 24	9.6	0.0	167.5	
OCT 25	1.7	0.0	152.5	
OCT 26	0.0	0.1	131.8	
OCT 27	0.0	0.0	101.9	
OCT 28	0.0	0.0	118.5	
OCT 29	0.0	0.0	111.0	
OCT 30	0.0	0.0	97.6	
OCT 31	1.1	0.0	117.6	
OCT 01 -31	2.7	0.5	112.2	

RADIAN
CORPORATION

TABLE III. DAILY AVERAGES FOR OCT 1 1979 THRU OCT 31 1979

TOTAL SUSPENDED PARTICULATE(UG/M**)

SITE 033	
DATE	
=====	
OCT 01	44.0
OCT 02	
OCT 03	37.0
OCT 04	
OCT 05	
OCT 06	52.0
OCT 07	
OCT 08	
OCT 09	
OCT 10	81.0
OCT 11	
OCT 12	78.0
OCT 13	
OCT 14	70.0
OCT 15	
OCT 16	
OCT 17	
OCT 18	66.0
OCT 19	
OCT 20	28.0
OCT 21	
OCT 22	39.0
OCT 23	
OCT 24	
OCT 25	
OCT 26	53.0
OCT 27	
OCT 28	38.0
OCT 29	
OCT 30	
OCT 31	
=====	
OCT 01 -31	50.5

RADIAN
CORPORATION

TABLE IV. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR OCT 1, 1979 - OCT 31, 1979

HYDROGEN SULFIDE (UG/M**3)
1-HOUR

SITE 033

1.10/12(8:00- 9:00)	26.0
2.10/10(22:00-23:00)	18.0
3.10/10(23:00- 0:00)	18.0
4.10/10(21:00-22:00)	18.0
5.10/10(10:00-11:00)	17.0

METHANE (UG/M**3)X10**-1)
6-9 AM

SITE 033

1.10/24(6:00- 9:00)	270.3
2.10/25(6:00- 9:00)	262.6
3.10/26(6:00- 9:00)	217.0
4.10/ 5(6:00- 9:00)	212.0
5.10/11(6:00- 9:00)	209.6

SULFUR DIOXIDE (UG/M**3)
1-HOUR

SITE 033

1.10/10(13:00-14:00)	73.0
2.10/10(9:00-10:00)	44.0
3.10/24(2:00- 3:00)	42.0
4.10/23(18:00-19:00)	39.0
5.10/23(17:00-18:00)	39.0

RADIAN
CORPORATION

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TABLE IV. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR OCT 1, 1979 - OCT 31, 1979

SULFUR DIOXIDE (UG/M**3)
3-HOUR

SITE	033
1.10/10(12:00-15:00)	42.6
2.10/23(16:00-19:00)	38.0
3.10/10(7:00-10:00)	33.6
4.10/24(1:00- 4:00)	33.0
5.10/14(8:00-11:00)	28.6

SULFUR DIOXIDE (UG/M**3)
24-HOUR

SITE	033
1.10/10(3:00- 3:00)	25.0
2.10/23(3:00- 3:00)	21.5
3.10/13(12:00-12:00)	10.1
4.10/22(3:00- 3:00)	8.5
5.10/11(3:00- 3:00)	6.3

TOTAL SUSPENDED PARTICULATE (UG/M**3)
24-HOUR

SITE	033
1.10/10(0:00- 0:00)	81.0
2.10/12(0:00- 0:00)	78.0
3.10/14(0:00- 0:00)	70.0
4.10/18(0:00- 0:00)	66.0
5.10/26(0:00- 0:00)	53.0

RADIAN CORPORATION

TABLE V. HOURLY AVERAGES OF SULFUR DIOXIDE (UG/M**3)
TRAILER NO. - 33 PERIOD(10/ 1/79 TO 10/31/79)

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	:	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	:	0	0	0	0	0:	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0
9	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	10	10	1
10	13	13	16	23	:	23	18	21	36	44	18	3	29	73	26	18	18	21	23	29	26	23	18	18	24
11	26	21	21	21	:	18	18	18	18	16	16	8	0	0	0	0	0	0	0	0	0	0	0	0	9
12	0	0	8	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	3	21	21	23	:	26	23	23	23	29	34	10	0	0	0	0	0	0	0	0	0	0	0	0	10
15	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	:	0	0	0	0	0	0	0	0
17	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	:	0	0	0	0	0	0	0	0	16	21	31	23	21	3	3	3	5	5	8	6
23	8	21	29	26	:	26	18	13	16	13	10	13	13	13	16	21	36	39	39	29	18	16	16	16	20
24	16	31	42	26	:	16	16	16	18	16	10	0	3	10	0	0	0	0	0	0	0	0	0	0	10
25	0	0	0	0	:	0	0	0	0	26	13	0	0	0	0	0	0	0	0	0	0	0	0	0	2
26	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8	1
MEAN	2	4	5	4		4	3	3	4	5	3	1	1	4	2	2	3	3	2	2	2	2	2	2	2

TOTAL NUMBER OF OBSERVATIONS = 693 MEAN = 2.7
: INDICATES CALIBRATION FOR THE HOUR

RADIANT CORPORATION

TABLE V. HOURLY AVERAGES OF HYDROGEN SULFIDE (UG/M**3)
TRAILER NO. - 33 PERIOD(10/ 1/79 TO 10/31/79)

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	:	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	:	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0:	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	:	0	0	0	1	1	0	0	0	1	0	0	0	0	0	3	3	6	1	0	1
7	0	0	1	1	:	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	6	0	0	0	:	0	1	10	14	15	17	17	7	4	7	10	11	14	15	17	17	18	19	18	10
11	1	1	3	3	:	3	3	4	4	6	6	0	0	0	0	0	0	0	1	1	1	1	1	0	2
12	0	0	0	0	:	0	0	0	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
13	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	:	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	:	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	0	0	0	0		0	0	0	2	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	

TOTAL NUMBER OF OBSERVATIONS = 687 MEAN = 0.5
: INDICATES CALIBRATION FOR THE HOUR

RADIAN CORPORATION

TABLE V. HOURLY AVERAGES OF METHANE (UG/M**3)X10**-1)
TRAILER NO. - 33 PERIOD(10/ 1/79 TO 10/31/79)

DAY	HOUR																								MEAN	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1	104	109	128	131		:126	138	127	117	105	101	: 93	: 96	92	94	94	92	97	113	95	95	89	89	91	105	
2	92	91	93	91		:107	114	103	95	91	90	90	91	:	:115	110	109	110	114	114	116	111	111	114	103	
3	111	112	112	109		:110	110	115	116	105	:103	102	101	101	101	101	102	102	113	104	107	110	106	106	107	
4	106	109	111	112		:115	122	120	127	118	109	111	106	106	106	:120	107	108	104	111	125	133	143	136	116	
5	141	147	174	232		:180	221	211	204	173	130	108	107	104	103	102	103	102	102	103	105	109	111	112	138	
6	112	114	118	121		:123	126	128	117	102	99	99	100	99	100	101	100	100	101	101	103	106	108	112	108	
7	119	129	130	125		:114	118	118	118	105	101	100	102	101	98	99	99	98		95	98	99	99	99	107	
8	99	100	100	100		:100	100	102	101	98	96		97				96	96	95	96	100	98	98	97	98	
9	96	96	95	96		: 98	98	99	100	96	95	94	94	94	94	96	96	96	95	94	99	102	102	103	97	
10	111	108	102	107		:103	104	105	105	104	102	101	111	107	104	103	102	103	103	109	130	115	108	119	107	
11	128	137	141	133		:163	254	198	177	115	102	98	101	98	98	122	103	101	101	100	101	103	106	107	126	
12	107	109	107	101		:104	104	107	106	100	97	96	97	97	97	97	96	97	97	99	105	107	100	98	101	
13	99	100	99	100		:102	115	119	130	162	111	100	103	102	104	105	111	107	105	106	108	110	112	114	110	
14	106	107	112	116		:119	118	119	116	117	114	109	105	104	105	105	104	105	105	105	107	109	115	118	110	
15	114	115	110	105		:107	117	114	108	105	105	104	102	101	102	104	102	101	101	111	110	105	102	102	106	
16	106	106	99	98		: 99	99	100	100	100	99	99	100	100	101	100	100	100	100	100	101	102	102	103	106	101
17	102	103	101	107		:115	114	116	121	108	104	103	102	104	103	105	107	106	114	112	115	116	119	115	109	
18	109	114	111	119		:115	117	122	120	111	108	108	107	104	103	104	105	113	113	113	120	120	112	111	112	
19	106	103	102	101		:102	102	104	105	103	99	98	98	98	97	97	97	96	97	96	96	96	96	97	99	
20	97	97	97	97		: 97	97	97	97	97	98	97	97	97	97	97	98	96	96	96	96	96	96	95	97	
21	96	96	95	95		: 96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	97	97	97	96	
22	96	96	96	97		: 97	97	98	97	101						128	112	105	96	85	77	71	69		95	
23						:							111	108	113	114	116	116	117	118	118	138	188	196	130	
24	210	226	243	254		:272	295	272	244	189		113	114	113	113	112	113	112	117	111	112	113	114	122	167	
25	127	127	136	145		:201	233	258	297	229	186	146	121	117	118	128	113	116	116	119	125	116	116	117	152	
26	115	116	116	123		:191	242	211	198	166	135	109	107	107	106	105	108	106	106	112	117	115	113	108	132	
27	108	105	102	102		:106	112	117	116	108	98	98	97	97	97	97	96	96	100	98	101	98	97	98	102	
28	107	121	107	134		:211	172	166	165	151	107	100	98	98	96	96	96	95	96	97	96	97	107	112	118	
29	114	105	101	100		:108	104	121	116	96	96	275	103	101	100	92	104	104	107	106	103	101	98	99	111	
30	98	98	99	98		: 99	98	98	98	98	98	97	97	97	97	97	96	96							98	
31												106	107	107	107	106	108	107	106	106	108	110	118	153	197	118
MEAN	112	114	115	119		127	136	133	131	119	107	109	102	102	103	104	103	102	104	103	106	107	111	114		

TOTAL NUMBER OF OBSERVATIONS = 674 MEAN = 112.2
: INDICATES CALIBRATION FOR THE HOUR

III. BAG SAMPLING PROGRAM

Grab-bag samples are collected bi-weekly and analyzed for methane. The ambient air samples are collected in tedlar bags using a metal bellows pump connected to the ambient sample manifold. Each bag sample is collected over a three-hour period.

The bag samples are returned to Austin for analysis for methane concentration. The analysis is performed on either a Bendix 8202 or a Baseline Industries Model 1030 gas chromatograph using a flame ionization detector. The minimum detectable limit using this technique is less than 1 ppm.

Results of the bag sampling analyses are given below:

<u>Date</u>	<u>Time</u>	<u>Methane Concentration (ppm)</u>
10/30/79	0600-0900	1.99
11/13/79	0600-0900	2.53
11/27/79	0600-0900	3.82

RADIAN

CORPORATION

TABLE 1.
DOWNTIME HOURS FOR CHOCOLATE BAYOU 1979

SITE 033
DIGITIZING

DATE	SYSTEM	SO2	H2S	CH4	TSP
11/ 1	0	0	0	0	-
11/ 2	0	0	0	0	0
11/ 3	0	0	0	0	-
11/ 4	0	0	0	0	0
11/ 5	0	0	0	0	-
11/ 6	0	0	0	0	0
11/ 7	0	0	0	0	-
11/ 8	0	0	0	0	0
11/ 9	0	0	0	0	-
11/10	0	0	0	0	0
11/11	0	0	0	0	-
11/12	0	0	0	0	0
11/13	0	0	0	0	-
11/14	0	0	0	0	0
11/15	0	0	0	0	-
11/16	0	0	0	0	0
11/17	0	0	0	0	-
11/18	0	0	0	0	0
11/19	0	0	0	0	-
11/20	0	0	0	0	0
11/21	0	0	0	0	-
11/22	0	0	0	0	0
11/23	0	0	0	0	-
11/24	0	0	0	0	0
11/25	0	0	0	0	-
11/26	0	17	0	0	0
11/27	0	23	0	0	-
11/28	0	9	0	0	24
11/29	0	2	1	0	-
11/30	0	0	0	0	-

CAL TIME

32 32 30

DATA CAPTURE
RATE (%)

93 100 100 93

Downtime Summary for November 1979

Data recovery for the month of November was very high. All parameters had 93 percent data capture or above.

Loss of SO₂ data occurred on November 26, 27, 28, and 29 for a total of 51 hours as a result of a malfunction in the high temperature control board. The instrument was repaired and returned to service on November 27.

TABLE II

FEDERAL AND TEXAS STATE AMBIENT AIR QUALITY STANDARDS

Agency	Pollutant	Special Conditions		$\mu\text{g}/\text{m}^3$ Primary	(PPM)	$\mu\text{g}/\text{m}^3$ Secondary	(PPM)
Federal and Texas	SO ₂		Annual	80	.03		.
			24-Hour*	365	.14		
			3-Hour*	---		1300	.5
Texas	SO ₂	All Counties Except	30-Minute**	1061	.4	----	
		Harris, Galveston	30-Minute**	743	.28	----	
		Orange, Jefferson	30-Minute**	849	.32	----	
Federal and Texas	Particulate		Annual***	75		60	
			24-Hour*	260		150	
			5-Hour**	100		---	
Texas	Particulate		3-Hour**	200		---	
			1-Hour**	400		---	
Federal and Texas	CO		8-Hour*	10,000	9.	10,000	9.
			1-Hour*	40,000	35.	40,000	35.
Federal and Texas	Photochemical Oxidant IIC (Non-Methane)	6-9 a.m.	1-Hour†	235	.12	235	.12
			3-Hour*	160	.24	160	.24
	NO ₂		Annual	100	.05	100	.05

*Not to be exceeded more than once per year.

**Texas special regulations. Single plant source may not exceed these ambient levels in Texas at any point, at any time.

***Geometric Mean.

†The expected number of exceedances not to occur on more than one calendar day per year.

TABLE III. DAILY AVERAGES FOR NOV 1 1979 THRU NOV 30 1979

SULFUR DIOXIDE (UG/M**3)		HYDROGEN SULFIDE (UG/M**3)		METHANE(UG/M**3)X10**-1)
SITE	033	033	033	
DATE				
NOV 01	8.9	0.0	134.7	
NOV 02	12.9	0.0	150.2	
NOV 03	7.1	0.0	140.4	
NOV 04	0.8	0.0	136.1	
NOV 05	0.0	0.0	125.6	
NOV 06	14.1	0.0	153.0	
NOV 07	9.9	0.0	138.3	
NOV 08	0.0	0.0	127.9	
NOV 09	0.0	0.0	107.5	
NOV 10	2.1	0.0	125.8	
NOV 11	14.7	0.0	130.7	
NOV 12	24.5	0.0	141.7	
NOV 13	15.7	0.0	138.8	
NOV 14	2.7	0.0	175.4	
NOV 15	2.9	0.0	161.0	
NOV 16	0.0	0.0	154.7	
NOV 17	0.0	0.0	136.9	
NOV 18	0.0	0.0	109.8	
NOV 19	0.0	0.0	109.6	
NOV 20	0.0	0.0	110.6	
NOV 21	0.0	0.0	107.3	
NOV 22	1.5	0.0	118.8	
NOV 23	0.1	0.0	118.3	
NOV 24	0.0	0.0	123.8	
NOV 25	0.0	0.0	120.7	
NOV 26		0.0	127.5	
NOV 27		0.6	104.2	
NOV 28	1.2	0.3	123.4	
NOV 29	0.2	0.1	114.0	
NOV 30	15.6	0.0	140.8	
NOV 01 -30	4.8	0.0	130.2	

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TABLE III. DAILY AVERAGES FOR NOV 1 1979 THRU NOV 30 1979

TOTAL SUSPENDED PARTICULATE(UG/M**)

SITE 033	
DATE	
=====	
NOV 01	
NOV 02	45.0
NOV 03	
NOV 04	36.0
NOV 05	
NOV 06	66.0
NOV 07	
NOV 08	38.0
NOV 09	
NOV 10	28.0
NOV 11	
NOV 12	56.0
NOV 13	
NOV 14	49.0
NOV 15	
NOV 16	68.0
NOV 17	
NOV 18	41.0
NOV 19	
NOV 20	76.0
NOV 21	
NOV 22	20.0
NOV 23	
NOV 24	26.0
NOV 25	
NOV 26	46.0
NOV 27	
NOV 28	
NOV 29	
NOV 30	
=====	
NOV 01 -30	42.7

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TABLE IV. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR NOV 1, 1979 - NOV 30, 1979

HYDROGEN SULFIDE (UG/M**3)
1-HOUR

SITE	Ø33
1.11/29(11:00-12:00)	3.0
2.11/ 6(9:00-10:00)	1.0
3.11/19(10:00-11:00)	1.0
4.11/27(10:00-11:00)	1.0
5.11/ 2(11:00-12:00)	1.0

METHANE(UG/M**3)X10**-1)
6-9 AM

SITE	Ø33
1.11/14(6:00- 9:00)	313.0
2.11/15(6:00- 9:00)	301.6
3.11/16(6:00- 9:00)	281.0
4.11/30(6:00- 9:00)	226.3
5.11/ 8(6:00- 9:00)	207.6

SULFUR DIOXIDE (UG/M**3)
1-HOUR

SITE	Ø33
1.11/12(13:00-14:00)	76.0
2.11/12(12:00-13:00)	65.0
3.11/12(14:00-15:00)	63.0
4.11/12(21:00-22:00)	55.0
5.11/30(9:00-10:00)	49.0

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TABLE IV. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR NOV 1, 1979 - NOV 30, 1979

SULFUR DIOXIDE (UG/M**3)
3-HOUR

SITE 033

1.11/12(12:00-15:00)	68.0
2.11/30(13:00-16:00)	42.3
3.11/12(21:00- 0:00)	40.6
4.11/13(0:00- 3:00)	39.0
5.11/ 2(0:00- 3:00)	34.6

SULFUR DIOXIDE (UG/M**3)
24-HOUR

SITE 033

1.11/12(10:00-10:00)	34.1
2.11/ 6(11:00-11:00)	19.3
3.11/29(17:00-17:00)	15.5
4.11/10(20:00-20:00)	15.3
5.11/ 2(0:00- 0:00)	12.8

TOTAL SUSPENDED PARTICULATE (UG/M**3)
24-HOUR

SITE 033

1.11/20(0:00- 0:00)	76.0
2.11/16(0:00- 0:00)	68.0
3.11/ 6(0:00- 0:00)	66.0
4.11/12(0:00- 0:00)	56.0
5.11/14(0:00- 0:00)	49.0

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TABLE V. HOURLY AVERAGES OF SULFUR DIOXIDE (UG/M**3)
TRAILER NO. - 33 PERIOD(11/ 1/79 TO 11/30/79)

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	31	10	0	0	:	13	13	3	5	8	29	29	0	5	3	13	13	0	0	0	0	3	18	8	9
2	23	47	34	16	:	10	16	16	3	0	0	3	0	0	0	3	29	18	3	0	3	31	26	16	13
3	13	16	8	8	:	31	23	10	5	0	0	0	0	0	13	18	16	3	0	0	0	0	0	0	7
4	0	0	0	0	:	3	5	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	:	0	3	21	0	3	8	26	34	21	44	26	21	10	0	0	18	31	29	29	14
7	23	16	16	18	:	10	16	13	16	18	10	0	5	16	8	13	16	8	0	0	0	3	3	0	10
8	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	:	0	0	13	10	0	0	0	0	0	0	0	0	0	5	3	13	0	5	0	2
11	0	3	10	8	:	3	16	13	18	31	29	23	16	31	26	34	34	18	13	8	0	3	0	0	15
12	0	5	10	10	:	8	3	8	18	21	29	29	65	76	63	26	10	5	16	10	29	55	36	31	24
13	42	39	36	31	:	34	34	23	36	31	23	21	10	0	0	0	0	0	0	0	0	0	0	0	16
14	0	0	0	0	:	0	0	0	16	36	10	0	0	0	0	0	0	0	0	0	0	0	0	0	3
15	0	0	0	0	:	0	0	0	0	0	3	0	0	21	34	8	0	0	0	0	0	0	0	0	3
16	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	:	8	23	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
23	3	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	:	0	0																		0
27					:																				
28					:							:	8	0	0	0	0	0	0	3	0	3	0	0	1
29	0	0	0	0	:	0	0	0	0			5	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	:	18	29	13	23	49	26	18	26	31	47	49	29	0	0	0	0	0	0	0	16
MEAN	5	5	4	3		5	6	5	6	8	6	6	6	7	9	7	6	2	1	1	2	5	4	3	

TOTAL NUMBER OF OBSERVATIONS = 637 MEAN = 4.8
: INDICATES CALIBRATION FOR THE HOUR

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CORPORATION

TABLE V. HOURLY AVERAGES OF HYDROGEN SULFIDE (UG/M**3)
TRAILER NO. - 33 PERIOD(11/ 1/79 TO 11/30/79)

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	:	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	:	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	:	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	:	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
28	0	1	1	1	:	1	1	1	1	:	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	:	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL NUMBER OF OBSERVATIONS = 687 MEAN = 0.0
: INDICATES CALIBRATION FOR THE HOUR

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TABLE V. HOURLY AVERAGES OF METHANE(UG/M**3)X10**-1)
TRAILER NO. - 33 PERIOD(11/ 1/79 TO 11/30/79)

	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																								MEAN
DAY	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																								
1	228	181	153	133		:118	118	114	116	113	116	117	112	112	111	112	114	115	112	125	164	155	161	197	135
2	163	170	170	191		:207	193	151	142	117	114	115	114	110	112	114	120	125	177	129	151	208	178	183	150
3	186	159	164	216		:212	171	143	124	125	117	112	111	111	114	117	116	121	118	118	123	136	169	147	140
4	167	158	158	175		:183	177	158	161	131	114	111	111	111	112	112	114	113	112	120	123	165	121	123	136
5	126	118	113	119		:270	133	132	121	111	109	108	108	108	108	109	117	123	118	121	124	128	131	133	126
6	132	131	127	245		:217	210	250	149	118	136	124	127	131	133	128	126	127	132	131	142	154	166	182	153
7	184	177	156	143		:189	150	136	139	133	126	122	123	130	125	125	125	130	124	126	132	132	132	121	138
8	116	125	126	139		:170	170	248	205	125	110	110	110	111	110	109	109	108	108	107	107	107	106	105	128
9	104	103	103	102		:100	100	100	99	99	100	101	102	107	105	107	108	114	108	111	120	126	122	132	108
10	134	147	139	143		:121	129	131	124	119	119	117	115	115	116	117	119	123	123	121	119	119	134	150	126
11	136	136	138	131		:157	154	138	131	120	117	119	118	119	120	120	119	120	117	136	135	129	139	158	131
12	177	165	170	151		:149	153	154	155	131	126	120	128	126	122	117	115	119	136	138	142	162	167	135	142
13	133	147	130	126		:159	165	158	164	145	122	124	121	118	117	137	122	119	130	123	139	152	160	182	139
14	197	239	279	263		:275	303	387	249	168	123	116	113	114	115	118	118	117	120	123	120	121	128	129	175
15	134	136	134	151		:225	289	345	271	199	145	130	127	127	125	126	121	124	126	120	122	132	137	156	161
16	133	130	128	130		:236	368	263	212	149	138	123	125	123	125	129	126	127	132	142	143	118	118	141	155
17	172	142	142	170		:148	147	248	196	131	116	114	112	113	117	116	116	118	115	124	128	121	122	121	137
18	119	129	128	132		:120	119	121	107	103	103	102	103	103	102	102	102	105	107	106	104	103	102	103	110
19	102	103	105	114		:114	108	110	107	103	103	105	104	104	107	107	110	110	112	112	112	119	129	121	110
20	116	111	113	113		:112	112	112	111	109	110	113	110	114	112	108	109	110	115	118	111	102	102	101	111
21	102	103	103	102		:101	101	101	101	100	100	101	100	100	108	114	114	110	100	115	116	124	123	130	107
22	138	120	116	119		:121	124	125	116	117	119	114	117	112	115	115	114	113	114	115	117	118	125	128	119
23	124	129	121	121		:116	121	130	123	124	117	112	110	109	108	109	109	109	110	110	113	127	128	140	118
24	137	125	127	116		:135	126	120	114	110	111	114	122	119	122	122	126	127	145	134	143	125	115	113	124
25	113	117	120	137		:137	140	140	123	116	110	109	109	109	111	113	113	116	120	122	123	121	126	131	121
26	123	123	123	132		:142	135	136	146	146	143	138	131	138	112	112	112	114	117	120	126	122	134	108	128
27	105	104	104	105		:106	109	107	105	94	100	100	100	99	100	100	101	102	101	101	106	108	116	123	104
28	121	134	120	119		:117	111	112	114	110	291	110	109	108	107	109	108	108	112	126	128	117	116	131	123
29	133	122	113	111		:126	112	120	116	117	115	113	104	101	101	101	101	101	101	108	123	142	128	114	114
30	118	155	200	172		:186	224	241	214	144	152	110	111	109	110	111	106	106	111	103	112	135	107	101	141
MEAN	139	138	137	144		159	159	164	145	124	124	114	114	114	113	115	114	116	119	120	126	131	131	135	

TOTAL NUMBER OF OBSERVATIONS = 690 MEAN = 130.2
: INDICATES CALIBRATION FOR THE HOUR

III. BAG SAMPLING PROGRAM

Grab-bag samples are collected bi-weekly and analyzed for methane. The ambient air samples are collected in tedlar bags using a metal bellows pump connected to the ambient sample manifold. Each bag sample is collected over a three-hour period.

The bag samples are returned to Austin for analysis for methane concentration. The analysis is performed on either a Bendix 8202 or a Baseline Industries Model 1030 gas chromatograph using a flame ionization detector. The minimum detectable limit using this technique is less than 1 ppm.

Results of the bag sampling analyses are given below:

<u>Date</u>	<u>Time</u>	<u>Methane Concentration (ppm)</u>
12/11/79	0600-0900	3.21
12/28/79	0600-0900	2.77

TABLE 1.
DOWNTIME HOURS FOR CHOCOLATE BAYOU 1979

SITE 033 DIGITIZING					
DATE	SYSTEM	SO2	F2S	CH4	TSP
12/ 1	0	0	0	9	-
12/ 2	0	0	0	2	0
12/ 3	0	0	0	0	-
12/ 4	0	0	0	0	0
12/ 5	0	0	0	0	-
12/ 6	0	0	0	0	0
12/ 7	0	0	0	0	-
12/ 8	0	0	0	0	0
12/ 9	0	0	0	0	-
12/10	0	0	0	0	0
12/11	0	0	0	0	-
12/12	0	0	0	0	0
12/13	0	0	0	9	-
12/14	0	0	0	8	0
12/15	0	0	0	0	-
12/16	0	0	0	0	0
12/17	0	0	0	0	-
12/18	0	0	0	0	0
12/19	0	0	0	0	-
12/20	0	0	0	0	0
12/21	0	0	0	0	-
12/22	0	0	0	0	0
12/23	0	1	1	8	-
12/24	1	0	0	23	-
12/25	1	0	0	23	24
12/26	1	0	0	23	-
12/27	0	0	0	24	-
12/28	0	1	0	9	0
12/29	0	0	0	0	-
12/30	0	0	0	0	0
12/31	0	0	0	0	-
CAL TIME		33	32	25	
DATA CAPTURE RATE (%)		98	98	80	93

Downtime Summary for December 1979

Data recovery for the month was very good except for the CH₄ parameter. Loss of methane data occurred on December 23, 24, 25, 26, and 27 as a result of a malfunction in the analyzer's electrical system. Once diagnosed, this intermittent problem was repaired and the analyzer brought back online.

TABLE II

FEDERAL AND TEXAS STATE AMBIENT AIR QUALITY STANDARDS

Agency	Pollutant	Special Conditions		µg/m ³ Primary	(PPM)	µg/m ³ Secondary	(PPM)
Federal and Texas	SO ₂		Annual	80	.03		.
			24-Hour*	365	.14		
			3-Hour*	---		1300	.5
Texas	SO ₂	All Counties Except	30-Minute**	1061	.4	----	
		Harris, Galveston	30-Minute**	743	.28	----	
		Orange, Jefferson	30-Minute**	849	.32	----	
Federal and Texas	Particulate		Annual***	75		60	
			24-Hour*	260		150	
Texas	Particulate		5-Hour**	100		---	
			3-Hour**	200		---	
			1-Hour**	400		---	
Federal and Texas	CO		8-Hour*	10,000	9.	10,000	9.
			1-Hour*	40,000	35.	40,000	35.
Federal and Texas	Photochemical Oxidant HC (Non-Methane) NO ₂	6-9 a.m.	1-Hour†	235	.12	235	.12
			3-Hour*	160	.24	160	.24
			Annual	100	.05	100	.05

*Not to be exceeded more than once per year.

**Texas special regulations. Single plant source may not exceed these ambient levels in Texas at any point, at any time.

***Geometric Mean.

†The expected number of exceedances not to occur on more than one calendar day per year.

TABLE III. DAILY AVERAGES FOR DEC 1 1979 THRU DEC 31 1979

SITE DATE	SULFUR DIOXIDE (UG/M**3) 033	HYDROGEN SULFIDE (UG/M**3) 033	METHANE (UG/M**3)X10**-1 033
DEC 01	19.5	0.0	121.5
DEC 02	7.3	0.0	179.6
DEC 03	9.4	0.1	127.9
DEC 04	17.3	0.0	153.3
DEC 05	0.0	0.0	124.6
DEC 06	0.0	0.0	117.6
DEC 07	0.0	0.0	153.4
DEC 08	3.7	0.0	143.6
DEC 09	0.1	0.0	128.0
DEC 10	0.3	0.0	120.1
DEC 11	0.0	0.0	102.2
DEC 12	0.0	0.0	103.7
DEC 13	0.0	0.0	111.6
DEC 14	1.5	0.1	119.1
DEC 15	2.7	0.0	125.9
DEC 16	12.9	0.0	139.5
DEC 17	3.7	0.0	118.0
DEC 18	1.8	0.0	160.0
DEC 19	0.0	0.0	129.0
DEC 20	0.0	0.0	100.8
DEC 21	0.0	0.0	99.4
DEC 22	0.0	0.0	24.0
DEC 23	0.0	0.0	
DEC 24	0.0	0.0	
DEC 25	16.3	0.0	
DEC 26	0.0	0.0	
DEC 27	0.0	0.0	
DEC 28	0.0	0.1	130.5
DEC 29	0.0	0.0	122.5
DEC 30	0.0	0.0	129.0
DEC 31	0.0	0.0	123.7
DEC 01 -31	3.2	0.0	123.0

TABLE III. DAILY AVERAGES FOR DEC 1 1979 THRU DEC 31 1979

TOTAL SUSPENDED PARTICULATE (UG/M**3)

SITE 033
DATE

DEC 01	
DEC 02	49.0
DEC 03	
DEC 04	69.0
DEC 05	
DEC 06	53.0
DEC 07	
DEC 08	58.0
DEC 09	
DEC 10	49.0
DEC 11	
DEC 12	14.0
DEC 13	
DEC 14	21.0
DEC 15	
DEC 16	38.0
DEC 17	
DEC 18	31.0
DEC 19	
DEC 20	26.0
DEC 21	
DEC 22	26.0
DEC 23	
DEC 24	
DEC 25	
DEC 26	
DEC 27	
DEC 28	54.0
DEC 29	
DEC 30	16.0
DEC 31	

DEC 01 -31 34.6

RADIAN
CORPORATION

TABLE IV. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR DEC 1, 1979 - DEC 31, 1979

HYDROGEN SULFIDE (UG/M**3)
1-HOUR

SITE 033

1.12/ 3(11:00-12:00)	3.0
2.12/14(9:00-10:00)	3.0
3.12/28(9:00-10:00)	3.0
4.12/ 1(3:00- 4:00)	0.0
5.12/ 1(2:00- 3:00)	0.0

METHANE (UG/M**3)X10**-1)
6-9 AM

SITE 033

1.12/ 2(6:00- 9:00)	380.3
2.12/ 7(6:00- 9:00)	297.3
3.12/18(6:00- 9:00)	290.6
4.12/ 8(6:00- 9:00)	223.6
5.12/ 4(6:00- 9:00)	208.6

SULFUR DIOXIDE (UG/M**3)
1-HOUR

SITE 033

1.12/25(10:00-11:00)	146.0
2.12/25(9:00-10:00)	120.0
3.12/ 1(15:00-16:00)	78.0
4.12/ 1(14:00-15:00)	76.0
5.12/25(11:00-12:00)	76.0

TABLE IV. THE FIVE MAXIMUM INDEPENDENT SLIDING AVERAGES FOR DEC 1, 1979 - DEC 31, 1979

SULFUR DIOXIDE (UG/M**3)
3-HOUR

SITE	033
1.12/25(9:00-12:00)	114.0
2.12/ 1(13:00-16:00)	74.6
3.12/ 4(9:00-12:00)	59.6
4.12/16(10:00-13:00)	56.3
5.12/ 3(10:00-13:00)	46.6

SULFUR DIOXIDE (UG/M**3)
24-HOUR

SITE	033
1.12/ 1(9:00- 9:00)	24.6
2.12/ 3(17:00-17:00)	18.0
3.12/24(17:00-17:00)	16.1
4.12/15(16:00-16:00)	12.8
5.12/ 2(14:00-14:00)	9.3

TOTAL SUSPENDED PARTICULATE (UG/M**3)
24-HOUR

SITE	033
1.12/ 4(0:00- 0:00)	69.0
2.12/ 8(0:00- 0:00)	58.0
3.12/28(0:00- 0:00)	54.0
4.12/ 6(0:00- 0:00)	53.0
5.12/ 2(0:00- 0:00)	49.0

RADIAN CORPORATION

TABLE V. HOURLY AVERAGES OF SULFUR DIOXIDE (UG/M**3)
TRAILER NO. - 33 PERIOD(12/ 1/79 TO 12/31/79)

	HOUR																								MEAN
DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	0	0	0	0	:	0	0	0	0	29	31	36	65	70	76	78	42	21	0	0	0	0	0	0	19
2	5	0	0	0	:	5	29	47	34	10	0	0	0	13	13	8	3	0	0	0	0	0	0	0	7
3	0	0	0	0	:	0	0	0	3	21	44	47	49	29	0	0	3	10	0	0	10	0	0	0	9
4	0	0	0	0	:	0	0	0	23	65	57	57	49	34	42	39	29	3	0	0	0	0	0	0	17
5	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	:	0	0	0	0	21	18	21	13	5	0	0	3	0	0	0	0	3	0	0	4
9	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	:	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	:	0	0	0	0	0	0	10	21	29	3	13	21	0	0	0	0	0	0	0	1
16	0	0	0	0	:	0	0	0	0	42	63	49	57	31	44	10	0	0	0	0	0	0	0	0	3
17	0	0	0	0	:	0	0	0	0	0	5	18	26	36	0	0	0	0	0	0	0	0	0	0	13
18	0	0	0	0	:	0	0	0	0	13	21	8	0	0	0	0	0	0	0	0	0	0	0	0	4
19	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	:	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	:	0	0	0	0	120	146	76	0	0	16	0	0	0	0	0	0	0	0	0	16
26	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	:	0	0	0	0	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	0	0	0	0		0	1	2	2	10	12	10	9	8	7	5	3	1	0	0	0	0	0	0	0

TOTAL NUMBER OF OBSERVATIONS = 698 MEAN = 3.2
: INDICATES CALIBRATION FOR THE HOUR

RADIAN CORPORATION

TABLE V. HOURLY AVERAGES OF HYDROGEN SULFIDE (UG/M**3)
TRAILER NO. - 33 PERIOD(12/ 1/79 TO 12/31/79)

DAY	HOUR																								MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	:	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	:	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	:	0	0	0	0	0	0	0	:	2	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	:	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL NUMBER OF OBSERVATIONS = 700 MEAN = 0.0
: INDICATES CALIBRATION FOR THE HOUR

RADIAN CORPORATION

TABLE V. HOURLY AVERAGES OF METHANE(UG/M**3)X10**-1)
TRAILER NO. - 33 PERIOD(12/ 1/79 TO 12/31/79)

DAY	HOUR																								MEAN	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1										149	133	137	126	137	128	122	124	115	108	101	101	106	115	121	122	
2	116	120	166	198	:413	450	375	316	152				71	116	111	113	113	112	114	122	121	133	170	170	180	
3	141	126	133	142	:133	142	133	134	127	131	134	128	125	118	117	121	118	119	117	121	132	126	123	128	128	
4	148	165	196	221	:181	195	204	227	179	161	144	122	120	122	129	126	120	120	120	121	134	149	122	153	153	
5	146	154	149	139	:164	187	143	161	119	103	101	100	100	101	100	101	106	118	122	121	116	110	105	125	125	
6	107	113	116	121	:117	112	110	112	110	110	109	113	106	102	103	103	103	131	140	120	163	147	137	118	118	
7	124	130	159	225	:235	324	327	241	141	114	111	115	112	112	110	108	116	117	126	111	132	121	118	153	153	
8	123	124	142	206	:219	230	238	203	170	136	127	118	109	106	108	109	110	111	116	121	125	131	121	144	144	
9	109	115	130	122	:153	139	135	144	143	128	115	114	114	113	116	115	126	122	141	140	134	154	121	128	128	
10	124	128	124	155	:121	125	114	125	117	111	112	163	109	106	106	113	110	112	112	113	111	125	127	120	120	
11	104	100	99	98	:121	108	110	98	97	96	96	95	95	96	96	98	97	99	104	99	114	117	114	102	102	
12	104	99	98	95	: 96	95	94	95	95	94	94	103	108	106	106	106	108	108	109	117	115	119	120	104	104	
13	119	115	118	117	:118	119	73	97	78			134	126	127	137	84								112	112	
14								70	176	106	108	105	119	130	115	115	108	113	117	126	179	112	107	119	119	
15	108	114	120	120	:131	132	155	144	141	133	133	128	128	116	125	127	126	121	112	113	118	125	125	126	126	
16	116	119	123	124	:164	159	152	175	178	194	183	144	125	129	119	112	121	113	147	141	140	118	113	140	140	
17	113	113	115	108	:109	110	111	114	119	113	117	119	117	115	116	113	109	108	108	114	146	163	143	118	118	
18	139	151	208	248	:260	284	303	285	180	135	129	119	113	113	115	116	114	115	116	113	110	107	106	160	160	
19	113	123	129	125	:134	130	142	208	192	174	128	118	112	125	118	118	120	119	122	117	102	99	98	129	129	
20	98	98	97	97	: 97	98	97	98	98	97	140	100	100	101	101	101	100	100	100	100	100	101	101	101	101	
21	103	100	100	99	: 98	97	105	99	97	97	98	98	97	98	99	100	100	102	99	101	99	100	101	99	99	
22	98	97	96	96	: 96	49	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	24	
23	96	96	96	98	: 97	96	96																	96	96	
24																										
25																										
26																										
27																										
28										98	130	131	129	121	116	118	122	132	144	145	150	135	145	142	131	131
29	136	123	121	123	:117	130	146	126	118	125	118	114	117	119	117	117	117	121	121	121	123	123	124	122	122	
30	125	126	126	125	:151	159	162	140	130	132	127	123	122		:120	118	117	115	118	122	124	126	131	129	129	
31	154	162	139	131	:129	126	126	125	119	120	112	110	111	109	108	108	107	108	109	121	132	140	139	124	124	
MEAN	119	121	129	139		152	158	152	147	128	120	117	112	110	109	109	107	109	110	114	114	121	122	117		

TOTAL NUMBER OF OBSERVATIONS = 570 MEAN = 123.0
: INDICATES CALIBRATION FOR THE HOUR

[The page contains extremely faint, illegible text, likely a scan of a document with very low contrast or a blank page with noise.]

APPENDIX II:

MICROSEISMIC MONITORING

TELEDYNE GEOTECH

GARLAND, TEXAS

MICROSEISMICITY AT THE BRAZORIA COUNTY
GEOPRESSURED RESERVOIR
SEPTEMBER 1978-DECEMBER 1979

1. INTRODUCTION

1.1 BACKGROUND AND PURPOSE OF THE MONITORING PROGRAM

The commercial feasibility of mining the vast quantities of geopressured brine underlying the Gulf Coast is dependent upon high volumetric production rates. The production requirements for effective withdrawal and subsurface disposal of geopressured fluids is generally near 3×10^4 /barrels/day/well. Volumes of this order, by substantially altering the local state of subsurface stress, will likely cause ground subsidence and tilt in the immediate area of brine withdrawal. ReInjection of these fluids may activate preexisting growth faults as well as cause new fracturing to occur.

In an investigation aimed toward better understanding and evaluating the seismic risks associated with geopressured fluid production, Teledyne Geotech, under the authorization of the Texas Bureau of Economic Geology, has for the past twenty-four months conducted a seismic monitoring program in the vicinity of the Brazoria County geopressured well test site. According to prescheduled test plans, the Brazoria County Pleasant Bayou No. 2 is to be produced in a long-term flow test from depths near 15,000 feet, at rates approaching 30,000 BPD. The spent fluids will be reinjected at a depth of approximately 6500 feet, into the Pleasant Bayou No. 1 well site, located approximately 0.5 kilometer from the production well.

The monitoring program was designed to initially establish a baseline of data representative of the level of naturally occurring microseismic activity in the locality prior to production of the test well, and then, to provide continued surveillance of the area during the well test. The purpose of the continued monitoring, therefore, is to detect any increase in microseismicity that might be associated with either the reinjection process or with actual changes in the reservoir geometry of the production well.

Numerous networks of growth faults occur in the immediate area of the test well, thus increasing the seismic risk factor. Analysis of the microseismic data collected by the monitoring system should also reveal any increase of seismic activity which may result from induced activation of these pre-existing fault planes.

1.2 HYPOTHETICAL CALCULATIONS OF SEISMIC EFFECTS OF FLUID WITHDRAWAL

For several years, there has been concern by many scientists in the energy industry regarding the possible seismic consequences of the withdrawal and subsurface disposal of geopressured brines. Through an internally sponsored research project, Geotech has developed and implemented a computer program which calculates various parameters as functions of time and distance from the production well based upon a model of the geopressured reservoir test. The model of the hypothetical reservoir and the well testing plan shown in figure 1 have been used to illustrate the effects of geo-pressured fluid production at realistic rates of 20,000 and 30,000 BPD. The theoretical calculations which follow in this section are based upon this model of a disc shaped reservoir situated at a depth of 15,000 feet, with a diameter of two miles.

Figure 2(a) shows the pressure decline at one point, a distance of 800 meters from the well, during a production period of two years at the 20,000 and 30,000 BPD rate specified by the model of figure 1. The initial pressure is assumed to be 816 atmospheres with a viscosity of 0.15 centipoise and a compressibility of $3 \times 10^{-6} \text{ (psi)}^{-1}$. These production rates result in a pressure decline of 0.33 atmospheres/day, thus reducing the pressure to approximately 575 atmospheres at the end of the specified two year production period.

Figure 2(b) illustrates the pressure decline over a distance extending from the well to 1400 meters, at time intervals of 6 months, 1 year and 2 years. Pressure drops are shown to be fairly constant over the 1400 meters, which is a distance slightly less than the radius of the reservoir.

Theoretical calculations show that the rapid withdrawal of fluids, not only causes pressure depletions, but also results in significant changes in reservoir size. Assuming the disc model of the reservoir deforms elastically to the decline of reservoir pressure, then compaction is shown to be

$$\Delta h = C_m \Delta p H \quad (1)$$

by Geertsma (1973)

where

h = change in reservoir height

C_m = compaction coefficient = $0.5 \times 10^{-6} \text{ (psi)}^{-1}$

p = pressure decline = 190 atmospheres $\times 14.7 = 2793 \text{ psi}$

H = original reservoir height = 800 feet

RESERVOIR PROPERTIES

POROSITY: 15%

PERMEABILITY: 10 mD

COMPACTION COEFFICIENT: $0.5 \times 10^{-6} \text{ (psi)}^{-1}$

FLUID PROPERTIES

INITIAL PRESSURE: 12000

COMPRESSIBILITY: $3 \times 10^{-6} \text{ (psi)}^{-1}$

VISCOSITY: .15 cP

PRODUCTION HISTORY

20,000 BPD FOR 2 MONTHS

30,000 BPD FOR 22 MONTHS

FIGURE 1. THEORETICAL MODEL OF GEOPRESSURED RESERVOIR TEST

G 11139

▲ PRESSURE 800 M FROM WELL
BEGINNING PRESSURE: 816 ATM

(a)

▲ PRESSURE AFTER 6 MOS.
† PRESSURE AFTER 1 YR.
× PRESSURE AFTER 2 YRS.
BEGINNING PRESSURE: 816 ATM

(b)

FIGURE 2. PRESSURE DECLINE DURING A TWO YEAR PRODUCTION PERIOD

Then, assuming a compaction coefficient of $0.5 \times 10^{-6} \text{ (psi)}^{-1}$, equation 1 yields a change in height of 11.2 feet at the end of the 2 year production. The corresponding change in reservoir volume would be approximately 1 billion cubic feet, about 1.4% of the original reservoir volume. Volume loss on this order must result in deformation of the rocks surrounding the reservoir. If this deformation is assumed elastic, then the perturbations of the earth strain field within the overburden may be computed by an extension of Geertsma's arguments. Based on this extension and, again, the hypothetical model, radial profiles of the maximum principal strain, minimum principal strain and maximum shearing (deviatoric) strain accumulations have been calculated and are shown in figures 3 and 4. The curves shown in figure 3 represent strain accumulation at surface; figure 4 shows strain accumulations at a depth of 14,000 feet, 1000 feet above the reservoir.

The peaks of the theoretical shearing strains calculated for the earth's surface, and shown in the lower portion of figure 3, occur at well site. Shearing strains calculated for a 14,000 foot depth, however are shown in the lower portion of figure 4 to peak at a location above the outer boundary of the reservoir, and are greater than surface shearing strains by a factor of near 30. The forces that result in these strains may be best illustrated by the diagram of figure 5.

The intensity of shading in the illustration denotes the intensity of the strain accumulation. The surface land material from the outer edges of the subsiding area is shown to slide downward toward the well as the roof of the reservoir sinks into the depleted area. The movement of the upper land masses toward the center results in the strain accumulations directly under the well at the upper levels.

The peaks of the shearing strains indicate substantial accumulations. The accumulation at 14,000 feet near the outer edge of the reservoir is on the order of 10^{-3} at the end of the 2 year production, indicating an effective accumulation rate of near 10^{-5} /month.

Ground displacements associated with the calculated strains for both surface and 14,000 foot depth are illustrated graphically in 3-dimension in figures 6 and 7. Displacements are represented at time intervals corresponding to the calculated pressure reductions and strains, 6 months, 1 year and 2 years. The 3-dimensional plots dramatically illustrate with an exaggeration of the vertical scale, a displacement at the end of two years, of 1.4 centimeters at surface level and 7.1 centimeters at the 14,000 foot depth.

The results obtained by use of the hypothetical model are probably not what will occur in Brazoria County during the well test, because of differences in actual parameters and parameters which have been assumed in the model construction. It is still evident, however, that the assumed parameters are realistic to geopressured well production in general, and therefore, the results are indicative of the magnitude of problem which may be encountered. Certainly, the consequences of subsidence and seismic risk should be recognized and controlled.

FIGURE 3. SURFACE LEVEL STRAIN ACCUMULATIONS CALCULATED FOR TIME INTERVALS OF 6 MONTHS, 1 YEAR AND 2 YEARS

G 11141

FIGURE 4. STRAIN ACCUMULATIONS CALCULATED FOR A DEPTH OF 14,000 FEET AT TIME INTERVALS OF 6 MONTHS, 1 YEAR AND 2 YEARS

G 11142

FIGURE 5. VISUAL INTERPRETATION OF THE PATTERN OF SHEARING STRAIN ACCUMULATIONS

G 11143

FIGURE 6. COMPARISON OF VERTICAL DISPLACEMENT AT SURFACE AFTER TIME INTERVALS OF 6 MONTHS, 1 YEAR AND 2 YEARS

G 11144

FIGURE 7. COMPARISON OF VERTICAL DISPLACEMENT AT 14,000 FEET BELOW SURFACE AT TIME INTERVALS OF 6 MONTHS, 1 YEAR AND 2 YEARS

G 11145

2. DATA COLLECTION AND ANALYSIS

2.1 FIELD MEASUREMENTS

The monitoring system instrumentation consists of five borehole seismometers (Geotech Model S-500) installed at a depth of approximately 100 feet, and one surface seismometer, Geotech Model S-13. The seismometers are installed in sealed containers to reduce detrimental moisture, temperature and barometric effects. Amplification and response shaping are performed by low-noise amplifier/filters, Geotech Model 42.50. Amplitude data are then transformed to constant bandwidth, frequency modulated format using the Geotech Model 46.22 voltage controlled oscillator (VCO).

Figure 8 shows the location and configuration of the monitoring system array and the test well. The S-13 surface sensor, a standard moving-coil seismometer, is installed at an approximate 4 foot depth at the Site 1 location on figure 8 and is recording data along with the borehole system as a gauge to the signal/noise improvement gained by operating at depth. The geographical coordinates and the X (east-west) and Y (north-south) coordinates of the individual sensor sites are listed in table 1. X, Y coordinates for flat earth are calculated relative to sensor site 3.

Table 1. Site coordinates

Site	Latitude			Longitude			N-S (km)	E-W (km)	Elevation feet
	Deg	Min	Secs	Deg	Min	Secs			
1	29	17	27	95	16	52	1.027	-2.422	15
2	29	17	32	95	14	01	1.171	2.242	15
3	29	16	54	95	15	23	0.000	0.000	5
4	29	15	54	95	14	45	-1.872	1.032	12
5	29	15	54	95	16	11	-1.898	-1.284	18

Figure 9 illustrates a block diagram of the data acquisition system. As shown in the illustration, data from four of the sites can be transmitted via radio telemetry to a collection point in Liverpool, Texas. Here they are multiplexed together with data from a nearby sensor (site 1 in figure 8) and then transmitted via commercial telephone lines to the Garland plant. At this point, the signals are discriminated and the seismic outputs are recorded on both magnetic tape and 16 mm film.

Site 3 system is shown in the diagram of figure 9 by dashed lines, indicative of the presently inoperative status of this particular installation. No data have been received from this installation since July 1979 because of severe local interference on the radio frequency used by this transmitter.

FIGURE 8. LOCATION OF SENSOR SITES OF BRAZORIA COUNTY FIELD PROGRAM

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FIGURE 9. BLOCK DIAGRAM OF THE BRAZORIA COUNTY MONITORING SYSTEM

The velocity response of the overall system (from film) is shown in figure 10 as the solid black line curve. All systems have responses matched to this curve with the exception of the downhole Site 1 installation. The response of this system was extended on 3 December 1979 to allow observation of lower frequency microseismic arrivals, and is shown in figure 10 as the dashed line curve.

2.2 DATA ANALYSIS PROCEDURES

The film records are continuously reviewed to tabulate microseismic activity, assess the general quality of the data, and obtain information on detection thresholds.

The arrival time data is processed by MEHYPO (Johnson, et al, 1977) a digital computer program which determines hypocenter, magnitude and reliability parameters of the local events. The location program utilizes both compressional and shear arrivals, tracing the refracted paths through an appropriate earth model consisting of horizontal layers with constant velocities. The solution is based upon a conventional least squares minimization criteria for the estimation of hypocenter coordinates.

The earth model presently used by MEHYPO for epicenter determination is shown in table 2.

Hypocenters are computed only for events observed at three or more stations because of possible ambiguities of solutions based on data from fewer stations.

Local seismic magnitudes are based upon maximum P wave amplitude and are calculated as:

$$M_L = \log_{10} (A/2) - 1.75 + 0.8 \log_{10} (X^2)$$

where: M_L is the local magnitude

A is the peak-to-peak compressional wave amplitude in nanometers
(10^{-9} meters)

$$X = \left[\frac{(\text{epicentral distance})^2 + (\text{hypocentral depth})^2}{(\text{in kilometers})^2} \right]^{1/2}$$

and X must be ≥ 1.0

FIGURE 10. VELOCITY RESPONSE OF THE MONITORING SYSTEMS (FROM FILM)

G 11147

Table 2. Velocity model utilized by MEHYPO for epicenter determination

<u>Layer</u>	<u>Thickness (km)</u>	<u>Velocity - (km/s)</u>
1	0.4000	1.8000
2	0.4000	1.9000
3	0.3000	2.1000
4	0.3000	2.3000
5	0.3000	2.4000
6	0.3000	2.5000
7	0.3000	2.9000
8	0.3000	2.6500
9	0.2700	2.4000
10	0.1300	1.6500
11	0.2500	2.8000
12	0.3000	3.3500
13	0.3000	3.4000
14	1000.0000	3.5000

3. RESULTS

3.1 BACKGROUND NOISE

The initial operating system included five surface instruments. Beginning in September 1979 four of these instruments were replaced by downhole instruments in 100-foot deep boreholes. The background noise spectra for the surface and downhole seismometers are compared in figure 11. The downhole sensors provide a noise reduction factor of 10 in power and about 3 in amplitude, thus lowering the detection threshold by one-half magnitude. Events with magnitude of -0.5 have been detected with the current array.

3.2 SUMMARY OF SEISMICITY PRIOR TO JANUARY 1, 1980

Since monitoring began at the Brazoria County site a total of 1374 events have been observed and logged of which 202 have been located. The activity by month is listed in table 3. The majority fall into a class with the following general characteristics:

- a. Origin times during daylight hours only;
- b. Impulsive first motions;
- c. Frequencies from 8-12 Hz;
- d. Time delays across the array up to 6 seconds;
- e. Local magnitudes of 0.9 ± 0.2 ;
- f. Durations of 3-4 seconds.

Epicenters for 150 events of this type were located and plotted in figure 12. They are evidently explosive shots for seismic surveys running perpendicular and parallel to the regional geologic structure. Epicenters and magnitudes for November and December shots are listed in table 9 and a typical example is shown in figure 23.

During November and December 1979, 82 well defined events were recorded which differed sharply from the usual seismic shots in each of the above characteristics. This second class of events have:

- a. Origin times during all hours;
- b. Emergent first motions;
- c. Frequencies from 4-8 Hz;

FIGURE 11. SPECTRAL COMPARISON OF A BACKGROUND NOISE SAMPLE RECORDED BY THE DOWNHOLE AND SURFACE MONITORING SYSTEMS DURING A QUIET PERIOD

G 11095

Table 3. Seismicity by month

	<u>Total events</u>	<u>Total located events</u>	<u>Natural events</u>	<u>Natural located events</u>
1978 Sept	40	0	-	-
Oct	53	0	6	0
Nov	259	78	10	8
Dec	74	0	1	0
1979 Jan	14	2	-	-
Feb	0	0	-	-
Mar	90	25	-	-
Apr	180	39	-	-
May	200	0	-	-
Jun	40	0	-	-
Jul	System down			
Aug	System down			
Sep	101	0	-	-
Oct	100	2	2	2
Nov	177	46	78	38
Dec	46	10	4	4
	<u>1374</u>	<u>202</u>	<u>101</u>	<u>52</u>

FIGURE 12. EPICENTER LOCATIONS OF SEISMIC SHOT ACTIVITY

G 10260 C

- d. Time delays across the array of up to 14 seconds;
- e. Local magnitudes of 0.5 ± 0.5 ;
- f. Durations of 4-30 seconds.

An example of this type is in figure 13 and can be contrasted with the shot in figure 23.

These arrivals were noteworthy in that they appeared to consist primarily of surface waves with weak to undiscernible P and S waves. Recorded on vertical seismometers, these waves have arrival times which vary by up to 14 seconds across the 4.3 km array. Many traces have two or more phases readily apparent. Thus, these arrivals are assumed to be fundamental and higher mode Rayleigh waves with velocities in the range of 300-350 m/s.

The absence of observable P waves and the presence of multiple modes in the surface wave train makes arrival time selection very difficult. For each event the arrival time of the phase which was most consistently observable across the four channels was selected for location purposes. Often this was the first arriving Rayleigh mode but sometimes the last (fundamental) mode had greater amplitude so it was used instead. A model velocity of 315 m/s was used for all events and the depth was arbitrarily constrained to 1 m. Magnitudes were calculated using a body wave formula and are thus relative values only. Forty-one of these events were located by MEHYPO while the rest were assigned approximate locations based on similar signals with MEHYPO locations. Results are in table 4 and figure 14.

The epicenters are scattered about 4 linear regions which were active during the months of October, November and December 1979. The scattering in the eastern region is greater because it is farther from the array. Each of these regions lie parallel to and in close proximity to a known growth fault mapped by Bebout, et al (1978). The southwestern region lies 3 miles southwest of station 5, the western region passes 1 mile south of Liverpool, Texas, the central region runs just east of station 5, and the eastern region passes either through or just north of the Monsanto petrochemical plant.

These events were noted only because of their number and frequency of occurrence. Since the accepted procedure has been to log and locate only events with well defined P waves, it was believed that similar events have occurred during the monitoring period which were not noted because they had no clear P arrivals, were few in number and were widely scattered in time. Reviewing film data and logs for October and November 1978, did in fact reveal several surface wave signals of the type discussed above. These events were also located and plotted in figure 14. The months between November 1978 and November 1979 have not been fully scanned for this type of event.

FIGURE 13 TYPICAL SURFACE WAVE EVENT, NOVEMBER 4, 1979

Table 4 Microseismic events (surface waves)

Date yr mo day	Event No.	Time			Coordinates		Depth (km)	Magnitude
		h	min	s	Y (km)	X (km)		
78 10 12	1	15	11	54.96	-1.996	0.376	0.001	0.89
78 11 07	2	16	39	55.32	-1.844	-0.835	0.001	0.99
78 11 29	3	15	40	27.25	-0.029	-3.376	0.001	1.06
78 11 30	4	14	21	42.81	-0.033	-3.078	0.001	1.00
78 11 30	5	16	28	17.99	-0.205	-3.793	0.001	1.04
78 11 30	6	17	11	3.77	-0.354	-2.413	0.001	0.93
78 11 30	7	17	11	32.48	-0.228	-2.004	0.001	1.01
78 11 30	8	17	19	3.32	-0.151	-3.096	0.001	0.96
78 11 30	9	17	40	51.43	0.065	-3.892	0.001	1.03
78 12 01	10	13	46	40.71	-1.071	-5.957	0.001	1.47
78 10 15	11	2	55	45.00	-7.000	-3.000	0.000	0.60
79 10 15	12	2	55	54.00	-7.100	-3.100	0.000	0.60
79 11 04	13	16	11	42.11	-0.240	-2.412	0.001	0.68
79 11 04	14	16	12	14.15	-0.741	-3.378	0.001	0.96
79 11 04	15	16	19	0.00	-0.700	-3.000	0.000	0.47
79 11 04	16	16	21	2.83	-0.711	-3.076	0.001	0.87
79 11 22	17	0	10	58.09	-1.348	1.377	0.001	0.99
79 11 22	18	0	14	15.21	-1.549	0.987	0.001	0.98
79 11 22	19	0	18	38.35	-1.603	4.671	0.001	1.41
79 11 22	20	0	19	16.98	-3.179	4.719	0.001	1.70
79 11 22	21	0	21	29.09	-9.043	6.491	0.001	1.93
79 11 22	22	0	35	15.25	-1.922	3.606	0.001	1.00
79 11 22	23	0	43	42.00	-4.000	4.500	0.000	0.42
79 11 22	24	1	3	0.00	-4.000	4.500	0.000	1.12
79 11 22	25	1	42	56.34	-5.214	7.128	0.001	1.47
79 11 22	26	1	46	44.75	-2.719	5.088	0.001	1.02
79 11 22	27	1	48	25.63	-2.168	4.389	0.001	0.84
79 11 22	28	1	55	31.00	-3.000	5.000	0.000	0.39
79 11 22	29	1	58	21.00	-3.000	5.000	0.000	0.91
79 11 22	30	2	0	5.00	-3.000	5.000	0.000	0.96
79 11 22	31	2	41	52.00	-6.100	-2.600	0.000	1.17
79 11 22	32	2	44	12.00	-6.000	-2.800	0.000	1.10
79 11 22	33	2	45	2.48	-6.204	-2.681	0.001	1.05
79 11 22	34	3	9	4.00	-6.000	-2.500	0.000	-0.15
79 11 22	35	3	11	55.63	-2.371	-0.439	0.001	0.44
79 11 22	36	3	20	35.27	-1.818	-0.725	0.001	0.62
79 11 22	37	3	22	8.39	-2.010	-0.626	0.001	0.88
79 11 22	38	3	23	45.42	-2.988	-0.913	0.001	0.62
79 11 22	39	3	26	52.00	-2.500	-0.600	0.000	-0.50
79 11 22	40	3	28	7.00	-2.500	-0.600	0.000	0.75
79 11 22	41	3	29	45.40	-2.496	-0.564	0.001	0.49
79 11 22	42	3	33	7.73	-1.628	-0.679	0.001	0.49
79 11 22	43	3	37	14.07	-2.450	-0.627	0.001	0.54
79 11 22	44	3	39	21.67	-2.105	-0.752	0.001	0.39
79 11 22	45	3	48	34.74	-3.705	-0.968	0.001	0.64

Table 4 Continued

<u>Date</u>			<u>Event</u>	<u>Time</u>			<u>Coordinates</u>		<u>Depth</u>	<u>Magnitude</u>
<u>yr</u>	<u>mo</u>	<u>day</u>	<u>No.</u>	<u>h</u>	<u>min</u>	<u>s</u>	<u>Y (km)</u>	<u>X (km)</u>	<u>(km)</u>	
79	11	22	46	3	51	23.53	-1.903	-0.968	0.001	0.56
79	11	22	47	4	12	51.94	-2.654	-0.263	0.001	0.73
79	11	22	48	4	15	46.00	-1.500	0.500	0.000	0.92
79	11	22	49	4	18	15.87	-1.861	0.108	0.001	0.66
79	11	22	50	4	19	44.00	-1.500	0.500	0.000	0.61
79	11	22	51	4	21	13.00	-1.500	0.500	0.000	0.89
79	11	22	52	4	24	0.00	-1.500	0.500	0.000	0.26
79	11	22	53	4	27	43.00	-1.500	0.500	0.000	0.81
79	11	22	54	4	28	52.00	-1.500	0.500	0.000	0.81
79	11	22	55	4	32	36.00	-1.500	0.500	0.000	0.74
79	11	22	56	4	36	40.00	-1.500	0.500	0.000	1.00
79	11	22	57	4	40	39.40	-1.631	0.522	0.001	0.68
79	11	22	58	4	42	20.84	-2.791	-0.377	0.001	0.69
79	11	22	59	4	40	41.00	-1.500	0.500	0.000	0.33
79	11	22	60	4	45	17.00	-1.500	0.500	0.000	0.56
79	11	22	61	4	57	16.17	-1.653	0.619	0.001	0.78
79	11	22	62	5	3	3.00	-1.500	0.500	0.000	0.24
79	11	22	63	5	7	10.00	-1.500	0.500	0.000	0.24
79	11	22	64	5	8	0.00	-1.500	0.500	0.000	0.00
79	11	22	65	5	10	50.00	-1.500	0.500	0.000	0.75
79	11	22	66	5	15	33.00	-3.000	4.500	0.000	1.37
79	11	22	67	5	40	13.40	-3.246	4.177	0.001	0.99
79	11	22	68	6	4	30.00	-3.000	4.500	0.000	0.76
79	11	22	69	6	51	0.00	-3.000	4.500	0.000	0.56
79	11	22	70	7	28	54.00	-3.000	4.500	0.000	1.07
79	11	22	71	7	44	0.00	-3.000	4.500	0.000	0.97
79	11	22	72	7	45	19.02	-15.468	15.101	0.001	1.89
79	11	22	73	8	4	12.92	-1.576	6.182	0.001	1.38
79	11	22	74	8	12	29.90	-0.278	2.431	0.001	0.44
79	11	22	75	8	20	49.12	-1.323	7.963	0.001	1.23
79	11	22	76	8	31	59.00	-1.500	6.000	0.000	1.11
79	11	22	77	8	44	20.00	-1.500	6.000	0.000	1.25
79	11	22	78	9	40	30.00	-1.000	-1.000	0.000	0.57
79	11	22	79	11	56	30.00	-1.000	-1.000	0.000	0.73
79	11	22	80	12	33	49.00	-1.000	-1.000	0.000	0.03
79	11	22	81	12	51	0.00	-1.000	-1.000	0.000	0.21
79	11	22	82	12	55	8.00	-1.000	-1.000	0.000	0.51
79	11	22	83	12	56	27.00	-1.000	-1.000	0.000	0.51
79	11	22	84	12	59	58.23	-1.316	-1.100	0.001	0.84
79	11	22	85	13	12	44.00	-1.500	0.000	0.000	0.77
79	11	22	86	13	14	38.22	-1.525	0.187	0.001	0.45
79	11	22	87	13	21	24.88	-4.706	2.675	0.001	0.99

Table 4 Continued

<u>Date</u> yr mo day	<u>Event</u> No.	<u>Time</u>			<u>Coordinates</u>		<u>Depth</u> (km)	<u>Magnitude</u>
		h	min	s	Y (km)	X (km)		
79 11 22	88	13	23	1.51	-6.438	6.105	0.001	1.46
79 11 22	89	13	24	0.00	-5.500	4.500	0.000	1.68
79.11 22	90	13	27	19.00	-5.500	4.500	0.000	1.28
79 11 22	91	13	37	10.00	-5.500	4.500	0.000	1.27
79 11 22	92	13	51	14.22	-1.421	8.512	0.001	1.49
79 12 07	93	15	15	2.96	3.065	-1.865	0.001	0.99
79 12 07	94	15	18	24.13	2.998	-1.663	0.001	0.67
79 12 07	95	17	56	0.35	0.171	-2.765	0.001	1.05
79 12 26	96	17	6	38.59	-0.095	-3.002	0.001	0.98

Two events on October 14, 1979 were located adjacent to a growth fault southwest of the array. The four events of November 4 were closely grouped in the western region. The activity during the night of November 21, 74 events, alternated between the central and eastern faults with 1 or 2 events on the southwestern fault. Table 5 demonstrates this pattern of activity. The 3 events of November 7 and the 1 on December 26 were in the western region where the sequence began.

In the 1978 sequence the activity progressed from east to west, commencing with single events in the central region on October 12 and November 7, 1978, peaking with 7 events in the west on November 29-30 and ending with 1 in the far west on December 1.

Table 5 Seismic activity on November 21-22, 1979

<u>Local time period</u>	<u>No. of events</u>	<u>Region</u>
6:00 - 8:00 p.m.	14	Eastern
8:45 -11:15 p.m.	34	Central
11:15 - 2:45 a.m.	12	Eastern
3:40 - 7:15 a.m.	9	Central
7:15 - 7:37 a.m.	5	Eastern

- 10/12/78
- 11/7/78
- △ 11/30/78
- + 12/1/78
- x 10/15/79
- ◇ 11/4/79
- ↑ 11/22/79
- ✕ 12/7/79
- ⌵ 12/26/79

FIGURE 14 GROWTH FAULTS AT 15,000 FOOT DEPTH AND ASSOCIATED EPICENTERS

G 11090B

JANUARY RESULTS

A total of fourteen microseismic events which occurred within the test well area has been detected during the month of January 1979. Only two of these events were recorded with distinct compressional (P) or shear (S) arrivals, which yielded reliable hypocenter locations and magnitudes with program MEHYPO. A rough estimate of the location of these events places the epicenter about 0.3 km south and 2.40 km east of Site 3, with an estimated average magnitude of 0.65.

Figure 15 is one of the two locatable events observed during January which has exceptionally distinct compressional (P) arrivals.

All microseismic events detected during this monitoring period have occurred during the daylight hours. This fact combined with the regularity of occurrence and similarity of magnitudes indicates that the activity observed during January is of cultural origin.

No definite naturally occurring microseismic activity from within the test well vicinity has been identified since the beginning of the monitoring program.

Figure 15 A typical locatable event recorded by the Brazoria monitoring system during the month of January 1979

FEBRUARY RESULTS

No definite naturally occurring microseismic activity from within the test well vicinity has been identified since the beginning of the monitoring program.

MARCH RESULTS

A total of ninety microseismic events which occurred within the test well area has been detected during the month of March 1979. Twenty five of these events were recorded with distinct compressional (P) or shear (S) arrivals, therefore hypocenter locations and magnitudes have been calculated by program MEHYPO. These locations are plotted in figure 8. Magnitudes range from 0.86 to 1.01. The estimated hypocenter locations and magnitudes are listed in table 6

Figure 16 is a typical example of the events observed during March, and illustrates the greater confidence in determining arrival times and phase identification from the recorded signals, relative to past months.

All microseismic events detected during this monitoring period have occurred during the daylight hours. This fact combined with the regularity of occurrence and similarity of magnitudes indicates that the activity observed during March is of cultural origin, presumably a seismic survey.

No definite naturally occurring microseismic activity from within the test well vicinity has been identified since the beginning of the monitoring program.

Table 6 Microseismic events

<u>Date</u>			<u>Event No.</u>	<u>Coordinates</u>		<u>Depth Km</u>	<u>Magnitude</u>
<u>Yr</u>	<u>Mo</u>	<u>Day</u>		<u>y(Km)</u>	<u>x(Km)</u>		
79	3	13	1	-1.001	-1.446	0.001	0.993
			2	-1.311	0.939	0.005	0.98
			3	-2.011	-0.623	0.005	0.92
		14	4	-0.485	1.627	0.005	0.96
			5	-0.602	1.819	0.005	0.97
			6	-1.414	0.767	0.005	1.02
			7	-1.427	0.798	0.005	1.04
			8	-1.260	0.083	0.005	0.98
			9	-2.004	-0.239	0.005	1.03
			10	-2.256	-0.381	0.005	0.97
		15	11	-2.039	-0.624	0.005	0.96
			12	-2.176	-0.696	0.001	1.08
			13	-2.026	-0.796	0.005	0.99
		16	14	-2.131	-0.906	0.005	0.92
			15	-0.478	2.173	0.001	1.01
			16	-0.230	1.720	0.005	0.94
			17	-0.200	1.521	0.005	1.09
			18	-0.137	1.419	0.005	0.90
			19	-0.261	1.665	0.005	0.93
			20	-0.239	1.555	0.005	0.89
			21	-0.408	1.679	0.005	0.96
			22	-0.477	1.669	0.005	0.98
			23	-0.574	1.804	0.005	0.97
			24	-0.563	1.800	0.005	1.01
			25	-0.572	1.735	0.005	1.01

Figure 16 A typical event recorded by the Brazoria monitoring system during the month of March 1979.

APRIL RESULTS

A total of 180 microseismic events which occurred within the test well area has been detected during the month of April 1979. Thirty-nine of these events were recorded with distinct compressional (P) or shear (S) arrivals, therefore hypocenter locations and magnitudes have been calculated by program MEHYPO. These locations are plotted in figure 8. Magnitudes range from 0.57 to 1.01. The estimated hypocenter locations and magnitudes are listed in table 7. Figure 17 is a typical example of the recorded events.

All microseismic events detected during this monitoring period have occurred during the daylight hours. This fact combined with the regularity of occurrence and similarity of magnitudes indicates that the activity observed during April is of cultural origin, presumably a seismic survey.

No definite naturally occurring microseismic activity from within the test well vicinity has been identified since the beginning of the monitoring program.

Table 7 Microseismic events

Event Number	Date			Origin Time			Coordinates		Depth (km)	Magnitude
	Yr	Mo	Day	Hr	Min	Sec	Y(km)	X(km)		
1	79	4	5	1 pm	25	5.109	1.523	0.991	0.001	0.60
2				1	27	34.109	1.620	0.939	0.005	0.71
3				1	31	10.926	1.583	0.959	0.005	0.67
4				1	38	23.438	1.014	1.174	0.005	0.62
5				1	52	38.348	1.533	0.974	0.005	0.67
6				2	08	31.948	1.513	0.978	0.005	0.72
7				3	18	56.762	1.632	1.047	0.005	0.72
8	79	4	6	9 am	33	43.570	1.668	1.079	0.005	0.76
9				9	40	0.272	1.555	1.129	0.005	0.72
10				9	57	24.321	1.445	1.168	0.005	0.67
11				10	01	1.263	1.589	1.189	0.001	0.75
12				10	06	44.604	1.533	1.238	0.005	0.74
13				12 pm	12	9.934	0.971	0.916	0.005	0.60
14				12	16	13.995	1.728	1.000	0.005	0.73
15				12	27	9.363	1.658	1.038	0.005	0.63
16				12	30	38.250	1.427	1.074	0.005	0.62
17				12	45	21.459	1.608	1.121	0.005	0.57
18	79	4	7	8 am	07	46.198	0.183	2.033	0.005	0.79
19				8	21	17.725	0.585	1.447	0.005	0.92
20	79	4	9	12 pm	49	25.889	1.173	1.133	0.001	0.86
21				12	55	43.420	1.084	1.187	0.005	0.81
22	79	4	10	8 am	43	34.875	1.038	1.331	0.005	0.95
23				9	17	48.292	0.875	1.311	0.005	0.99

Table 7 Microseismic events
Page 2

Event Number	Date			Origin Time			Coordinates		Depth (km)	Magnitude
	Yr	Mo	Day	Hr	Min	Sec	Y(km)	X(km)		
24	79	4	10	9	35	-0.446	0.990	1.372	0.005	0.99
25				9	44	9.152	1.064	1.417	0.005	1.01
26				11	29	38.726	1.019	1.474	0.005	0.92
27				12 pm	20	38.335	0.789	1.618	0.005	1.01
28				1	02	36.960	0.741	1.705	0.005	0.95
29				1	15	37.029	0.987	1.432	0.005	0.88
30				1	19	44.706	0.755	1.691	0.005	0.99
31				1	25	46.490	0.675	1.622	0.001	0.96
32				3	05	51.841	0.688	1.660	0.005	0.91
33				3	35	4.494	0.718	1.738	0.005	0.86
34				3	45	29.674	0.727	1.723	0.005	0.93
35	79	4	11	9 am	41	7.322	1.468	1.124	0.005	0.83
36				9	57	9.695	1.356	1.161	0.005	0.82
37				10	20	6.114	1.338	1.192	0.005	0.86
38				10	43	33.564	1.928	1.171	0.005	0.94
39				11	19	6.149	1.128	1.267	0.005	0.97

Figure 17 A typical event recorded by the Brazoria monitoring system during the month of April 1970

MAY RESULTS

Approximately two hundred events which occurred within the test well area have been detected during the month of May 1979. None of these events were recorded with distinct compressional (P) or shear (S) arrivals, therefore no reliable hypocenter locations or magnitudes have been calculated by program MEHYPO. A rough estimate of the location of these events, however, places the epicenter northwest of the array, near 2.8 km north and 2.7 km west of Site 3, with an estimated average magnitude of 1.0.

Figure 18 is a typical example of the events observed during May, and illustrates the difficulty in determining arrival times and phase identification from the recorded signals.

All microseismic events detected during this monitoring period have occurred during the daylight hours. This fact combined with the regularity of occurrence and similarity of magnitudes indicates that the activity observed during May is of cultural origin.

No definite naturally occurring microseismic activity from within the test well vicinity has been identified since the beginning of the monitoring program.

Figure 18 A typical event recorded by the Brazoria monitoring system during the month of May 1979.

JUNE RESULTS

Approximately forty events which occurred within the test well area have been detected during the month of June 1979. None of these events were recorded with distinct compressional (P) or shear (S) arrivals, therefore no reliable hypocenter locations or magnitudes have been calculated by program MEHYPO. A rough estimate of the location of these events, however, places the epicenter northwest of the array, near 2.8 km north and 2.7 km west of Site 3, with an estimated average magnitude of 0.7.

Figure 19 is a typical example of the events observed during June, and illustrates the difficulty in determining arrival times and phase identification from the recorded signals.

All microseismic events detected during this monitoring period have occurred during the daylight hours. This fact combined with the regularity of occurrence and similarity of magnitudes indicates that the activity observed during June is of cultural origin.

No definite naturally occurring microseismic activity from within the test well vicinity has been identified since the beginning of the monitoring program.

JULY RESULTS

No definite microseismic activity from within the test well vicinity has been identified during July.

AUGUST RESULTS

Monitoring of the Brazoria test well area was halted during the time period from 26 July to 31 August 1979 because of the severe flooding which occurred in the Alvin area.

Figure 19 A typical event recorded by the Brazoria monitoring system during the month of June 1979

SEPTEMBER RESULTS

Approximately one hundred one events which occurred within the test well area have been detected by the downhole system during the month of September 1979. None of these events were recorded with distinct compressional (P) or shear (S) arrivals, therefore, no reliable hypocenter locations or magnitudes have been calculated by program MEHYPO. A rough estimate of the location of these events, however, places the epicenter southwest of the array.

All microseismic events detected during this monitoring period have occurred during the daylight hours. This fact combined with the regularity of occurrence and similarity of magnitudes indicates that the activity observed during September is of cultural origin.

No definite naturally occurring microseismic activity from within the test well vicinity has been identified since the beginning of the monitoring program.

OCTOBER RESULTS

Two small microseismic events were recorded Sunday, 14 October 1979, which are thought to result from naturally occurring processes. Both events appear to be near magnitude 0.6 and are separated by approximately 8 seconds of time. A rough calculation of epicenter locations places these events about 7.5 kilometers southwest of the center of the array, and near a known growth fault extending from the Danbury Dome. The crude estimate of the epicenter has been plotted on a geological map and is shown in figure 20. Figure 21 is a copy of the portion of the seismogram containing the events. The recorded signals were not of sufficient quality to allow a computer solution by the location program MEHYPO.

Ninety-eight cultural-type events were also observed to occur in the test well area during this monitoring period. None of these events were recorded with well defined P and S arrivals, therefore hypocenter locations and magnitudes have not been calculated. This activity is similar to the seismic activity which has previously been observed in the test area.

Figure 20 Estimated epicenter location of event recorded by the Brazoria Monitoring Array 14 Oct., 1979.

Figure 21 Microseismic event originating from the Danbury Dome region,
recorded by the Brazoria County array 14 October 1979

1 second

15 28

Figure 22 Typical event recorded during October 1979
by the Brazoria monitoring array

Table 8

MICROSEISMIC EVENTS NOVEMBER 1979

DATE YR MO DAY	EVENT NO.	TIME			COORDINATES		DEPTH (KM)	MAGNITUDE
		HR	MIN	SEC	Y(KM)	X(KM)		
79 11 22	1	0	10	58.09	-1.348	1.377	0.001	0.99
79 11 22	2	0	14	15.21	-1.549	0.987	0.001	0.98
79 11 22	3	0	18	38.35	-1.603	4.671	0.001	1.41
79 11 22	4	0	19	16.98	-3.179	4.719	0.001	1.70
79 11 22	5	0	21	29.09	-9.043	6.491	0.001	1.93
79 11 22	6	0	35	15.25	-1.922	3.606	0.001	1.00
79 11 22	7	0	43	42.00	-4.000	4.500	0.000	0.42
79 11 22	8	1	3	0.00	-4.000	4.500	0.000	1.12
79 11 22	9	1	42	56.34	-5.214	7.128	0.001	1.47
79 11 22	10	1	46	44.75	-2.719	5.088	0.001	1.02
79 11 22	11	1	48	25.63	-2.168	4.389	0.001	0.84
79 11 22	12	1	55	31.00	-3.000	5.000	0.000	0.39
79 11 22	13	1	58	21.00	-3.000	5.000	0.000	0.91
79 11 22	14	2	0	5.00	-3.000	5.000	0.000	0.96
79 11 22	15	2	41	52.00	-5.000	-2.000	0.000	1.17
79 11 22	16	2	44	12.00	-5.000	-2.000	0.000	1.10
79 11 22	17	2	45	2.48	-6.204	-2.681	0.001	1.05
79 11 22	18	3	9	4.00	-5.000	-2.000	0.000	-0.15
79 11 22	19	3	11	55.63	-2.371	-0.439	0.001	0.44
79 11 22	20	3	20	35.27	-1.818	-0.725	0.001	0.62
79 11 22	21	3	22	8.39	-2.010	-0.626	0.001	0.88
79 11 22	22	3	23	45.42	-2.988	-0.913	0.001	0.62
79 11 22	23	3	26	52.00	-2.500	-0.600	0.000	-0.50
79 11 22	24	3	28	7.00	-2.500	-0.600	0.000	0.75
79 11 22	25	3	29	45.40	-2.496	-0.564	0.001	0.49
79 11 22	26	3	33	7.73	-1.628	-0.679	0.001	0.49
79 11 22	27	3	37	14.07	-2.450	-0.627	0.001	0.54
79 11 22	28	3	39	21.67	-2.105	-0.752	0.001	0.39
79 11 22	29	3	48	34.74	-3.705	-0.968	0.001	0.64
79 11 22	30	3	51	23.53	-1.903	-0.968	0.001	0.56
79 11 22	31	4	15	46.00	-1.500	0.500	0.000	0.92
79 11 22	32	4	18	15.87	-1.861	0.108	0.001	0.66
79 11 22	33	4	19	44.00	-1.500	0.500	0.000	0.61
79 11 22	34	4	21	13.00	-1.500	0.500	0.000	0.89
79 11 22	35	4	24	0.00	-1.500	0.500	0.000	0.26
79 11 22	36	4	27	43.00	-1.500	0.500	0.000	0.81
79 11 22	37	4	28	52.00	-1.500	0.500	0.000	0.81
79 11 22	38	4	32	36.00	-1.500	0.500	0.000	0.74
79 11 22	39	4	36	40.00	-1.500	0.500	0.000	1.00
79 11 22	40	4	40	39.40	-1.631	0.522	0.001	0.68
79 11 22	41	4	42	20.84	-2.791	-0.377	0.001	0.69
79 11 22	42	4	40	41.00	-1.500	0.500	0.000	0.33
79 11 22	43	4	45	17.00	-1.500	0.500	0.000	0.56
79 11 22	44	4	57	16.17	-1.653	0.619	0.001	0.78
79 11 22	45	5	3	3.00	-1.500	0.500	0.000	0.24

Table 8 (cont.)

DATE			EVENT NO.	TIME			COORDINATES		DEPTH (KM)	MAGNITUDE
YR	MO	DAY		HR	MIN	SEC	Y(KM)	X(KM)		
79	11	22	46	5	7	10.00	-1.500	0.500	0.000	0.24
79	11	22	47	5	8	0.00	-1.500	0.500	0.000	0.00
79	11	22	48	5	10	50.00	-1.500	0.500	0.000	0.75
79	11	22	49	5	15	33.00	-3.000	4.500	0.000	1.37
79	11	22	50	5	40	13.40	-3.246	4.177	0.001	0.99
79	11	22	51	6	4	30.00	-3.000	4.500	0.000	0.76
79	11	22	52	6	51	0.00	-3.000	4.500	0.000	0.56
79	11	22	53	7	28	54.00	-3.000	4.500	0.000	1.07
79	11	22	54	7	44	0.00	-3.000	4.500	0.000	0.97
79	11	22	55	7	45	19.02	-15.468	15.101	0.001	1.89
79	11	22	56	8	4	12.92	-1.576	6.182	0.001	1.38
79	11	22	57	8	12	29.90	-0.278	2.431	0.001	0.44
79	11	22	58	8	20	49.12	-1.323	7.963	0.001	1.23
79	11	22	59	8	31	59.00	-1.500	6.000	0.000	1.11
79	11	22	60	8	44	20.00	-1.500	6.000	0.000	1.25
79	11	22	61	9	40	30.00	-0.100	-0.100	0.000	0.00
79	11	22	62	11	56	30.00	-1.000	-1.000	0.000	0.73
79	11	22	63	12	33	49.00	-1.000	-1.000	0.000	0.03
79	11	22	64	12	51	0.00	-1.000	-1.000	0.000	0.21
79	11	22	65	12	55	8.00	-1.000	-1.000	0.000	0.51
79	11	22	66	12	56	27.00	-1.000	-1.000	0.000	0.51
79	11	22	67	12	59	58.23	-1.316	-1.100	0.001	0.84
79	11	22	68	13	12	44.00	-1.500	0.000	0.000	0.77
79	11	22	69	13	14	38.22	-1.525	0.187	0.001	0.45
79	11	22	70	13	21	24.88	-4.706	2.675	0.001	0.99
79	11	22	71	13	23	1.51	-6.438	6.105	0.001	1.46
79	11	22	72	13	24	0.00	-5.500	4.500	0.000	1.68
79	11	22	73	13	27	19.00	-5.500	4.500	0.000	1.28
79	11	22	74	13	37	10.00	-5.500	4.500	0.000	1.27

Table 9 Seismic shots located during November and December 1979

Microseismic events November 1979

<u>Date</u> <u>yr mo day</u>	<u>Event</u> <u>No.</u>	<u>Time</u>			<u>Coordinates</u>		<u>Depth</u> <u>(km)</u>	<u>Magnitude</u>
		<u>h</u>	<u>min</u>	<u>s</u>	<u>Y (km)</u>	<u>X (km)</u>		
79 11 03	1	14	52	41.98	1.810	-1.046	0.001	0.29
79 11 03	2	15	54	42.09	2.031	-1.000	0.001	0.50
79 11 03	3	16	16	34.60	2.355	-0.980	0.001	0.53
79 11 03	4	17	29	37.72	1.735	-0.577	0.001	0.40
79 11 03	5	17	40	35.46	2.066	-0.755	0.001	0.49
79 11 03	6	17	40	45.74	1.647	-0.569	0.001	0.44
79 11 03	7	21	22	11.00	2.147	-0.985	0.001	0.34
79 11 03	8	21	53	10.52	1.877	-0.890	0.001	0.23

Microseismic events December 1979

<u>Date</u> <u>yr mo day</u>	<u>Event</u> <u>No.</u>	<u>Time</u>			<u>Coordinates</u>		<u>Depth</u> <u>(km)</u>	<u>Magnitude</u>
		<u>h</u>	<u>min</u>	<u>s</u>	<u>Y (km)</u>	<u>X (km)</u>		
79 12 10	1	22	20	39.69	1.404	0.795	0.001	0.54
79 12 11	2	17	24	20.92	1.810	0.920	0.001	0.43
79 12 11	3	17	43	12.24	1.601	0.882	0.001	0.32
79 12 11	4	17	46	52.58	1.575	0.842	0.001	0.22
79 12 11	5	17	50	20.56	1.816	0.773	0.001	0.32
79 12 11	6	20	38	35.24	1.158	1.060	0.001	0.28

FIGURE 23 TYPICAL SEISMIC SHOT EVENT, NOVEMBER 3, 1979

4. CONCLUSIONS

Despite the crude location techniques employed, i.e., using surface wave arrival times and fixing the depth at 1 m, four distinct epicentral regions have been defined. At least two, if not all four, have a linear character parallel to and in the vicinity of growth faults. Just how close they are to the faults is not known because neither the true hypocenter depths nor the fault dips are known.

There are several possible explanations for the low body wave amplitudes. The few possible P waves which were observed had fairly low frequencies, near 5-6 Hz. Lower frequencies would be sharply attenuated by the response of the system. If the hypocenters are very shallow P waves would be observable on horizontal instruments only. Finally, the fault displacements may be too small to generate observable P waves at any frequency.

It was anticipated that seismicity in this region would be due to either brittle fracture of the reservoir overburden or stick slip "creep" on nearby growth faults. Brittle fracture would involve large stress drops and displacements over small source dimensions while creep implies very small displacements of larger fault surfaces. The low frequency of the observed signals are indications of large source dimensions and the very low body wave amplitudes could result from small fault displacements and attenuation by the recording system. Thus, the activity is consistent with a creep mechanism acting on growth faults. The epicenter locations support this but if the faults dip at 60° the source depths must be 3-5 km on all four faults.

The sequence of events on November 21-22, 1979 began 77 hours after the halt of the first extended flow test. While a number of similar events were observed a year earlier, the large number and frequency of occurrence may well be related to either the flow testing or the sudden halt in testing to replace a broken pressure gauge. A resumption of production on November 23 and shut-in on November 26 did not produce observable events, but a resumption on December 4 was followed 86 hours later by three events on December 7.

5. FUTURE WORK RECOMMENDATIONS

Future work should include installation of at least one pair of horizontal instruments to see if better P wave signals can be recorded than on the vertical and to obtain a vector solution estimate of source depth.

Velocity structure in the region at less than 1350 feet is not known and must be determined by well logs, seismic reflection data obtained from other companies or a new seismic survey by Teledyne Geotech. These data are vital to both body wave travel time locations and an understanding of surface wave energy partition and group velocity dispersion. In particular, we would like to explain the generation of strong surface waves and weak body waves and determine at what focal depths this would be possible.

A recording system with a better response at low frequencies (3-6 Hz) might be necessary if body waves are to be used extensively for locations.

Finally, the film records from November 1978 to November 1979 should be reviewed for the surface wave-dominated type of event. Although there were few such events during this period the precise number should be determined for comparison with post-production activity.

6. REFERENCES

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