Lawrence Livermore Laboratory

IMPERIAL VALLEY ENVIRONMENTAL PROJECT: BASELINE AIR QUALITY
AND METEOROLOGICAL DATA

P. H. Gudiksen, K. C. Lamson, M. C. Axelrod,
V. Fowler, and R. A. Nyholm

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MASTER

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IMPERIAL VALLEY ENVIRONMENTAL PROJECT:
BASELINE AIR QUALITY AND METEOROLOGICAL DATA

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ABSTRACT

This report describes the baseline air quality and meteorological data gathered by the Imperial Valley Environmental Project. The survey was conducted from December 1976 through April 1978.

INTRODUCTION

The Imperial Valley Environmental Project assessed the potential environmental impact of developing the valley's geothermal resources for electrical power production. Since a variety of gases may be released into the atmosphere from some power production cycles, an integral part of the project is evaluating how this development will affect air quality in the valley. The principal gas of concern is H_2S , but other gaseous species such as NH_3 , CO_2 , CH_4 , Rn, and Hg may also be released. The air quality impact was assessed by integrating baseline air quality measurements, meteorological measurements, and chemical analyses of geothermal fluids (for estimates of power plant gas emissions) with air quality modeling of likely power production scenarios.

This report describes in detail the baseline air quality and meteorological data used in this assessment. For a general summary of these data and the results of the air quality impact assessment, the reader is referred to the references.

The baseline measurements were obtained by installing a network of six air quality and meteorological measurement stations. These were operated from December 1976 to April 1978 at the sites shown in Fig. 1. Their names and exact locations are given in Table 1. Each station provided continuous measurements of H_2S , SO_2 , O_3 , CO_2 , and particulate concentrations while three stations were equipped to measure NO and NO_x levels. Also included were periodic measurements of Hg concentrations at each site, Rn was measured at one site. The meteorological measurements included wind velocity, the standard deviation of the wind directions, and temperature. The six stations

FIG. 1. Map of Imperial Valley showing the locations of the air quality and meteorological measurements systems.

TABLE 1. Air quality station identification and location data.

Station number	Station name	Location
1	Niland	Reinjection well of San Diego Gas & Electric Co (SDG&E) facility
2	Imperial	Imperial Irrigation District Headquarters
3	Heber	Chevron and SDG&E site south of Heber
4	East Mesa	Bureau of Reclamation Well 5-1
5	Elmore	Elmore Land Co property
6	Brawley	Union Oil Kruger Well No. 1

were fielded and operated by personnel from LLL with support from the Imperial County Air Pollution Control District. The particulate samples were analyzed for elemental concentrations by investigators from the University of California at Davis.

At each of the six sites, the system for air quality and meteorological monitoring consisted of the air-quality sensors and the data processing and recording systems, which were housed in an air-conditioned trailer. Five sites were equipped with 10-m-high, instrumented, meteorological towers. The Heber site, No. 3, had a 60-m tower, instrumented at 10 and 60 m and erected by the San Diego Gas and Electric Company (SDG&E) under Electric Power Research Institute (EPRI) funding. Table 2 lists the air quality and meteorological sensors used in the program. A schematic diagram of a typical station is shown in Fig. 2. Ambient air is drawn in--at a height of 5 m--through a glass and teflon sample train that leads to the air-quality instruments. The outputs from these instruments and from the meteorological sensors were fed into a digital data logging system that featured a dual cassette-tape recording system. All signals were normally averaged over 15-min periods. Peak values of all air-quality measurements were also recorded. Data in selected channels were recorded by two 6-channel strip-chart recorders. These served as a back-up to the tape systems and provided a means for evaluating instrument performance in the field. The tape cassettes were collected each week for transport to LLL where the data were extracted and transferred by a minicomputer to the LLL computer system for analysis.

Particulates were sampled at each site continuously with a three-stage rotating drum impactor. The particles were collected on grease-coated mylar surfaces and back-up filters to prevent bounce-off. The three size groups were 0.1-0.65 μm , 0.65-3.6 μm , and 3.6-20 μm . The elemental analyses were performed by ion-induced x-ray fluorescence by the Air Quality Group at the University of California, Davis.

With the exception of the O_3 detector, all gas analyzers were calibrated at least twice monthly. The output from the calibrator as well as the calibration of the instruments were routinely checked by the State of California Air and Industrial Hygiene Laboratory, Berkeley, California. The primary O_3 calibration was performed by comparison with an instrument calibrated by the California Air Resources Board; however, gas phase titration, based on O_3 reactions with NO , was also used routinely for O_3 calibrations.

TABLE 2. Air quality and meteorological instrumentation used in a typical air quality station.

Air quality			
Parameter	Instrument	Measurement technique	Lower limit of sensitivity (ppm)
H ₂ S	Houston Atlas Model 825R	Colorimetry (lead acetate tape)	0.005
SO ₂	Thermo Electron Model 43	Pulsed UV fluorescence	0.005
O ₃	Dasibi Model 1003AH	UV absorption photometry	0.003
NO, NO _x	Thermo Electron Model 14D	Chemiluminescence	0.005
CO ₂	Horiba Model PIR-2000	Nondispersive infrared spectrometry	5
Particulates	Sierra Multiday Impactor Model 46206		
Meteorology			
Parameter	Sensor		
Wind direction	Climet wind vane with sin-cos potentiometer.		
Wind speed	TechEcology 010 cup anemometers. Climet WS-011-1 cup anemometers.		
Temperature	Climet 015-13 thermisters.		
Solar radiation	Eppley pyranometer.		
Visibility	MRI 1550B nephelometer.

FIG. 2. Schematic diagram of a typical air-quality station.

In addition, several calibration audits were performed by Rockwell International under USEPA (Las Vegas) contract. The meteorological instruments were routinely checked each week with sensors replaced as appropriate.

In addition to these six fixed location air quality measurement sites, a mobile laboratory conducted supplementary air quality and meteorological measurements at selected locations in the vicinity of the Heber KGRA; these measurements were in support of the planned SDG&E and Chevron geothermal power plant. The instrumentation used in this mobile laboratory is identical to that used at the fixed-location sites. The results of these measurements are also reported here.

This report is divided into three sections. Section I reports the air quality data obtained at the six fixed location sites in the form of histograms; Section II presents histograms and wind roses of the meteorological data collected at the six sites; and Section III lists in a similar format the air quality and meteorological data obtained by the mobile laboratory in the vicinity of the Heber KGRA (at the sites shown on the map included in this section). All of the data presented in this report are hourly-averaged.

REFERENCES

1. P. H. Gudiksen, D. L. Ermak, K. C. Lamson, M. C. Axelrod, and R. A. Nyholm, *The Potential Air Quality Impact of Geothermal Power Production in the Imperial Valley*, Lawrence Livermore Laboratory, Livermore, CA, UCRL-52797 (1979).
2. D. L. Ermak, R. A. Nyholm, and P. H. Gudiksen, *Imperial Valley Environmental Project: Air Quality Assessment*, Lawrence Livermore Laboratory, Livermore, CA, UCRL-52699 (1979).

BSS/jvb

SECTION I
Baseline Air Quality Data

FEBRUARY 1, 1977

THRU

FEBRUARY 28, 1977

ELMORE

HOURLY AVERAGES

MARCH 1, 1977

THRU

MARCH 31, 1977

ELMORE

HOURLY AVERAGES

JUNE 1, 1977
THRU
JUNE 30, 1977

ELMORE
HOURLY AVERAGES

JULY 1, 1977
THRU
JULY 31, 1977

ELMORE
HOURLY AVERAGES

FEBRUARY 1, 1977

ELMORE

THRU

FEBRUARY 28, 1977

HOURLY AVERAGES

MARCH 1, 1977

ELMORE

THRU

MARCH 31, 1977

HOURLY AVERAGES

OCTOBER 1, 1977

ELMORE

THRU

OCTOBER 31, 1977

HOURLY AVERAGES

NOVEMBER 1, 1977

ELMORE

THRU

NOVEMBER 30, 1977

HOURLY AVERAGES

DECEMBER 1, 1977
THRU
DECEMBER 31, 1977

ELMORE
HOURLY AVERAGES

JANUARY 1, 1978
THRU
JANUARY 31, 1978

ELMORE
HOURLY AVERAGES

APRIL 1, 1978

THRU

APRIL 30, 1978

ELMORE

HOURLY AVERAGES

STATION ELMORE APR 1977

STATION ELMORE MAY 1977

STATION ELMORE JUN 1977

STATION ELMORE JUL 1977

STATION ELMORE AUG 1977

STATION ELMORE SEP 1977

STATION ELMORE OCT 1977

STATION ELMORE NOV 1977

STATION ELMORE DEC 1977

STATION ELMORE FEB 1978

DECEMBER 1, 1976

THRU

DECEMBER 31, 1976

SO2 CONCENTRATIONS (PPB)

NILAND

HOURLY AVERAGES

JANUARY 1, 1977

THRU

JANUARY 31, 1977

SO2 CONCENTRATIONS (PPB)

NILAND

HOURLY AVERAGES

AUGUST 1, 1977

THRU

AUGUST 31, 1977

SO2 CONCENTRATIONS (PPB)

NILAND

HOURLY AVERAGES

SEPTEMBER 1, 1977

THRU

SEPTEMBER 30, 1977

SO2 CONCENTRATIONS (PPB)

NILAND

HOURLY AVERAGES

JANUARY 1, 1978

THRU

JANUARY 31, 1978

SO2 CONCENTRATIONS (PPB)

NILAND

HOURLY AVERAGES

DECEMBER 1, 1977

THRU

DECEMBER 31, 1977

SO2 CONCENTRATIONS (PPB)

NILAND

HOURLY AVERAGES

FEBRUARY 1, 1978
THRU
FEBRUARY 28, 1978

NILAND
HOURLY AVERAGES

MARCH 1, 1978
THRU
MARCH 31, 1978

NILAND
HOURLY AVERAGES

DECEMBER 1, 1976

NILAND

THRU

DECEMBER 31, 1976

HOURLY AVERAGES

JANUARY 1, 1977

NILAND

THRU

JANUARY 31, 1977

HOURLY AVERAGES

FEBRUARY 1, 1977
THRU
FEBRUARY 28, 1977

NILAND
HOURLY AVERAGES

MARCH 1, 1977
THRU
MARCH 31, 1977

NILAND
HOURLY AVERAGES

OCTOBER 1, 1977

THRU

OCTOBER 31, 1977

NILAND

HOURLY AVERAGES

NOVEMBER 1, 1977

THRU

NOVEMBER 30, 1977

NILAND

HOURLY AVERAGES

JUNE 1, 1977

NILAND

THRU

JUNE 30, 1977

HOURLY AVERAGES

JULY 1, 1977

NILAND

THRU

JULY 31, 1977

HOURLY AVERAGES

AUGUST 1, 1977
THRU
AUGUST 31, 1977

NILAND
HOURLY AVERAGES

SEPTEMBER 1, 1977
THRU
SEPTEMBER 30, 1977

NILAND
HOURLY AVERAGES

STATION NILAND APR 1977

STATION NILAND MAY 1977

STATION NILAND JUN 1977

STATION NILAND JUL 1977

STATION NILAND AUG 1977

STATION NILAND SEP 1977

STATION NILAND OCT 1977

STATION NILAND NOV 1977

STATION NILAND DEC 1977

STATION NILAND JAN 1978

STATION NILAND FEB 1978

STATION NILAND MAR 1978

JUNE 1, 1977
 THRU
 JUNE 30, 1977
 BRAWLEY
 HOURLY AVERAGES

JULY 1, 1977
 THRU
 JULY 31, 1977
 BRAWLEY
 HOURLY AVERAGES

AUGUST 1, 1977

THRU

AUGUST 31, 1977

SO2 CONCENTRATIONS (PPB)

BRAWLEY

HOURLY AVERAGES

SEPTEMBER 1, 1977

THRU

SEPTEMBER 30, 1977

SO2 CONCENTRATIONS (PPB)

BRAWLEY

HOURLY AVERAGES

FEBRUARY 1, 1977

BRAWLEY

THRU

FEBRUARY 28, 1977

HOURLY AVERAGES

MARCH 1, 1977

BRAWLEY

THRU

MARCH 31, 1977

HOURLY AVERAGES

OCTOBER 1, 1977

THRU

OCTOBER 31, 1977

BRAWLEY

HOURLY AVERAGES

NOVEMBER 1, 1977

THRU

NOVEMBER 30, 1977

BRAWLEY

HOURLY AVERAGES

DECEMBER 1, 1977
THRU
DECEMBER 31, 1977

BRAWLEY
HOURLY AVERAGES

JANUARY 1, 1978
THRU
JANUARY 31, 1978

BRAWLEY
HOURLY AVERAGES

APRIL 1, 1978
THRU
APRIL 30, 1978

BRAWLEY
HOURLY AVERAGES

STATION BRAWLEY APR 1977

STATION BRAWLEY MAY 1977

STATION BRAWLEY JUN 1977

STATION BRAWLEY JUL 1977

STATION BRAWLEY SEP 1977

STATION BRAWLEY OCT 1977

STATION BRAWLEY NOV 1977

STATION BRAWLEY DEC 1977

STATION BRAWLEY JAN 1978

STATION BRAWLEY FEB 1978

STATION BRAWLEY MAR 1978

JULY 1, 1977

BRAWLEY

THRU

JULY 31, 1977

HOURLY AVERAGES

AUGUST 1, 1977

BRAWLEY

THRU

AUGUST 31, 1977

HOURLY AVERAGES

SEPTEMBER 1, 1977

BRAWLEY

THRU

SEPTEMBER 30, 1977

HOURLY AVERAGES

OCTOBER 1, 1977

BRAWLEY

THRU

OCTOBER 31, 1977

HOURLY AVERAGES

JANUARY 1, 1978

BRAWLEY

THRU

JANUARY 31, 1978

HOURLY AVERAGES

FEBRUARY 1, 1978

BRAWLEY

THRU

FEBRUARY 28, 1978

HOURLY AVERAGES

MARCH 1, 1978

BRAWLEY

THRU

MARCH 31, 1978

HOURLY AVERAGES

APRIL 1, 1978

BRAWLEY

THRU

APRIL 30, 1978

HOURLY AVERAGES

JANUARY 1, 1977

THRU

JANUARY 31, 1977

IMPERIAL

HOURLY AVERAGES

DECEMBER 1, 1976

THRU

DECEMBER 31, 1976

IMPERIAL

HOURLY AVERAGES

FEBRUARY 1, 1977

IMPERIAL

THRU

FEBRUARY 28, 1977

HOURLY AVERAGES

MARCH 1, 1977

IMPERIAL

THRU

MARCH 31, 1977

HOURLY AVERAGES

APRIL 1, 1977

THRU

APRIL 30, 1977

SO2 CONCENTRATIONS (PPB)

IMPERIAL

HOURLY AVERAGES

MAY 1, 1977

THRU

MAY 31, 1977

SO2 CONCENTRATIONS (PPB)

IMPERIAL

HOURLY AVERAGES

AUGUST 1, 1977

THRU

AUGUST 31, 1977

IMPERIAL

HOURLY AVERAGES

SEPTEMBER 1, 1977

THRU

SEPTEMBER 30, 1977

SO2 CONCENTRATIONS (PPB)

IMPERIAL

HOURLY AVERAGES

DECEMBER 1, 1977

IMPERIAL

THRU

DECEMBER 31, 1977

HOURLY AVERAGES

JANUARY 1, 1978

IMPERIAL

THRU

JANUARY 31, 1978

HOURLY AVERAGES

FEBRUARY 1, 1978

IMPERIAL

THRU

FEBRUARY 28, 1978

HOURLY AVERAGES

MARCH 1, 1978

IMPERIAL

THRU

MARCH 31, 1978

HOURLY AVERAGES

APRIL 1, 1978
THRU
APRIL 30, 1978

IMPERIAL
HOURLY AVERAGES

FEBRUARY 1, 1978

THRU

FEBRUARY 28, 1978

IMPERIAL

HOURLY AVERAGES

MARCH 1, 1978

THRU

MARCH 31, 1978

IMPERIAL

HOURLY AVERAGES

STATION IMPERIAL APR 1977

STATION IMPERIAL MAY 1977

STATION IMPERIAL JUN 1977

MEDIAN MASS CONCENTRATIONS

STATION IMPERIAL JUL 1977

STATION IMPERIAL AUG 1977

STATION IMPERIAL SEP 1977

STATION IMPERIAL OCT 1977

STATION IMPERIAL NOV 1977

STATION IMPERIAL DEC 1977

STATION IMPERIAL JAN 1978

STATION IMPERIAL FEB 1978

STATION IMPERIAL MAR 1978

DECEMBER 1, 1976

THRU

DECEMBER 31, 1976

SO2 CONCENTRATIONS (PPB)

EAST MESA

HOURLY AVERAGES

JANUARY 1, 1977

THRU

JANUARY 31, 1977

SO2 CONCENTRATIONS (PPB)

EAST MESA

HOURLY AVERAGES

FEBRUARY 1, 1977

EAST MESA

THRU

FEBRUARY 28, 1977

HOURLY AVERAGES

MARCH 1, 1977

EAST MESA

THRU

MARCH 31, 1977

HOURLY AVERAGES

DECEMBER 1, 1977

THRU

DECEMBER 31, 1977

SO2 CONCENTRATIONS (PPB)

EAST MESA

HOURLY AVERAGES

JANUARY 1, 1978

THRU

JANUARY 31, 1978

SO2 CONCENTRATIONS (PPB)

EAST MESA

HOURLY AVERAGES

JANUARY 1, 1977
THRU
JANUARY 31, 1977

EAST MESA
HOURLY AVERAGES

FEBRUARY 1, 1977
THRU
FEBRUARY 28, 1977

EAST MESA
HOURLY AVERAGES

MARCH 1, 1978
THRU
MARCH 31, 1978

EAST MESA
HOURLY AVERAGES

APRIL 1, 1978
THRU
APRIL 30, 1978

EAST MESA
HOURLY AVERAGES

STATION EAST MESA APR 1977

STATION EAST MESA MAY 1977

STATION EAST MESA JUN 1977

STATION EAST MESA JUL 1977

STATION EAST MESA AUG 1977

STATION EAST MESA SEP 1977

STATION EAST MESA OCT 1977

STATION EAST MESA NOV 1977

STATION EAST MESA DEC 1977

STATION EAST MESA JAN 1978

STATION EAST MESA FEB 1978

STATION EAST MESA MAR 1978

FEBRUARY 1, 1977

THRU

FEBRUARY 28, 1977

HEBER

HOURLY AVERAGES

MARCH 1, 1977

THRU

MARCH 31, 1977

HEBER

HOURLY AVERAGES

APRIL 1, 1977

THRU

APRIL 30, 1977

HEBER

HOURLY AVERAGES

MAY 1, 1977

THRU

MAY 31, 1977

HEBER

HOURLY AVERAGES

DECEMBER 1, 1977

HEBER

THRU

DECEMBER 31, 1977

HOURLY AVERAGES

JANUARY 1, 1978

HEBER

THRU

JANUARY 31, 1978

HOURLY AVERAGES

FEBRUARY 1, 1977
THRU
FEBRUARY 28, 1977

HEBER
HOURLY AVERAGES

MARCH 1, 1977
THRU
MARCH 31, 1977

HEBER
HOURLY AVERAGES

JUNE 1, 1977
THRU
JUNE 30, 1977

HEBER
HOURLY AVERAGES

JULY 1, 1977
THRU
JULY 31, 1977

HEBER
HOURLY AVERAGES

STATION HEBER

APR 1977

STATION HEBER

MAY 1977

STATION HEBER JUN 1977

STATION HEBER JUL 1977

STATION HEBER

AUG 1977

STATION HEBER

SEP 1977

STATION HEBER OCT 1977

STATION HEBER NOV 1977

STATION HEBER DEC 1977

STATION HEBER JAN 1978

STATION HEBER FEB 1978

STATION HEBER MAR 1978

SECTION II
Meteorological Data

ELMORE
FEB 1, 1977
TO
FEB 28, 1977
WIND DIR

ELMORE
MAR 1, 1977
TO
MAR 31, 1977
WIND DIR

ELMORE
JUN 1, 1977
TO
JUN 30, 1977
WIND DIR

ELMORE
JUL 1, 1977
TO
JUL 31, 1977
WIND DIR

ELMORE
AUG 1, 1977
TO
AUG 31, 1977
WIND DIR

ELMORE
SEP 1, 1977
TO
SEP 30, 1977
WIND DIR

ELMORE
OCT 1, 1977
TO
OCT 31, 1977
WIND DIR

ELMORE
NOV 1, 1977
TO
NOV 30, 1977
WIND DIR

ELMORE
 DEC 1, 1977
 TO
 DEC 31, 1977
 WIND DIR

ELMORE
 JAN 1, 1978
 TO
 JAN 31, 1978
 WIND DIR

ELMORE
FEB 1, 1978
TO
FEB 28, 1978
WIND DIR

ELMORE
MAR 6, 1978
TO
MAR 31, 1978
WIND DIR

DECEMBER 1, 1976
THRU
DECEMBER 31, 1976

ELMORE
ELEVATION 10 METERS
HOURLY AVERAGES

JANUARY 1, 1977
THRU
JANUARY 31, 1977

ELMORE
ELEVATION 10 METERS
HOURLY AVERAGES

FEBRUARY 1, 1977
THRU
FEBRUARY 28, 1977

ELMORE
ELEVATION 10 METERS
HOURLY AVERAGES

MARCH 1, 1977
THRU
MARCH 31, 1977

ELMORE
ELEVATION 10 METERS
HOURLY AVERAGES

DECEMBER 1, 1976

ELMORE

THRU

DECEMBER 31, 1976

HOURLY AVERAGES

JANUARY 1, 1977

ELMORE

THRU

JANUARY 31, 1977

HOURLY AVERAGES

JUNE 1, 1977
THRU
JUNE 30, 1977

ELMORE
HOURLY AVERAGES

JULY 1, 1977
THRU
JULY 31, 1977

ELMORE
HOURLY AVERAGES

FEBRUARY 1, 1978
THRU
FEBRUARY 28, 1978
ELMORE
HOURLY AVERAGES

MARCH 1, 1978
THRU
MARCH 31, 1978
ELMORE
HOURLY AVERAGES

NILAND
DEC 1, 1976
TO
DEC 31, 1976
WIND DIR

NILAND
JAN 1, 1977
TO
JAN 31, 1977
WIND DIR

NILAND
FEB 1, 1977
TO
FEB 28, 1977
WIND DIR

NILAND
MAR 1, 1977
TO
MAR 31, 1977
WIND DIR

NILAND
APR 1, 1977
TO
APR 30, 1977
WIND DIR

NILAND
MAY 1, 1977
TO
MAY 31, 1977
WIND DIR

NILAND
JUN 1, 1977
TO
JUN 30, 1977
WIND DIR

NILAND
JUL 1, 1977
TO
JUL 31, 1977
WIND DIR

NILAND
 AUG 1, 1977
 TO
 AUG 31, 1977
 WIND DIR

NILAND
 SEP 1, 1977
 TO
 SEP 30, 1977
 WIND DIR

NILAND
OCT 1, 1977
TO
OCT 31, 1977
WIND DIR

NILAND
NOV 1, 1977
TO
NOV 30, 1977
WIND DIR

NILAND
DEC 1, 1977
TO
DEC 31, 1977
WIND DIR

NILAND
JAN 1, 1978
TO
JAN 31, 1978
WIND DIR

NILAND
FEB 1, 1978
TO
FEB 28, 1978
WIND DIR

NILAND
MAR 1, 1978
TO
MAR 31, 1978
WIND DIR

NILAND
 APR 1, 1978
 TO
 APR 19, 1978
 WIND DIR

OCTOBER 1, 1977
THRU
OCTOBER 31, 1977

NILAND
ELEVATION 10 METERS
HOURLY AVERAGES

NOVEMBER 1, 1977
THRU
NOVEMBER 30, 1977

NILAND
ELEVATION 10 METERS
HOURLY AVERAGES

DECEMBER 1, 1977
THRU
DECEMBER 31, 1977

NILAND
ELEVATION 10 METERS
HOURLY AVERAGES

JANUARY 1, 1978
THRU
JANUARY 31, 1978

NILAND
ELEVATION 10 METERS
HOURLY AVERAGES

FEBRUARY 1, 1977

NILAND

THRU

FEBRUARY 28, 1977

HOURLY AVERAGES

MARCH 1, 1977

NILAND

THRU

MARCH 31, 1977

HOURLY AVERAGES

APRIL 1, 1977
THRU
APRIL 30, 1977

NILAND
HOURLY AVERAGES

MAY 1, 1977
THRU
MAY 31, 1977

NILAND
HOURLY AVERAGES

JUNE 1, 1977

NILAND

THRU

JUNE 30, 1977

HOURLY AVERAGES

JULY 1, 1977

NILAND

THRU

JULY 31, 1977

HOURLY AVERAGES

AUGUST 1, 1977

THRU

AUGUST 31, 1977

NILAND

HOURLY AVERAGES

SEPTEMBER 1, 1977

THRU

SEPTEMBER 30, 1977

NILAND

HOURLY AVERAGES

OCTOBER 1, 1977

THRU

OCTOBER 31, 1977

NILAND

HOURLY AVERAGES

NOVEMBER 1, 1977

THRU

NOVEMBER 30, 1977

NILAND

HOURLY AVERAGES

DECEMBER 1, 1977
THRU
DECEMBER 31, 1977

NILAND
HOURLY AVERAGES

JANUARY 1, 1978
THRU
JANUARY 31, 1978

NILAND
HOURLY AVERAGES

FEBRUARY 1, 1978
THRU
FEBRUARY 28, 1978

NILAND
HOURLY AVERAGES

MARCH 1, 1978
THRU
MARCH 31, 1978

NILAND
HOURLY AVERAGES

APRIL 1, 1978
THRU
APRIL 30, 1978

NILAND
HOURLY AVERAGES

BRAWLEY
FEB 2, 1977
TO
FEB 28, 1977
WIND DIR

BRAWLEY
MAR 1, 1977
TO
MAR 31, 1977
WIND DIR

BRAWLEY
APR 1, 1977
TO
APR 30, 1977
WIND DIR

BRAWLEY
MAY 1, 1977
TO
MAY 21, 1977
WIND DIR

BRAWLEY
JUN 16, 1977
TO
JUN 30, 1977
WIND DIR

BRAWLEY
JUL 1, 1977
TO
JUL 31, 1977
WIND DIR

BRAWLEY
AUG 1, 1977
TO
AUG 31, 1977
WIND DIR

BRAWLEY
SEP 1, 1977
TO
SEP 30, 1977
WIND DIR

BRAWLEY
OCT 1, 1977
TO
OCT 31, 1977
WIND DIR

BRAWLEY
NOV 1, 1977
TO
NOV 30, 1977
WIND DIR

BRAWLEY
DEC 1, 1977
TO
DEC 31, 1977
WIND DIR

BRAWLEY
JAN 1, 1978
TO
JAN 31, 1978
WIND DIR

BRAWLEY
FEB 1, 1978
TO
FEB 28, 1978
WIND DIR

BRAWLEY
MAR 1, 1978
TO
MAR 31, 1978
WIND DIR

BRAWLEY
APR 1, 1978
TO
APR 18, 1978
WIND DIR

JUNE 1, 1977
THRU
JUNE 30, 1977

BRAWLEY
ELEVATION 10 METERS
HOURLY AVERAGES

JULY 1, 1977
THRU
JULY 31, 1977

BRAWLEY
ELEVATION 10 METERS
HOURLY AVERAGES

DECEMBER 1, 1977
THRU
DECEMBER 31, 1977

BRAWLEY
ELEVATION 10 METERS
HOURLY AVERAGES

JANUARY 1, 1978
THRU
JANUARY 31, 1978

BRAWLEY
ELEVATION 10 METERS
HOURLY AVERAGES

FEBRUARY 1, 1977

BRAWLEY

THRU

FEBRUARY 28, 1977

HOURLY AVERAGES

MARCH 1, 1977

BRAWLEY

THRU

MARCH 31, 1977

HOURLY AVERAGES

APRIL 1, 1977

BRAWLEY

THRU

APRIL 30, 1977

HOURLY AVERAGES

MAY 1, 1977

BRAWLEY

THRU

MAY 31, 1977

HOURLY AVERAGES

OCTOBER 1, 1977
THRU
OCTOBER 31, 1977

BRAWLEY
HOURLY AVERAGES

NOVEMBER 1, 1977
THRU
NOVEMBER 30, 1977

BRAWLEY
HOURLY AVERAGES

DECEMBER 1, 1977

THRU

DECEMBER 31, 1977

BRAWLEY

HOURLY AVERAGES

JANUARY 1, 1978

THRU

JANUARY 31, 1978

BRAWLEY

HOURLY AVERAGES

APRIL 1, 1978
THRU
APRIL 30, 1978

BRAWLEY
HOURLY AVERAGES

IMPERIAL
 DEC 6, 1976
 TO
 DEC 31, 1976
 WIND DIR

IMPERIAL
 JAN 1, 1977
 TO
 JAN 31, 1977
 WIND DIR

IMPERIAL
FEB 1, 1977
TO
FEB 28, 1977
WIND DIR

IMPERIAL
MAR 1, 1977
TO
MAR 31, 1977
WIND DIR

IMPERIAL
APR 1, 1977
TO
APR 30, 1977
WIND DIR

IMPERIAL
MAY 1, 1977
TO
MAY 31, 1977
WIND DIR

IMPERIAL
JUN 1, 1977
TO
JUN 30, 1977
WIND DIR

IMPERIAL
JUL 1, 1977
TO
JUL 31, 1977
WIND DIR

IMPERIAL
AUG 1, 1977
TO
AUG 31, 1977
WIND DIR

IMPERIAL
SEP 1, 1977
TO
SEP 30, 1977
WIND DIR

IMPERIAL
OCT 1, 1977
TO
OCT 31, 1977
WIND DIR

IMPERIAL
NOV 1, 1977
TO
NOV 30, 1977
WIND DIR

IMPERIAL
DEC 1, 1977
TO
DEC 31, 1977
WIND DIR

IMPERIAL
JAN 1, 1978
TO
JAN 31, 1978
WIND DIR

IMPERIAL
FEB 1, 1978
TO
FEB 28, 1978
WIND DIR

IMPERIAL
MAR 1, 1978
TO
MAR 20, 1978
WIND DIR

IMPERIAL
APR 1, 1978
TO
APR 18, 1978
WIND DIR

DECEMBER 1, 1976

THRU

DECEMBER 31, 1976

IMPERIAL

HOURLY AVERAGES

JANUARY 1, 1977

THRU

JANUARY 31, 1977

IMPERIAL

HOURLY AVERAGES

FEBRUARY 1, 1977

THRU

FEBRUARY 28, 1977

IMPERIAL

HOURLY AVERAGES

MARCH 1, 1977

THRU

MARCH 31, 1977

IMPERIAL

HOURLY AVERAGES

JUNE 1, 1977
THRU
JUNE 30, 1977

IMPERIAL
HOURLY AVERAGES

JULY 1, 1977
THRU
JULY 31, 1977

IMPERIAL
HOURLY AVERAGES

AUGUST 1, 1977
 THRU
 AUGUST 31, 1977
 IMPERIAL
 HOURLY AVERAGES

SEPTEMBER 1, 1977
 THRU
 SEPTEMBER 30, 1977
 IMPERIAL
 HOURLY AVERAGES

OCTOBER 1, 1977

THRU

OCTOBER 31, 1977

IMPERIAL

HOURLY AVERAGES

NOVEMBER 1, 1977

THRU

NOVEMBER 30, 1977

IMPERIAL

HOURLY AVERAGES

FEBRUARY 1, 1978
THRU
FEBRUARY 28, 1978

IMPERIAL
HOURLY AVERAGES

MARCH 1, 1978
THRU
MARCH 31, 1978

IMPERIAL
HOURLY AVERAGES

EAST MESA
JAN 11, 1977
TO
JAN 31, 1977
WIND DIR

EAST MESA
FEB 1, 1977
TO
FEB 28, 1977
WIND DIR

EAST MESA
APR 1, 1977
TO
APR 30, 1977
WIND DIR

EAST MESA
MAY 1, 1977
TO
MAY 31, 1977
WIND DIR

EAST MESA
JUN 1, 1977
TO
JUN 30, 1977
WIND DIR

EAST MESA
JUL 1, 1977
TO
JUL 31, 1977
WIND DIR

EAST MESA
AUG 1, 1977
TO
AUG 31, 1977
WIND DIR

EAST MESA
SEP 1, 1977
TO
SEP 30, 1977
WIND DIR

EAST MESA
OCT 1, 1977
TO
OCT 31, 1977
WIND DIR

EAST MESA
DEC 1, 1977
TO
DEC 31, 1977
WIND DIR

EAST MESA
JAN 1, 1978
TO
JAN 31, 1978
WIND DIR

EAST MESA
FEB 1, 1978
TO
FEB 28, 1978
WIND DIR

EAST MESA
MAR 1, 1978
TO
MAR 31, 1978
WIND DIR

EAST MESA
 APR 1, 1978
 TO
 APR 17, 1978
 WIND DIR

MAY 1, 1977
THRU
MAY 31, 1977

EAST MESA
ELEVATION 10 METERS
HOURLY AVERAGES

JUNE 1, 1977
THRU
JUNE 30, 1977

EAST MESA
ELEVATION 10 METERS
HOURLY AVERAGES

DECEMBER 1, 1976

EAST MESA

THRU

DECEMBER 31, 1976

HOURLY AVERAGES

JANUARY 1, 1977

EAST MESA

THRU

JANUARY 31, 1977

HOURLY AVERAGES

APRIL 1, 1977

EAST MESA

THRU

APRIL 30, 1977

HOURLY AVERAGES

MAY 1, 1977

EAST MESA

THRU

MAY 31, 1977

HOURLY AVERAGES

AUGUST 1, 1977
THRU
AUGUST 31, 1977

EAST MESA
HOURLY AVERAGES

SEPTEMBER 1, 1977
THRU
SEPTEMBER 30, 1977

EAST MESA
HOURLY AVERAGES

JANUARY 1, 1978

EAST MESA

THRU

JANUARY 31, 1978

HOURLY AVERAGES

FEBRUARY 1, 1978

EAST MESA

THRU

FEBRUARY 28, 1978

HOURLY AVERAGES

HEBER
 DEC 5, 1976
 TO
 DEC 31, 1976
 LW WND DIR

HEBER
 JAN 1, 1977
 TO
 JAN 31, 1977
 LW WND DIR

HEBER
MAR 1, 1977
TO
MAR 31, 1977
LW WND DIR

HEBER
MAY 1, 1977
TO
MAY 31, 1977
LW WND DIR

HEBER
JUN 1, 1977
TO
JUN 30, 1977
LW WND DIR

HEBER
JUL 1, 1977
TO
JUL 31, 1977
LW WND DIR

HEBER
AUG 1, 1977
TO
AUG 31, 1977
LW WND DIR

HEBER
SEP 1, 1977
TO
SEP 30, 1977
LW WND DIR

HEBER
OCT 1, 1977
TO
OCT 27, 1977
LW WND DIR

HEBER
NOV 8, 1977
TO
NOV 30, 1977
LW WND DIR

HEBER
 DEC 1, 1977
 TO
 DEC 15, 1977
 LW WND DIR

HEBER
 JAN 4, 1978
 TO
 JAN 31, 1978
 LW WND DIR

HEBER
FEB 1, 1978
TO
FEB 28, 1978
LW WND DIR

HEBER
MAR 1, 1978
TO
MAR 31, 1978
LW WND DIR

HEBER
APR 1, 1978
TO
APR 18, 1978
LW WND DIR

HEBER
 DEC 5, 1976
 TO
 DEC 31, 1976
 UP WND DIR

HEBER
 JAN 1, 1977
 TO
 JAN 31, 1977
 UP WND DIR

HEBER
FEB 1, 1977
TO
FEB 28, 1977
UP WND DIR

HEBER
MAR 1, 1977
TO
MAR 31, 1977
UP WND DIR

HEBER
APR 1, 1977
TO
APR 30, 1977
UP WND DIR

HEBER
MAY 1, 1977
TO
MAY 31, 1977
UP WND DIR

HEBER
JUN 1, 1977
TO
JUN 30, 1977
UP WND DIR

HEBER
JUL 1, 1977
TO
JUL 31, 1977
UP WND DIR

HEBER
AUG 1, 1977
TO
AUG 31, 1977
UP WND DIR

HEBER
SEP 1, 1977
TO
SEP 30, 1977
UP WND DIR

HEBER
OCT 1, 1977
TO
OCT 27, 1977
UP WND DIR

HEBER
NOV 8, 1977
TO
NOV 30, 1977
UP WND DIR

HEBER
DEC 1, 1977
TO
DEC 31, 1977
UP WND DIR

HEBER
JAN 1, 1978
TO
JAN 31, 1978
UP WND DIR

HEBER
FEB 1, 1978
TO
FEB 28, 1978
UP WND DIR

HEBER
MAR 1, 1978
TO
MAR 31, 1978
UP WND DIR

HEBER
 APR 1, 1978
 TO
 APR 18, 1978
 UP WND DIR

DECEMBER 1, 1976
THRU
DECEMBER 31, 1976

HEBER
ELEVATION 10 METERS
HOURLY AVERAGES

JANUARY 1, 1977
THRU
JANUARY 31, 1977

HEBER
ELEVATION 10 METERS
HOURLY AVERAGES

FEBRUARY 1, 1977
THRU
FEBRUARY 28, 1977

HEBER
ELEVATION 60 METERS
HOURLY AVERAGES

MARCH 1, 1977
THRU
MARCH 31, 1977

HEBER
ELEVATION 60 METERS
HOURLY AVERAGES

DECEMBER 1, 1977
THRU
DECEMBER 31, 1977

HEBER
ELEVATION 60 METERS
HOURLY AVERAGES

JANUARY 1, 1978
THRU
JANUARY 31, 1978

HEBER
ELEVATION 60 METERS
HOURLY AVERAGES

DECEMBER 1, 1976

HEBER

THRU

DECEMBER 31, 1976

HOURLY AVERAGES

JANUARY 1, 1977

HEBER

THRU

JANUARY 31, 1977

HOURLY AVERAGES

DECEMBER 1, 1977

HEBER

THRU

DECEMBER 31, 1977

HOURLY AVERAGES

JANUARY 1, 1978

HEBER

THRU

JANUARY 31, 1978

HOURLY AVERAGES

FEBRUARY 1, 1978
THRU
FEBRUARY 28, 1978

HEBER
HOURLY AVERAGES

MARCH 1, 1978
THRU
MARCH 31, 1978

HEBER
HOURLY AVERAGES

SECTION III
Baseline Air Quality and Meteorological
Data in the Heber Area

CALEXICO
 SEP 1, 1977
 TO
 SEP 30, 1977
 WIND DIR

CALEXICO
 OCT 1, 1977
 TO
 OCT 19, 1977
 WIND DIR

KOA
OCT 19, 1977
TO
OCT 31, 1977
WIND DIR

KOA
DEC 1, 1977
TO
DEC 21, 1977
WIND DIR

Figure 1 is a histogram showing the frequency distribution of wind speed in meters per second. The x-axis is labeled 'METERS PER SECOND' and 'PERCENT FREQUENCY'. The y-axis is labeled 'PERCENT FREQUENCY' and ranges from 0 to 25. The histogram shows three categories: .5 TO 2, 2 TO 6, and ABOVE 6. The '2 TO 6' category has the highest frequency, around 22%.

Wind Speed Category (meters per second)	Percent Frequency
.5 TO 2	~10%
2 TO 6	~22%
ABOVE 6	~12%

JAIL
FEB 1, 1978
TO
FEB 15, 1978
WIND DIR

DECEMBER 21, 1977
THRU
FEBRUARY 15, 1978

JAIL
HOURLY AVERAGES

SUMP PUMP
FEB 15, 1978
TO
FEB 28, 1978
WIND DIR

SUMP PUMP
MAR 1, 1978
TO
MAR 31, 1978
WIND DIR

SUMP PUMP
APR 1, 1978
TO
APR 4, 1978
WIND DIR

ALMO FEED-LOT
APR 6, 1978
TO
APR 20, 1978
WIND DIR