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Reference Manual

Fine Particle Emissions Information System

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Fine Particle Emissions Information System Reference Manual

by

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PREFACE

The work was performed in the Environmental and Materials Sciences Division of Midwest Research Institute. Mr. M. P. Schrag, Deputy Director of the Division, served as program manager.

Contributing authors of this document included: Mr. Schrag, Dr. A. K. Rao, Mr. J. P. Reider, and Dr. R. F. Hegarty, all of Midwest Research Institute; Mr. G. S. McMahon, Mr. C. B. Maney, and Mr. F. N. Young, of MRI Systems, Inc.; and Mr. Gary L. Johnson, the EPA Project Officer.

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1.0 Introduction

The Fine Particle Emissions Information System (FPEIS) is a computerized information system which contains data on primary fine particle emissions to the atmosphere from stationary point sources and includes data on control device performance. The purpose of the system is to provide a centralized source of fine particle measurement information for use by engineers and scientists engaged in fine particle control technology development and in the environmental assessment of industrial processes.

The contents of the FPEIS may include source test data with particle size distributions; chemical, physical, and bioassay testing results from analyses of particulate samples; and design and performance data on any particle control systems applied. Also included are process descriptions of the sources and descriptions of the sampling equipment and techniques employed. This information is classified and arranged so as to enable users to correlate FPEIS data with information contained in other data bases. For this reason, the NEDS Source Classification Codes,[1/] the SOTDAT particulate chemical identification indices,[2/] and the Chemical Abstracts Services registration numbers[3/] are used in the FPEIS.

1/ "Guide for Compiling a Comprehensive Emission Inventory," EPA No. APTD-1135, NTIS No. PB212-231, March 1973.
2/ "SOTDAT Final Report," EPA No. 450/3-75-070, July 1975.
3/ "Chemical Abstracts - Chemical Substance Index," American Chemical Society.

A uniform protocol for units and terminology has been developed along with standard data input forms and output report formats. Each data element in the system has been defined in detail for clarity. These standards and definitions will allow all data in the system to be stored or retrieved on a common basis.

The FPEIS has been implemented at the Environmental Protection Agency (EPA) National Computer Center (NCC) at Research Triangle Park, on the UNIVAC 1110 computer, using SYSTEM 2000®, a flexible data base management system. SYSTEM 2000, developed by MRI Systems, Inc., of Austin, Texas (no relation to Midwest Research Institute (MRI)), will provide users with a virtually unlimited potential for data analysis. Features of SYSTEM 2000 include sorting, comparing, and retrieving information from the FPEIS in a variety of arrangements.

This document constitutes a basic Reference Manual for the FPEIS. Topics covered include a detailed description of the FPEIS data base with definitions of all data types and elements, a list of available information request procedures, sample data input forms, output format capabilities, and a listing of the emission sources and control devices currently reported in the FPEIS data base, in order of unique Test Series Number. A companion document, the FPEIS User Guide (EPA-600/8-78-006), contains detailed instructions for encoding and submitting new data to the FPEIS, as well as specific procedures to be used for retrieving information from the data base.

These manuals are designed with discrete segments for major sections and subsections. As changes, additions, and expansions of the system and the informational capabilities are made, the manuals will be updated as appropriate.

SECTION 2

FPEIS DATA BASE DESCRIPTION

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2.0 Introduction

The FPEIS contains industrial source emissions test data and any applied control device design and operating data. It attempts to describe completely the aerosol at the point from which the particulate sample is collected from the gas stream. General categories of information include source characteristics, control system descriptions, process operating conditions, particulate mass train results, physical, biological, and chemical properties of the particulates, information on the particulate size measurement equipment or method, and particulate size distribution data. Each category of information includes a number of related data elements, each of which is a unique variable essential for the description of the source tested.

The discussion in this section is intended to introduce the new FPEIS user to the data base. This section includes a narrative description of the structure, organization, and format of the FPEIS. The specific definition of each data element is contained in Section 3 while encoding instructions are given in Section 2 of the User Guide.[1/] Users should be thoroughly familiar with the contents of both documents before attempting to encode data.

1/ Fine Particle Emissions Information System User Guide, EPA-600/8-78-006.

2.1 FPEIS Structure

The structure of the FPEIS data base includes data elements sufficient to provide information for source tests where fine particle measurements were made. A data element is defined as a computer variable corresponding to a particular source test data item. The completeness of information for any given source test within the data base is limited only by the availability of such information as contained in the test report or original test data from which the FPEIS input was derived and as provided by the testing group.

The organization of the FPEIS is shown in Figure 2.1-1. The input data to the FPEIS have generally been derived from source test reports, published papers, or FPEIS Data Input Forms as standard practice. Each report or paper may have test data on one or more source/control device combinations. (An uncontrolled source is defined as a combination of source and no control devices.) All the data pertaining to a source/control device combination obtained at a certain time are given a unique test series number. For example, all data obtained on the Union Electric Meramec plant, Boiler Unit 1, as a part of "Refuse Firing Demonstration Study," were given five test series numbers. They are Test Series Nos. 19, 28, 29, 30, and 31, which were tests conducted during December 1973, November 1974, March 1975, May 1975, and November 1975, respectively. During each Test Series, coal only and/or coal-plus-refuse was burned, and the boiler was operated at various power loads. These Test Series Numbers are unique numbers which are assigned by the FPEIS project officer and may be used to retrieve all of the data pertaining to a particular source test; that is, no two test series will have the same Test Series Number.

Each test series consists of a number of subsets or subseries which represent all the data pertaining either to a given combination of source and control device operating parameters or to data taken at either the inlet or outlet of the control device. The subseries ties different sampling activities together and gives a complete description of the gas stream for the various operating conditions of the source and control device. Subseries are numbered sequentially from one within a given test series.

The test run, which is the fundamental unit of the FPEIS system, is defined as any test measurement of a specific source/control device combination for a specific length of time, and using a specific particle size measuring instrument or method. For example, one size distribution measurement using an impactor train constitutes a run. Another size distribution measurement using an optical particle counter made at about the same time, with the source and control device operating parameters unchanged, constitutes another run. The mass train results such as those using EPA Method 5 are not treated as a test run since the focus is upon particle size distribution data, and these results are included at the subseries level as additional information.

The test run as defined above has some advantages and disadvantages. The disadvantages stem from the fact that the test run data being obtained by a single particle size measuring instrument or method may not cover the entire size spectrum of the particles; therefore, it may be necessary to group several test runs representing data from different instruments to obtain a complete size distribution. On the other hand, this approach has flexibility in that the data obtained by each instrument can be evaluated separately. This may be important in view of the history of variations in sampling system performance. For example, if six optical particle counter runs are made within the time of one impactor run, all the optical particle counter runs can be averaged and compared with the impactor run, or the six runs of the optical particle counter can be treated separately, getting a time resolution for the optical data.

An advantage of the test run, as defined, is that it simplifies data coding and verification; that is, a <u>discrete sample</u> is a <u>test run</u>. Furthermore, editing the data obtained by different instruments is also simplified. As an example, the cut points of an impactor which are found to be erroneous can, at a later date, be changed very easily. Test runs are numbered sequentially from one within the same subseries.

A <u>test subseries</u> is defined as a group of test runs at a specified location and under the same source/collector operating characteristics. Significant changes in source or collector operation as part of the test protocol define a new subseries. Examples of different subseries are: a planned change in the air-to-cloth ratio for a fabric filter under test;

a change in source feed material; or the charging cycle, melting cycle, lancing, and pouring for an arc furnace. Similarly, a change in measurement location (e.g., inlet or outlet of a collector) also defines a new subseries. Associated with each test subseries are the relevant data for source operating characteristics, control device operating parameters, sampling conditions, and any other data which describe the situation existing during the period of the test subseries. These data should be nominal values which are representative of the actual values of the various parameters in all the runs of the subseries. Supplemental information may be included, such as subsequent chemical analysis or biological testing of the collected particulate on a total mass basis or as a function of particle size. Additionally, provisions are also made for narrative comments which can be used to provide information not elsewhere classified. Test subseries are numbered sequentially within a test series by the encoder when the data are compiled for entry into the system. This arrangement allows for the grouping of simultaneous test runs into a common data set.

Subseries data sets for a source/collector test program are contained within a test series. Again, a test series is defined as all the test runs and subseries for an identifiable testing program. Samples taken from the same source/collector combination at different periods will result in different test series. Samples taken from other sources at the same site or plant, or at separate plants, will also define a different test series. The specific definition of a test series will depend upon the nature of the testing program itself. Usually, a test report or sampling activity at a site will contain data for only one test series; however, it is possible to define several test series from the same activity or report. A table of Test Series Numbers and sources presently contained in the FPEIS data base is given in Section 5.3.

It should be emphasized that the definitions given for test series and subseries are not inflexible. The user (or encoder) has the complete discretion to define the test series and subseries in a way that most closely satisfies his data needs or that is most compatible with his test program. The definitions as given are merely guidelines to the user.

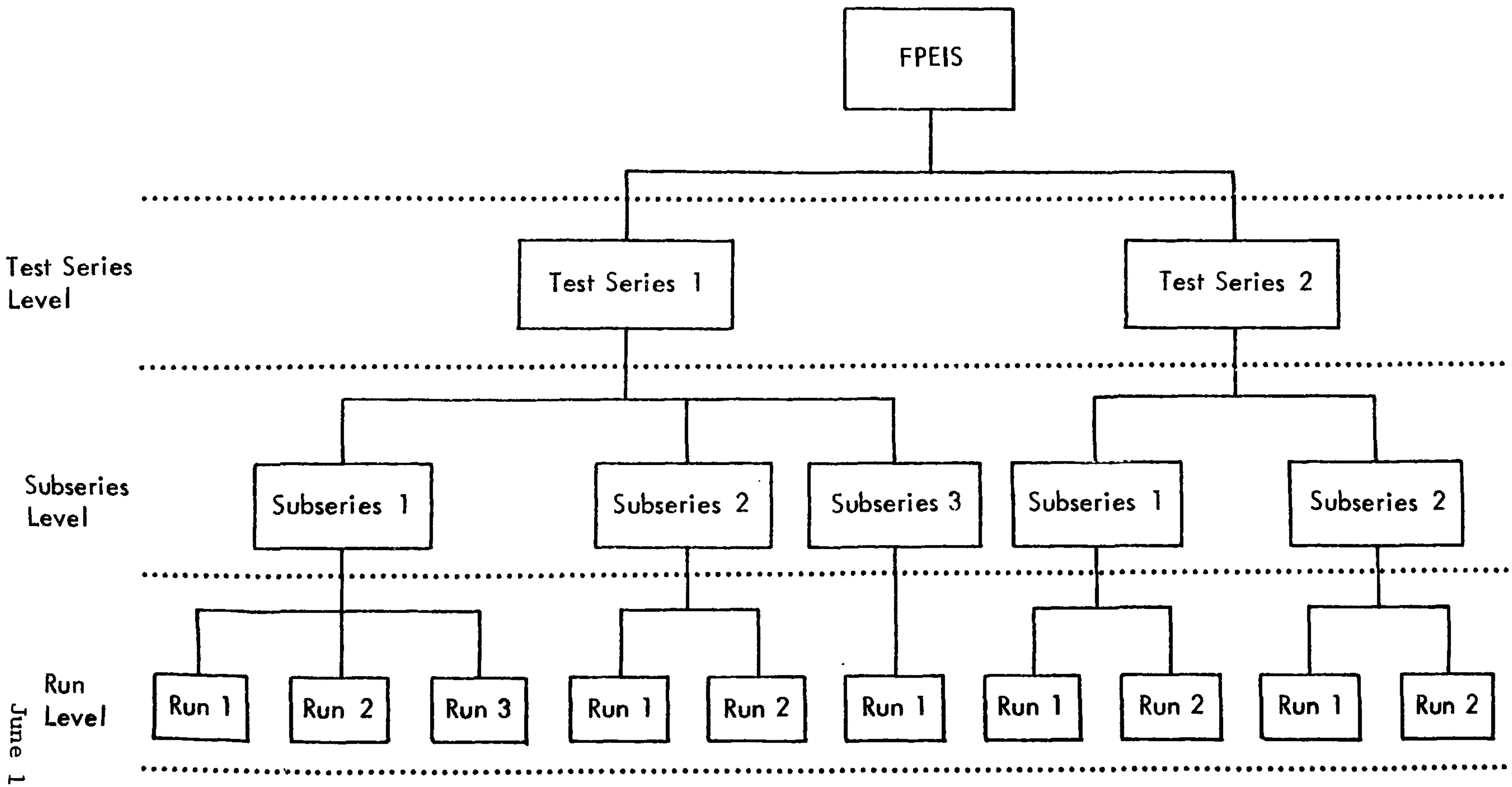

Figure 2.1-1. FPEIS Structure.

2.2 FPEIS Organization

FPEIS data are grouped into five general categories of information. These include: (a) general source description and related information; (b) control device characteristics and design parameters; (c) source process conditions and control device operating parameters; (d) biological and chemical analysis results; and (e) particle size measurement equipment and data.

Each of these categories is described in the following subsections. The relationship between these general categories of information and the data base structure discussed in the previous section is shown in Table 2.2-1. This table also lists the discrete data elements which comprise the data base itself.

TABLE 2.2.1. FPEIS DATA ELEMENTS AND THEIR LEVELS

Test Series Level

A. Source Characteristics
- Source category (SCC I)
- Type of operation (SCC II)
- Feed material class (SCC III)
- Operating mode class (SCC IV)
- Site and source name
- Source address (street, city, state, zip code)
- UTM zone location and coordinates
- Test series start and finish date
- Tested by and reference

B. Test Series Remarks

C. Control Device(s) Characteristics
- Generic device type
- Device class and category
- Device commercial name
- Manufacturer
- Description
- Design parameter type and value

Subseries Level

D. Test Characteristics
- Test date, start, and finish time
- Source operating mode
- Source operating rate
- Percent design capacity
- Feed material and its composition
- Sampling location and its description
- Volume flow rate, velocity, temperature, and pressure
- Moisture content
- Percent isokinetic sampling
- Gas analysis and trace gas composition (Orsat, Fyrite, etc.)

Control Device(s) Operating Parameter and Value Remarks

Subseries Remarks

E. Particulate Mass Train Results
- Front half and total mass concentration
- Mass train comments

F. Particulate Physical Properties
- Density
- Resistivity
- Others

G. Bioassay Data
- (Space reserved for future use)

H. Chemical Composition
- Particle boundary diameters
- Sizing instrument calibrated or calculated
- Chemical entry code
- Chemical and analysis method ID
- Concentration in filter/total
- Concentration in Ranges 1 through 8

Run Level

I. Measurement Particulars
- Measurement instrument/method name
- Size range lower and upper boundary
- Collection surface
- Dilution factor
- Measurement start time and period
- Sample flow rate
- Sample temperature, pressure, and moisture content
- Comments

J. Particulate Size Distribution
- Particle diameter basis (Stokes, aerodynamic, or impaction)
- Boundary diameter
- Concentration basis (mass or number)
- Concentration

2.2.1 Source and Test Series Related Information

This group of data elements identifies the stationary source that was tested, the source location, and the origin of the data which comprise the test series. To enable a general grouping of sources to be made, each source has been described in terms of the NEDS Source Classification Codes[1/] that are applicable. The use of the NEDS codes is by specification of the word description, not the associated numeric code. The source location is described by address as well as by Universal Transverse Mercator zone and X-Y coordinates as defined by the U.S. Geological Survey maps with scales less than 1:62,500.[2/]

The name of the testing organization and the reference (report, journal article, etc.) from which the data have been extracted are included. Additionally, remarks or data may be included which may be pertinent to the test series, but for which a specific data type is not available.

An important feature to note is that the FPEIS can protect confidential or proprietary source data like site name and address. The FPEIS will accept the entry "CONFIDENTIAL" for any source whose identity cannot be disclosed by the encoding group. This enables the FPEIS to store important particle size data from sources which would otherwise be unavailable to the FPEIS. EPA will have no knowledge whatsoever of the identity of the source.

1/ "Guide for Compiling a Comprehensive Emission Inventory," EPA No. APTD-1135, NTIS No. PB 212-231, March 1973.

2/ "Universal Transverse Mercator Grid," U.S. Department of the Army, Washington, D.C., Publication No. TM5-241-8, July 1958.

2.2.2 Control Device Characteristics and Design Parameters

The definition and description of the control system tested (if any) for the test series as well as pertinent design parameters are contained in this grouping of data elements. Standard nomenclature (see Sections 3.1 and 3.2) is used to characterize the device by category, class, generic type, commercial name, and manufacturer. Additional device descriptive material is provided that may be necessary for novel or hybrid control systems. The device descriptive elements are arranged such that maximum flexibility exists for cases where multiple devices are involved. Up to three control devices in series on a given source may be reported.

Control device design parameters are indicated by type and value, where known. A tabulation of suggested minimum specification types are provided as standard nomenclature (see Section 2.1.6 of the User Guide, EPA-600/8-78-006) for the four most common generic device types: Electrostatic Precipitator, Cyclone, Wet Scrubber, and Fabric Filter. The units to be used are also given. The FPEIS uses metric units throughout.

2.2.3 Test Characteristics and Control Device(s) Operating Parameters

Data contained in this group of data elements identify and define the test subseries date and time, sampling location description, and specific source operating parameters. Items such as the source operating rates and mode, feed material and its composition, and stack gas conditions are also included. Ancillary test results such as mass train, analysis of gas composition (Orsat, Fyrite, etc.), physical measurement of the particulate (density, resistivity, etc.), and trace gas analysis can be reported. Additional remarks or data pertinent to the test subseries or test run which may be of use to the FPEIS users are also given.

Control device(s) operating parameters are indicated by type and value, and are described by standard nomenclature with units to be used also given (see Section 2.1.6 of the User Guide, EPA-600/8-78-006). As in the case of design parameters (see Section 2.2.2), suggested operating parameters are given for the four most common generic device types: Electrostatic Precipitator, Cyclone, Wet Scrubber, and Fabric Filter. The user may define and include additional parameters as required.

2.2.4 Biological and Chemical Analysis Data

Bioassay and chemical analyses which were performed on collected particulate matter are included in this data group. The specific protocol for entering bioassay test results into the FPEIS will be added at a later date.

Particulate Chemical Composition: Present chemical analysis techniques do not provide for real time, in situ analysis of the particulate matter in a gas stream. Generally, particulate samples are extracted from the gas stream by means of some type of inertial collection device such as a multiple cyclone collector or cascade impactor, and chemical analyses are performed on the material collected on each stage. In some cases, only the material collected from a mass train filter or from the pooling of collector stages is analyzed. The FPEIS has the capability of storing the results of chemical analyses (expressed as a concentration in micrograms per cubic meter) either as a function of particle size or as a mass train filter catch or pooled stages. When data are given according to particle size, the particle diameters may be based upon the Stokes, the aerodynamic, or the impaction diameter definition and may be either calibrated or calculated values.

The FPEIS provides considerable flexibility for the identification of chemical species when data are to be encoded. This flexibility is in recognition of the fact that there presently exists a variety of ways to identify a particular element or compound. The chemical ID used in reporting chemical data is likely to be one with which the user is most familiar. A user's familiarity with a chemical ID scheme will be due largely to the nature of the project on which he is working. The FPEIS enables users to choose from among four chemical ID schema when they encode their data. These are the SAROAD/SOTDAT[1/] system, the Chemical Abstracts Services (CAS) Registration Numbers,[2/] the Multimedia Environmental Goals (MEG) for Environmental Assessment Numbers,[3/] and the EPA Environmental Assessment Level 1 Fractions.[4/] Each scheme has a unique entry code which will identify the type of chemical ID encoded to the FPEIS.

Where possible, the preferred ID is the CAS Registration Number; however, any of the four may be used.

While the input protocol requires that a specific chemical ID be used, the FPEIS SERIES and SUMMARY Reports will give the name of the chemical species as well as additional pertinent data. A typical SERIES Report is given in Section 5.2 of this Reference Manual.

General types of chemical analysis methods have been identified for the FPEIS. A standard one- or two-character alphabetic code is used to identify the chemical analysis method when the data are encoded. As with the chemical ID's, the complete name of the analysis method will be given on output and not the alphabetic code.

1/ "SOTDAT Final Report," EPA No. 450/3-75-070, July 1975.
2/ "Chemical Abstracts - Chemical Substance Index," American Chemical Society.
3/ "Multimedia Environmental Goals for Environmental Assessment," EPA No. 600/7-77-136a, November 1977.
4/ "Procedure Manual: Level 1 Environmental Assessment," EPA No. 600/2-76-160a, June 1976.

2.2.5 Particle Size Measurement Equipment and Data

This group of data elements provides identification of the measurement instrument or method, specific run data, and sampling conditions. Measurement instruments are defined in standard nomenclature (see Section 2.1.6 of the User Guide, EPA-600/8-78-006) by generic class and type. Indication is given of the general size range covered by the equipment and, for impactors, a description of the collection substrate and its specifications. Comments on the measurement are in text form where details of equipment calibration methods or protocol can also be included.

Among the sampling conditions identified in this group of data elements are the temperature, pressure, and percent moisture of the gas stream. For *in situ* sampling, the gas temperature and stack pressure are the same for both the sampling and measurement locations (data cards D03 and I01, respectively). However, for an *ex situ* measurement instrument, the gas temperature and stack pressure at the measurement location are the conditions at which the instrument was operating.

Particle size distribution data are entered as mass fractions or number fractions in order of decreasing particle diameter. The class boundary diameters are given along with whether the diameters are obtained from calibration or from calculations. Designation of Stokes, classical aerodynamic, or aerodynamic impaction diameter is required.

When the maximum particle size (upper boundary) is unknown, some arbitrary value (e.g., 100 μm) may be used. If the last stage represents a filter, and the lower boundary is not known, then an assumed value, usually the filter's cutpoint, is entered into the data. For example, cascade impactors have a finite number of stages which break a continuous particle size distribution into a series of discrete particle size intervals. Each mass or number fraction corresponds to a particle size interval, thus resulting in an extra particle size diameter entered for each size distribution.

The data are given in terms of mass concentrations per size interval (i.e., micrograms per dry normal cubic meter) or number concentrations per size interval (i.e., number per cubic centimeter). By assuming the particles to be spherical and by using a required value for particle density, output may be obtained which includes calculation of mass and number size distributions. All particle concentrations entered into the FPEIS should be reported on the basis of 20°C and 1 atm pressure. This is the SI standard temperature and pressure and should not be confused with the metric equivalent of the English units (e.g., 21°C and 1 atm).

2.3 Derivation of Particle Size Distribution Equations

Aerosols can be characterized in a number of different ways depending upon the particular area of interest. For example, in the field of air pollution, concentrations and size distributions based on aerosol mass are of most interest. An FPEIS output option provides concentration and size distributions based on particle mass or number. Moreover, these distributions are provided on both a differential and a cumulative basis.

Although there are a variety of data reduction techniques in the literature, a simple, general and straightforward procedure has been adopted. Each run consists of several classes or stages. The raw data generally are mass or number concentrations in each class and the upper and lower Stokes, classical aerodynamic, or aerodynamic impaction boundary diameters. For example, in the case of impactors, the mass collected on each stage per unit volume of gas sampled and the effective cut-off diameter of each stage are available. The upper boundary for the first stage and lower boundary for the final filter can usually be estimated.

The FPEIS allows the encoder to enter particle diameters based on either the Stokes, classical aerodynamic, or aerodynamic impaction diameter definition. Although only one particle definition is used for data input, the SERIES Report will include diameter values based on all three definitions. The equations used for these conversions are shown in Table 2.3-1. Because the unknown diameter appears on both sides of these equations, an iterative technique is needed to perform the conversions.

The slip correction factor, as used in the particle diameter definition equations, is given by:

$$C(D) = 1 + \frac{2\lambda}{D}\left[1.246 + 0.42 \exp(-0.87\ D/2\lambda)\right] \quad (1)$$

where λ = mean free path of gas molecules, and

$C(D) = 1 + 0.162/D$ for air at standard temperature and pressure ($20^{\circ}C$ and 1 atm)

The equations and definitions used to describe the mass and number concentrations are as follows:

D_i = particle diameter midpoint (μm) (upper boundary x lower boundary)$^{1/2}$

ΔM_i = mass in $\mu g/m^3$ within the class

$$= \frac{\pi}{6} D_i^{\ 3}\ \rho\ \Delta N_i \quad (2)$$

ΔN_i = number of particles per cubic centimeter within the class ($No./cm^3$)

The underlying assumption that all the particles are spherical is, in many cases, not valid. For nonspherical particles, the encoder must use a shape factor whose value depends upon the definition of the diameter of the nonspherical particle itself.

The differential size distributions are calculated in the following way:

$$\Delta \log D_{ae_i} = \log_{10}\left[\frac{D_{ae} \text{ upper boundary of class } i}{D_{ae} \text{ lower boundary of class } i}\right] \quad (3)$$

$$(\Delta X/\Delta \log D_{ae})_i = \frac{\Delta X_i}{\Delta \log D_{ae_i}} \quad (4)$$

where X is mass or number concentration

The distributions $\Delta M/\Delta \log D_{ae}$ and $\Delta N/\Delta \log D_{ae}$ are usually displayed on a semi-log graph with the distribution function as the ordinate and $\log D_{ae}$ as the abscissa.

The cumulative size distributions are calculated by summing mass or number concentrations in the classes below the class of interest and dividing it by the total concentration.

$$\text{cum \% less } x_i = \left(\sum_{k=i+1}^{j} \Delta X_k / \sum_{k=1}^{j} \Delta X_k\right) 100 \quad (5)$$

where X = mass number

x = particle diameter

j = number of classes + 1, and

i = class number of interest

Note that particle sizes decrease with increasing class number.

TABLE 2.3-1. EQUATIONS USED FOR PARTICLE SIZE CONVERSIONS--STOKES, CLASSICAL AERODYNAMIC, AND AERODYNAMIC IMPACTION DIAMETER

Diameter Definition (given)	Conversion Equation: Stokes' Diameter (D_s)	Conversion Equation: Classical Aerodynamic Equivalent Diameter (D_{Ae})	Conversion Equation: Aerodynamic Impaction (Lovelace) Diameter (D_{Ai})
Stokes' diameter (D_s)	1.0	$D_{Ae} = D_s \left[\frac{\rho C(D_s)}{C(D_{Ae})}\right]^{1/2}$	$D_{Ai} = D_s \left[C(D_s)\rho\right]^{1/2}$
Classical aerodynamic diameter (D_{Ae})	$D_s = D_{Ae} \left[\frac{C(D_{Ae})}{\rho C(D_s)}\right]^{1/2}$	1.0	$D_{Ai} = D_{Ae}\left[C(D_{Ae})\right]^{1/2}$
Aerodynamic impaction (Lovelace) diameter (D_{Ai})	$D_s = D_{Ai} \left[\frac{1}{C(D_s)\rho}\right]^{1/2}$	$D_{Ae} = D_{Ai} \left[\frac{1}{C(D_{Ae})}\right]^{1/2}$	1.0

Notation: D_s = Stokes' diameter, µm
D_{Ae} = Classical aerodynamic equivalent diameter, µm
D_{Ai} = Aerodynamic impaction (Lovelace) diameter, µm-$g^{1/2}$-$cm^{-3/2}$
ρ = Particle density, g/cm^3
$C(D_s)$, $C(D_{Ae})$, $C(D_{Ai})$ = Slip correction factors (Dimensionless)--see Eq. (1)

SECTION 3

FPEIS DATA DEFINITIONS AND PROTOCOL

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SECTION 3

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3.0 Introduction

This section provides definitions for all data elements contained in the FPEIS. Specific data input instructions and encoding criteria are given in the User Guide.[1/]

Standard nomenclature is specified for certain data elements. For example, on page 3.1.1-1, the Source Classification Codes from the NEDS System[2/] are used for information related to source description (word descriptions, not numeric codes). Other standard nomenclature for data are discussed in detail in Section 3.2. All FPEIS data are reported in metric units. While every attempt has been made to conform to SI (International System of Units),[3/] for clarity other metric units have been used in some places. This protocol has been developed in an attempt to standardize and categorize the input data to the FPEIS. Such standardization will allow data from different test series to be compared or used without the need for costly conversions. In addition, the use of standard nomenclature will greatly enhance the users' ability to retrieve data from the FPEIS. This retrieval capability is more fully explained in Section 4.0 of this manual.

1/ "Fine Particle Emissions Information System User Guide," EPA-600/8-78-006.
2/ "Guide for Compiling a Comprehensive Emission Inventory," EPA No. APTD-1135, NTIS No. PB 212-231, March 1973.
3/ "Standard Metric Practice Guide," ASTM No. E-380-74, American Society for Testing and Materials, November 1974.

The protocol provides a system which is extremely flexible, yet standardized. Establishment of these parameters in this manner will allow for expansion, modification, and additional capabilities for these particular portions of the FPEIS. As the system grows, users may obtain the widest possible spectrum of information in a common format.

3.1 Data Elements and Definitions

Data element definitions are grouped in the following subsections generally as discussed in Section 2.2. These definitions identify the particular data element and give an example of a typical value. Data elements which require the use of FPEIS standard nomenclature are identified in Section 3.2.

3.1.1 Source Description

Source Category	Source identifier using SCC code words. Example: EXTCOMB BOILER
Type of Operation	Specific operation which was tested using SCC code words. Example: ELECTRIC GENERATN
Feed Material Class	Specific type of material used as fuel feed using SCC code words. Example: BITUMINOUS COAL
Operating Mode Class	Size and characteristics of operation using SCC code words. Example: >100MMBTU PULVDRY
Site Name	Complete and unique name of company (and, if applicable, plant or station). Example: UNION ELECTRIC MERAMEC STATION
Source Name	Specific source tested within the site designated in the previous data element. Example: MERAMEC UNIT 1
UTM-X	UTM horizontal coordinate as shown on USGS maps with scales less than 1:62,500. Example: 473.0
UTM-Y	UTM vertical coordinate as shown on USGS maps with scales less than 1:62,500. Example: 3921.0
Zone Location	Universal Transverse Mercator Coordinates (UTM) zone location as found on United States Geological Survey (USGS) maps showing UTM Coordinates. Example: 12 (for Rocky Mountain states)
Address	Street number and street name, abbreviated if necessary. Example: 1234 RIVER RD

City	City name, abbreviated if necessary. Example: ST. LOUIS
State	State name, using Postal Service approved abbrevations. Example: MO
Zip Code	Five digit number designating postal area. Example: 63102
Test Series Number	Numerical identifier for specific test series. Each test series will be assigned an identifier from a master file listing by the data base administrator as received. Example: 14
Reference	Reference of the report from which the data have been extracted, if applicable. Example: EPA 650/2-74-031, APRIL 1974
Tested by	Complete and uniquely identifiable name of testing group. Example: MIDWEST RESEARCH INSTITUTE
Series Start Date	Start date for the series in the format MM DD YY (month/day/year). Example: 05 12 75
Series Finish Date	Finish date for the test series in the format MM DD YY (month/day/year). Example: 05 23 75

3.1.2 Test Series Remarks

Remarks in Text	Any comments or data not elsewhere reported, which are specifically related to the test series. Included in these remarks are physical and/or chemical properties which may have been measured, such as corrosiveness or solubility. This space may indicate a subjective judgment of the value of the data, measurement technique, etc., which may have a bearing on the general usefulness of a given test run, subseries or test series and the reliability of the data.

3.1.3 Control Device Characteristics and Design Parameters

Device Category	A specific definition of the generic device. Standard nomenclature will be used. For the appropriate generic device, only its name or combination of words are used. Example: CONTINUOUSLY CLEANED REVERSE AIR
Device Class	A designation of the state of development of the control device using standard nomenclature. Example: PILOT SCALE
Generic Type	General classification of control device in operation during test. The generic device types will use standard nomenclature. Example: FABRIC FILTER
Commercial Name	Commercial or given name of the device. Example: STEAM-HYDRO SCRUBBER
Manufacturer	Complete name of manufacturer. Example: RESEARCH COTTRELL
Device Description	One line qualifier to allow insertion of additional information for unusual or hybrid devices not completely described previously. Example: ATOMIZED SPRAY IS SUBJECTED TO ELECT FIELD TO CHARGE DROPS
Design Specification Type	Descriptive word for design specification, as appropriate for generic device type. Additional specification types required for more complete characterization of the device may be included. Example: DESIGN VOLUME
Design Specification Value	The numerical value and units corresponding to the design specification type. Example: 20,000 NM3/MIN

3.1.4 Test Characteristics and Control Device Operating Parameters

Subseries Number	Sequential, nonzero number assigned to the group of run numbers comprising the subseries, to be assigned by the data encoder. Example: 2
Subseries Test Date	Date of test in format MM DD YY (month/day/year). Example: 05 15 75
Subseries Start Time	Start time of subseries based on 24 hr local standard time. Example: 1230 (Note: No colons)
Subseries Stop Time	Stop time of subseries based on 24 hr local standard time. Example: 1610 (Note: No colons)
Control Device Inlet or Outlet	Location of sampling train for this run relative to the control device, either inlet (I) or outlet (0). Example: I
Sampling Location Description	A brief description of the sample train location relative to significant flow disturbances. Example: 10 DUCT DIAMETERS DWNSTRM FROM 90 D BEND
Source Operating Mode	Brief description of source operation at time of run. Most sources will be steady-state, but for sources with cyclic operations or specific disturbances, this information is required. In the case of an arc furnace such description may include "oxygen-lancing," "charging," "pouring," etc. Example: OXYGEN-LANCING

% Design Capacity	An estimate of the source operating rate as a percent of design capacity. Full load or production rate is defined as 100%. Example: 95.2
Source Operating Rate	Operating rate of source per unit time. Example: 10 MG/HR
Feed Material	Specific type of fuel or feed material used during run. Example: PULVERIZED BITUMINOUS COAL
Feed Material Composition	Percentage data of feed material for appropriate constituents. Example: 4.1% S, 10.2% ASH
Volume Flow Rate	Stack gas flow rate (from EPA Method 1) in units of DNm^3/S. Example: 20.5
Gas Velocity at Sampling Location	Velocity of gas stream at the sampling location for this run in units of meters per second. Example: 20.4
Gas Temperature at Sampling Location	Temperature of gas stream at the sampling location for this run in ^{o}C. Example: 61
Pressure at Sampling Location	Stack pressure at the sampling location for this run in mm Hg absolute. Example: 740
Moisture Content	Percent moisture by volume (as from EPA Method 4). Example: 17.4
Percent Isokinetic Sampling	100 Times the ratio of the average velocity of the gas entering the sampling nozzle to velocity of the flue gas streams at the sampling point. Example: 98

Gas Composition	Percent of CO_2, O_2, CO, and N_2 by dry volume (as from EPA Method 3 or other method). $\% CO_2 + \% O_2 + \% CO + \% N_2 = 100\%$. Example: 12.0 (for CO_2), 6.0 (for O_2), 0.5 (for CO), 81.5 (for N_2).
Trace Gases in PPM	Chemical symbol and measured concentrations for trace gases measured during test run in parts per million (ppm). Example: SO2 - 300, NO2 - 50, CL - 200
Typical Operating Parameter Type	Descriptive word for typical operating parameter as appropriate for generic device type operation. Additional operating parameter types may be included as required for more complete description of device operational characteristics. Example: RAPPING FREQUENCY
Typical Operating Parameter Value	The numerical value and units corresponding to the typical operating parameter. Example: 2 PER MINUTE

3.1.5 Subseries Remarks, Mass Train Results and Physical Properties

Subseries Remarks	Any comments or data not elsewhere reported, which are specifically related to the subseries. Example: GAS VELOCITY DECREASED SLIGHTLY WHEN DUCT BY-PASS VENT WAS CLOSED
Mass Train-Total Mass Concentration	The measured value for particulate concentration from EPA Method 5 in units of $\mu g/DNm^3$. Example: 4.250 E+03
Mass Train-Front Half Mass Concentration	The measured value for particulate concentration for the front half of the EPA Method 5 train (particulate filter and probe wash) in units of $\mu g/DNm^3$. Example: 1.240 E+02
Mass Train Comments	Any comments or data not elsewhere reported which are specifically related to the mass train data. Example: MASS CON LOW - LEAK BETWEEN FILTER AND METER
Density	The particle density, in units of g/cm^3. Example: 1.0
Density Determination	An indication of whether the density value was determined experimentally or assumed. (1 = measured, 0 = assumed). Example: 1
Resistivity	The resistivity of the particle in units of ohm-cm. Example: 4.23+11 (where +11 denotes power of ten)
Resistivity Determination	An indication of whether the resistivity value was determined experimentally or assumed. (1 = measured, 0 = assumed). Example: 1

Other Physical Properties	Space for adding text comments regarding other physical properties of the particulate which may have been measured, such as solubility. Example: SOLUBILITY OF PARTICULATE IN WATER IS 0.4 G/ML

3.1.6 Particulate Bioassay Data

To be added at a later date.

3.1.7 Particulate Chemical Composition

Particle Boundary Diameter	The boundary diameter or cut point for each interval or stage used by the sampling instrument or method. Up to eight intervals may be designated. The diameter is in units of μm. Example: 20.00
Diameter Basis	Indication of which diameter definition is being employed. (0 = Stokes, 1 = aerodynamic, 2 = aerodynamic impaction). Example: 1
Designation of Boundary Determination	Indication of whether the boundary diameter is calculated from theory or based on calibration. (1 = calibrated, 0 = calculated). Example: 1
Chemical Entry Code	Indication of chemical identification system used to identify chemical species. (S = SOTDAT Code, C = CAS Number, M = MEG Number, F = Level 1 Fraction). Example: S
Chemical ID	The chemical or element identifier using standard nomenclature appropriate for the entry code. Example: 2103 (for arsenic)
Analysis ID	The identification letter(s) of the specific analysis method used. Standard nomenclature is used. Example: B (for chemiluminescence)
Mass Train Filter or Pooled Stages	The total concentration of the chemical listed as measured for particulate from the mass train filter, or the concentration of the chemical as measured for particulate combined from two or more stages. Units are $\mu g/DNm^3$. Example: 4.73+1 (where +1 denotes power of ten)

Chemical Concentration (Stage)	Concentration of the chemical listed from analysis of the particulate for the indicated stage or interval. Units are $\mu g/DNm^3$. Example: 2.1+1 (where +1 denotes power of ten)

3.1.8 Measurement Particulars

Run Number	Unique number assigned to each run within the test subseries. Example: 02
Measurement Instrument/ Method Name	Particulate size measuring equipment (including model type, if applicable). Example: UW MARK III IMPACTOR
Measurement Size Range Lower Limit	Lower limit of the size range for the equipment/method specified in units of micrometers (μm). Example: 0.40
Measurement Size Range Upper Limit	Upper limit of the size range for the equipment specified in units of micrometers (μm). Example: 20.00
Measurement Start Time	Start time of run based on 24 hr local standard time. Example: 1345 (Note: No colons)
Collection Surface/Substrate and Its Specifications	Identification of the collection surface or substrate and a brief description of its specifications, i.e., model number, type, manufacturer. Example: GLASS FIBER FILTER, GELMAN, TYPE A
Comments on the Measurement	Additional text comments or data regarding the run. Example: SUBSTRATE ON STAGE 1 SHOWED WEIGHT LOSS OF 0.05 MICROG.
Sampling Period	The length of time for the measurement in minutes. Example: 45.5
Sampling (Aerosol) Flow Rate	Sampling flow rate for this run in liters/min. Example: 4.5
Dilution Factor	Dilution factor used for sampling methods which require dilution (i.e., diffusion battery). Example: 1.0 (for no dilution)

Sampling Train Temperature	Gas temperature of the sampling train for the duration of the run in °C. Example: 42
Sampling Train Pressure	The absolute pressure of the gas at the inlet to the sample train in units of mm Hg. Example: 750
Percent Moisture	The percent water vapor by volume in the gas sampled by the instrument. Example: 72.5

3.1.9 Particulate Size Distribution Data

Particle Diameter Basis	Indication of the type of diameter specific for this measurement. (0 = Stokes, 1 = classical aerodynamic, 2 = aerodynamic impaction). Example: 1
Concentration Basis	Indication of the type of measurement/calculations used in obtaining concentration for this measurement - mass or number. (mass = 1, number = 0). Example: 1
Upper Diameter Boundary	The upper diameter boundary point in units of micrometers (μm) for the specific basis used for particle measurement. Example: 20.00
Diameter Boundary	The class interval boundary point (particle diameter) for the specific basis used for measurements. Units are micrometers (μm). Example: 13.770
Calibration/Calculation	Indication of whether the data are based on calibrated or calculated diameter boundary. (1 = calibration, 0 = calculation). Example: 0
Mass or Number Data	The mass <u>or</u> number concentration measured for the indicated stage in units of $\mu g/DNm^3$ or number/cm^3, corrected to $20^{\circ}C$ and 1 atm. Example: 2.98+06 (where +06 denotes power of ten)

3.2 Standard Nomenclature

Computerized information systems require that some standardization of data be present in order for specific data selection to be made. Computers search for and select data by comparing the selected value to a known value. When alphanumeric characters are used, such as in the name of a control device, the known value and the selected value must match exactly. For example, if a search is made for the value "ESP," all entries in the data base whose value is "ESP" will be selected; however, entries having the value "ELECTROSTATIC PRECIPITATOR" will not, although it is technically correct.

To ensure that uniform selection criteria are possible, the FPEIS uses standard nomenclature for certain data elements. The permitted values for these data elements are given in the FPEIS User Guide (Section 2.1.6). Whenever data from one of these data elements are requested, it is essential that correct spelling be used or the request will fail.

Data elements in the FPEIS data base which require the use of standard nomenclature are given in Table 3.2-1.

TABLE 3.2-1. DATA ELEMENTS REQUIRING STANDARD NOMENCLATURE

Source Description:

Source Category
Type of Operation
Feed Material Class
Operating Mode Class
State

Control Device Characteristics and Design Parameters:

Device Category
Device Class
Generic Device Type
Design Specification

Test Characteristics and Control Device Operating Parameters:

Sampling Location
Typical Operating Parameter Type

Particulate Chemical Composition:

Chemical Entry Code
Chemical ID
Analysis ID

Measurement Particulars:

Measurement Instrument/Method Name

3.3 Use of Metric Units

It is EPA policy to use metric units in all publications. Consistent with this policy, the FPEIS uses metric units throughout. Every attempt has been made to use SI (International System of Units) protocol; however, some data elements are given in the metric equivalent of their English units for clarity. For example, the SI unit for pressure is the pascal (Pa). The FPEIS reports pressure in units of millimeters of mercury (mm Hg) which is analogous to the more common inches of mercury (in. Hg).

The specific units in which a particular data element should be encoded are given in the FPEIS User Guide (Section 2.1.6).

SECTION 4

USER REQUEST COMMAND ABSTRACTS

CONTENTS

Number	Item	Page
4.0	Introduction	RM-4.0-1
4.1	SRC-1 - FPEIS SERIES Report	RM-4.1-1
4.2	SRC-2 - FPEIS SUMMARY Report	RM-4.2-1
4.3	SRC-3 - Fractional Penentration Program (PENTRA) .	RM-4.3-1
4.4	SRC-4 - TALLY WHERE, TALLY ALL	RM-4.4-1
4.5	SRC-5 - PRINT WHERE	RM-4.5-1
4.6	SRC-6 - Chemical Data Search	RM-4.6-1

4.0 Introduction

In order to simplify the retrieval of data from the FPEIS data base, a catalog of predefined (or "canned") programs has been developed as a user aid. Each program or procedure is identified by a unique number and is called a System Request Command, or SRC. The SRC's will allow users to obtain reports without having special expertise in either UNIVAC data processing or SYSTEM 2000 data base management system natural language. This feature will greatly enhance the usefulness and usability of the FPEIS to a wide audience of users.

Each entry in the SRC catalog is identified by the unique SRC number and by the title of the activity to be performed. Since most SRC's will be applicable to both demand and batch processing, step-by-step procedures for executing the SRC in both modes are given in the User Guide. For demand processing, it is assumed that the user has successfully established communications with the UNIVAC 1110 computer as described in the User Guide. It is assumed that batch users have established communications with the UNIVAC 1110 through a remote job entry terminal or have the capability of submitting jobs locally at the National Computer Center at Research Triangle Park, North Carolina.

This section contains abstracts of the SRC's currently available to the FPEIS user community. As new SRC's are developed and made available to users, this section will be updated.

4.1 <u>SRC Number:</u> SRC-1

<u>Title:</u> FPEIS SERIES Report

The FPEIS SERIES Report (SRC-1) is the basic report for the FPEIS. The only input parameter required by the SERIES Report is the unique test series number which identifies the particular test series of interest. The SERIES Report lists all of the data contained in the test series in subseries and run number order. A typical SERIES Report is given on the following pages and is discussed below.

The first page of the SERIES Report lists the data pertaining to the source, the test series remarks, and the control device. Depending upon the number of control devices in series on the gas stream and the number of design specifications given, these data may carry over to page 2. The next page begins with data from the subseries level. The data contained here are, in order, test characteristics, control device operating parameters, particulate mass train results, particulate physical properties, bioassay results, and chemical composition data. Following these data, all data at the run level are given. The SERIES Report uses the particle concentrations and stage boundaries stored in the data base to calculate a particle size distribution as well as DM/DlogD, DN/DlogD, and CUMULATIVE MASS % LESS THAN SIZE. Usually, one run will be reported on a single page. The total SERIES Report, then, will be of varying length, depending upon the number of runs and subseries.

FINE PARTICLE EMISSIONS INFORMATION SYSTEM
FPEIS SERIES REPORT

TEST SERIES NO: 6 TEST SERIES AT SITE FROM 09251973 TO 09271973 BY CSL/EPA, RTP, N.C.

REFERENCE: STATNICK, R.M., EPA-650/2-74-111 OCT 74

SOURCE CHARACTERISTICS

NEDS SCC SOURCE CATEGORY: INDUSTRIAL PROCES
TYPE OF OPERATION: PRIMARY METALS
FEED MATERIAL CLASS: COPPER SMELTER
OPERATING MODE CLASS: ROASTING/REVERBERATI

SITE NAME AMERICAN SMELTING + REFINING CO.
SOURCE NAME COPPER ROASTER/REVERBERAT
ADDRESS
TACOMA , WA
UTM ZONE 10 UTM X-COORD . UTM Y-COORD .

TEST SERIES REMARKS

PARTICLE SIZE DISTRIBUTION DATA READ FROM GRAPH
BOUNDARY SIZES MAY NOT BE IMPACTOR CUTPOINTS.

CONTROL DEVICE(S) CHARACTERISTICS

UNIT 1

DEVICE GENERIC TYPE: ESP
CATEGORY: PIPE
CLASS: CONVENTIONAL
DESCRIPTION:

COMMERCIAL NAME: ESP
MANUFACTURER:

CONTROL DEVICE DESIGN SPECIFICATIONS

TEST SERIES NO: 6 TEST SERIES AT SITE FROM 09251973 TO 09271973 BY CSL/EPA, RTP, N.C.

UNIT 2

DEVICE GENERIC TYPE: ESP
CATEGORY: PLATE
CLASS: CONVENTIONAL
DESCRIPTION:

COMMERCIAL NAME: ESP
MANUFACTURER:

CONTROL DEVICE DESIGN SPECIFICATIONS

TEST SERIES NO: 6 SUB-SERIES NO: 1 TEST LOCATION: 0 SUB-SERIES TEST DATE: 09271973 FROM 1900 TO 330 HOURS

TEST CHARACTERISTICS-----------------------------

SOURCE OPERATING MODE: ROASTING/REVERBERATING SOURCE OPERATING RATE: PCT DESIGN CAP:
FEED MATERIAL: FEED MATERIAL COMPOSITION:

SAMPLING LOCATION DESCRIPTION: 31 M FROM EXIT OF ESP, DUCT 6X5 M PERCENT ISOKINETIC SAMPLING= 100

PROCESS CONDITIONS AT SAMPLING LOCATION

VOL. FLOW RATE= 228.7 DNM3/S VELOCITY= 10.8 M/S TEMPERATURE= 81 C PRESSURE= 755 MM HG

GAS COMPOSITION

WATER VAPOR (PERCENT BY VOLUME)= 5.9

ORSAT ANALYSIS-- CO2 = .60 % CO = % O2 = 19.70 % N2 = 79.70 %

TRACE GASES (PPM):

SUB-SERIES REMARKS-------------------------------

PARTICULATE MASS TRAIN RESULTS-------------------

FRONT HALF= 1.610E+05 TOTAL= 2.530E+05 MASS TRAIN REMARKS: AVERAGE OF TWO RUNS

PARTICULATE PHYSICAL PROPERTIES------------------

DENSITY= 1.000 G/CM3 (ASSUMED) RESISTIVITY= E+ OHM-CM ( )

OTHER PHYSICAL PROPERTIES:

TEST SERIES NO: 6 SUB-SERIES NO: 1 TEST LOCATION: 0

CONTROL DEVICE OPERATING PARAMETERS--------------

UNIT 1	01	VOLUMETRIC FLOW RATE	224.2 M3/S
	02	ELECTRODE AREA	5341.8 M2
	03	VOLUME PER ELECTRODE AREA	0.04 M/S
	04	CORONA CURRENT DENSITY	0.013 MICRO A/CM2
	05	SPARK RATE	0 PER MIN
UNIT 2	01	VOLUMETRIC FLOW RATE	224.2 M3/S
	02	ELECTRODE AREA	16186.9 M2
	03	VOLUME PER ELECTRODE AREA	0.014 M/S
	04	CORONA CURRENT DENSITY	0.009 MICRO A/CM2
	05	SPARK RATE	14.3 /MIN

TEST SERIES NO: 6 SUB-SERIES NO: 1 TEST LOCATION: 0

CHEMICAL ANALYSIS----------------------------

PARTICLE DIAMETERS IN MICROMETERS

STAGE NUMBER:	0	1	2	3	4	5	6	7	8
PARTICLE DIAMETER BOUNDARY:	.	.	.	.	.	.	.	.	.

DIAMETER BASIS = CALCULATED BOUNDARY DIAMETERS

CHEMICAL DATA ARE LISTED IN THE FOLLOWING ORDER:

SAROAD NUMBER MEG NUMBER CHEM ABSTRACTS REG. NO. CONCENTRATION (UG/M3) BY STAGE

PREFERRED NAME

OTHER NAMES COMMONLY USED

EMPIRICAL FORMULA MOLECULAR WEIGHT

ANALYSIS METHOD

CHEMICAL DATA			FILTER /TOTAL	STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5	STAGE 6	STAGE 7	STAGE 8
2103	49A000	07440-38-2	2.51+4								
ARSENIC											
METALLIC ARSENIC											
BLACK ARSENIC											
AS		74.92									
ATOMIC ABSORPTION											
2110	82A000	07440-43-9	1.95+2								
CADMIUM											
CD		112.42									
ATOMIC ABSORPTION											
2112	68A000	07440-47-3	3.82+1								
CHROMIUM											
CR		51.99									
ATOMIC ABSORPTION											
2114	78A000	07440-50-8	2.54+3								
COPPER											
CUPRUM											
CU		63.55									
ATOMIC ABSORPTION											

TEST SERIES NO: 6 SUB-SERIES NO: 1 TEST LOCATION: 0

CHEMICAL ANALYSIS------------------------------ (CONTINUED)

CHEMICAL DATA			FILTER /TOTAL	STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5	STAGE 6	STAGE 7	STAGE 8
2128	46A000	07439-92-1	5.62+3								
LEAD											
PLUMBUM											
PB		207.22									
ATOMIC ABSORPTION											
2167	81A000	07440-66-6	7.99+3								
ZINC											
ZN		65.38									
ATOMIC ABSORPTION											

TEST SERIES NO: 6 SUB-SERIES NO: 1 TEST LOCATION: 0 RUN NUMBER: 01

MEASUREMENT PARTICULARS-------------------------

MEASUREMENT INSTRUMENT/METHOD NO: 1 NAME: ANDERSEN MODEL III IMPACTOR SIZE RANGE- .300 TO 10.000 MICROMETERS

COLLECTION SURFACE/SUBSTRATE:

MEASUREMENT START TIME: SAMPLING PERIOD: 0050.0 MIN SAMPLING RATE: 0023.77 L/MIN DILUTION FACTOR: 0001.0

GAS SAMPLING CONDITIONS- TEMPERATURE: 0077 C PRESSURE: MM HG PCT. WATER VAPOR: .

COMMENTS ON THE MEASUREMENT

IMPACTOR POSITION HORIZONTAL

CONCENTRATION BASIS = MASS

DIAMETER BASIS = CLASSIC AERODYNAMIC DEFINITION CALCULATED BOUNDARY DIAMETERS

PARTICLE SIZE DISTRIBUTION DATA------------------

STOKES-DIA (UM) BNDRY	STOKES-DIA (UM) MID PT	CLASSIC AERODYNAMIC DIA (UM) BNDRY	CLASSIC AERODYNAMIC DIA (UM) MID PT	AERODYNAMIC IMPACTION DIA (UM) BNDRY	AERODYNAMIC IMPACTION DIA (UM) MID PT	DM (UG/DNM3)	DM/DLDAE (UG/DNM3)	DN (NO/CM3)	DN/DLDAE (NO./CM3)	CUM M % LESS SIZE
10.000		10.000		10.081						
5.500	7.416	5.500	7.416	5.580	7.500	5.890+03	2.269+04	2.758+01	1.062+02	97.670
4.000	4.690	4.000	4.690	4.080	4.772	1.720+04	1.244+05	3.183+02	2.302+03	90.866
2.350	3.066	2.350	3.066	2.430	3.149	1.510+04	6.537+04	1.001+03	4.332+03	84.892
1.550	1.909	1.550	1.909	1.629	1.989	1.260+04	6.971+04	3.462+03	1.915+04	79.907
.760	1.085	.760	1.085	.837	1.168	2.269+04	7.331+04	3.389+04	1.095+05	70.931
.460	.591	.460	.591	.535	.669	3.800+04	1.743+05	3.511+05	1.610+06	55.898
.290	.365	.290	.365	.362	.440	8.370+04	4.177+05	3.281+06	1.638+07	22.787
.100	.170	.100	.170	.162	.242	5.760+04	1.246+05	2.228+07	4.817+07	.000

TOTAL MASS 2.528+05 TOTAL NUMBER 2.595+07

04

4.2 SCR Number: SRC-2

Title: FPEIS SUMMARY Report

The FPEIS SUMMARY Report (SRC-2) provides a listing of all data in the data base for a specific source category in SERIES Report format. Allowable source category values are given in the User Guide. The data are ordered by test series number within the given source category; that is, the SUMMARY Report consists of several SERIES Reports for the same source category. (See Section 4.1 for an example of a SERIES Report.)

The SUMMARY Report produces a large volume of computer output, possibly several thousand pages. There are several restrictions on the use of this SRC which are discussed in Section 5.0 of the User Guide.

4.3 SRC Number: SRC-3

Title: Fractional Penetration Program (PENTRA)

The Fractional Penetration Program PENTRA (SRC-3) enables users to calculate the efficiency of fine particle control devices (expressed as penetration) for specific test series, subseries, and runs. The FPEIS PENTRA has been adapted from a series of data reduction procedures developed for impactor measurements by Southern Research Institute. FPEIS PENTRA is, however, independent of measurement equipment since equipment-dependent parameters have already been accommodated when the data are first loaded into the FPEIS data base.

The input requirements for FPEIS PENTRA are very simple. First, it is assumed that the user has access to and has studied the SERIES report (see SRC-1) prior to executing this program. The user will identify the inlet and outlet runs to be compared by specifying the inlet subseries and run, and the outlet subseries and run. The capability also exists to enable the user to average groups of inlet or outlet runs in order to obtain composite data.

The PENTRA program will retrieve the specified data from the data base. The mass (or number) concentrations and stage boundary diameters will be used to calculate cumulative mass loadings and differential size distributions. A curve is fitted to the inlet and the outlet values of the cumulative mass concentrations less than the stage diameter versus the diameter.

Next, the derivative of each of these curves is calculated at specified diameters and the average and standard deviation of the differential mass distributions are calculated. The control device efficiency (expressed as penetration) is determined by comparing the two curves at the same diameter.

The output from PENTRA will include basic process and control device data, and a tabulation of the inlet and outlet data. A computerized plot of control device efficiency as a function of particle size will be given for each of three types of boundary definitions used in the FPEIS; e.g., Stokes, classical aerodynamic, and aerodynamic impaction.

(Example to be added at a later date.)

4.4 SRC Number: SRC-4

Title: TALLY WHERE, TALLY ALL

One of the command features of SYSTEM 2000 natural language is the TALLY command. This command enables a user to determine the frequency of occurrence of a particular data element and how many unique values it assumes. The TALLY command actually has two options: the TALLY/EACH and the TALLY/ALL. The TALLY/EACH option produces a list of each unique value for the specified element along with the frequency of occurrence for that unique value. The TALLY/ALL option, on the other hand, lists only the minimum and maximum unique values, not each value.

The natural language TALLY command is limited to key data elements; that is, those which have been specifically identified for sorting keys. To broaden the applicability of the TALLY command for the FPEIS, SRC-4 has been developed to provide the TALLY WHERE and TALLY ALL commands. The output is the same as for the TALLY/EACH and TALLY/ALL commands, respectively. SRC-4 does, however, allow the user to qualify the data element to be tallied. Examples of the TALLY WHERE and TALLY ALL commands are given on the following pages.

EXAMPLE 1:

```
-399- SELECTED RG IS 1500     -
************************
 TALLY WHERE FOR (MEASUREMENT INSTRUMENT/METHOD NAME)
************************
FREQUENCY VALUE
------------------------
       28      ANDERSEN MODEL III IMPACTOR
       29      BRINK IMPACTOR
        5      CNC/DIFF BATTERY
        5      OTHER-OPC
------------------------
        4 UNIQUE VALUES
------------------------
       67 OCCURRENCES
------------------------
---
>
```

```
-399- SELECTED RG IS 1500     -
************************
 TALLY ALL WHERE FOR (MEASUREMENT INSTRUMENT/METHOD NAME)
************************
 MINIMUM     ANDERSEN MODEL III IMPACTOR
 MAXIMUM     OTHER-OPC
************************
        4 UNIQUE VALUES
------------------------
       67 OCCURRENCES
------------------------
```

EXAMPLE 2:

```
-399- SELECTED RG IS 600     -
************************
 TALLY WHERE FOR (VOLUMETRIC FLOW RATE)
************************
FREQUENCY VALUE
------------------------
        6     -NULL-
        7       00097.0
        6       00105.7
        7       00123.2
        9       00125.8
        9       00169.0
        9       00170.6
        9       00172.4
------------------------
        8 UNIQUE VALUES
------------------------
       62 OCCURRENCES
------------------------
---
>
```

```
-399- SELECTED RG IS 600     -
************************
 TALLY ALL WHERE FOR (VOLUMETRIC FLOW RATE)
************************
 MINIMUM    00097.0
 MAXIMUM    00172.4
************************
        7 UNIQUE VALUES
------------------------
       56 OCCURRENCES
------------------------
---
>
```

4.5 SRC Number: SRC-5

Title: PRINT WHERE

The PRINT WHERE command (SRC-5) enables the user to screen data in the FPEIS while searching for a specific piece of information; that is, it aids data searching by allowing users to move from general to more specific selection criteria. This concept is best illustrated by an example: a user wants to know if there are any data in the FPEIS from copper smelters that use electrostatic precipitators as control devices. The PRINT WHERE command will enable the user to obtain a list of test series numbers that meet the given selection criteria. The user may then obtain SERIES reports for each test series number using SRC-1.

In using the PRINT WHERE command, the user has available a variety of data elements to select for both sorting and qualification. Up to three levels of qualification are permitted. For example, a user may print the measurement equipment method/name where the test series number equals a given value and the subseries number equals a given value and the run number equals a given value.

The following example illustrates the use of the PRINT WHERE command. Suppose that a user wishes to know which of the first 10 test series does not include chemical data. In addition, he wishes the output to be ordered by test series number. The output shown below would be the result of the proper use of SRC-5.

```
---
PRINT/NAME/
---
C310
---
, OB
---
C310
---
 WHERE
---
C1410 FAILS AND
---
C310 SPANS 1*10
---
:
            TEST SERIES NUMBER*       1
            TEST SERIES NUMBER*       2
            TEST SERIES NUMBER*       3
            TEST SERIES NUMBER*       4
            TEST SERIES NUMBER*       5
            TEST SERIES NUMBER*       8
            TEST SERIES NUMBER*       9
            TEST SERIES NUMBER       10
```

4.6 SRC Number: SRC-6

Title: Chemical Data Search (CHEMSEARCH)

The CHEMSEARCH command (SRC-6) enables the user to search all or parts of the FPEIS data base for the presence of a particular chemical species. The user must supply a chemical identification number, and, if he wishes to search only a part of the data base, he must also specify the test series number(s). Chemical ID's permitted include SAROAD/SOTDAT, Multi-Media Environmental Goals (MEG'S), Chemical Abstracts Services Registration Numbers, and Level 1 Fractions.

The output from SRC-6 will identify the particular test series in which the chemical species of interest appears. The user may then retrieve the SERIES report using SRC-1.

The following is an example output of SRC-6 in which the user was interested in those test series which include information about lead, with a SAROAD number of 2128. The entire data base was to be searched.

```
SAROAD NUMBER*        2128
MEG NUMBER*           46A000
PREFERRED NAME*       LEAD
EMPIRICAL FORMULA*    PB
MOLECULAR WEIGHT*     0207.22
CAS NUMBER*           07439-92-1
OTHER NAMES*          PLUMBUM

THE FOLLOWING SERIES WERE FOUND IN THE ENTIRE DATA BASE.

00006               00032
00007               00043
00013               00044
00025               00045
00026               00046
00027
```

SECTION 5

APPENDIX

CONTENTS

Number	Item	Page
5.1	Sample FPEIS Data Input Forms.	RM-5.1-1
5.2	Example of FPEIS Series Report Output.	RM-5.2-1
5.3	Summary of Contents of the FPEIS Data Base	RM-5.3-1

5.1 Sample FPEIS Data Input Forms

Standard data input forms have been developed for the FPEIS. Samples of completed forms are provided in pages RM-5.1-2 through RM-5.1-7. Detailed instructions for completing the forms are given in the FPEIS User Guide.

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FPEIS

FINE PARTICLE EMISSIONS INFORMATION SYSTEM
DATA INPUT FORMS

Form 1 9/77

Form Completed by: P. Reider

A – SOURCE DESCRIPTION

Test Series No. (1–5)	Card No. (11–13)	SCC I (Source Category) (16–32)	SCC II (Type of Operation) (33–49)	SCC III (Feed Material Class) (50–66)	Test Series Start Date Mo	Da	Yr	Finish Date Mo	Da	Yr	UTM Zone
14	A01	EXTCØMB BØILER	ELECTRIC GENERATN	BITUMINØUS CØAL	05	12	75	05	23	75	12

Card No.	SCC IV (Operating Mode Class) (16–35)	Site Name (36–75)
A02	>100MMBTU PULVDRY	UNIØN ELECTRIC MERAMEC STATIØN

Card No.	Source Name (16–40)	Street (41–60)	City (61–78)	State (79–80)
A03	MERAMEC UNIT 1	1234 RIVER RD	ST. LØUIS	MØ

Card No.	Zip (16–20)	UTM Coords X (21–24)	UTM Coords Y (25–29)	Tested By (31–80)
A04	63102	4730	39210	MIDWEST RESEARCH INSTITUTE

Card No.	Reference (16–75)
A05	EPA 650/2-74-031, APRIL 1974

B – TEST SERIES REMARKS

Test Series No. (1–5)	Card No. (11–13)	Remarks in Text (16–80)
	B01	
	B02	
	B03	
	B04	
	B05	
	B06	
	B07	
	B08	
	B09	
	B10	

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FINE PARTICLE EMISSIONS INFORMATION SYSTEM
DATA INPUT FORMS

Form 2 9/77
Form Completed by P. Reider

C - CONTROL DEVICE(S) CHARACTERISTICS

Test Series No. (1-10)	Card No. (11-13)	14	Device No. (1,2 or 3) (15)	Device Category (16-48)	Device Class (49-60)	Generic Type (61-80)
14	C01	1		CONTINUOUSLY CLEANED REVERSE AIR	PILOT SCALE	FABRIC FILTER

Card No. (11-13)	14	15	Commercial Name (16-45)	Manufacturer (46-75)	76-80
C02			STEAM-HYDRO SCRUBBER	RESEARCH COTTRELL	

Card No. (11-13)	14	15	Device Description (16-75)	76-80
C03			ATOMIZED SPRAY IS SUBJECTED TO ELECTRICAL FIELD FOR CHARGING	

Card No. (11-13)	14	15	Device Description (continued) (16-80)
C04			OF DROPLETS

CONTROL DEVICE(S) DESIGN PARAMETERS

Test Series No. (1-10)	Card No. (11-13)	14	Device No. (1,2 or 3) (15)	Serial No. (16-17)	Specifications (18-47)	Value (48-67)	68-80
14	C05	1		01	DESIGN VOLUME	20,000 NM3/MIN	
	C05						
	C05						
	C05						
	C05						
	C05						
	C05						
	C05						
	C05						
	C05						
	C05						
	C05						
	C05						
	C05						
	C05						
	C05						
	C05						
	C05						
	C05						
	C05						

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FINE PARTICLE EMISSIONS INFORMATION SYSTEM
DATA INPUT FORMS

Form 3 9/77

Form Completed by: P. Reider

D – TEST CHARACTERISTICS

Test Series No. (1–5)	Sub-series No. (6–8)	Card No. (11–13)	Control Device Inlet or Outlet (I or Ø) (15)	Test Subseries Date Mo/Da/Yr (16–21)	Start Time (22–25)	Stop Time (26–29)	Source Operating Mode (30–59)	Source Operating Rate* (60–76)	% Design Capacity* (77–80)
14	2	D01	I	05 15 75	1230	1610	OXYGEN-LANCING	10 MG/HR	952

Card No. (11–13)	Feed Material* (16–45)	Feed Material Composition* (46–80)
D02	PULVERIZED BITUMINOUS COAL	4.1% S, 10.28 ASH

Card No. (11–13)	Sampling Location Description* (16–55)	Volume Flow Rate* (56–61)	Velocity* (62–65)	Temp.* (66–69)	Press.* (70–74)	% H_2O* (75–77)	% Iso-kinetic* (78–80)
D03	10 DUCT DIAMETERS DWNSTRM FROM 90 D BEND	205	204	61	740	174	98

Card No. (11–13)	CO_2* (16–19)	CO* (20–23)	O_2* (24–27)	N_2* (28–31)	Trace Gases in ppm (Text)* (32–80)
D04	1200	50	600	8150	SO2 - 300, NO2 - 50, CL - 200

CONTROL DEVICE(S) OPERATING PARAMETERS

Test Series No. (1–5)	Sub-series No. (6–8)	Card No. (11–13)	Device No. (1, 2 or 3) (15)	Serial No. (16–17)	Specification* (18–47)	Value* (48–67)
14	2	D05	1	01	RAPPING FREQUENCY	2 PER MINUTE

*Need not be filled if the preceding subseries contains the same data; changes or modifications should be entered as necessary. If data or information from preceding subseries is not applicable, use NA or 999; for subseries following use of NA or 999 where data or information is available it must be entered.

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FINE PARTICLE EMISSIONS INFORMATION SYSTEM
DATA INPUT FORMS

Form 4 9/77

Form Completed by: P. Reider

CONTROL DEVICE(S) OPERATING PARAMETERS (cont'd)

Test Series No. (1–5)	Sub-series No. (6–8)	(9–10)	Card No. (11–13)	(14–15)	Serial No. (16–17) / Device No. (1, 2 or 3)	Specification* (18–47)	Value* (48–67)	(68–80)
			D05					
			D05					
			D05					
			D05					
			D05					
			D05					
			D05					
			D05					
			D05					
			D05					

SUBSERIES REMARKS

Test Series No. (1–5)	Sub-series No. (6–8)	(9–10)	Card No. (11–13)	(14–15)	Remarks in Text* (16–80)
14	2		D06		GAS VELØCITY DECREASED SLIGHTLY WHEN
			D07		DUCT BYPASS VENT WAS CLØSED
			D08		
			D09		
			D10		
			D11		
			D12		
			D13		
			D14		
			D15		
			D16		
			D17		
			D18		
			D19		
			D20		

E - PARTICULATE MASS TRAIN RESULTS

Test Series No. (1–5)	Sub-series No. (6–8)	(9–10)	Card No. (11–13)	(14–15)	Front Half (16–25)	Total (26–35)	Mass Train Comments (Text) (36–80)
14	2		E01		1.240E+02	4.250E+03	MASS CØN. LØW - LEAK BETWEEN FILTER AND METER

F - PARTICULATE PHYSICAL PROPERTIES

Test Series No. (1–5)	Sub-series No. (6–8)	(9–10)	Card No. (11–13)	(14–15)	Density* (16–19)	(20)	Determination — Resistivity* (21–27)	(28)	(29–30)	Other Physical Properties in Text (31–80)
14	2		F01		1.0	1	4.23+11	1	1	SØLUBILITY ØF PARTICULATE IN WATER IS 0.4 G/ML

*Need not be filled if the preceding subseries contains the same data; changes or modifications should be entered as necessary. If data or information from preceding subseries is not applicable, use NA or 999; for subseries following use of NA or 999 where data or information is available it must be entered.

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FINE PARTICLE EMISSIONS INFORMATION SYSTEM
DATA INPUT FORMS

Form 5b 2/78
Form Completed by P. Reider

H - CHEMICAL COMPOSITION

Stokes/Aerodynamic/Impaction Diameter (0, 1, or 2) (col. 19)
Calib or Calc (1 or 0) (col. 20)

Test Series No. (1-5)	Subseries No. (6-8)	Card No. (11-13)	Stokes/Aerodynamic/Impaction (19)	Calib or Calc (20)	Upper Boundary Diameter (27-32)	Particle Boundary Diameter* ①	②	③	④	⑤	⑥	⑦	⑧
14	2	H01	1	1	20.000	7.500	3.800	2.300	1.500	.710	.410	.100	.

Chemical Concentration (μg/m³)

Card No. (11-13)	Entry Code (16)	Chemical I.D. (16-24)	Analysis I.D. (25)	Mass Train Filter or Pooled Stages ±	① ±	② ±	③ ±	④ ±	⑤ ±	⑥ ±	⑦ ±	⑧ ±
H02		S2103	B	.	2.10+14	.60+07	.60+04	.10+04	.70+01	.79+04	.81+0	.
H02		S2110	A	.	1.80+24	.00+11	.43+28	.00+11	.10+22	.22+12	.83+1	.
H02		S2112	A	.	1.21+32	.19+23	.99+29	.40+22	.67+32	.24+28	.63+1	.
H02		S2113	A	.	9.20+12	.20+12	.60+12	.40+14	.98+13	.70+03	.30+0	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.
H02				.	.	.	.	.	.	.	.	.

*Need not be filled if the preceding subseries contains the same data; changes or modifications should be entered as necessary. If data or information from preceding subseries is not applicable, use NA or 999; for subseries following use of NA or 999 where data or information is available it must be entered.

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FINE PARTICLE EMISSIONS INFORMATION SYSTEM
DATA INPUT FORMS

Form 6 9/77

Form Completed by: P. Reider

I - MEASUREMENT PARTICULARS

Test Series No. (1-5)	Sub-series No. (6-8)	Run No. (9-10)	Card No. (11-13)	14	15	Measurement Instrument/Method No. / Measurement Instrument/Method Name** (16-45)	Meas. Start Time (46-49)	Sampling Period** (50-54)	Aerosol Flow Rate** (55-60)	Gas Conditions at Measurement Location** Temp. (61-64)	Press. (65-69)	% H_2O (70-72)	(73-75)	Dilution Factor** (76-80)
14	2	2	I01	1		UW MARK III IMPACTØR	1345	45.5	4.5	42	750	72.5		1.0

Card No. (11-13)	14	15	Measurement Size Range** Lower (16-20)	Upper (21-25)	Collection Surface/Substrate and its Specifications** (26-80)
I02			040	2000	GLASS FIBER FILTER, GELMAN, TYPE A

Card No. (11-13)	14	15	Comments on the Measurement** (16-80)
I03			SUBSTRATE ØN STAGE 1 SHØWED WEIGHT
I04			LØSS ØF 0.05 MICRØGS.
I05			

J - PARTICULATE SIZE DISTRIBUTION DATA

Test Series No. (1-5)	Sub-series No. (6-8)	Run No. (9-10)	Card No. (11-13)	Measurement Instrument/Method No. (14)	Stokes/Aerodynamic/Impaction Diameter (0, 1, or 2) (15)	Particle Size Data** 16-23	24-31	34-39	40-47	48-55	56-63	64-71	72-79	Calib or Calc (1 or 0) (80)
14	2	2	J01	1	1	20.00	13.770	7.500	3.807	2.299	1.545	.790	.400	0
			J02			.	.	.	.	.	.	.	.	
			J03			.	.	.	.	.	.	.	.	

Card No. (11-13)	Measurement Instrument/Method No. (14)	Mass/No. (1 or 0) (15)	Mass/No. Data ± 16-23	± 24-31	± 32-39	± 40-47	± 48-55	± 56-63	± 64-71	± 72-79
J04	1	1	2.98+06	2.19+05	1.13+05	9.34+04	4.54+04	2.78+04	8.20+03	.
J05			.	.	.	.	.	.	.	.
J06			.	.	.	.	.	.	.	.

**Need not be filled if the preceding subseries or run with this instrument/method contains the same data; changes or modifications should be entered as necessary. If data or information from preceding subseries or run is not applicable, use NA or 999; for subseries or run following use of NA or 999 where data or information is available it must be entered.

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5.2 Example of FPEIS Series Report Output

Both standard and optional formats are available for the output from the FPEIS data base. An example of the standard FPEIS series report format is provided on the following pages, as typical of FPEIS output.

FINE PARTICLE EMISSIONS INFORMATION SYSTEM
FPEIS SERIES REPORT

TEST SERIES NO: 63 TEST SERIES AT SITE FROM TO BY KVB ENGINEERING,TUSTIN,CA

REFERENCE: HUNTER,S.C. ET AL., EPA 68-02-1074

SOURCE CHARACTERISTICS

NEDS SCC SOURCE CATEGORY:	EXTCOMB BOILER	SITE NAME	CONFIDENTIAL
TYPE OF OPERATION:	INDUSTRIAL	SOURCE NAME	BOILER UNIT 8
FEED MATERIAL CLASS:	BITUMINOUS COAL	ADDRESS	CONFIDENTIAL
OPERATING MODE CLASS:	10-100MMBTU/HR		CONFIDENTIAL , IL 00000
		UTM ZONE 16	UTM X-COORD UTM Y-COORD

TEST SERIES REMARKS

BASELINE SPREADER STOKER

CONTROL DEVICE(S) CHARACTERISTICS

UNIT 1

DEVICE GENERIC TYPE: NONE
CATEGORY:
CLASS:
DESCRIPTION:

COMMERCIAL NAME: NA
MANUFACTURER:

CONTROL DEVICE DESIGN SPECIFICATIONS

TEST SERIES NO: 63 SUB-SERIES NO: 1 TEST LOCATION: I SUB-SERIES TEST DATE: FROM TO HOURS

TEST CHARACTERISTICS-----------------------------

SOURCE OPERATING MODE: COAL BURNING SOURCE OPERATING RATE: 50 MBTU/HR PCT DESIGN CAP: 400
FEED MATERIAL: BITUMINOUS COAL FEED MATERIAL COMPOSITION: C=68.3,H=4.7,S=1.16,A=9.71,O=11.01

SAMPLING LOCATION DESCRIPTION: PERCENT ISOKINETIC SAMPLING=

PROCESS CONDITIONS AT SAMPLING LOCATION

VOL. FLOW RATE= DNM3/S VELOCITY= M/S TEMPERATURE= 193 C PRESSURE= MM HG

GAS COMPOSITION
WATER VAPOR (PERCENT BY VOLUME)=

ORSAT ANALYSIS-- CO2 = 9.70 % CO = % O2 = 10.00 % N2 = 80.30 %

TRACE GASES (PPM): CO-33,NOX-360,NO-351

SUB-SERIES REMARKS------------------------------

NO METHOD 5 TEST TAKEN.

PARTICULATE MASS TRAIN RESULTS-------------------

FRONT HALF= E+ TOTAL= E+ MASS TRAIN REMARKS:

PARTICULATE PHYSICAL PROPERTIES-----------------

DENSITY= 1.000 G/CM3 (ASSUMED) RESISTIVITY= E+ OHM-CM ( )

OTHER PHYSICAL PROPERTIES: NA

TEST SERIES NO: 63 SUB-SERIES NO: 1 TEST LOCATION: 1 RUN NUMBER: 01

MEASUREMENT PARTICULARS-------------------------

MEASUREMENT INSTRUMENT/METHOD NO: 1 NAME: BRINKS BMS-11 IMPACTOR SIZE RANGE- .100 TO 50.000 MICROMETERS

COLLECTION SURFACE/SUBSTRATE: ALUMINUM FOIL PLATE

MEASUREMENT START TIME: SAMPLING PERIOD: 0059.0 MIN SAMPLING RATE: L/MIN DILUTION FACTOR: 001.0

GAS SAMPLING CONDITIONS- TEMPERATURE: 0193 C PRESSURE: MM HG PCT. WATER VAPOR:

COMMENTS ON THE MEASUREMENT

IMPACTOR ORIENTATION IS HORIZONTAL PREHEATED IN THE STACK

CONCENTRATION BASIS = MASS

DIAMETER BASIS = CLASSIC AERODYNAMIC DEFINITION

CALCULATED BOUNDARY DIAMETERS

PARTICLE SIZE DISTRIBUTION DATA-----------------

STOKES-DIA (UM)		CLASSIC AERODYNAMIC DIA (UM)		AERODYNAMIC IMPACTION DIA (UM)		DM (UG/DNM3)	DM/DLDAE (UG/DNM3)	DN (NO/CM3)	DN/DLDAE (NO./CM3)	CUM M % LESS SIZE
BNDRY	MID PT	BNDRY	MID PT	BNDRY	MID PT					
50.000		50.000		50.081						
10.900	23.345	10.900	23.345	10.981	23.450	4.562+05	6.896+05	6.848+01	1.035+02	16.973
2.500	5.220	2.500	5.220	2.580	5.322	5.060+04	7.913+04	6.794+02	1.062+03	7.764
1.500	1.936	1.500	1.936	1.579	2.018	3.335+04	1.503+05	8.771+03	3.954+04	1.694
1.000	1.225	1.000	1.225	1.078	1.305	2.965+03	1.684+04	3.082+03	1.750+04	1.154
.500	.707	.500	.707	.575	.788	2.406+03	7.993+03	1.300+04	4.317+04	.717
.250	.354	.250	.354	.321	.430	3.208+03	1.066+04	1.386+05	4.605+05	.133
.100	.158	.100	.158	.162	.228	7.290+02	1.832+03	3.522+05	8.851+05	.000

TOTAL MASS 5.495+05 TOTAL NUMBER 5.165+05

04

5.3 Summary of Contents of the FPEIS Data Base

This section provides a summary of the contents of the FPEIS data base as of June 1, 1978. As new test data are added to the FPEIS, this list will be updated.

Test Series No.	Report's Author and Name	Testing Equipment	Source	Control Equipment	No. of Runs
1	Harris, D. B., and D. C. Drehmel, "Fractional Efficiency of Metal Fume Control as Determined by Brink Impactor," EPA/CSL (1973)	Brink Impactor	Zn Roaster	Wet ESP	4
2	Harris, D. B., and D. C. Drehmel, "Fractional Efficiency of Metal Fume Control as Determined by Brink Impactor," EPA/CSL (1973)	Brink Impactor	Cu Converter	Wet ESP	4
3	Harris, D. B., and D. C. Drehmel, "Fractional Efficiency of Metal Fume Control as Determined by Brink Impactor," EPA/CSL (1973)	Brink Impactor	Zn Sintering	Dry ESP	2
4	Harris, D. B., and D. C. Drehmel, "Fractional Efficiency of Metal Fume Control as Determined by Brink Impactor," EPA/CSL (1973)	Brink Impactor	Pb Sintering	Baghouse (Orlon)	2
5	Harris, D. B., and D. C. Drehmel, "Fractional Efficiency of Metal Fume Control as Determined by Brink Impactor," EPA/CSL (1973)	Brink Impactor	Pb Blast Furnace	Baghouse (wool felt)	2
6	Statnick, R. M., "Measurement of SO_2, Particulate, and Trace Elements in a Copper Smelter Converter and Roaster/Reverberatory Gas Streams," EPA/CSL	Brink and Andersen Impactors	Cu Roaster and Reverberatory Furnace (ASARCO)	Dry ESP (pipe) and Parallel Type ESP	2
7	Statnick, R. M., "Measurement of SO_2, Particulate, and Trace Elements in a Copper Smelter Converter and Roaster/Reverberatory Gas Streams," EPA/CSL	Brink and Andersen Impactors	Cu Converter	Plate Type ESP	2

Test Series No.	Report's Author and Name	Testing Equipment	Source	Control Equipment	No. of Runs
8	McCain, J. D., and W. B. Smith, "Lone Star Steel Steam-Hydro Air Cleaning System Evaluation," EPA-650/2-74-028 (1974)	Brink and Andersen Impactors. Optical Particle Counter and Diffusion Battery	Open Hearth Furnace	Lone Star Steel Steam-Hydro Scrubber	38
9	Cooper, D. W., and D. P. Andersen, "Dynactor Scrubber Evaluation," GCA Corporation (1974)	Andersen Impactor	Test Aerosol from Dust Feeder	Dynactor Scrubber	50
10	Harris, D. B., "Tests Performed at Celotex Corporation, Goldsboro, North Carolina	Pilat Impactor	Asphalt Roofing	Afterburner	1
11	Harris, D. B., and J. A. Turner, "Particulate and SO_2/SO_3 Measurement Around an Anthracite Steam Generator Baghouse," EPA/CSL (1973)	Brink Impactor	Pulverized Coal-Fired Boiler	Baghouse	4
12	McKenna, J. D., "Applying Fabric Filtration to Coal-Fired Industrial Boilers: A Preliminary Pilot Scale Investigation," Enviro-Systems and Research, Inc. (1974)	Andersen Impactor	Coal-Fired Industrial Boiler	Baghouse	3
13	Cowherd, C. et al., "Hazardous Emission Characterization of Utility Boilers," EPA-650/2-75-066	Brink Impactor	Utility Boiler	Cyclone	6
15	Statnick, R. M., and D. C. Drehmel, "Fine Particulate Control Using SO_2 Scrubbers," EPA (1974)	Brink and Andersen Impactors	Coal-Fired Utility Boiler	TCA Scrubber	14
16	Statnick, R. M., and D. C. Drehmel, "Fine Particulate Control Using SO_2 Scrubbers," EPA (1974)	Brink and Andersen Impactors	Coal-Fired Utility Boiler	Venturi Scrubber	4

Test Series No.	Report's Author and Name	Testing Equipment	Source	Control Equipment	No. of Runs
17	Statnick, R. M., and D. C. Drehmel, "Fine Particulate Control Using SO_2 Scrubbers, EPA (1974)	Brink and Andersen Impactors	Oil-Fired Boiler	Venturi MgO Scrubber	8
18	Riggenbach, J. D., E. D. Johnson, and M. K. Hamlin, "Measurement of Particulate Grain Loadings, Particle Size Distribution, and Sulfur Gas Concentrations at Hoerner Waldorf's Pulp and Papermill No. 3 Recovery System, Vols. I, II, and III, Environmental Science and Engineering, Inc.	Brink Impactor	Pulp and Papermill Recovery Boiler	ESP	38
19	Shannon, L. J. et al., "St. Louis/Union Electric Refuse Firing Demonstration Air Pollution Test Report"	Brink and Andersen Impactors	Coal-Fired Utility Boiler	ESP	26
20	McCain, J. D., "Evaluation of Aronetics Two-Phase Jet Scrubber," EPA-650/2-74-129	Brink and Andersen Impactors. Optical Particle Counter, Diffusion Battery + CNC	Ferro-Alloy Electric Arc Furnace	Aronetics Two-Phase Jet Scrubber	41
21	Bosch, J. C., M. J. Pilat, and B. F. Hrutfiord, "Size Distribution of Aerosols From a Kraft Mill Recovery Furnace," Tappi, 54(11):1871 (1971)	Pilat Impactor	Kraft Mill Recovery Furnace	ESP	4
22	McGarry, F. J., and C. J. Gregory, "A Comparison of the Size Distribution of Particulates Emitted from Air, Mechanical, and Steam Atomized Oil-Fired Burners," JAPCA, 22(8):636 (1972)	Andersen Impactor	Air Atomized Oil-Fired Boiler	ESP	1

Test Series No.	Report's Author and Name	Testing Equipment	Source	Control Equipment	No. of Runs
23	McGarry, F. J., and C. J. Gregory, "A Comparison of the Size Distribution of Particulates Emitted from Air, Mechanical, and Steam Atomized Oil-Fired Burners," JAPCA, 22(8):636 (1972)	Andersen Impactor	Mechanical Atomized Oil-Fired Boiler	ESP	1
24	McGarry, F. J., and C. J. Gregory, "A Comparison of the Size Distribution of Particulates Emitted from Air, Mechanical, and Steam Atomized Oil-Fired Burners," JAPCA, 22(8):636 (1972)	Andersen Impactor	Steam Atomized Oil-Fired Boiler	ESP	1
25	Lee, R. E., Jr., H. L. Crist, A. E. Riley, and K. E. MacLeod, "Concentration and Size of Trace Metal Emissions from a Power Plant, a Steel Plant, and a Cotton Gin," Env. Sci. and Tech., 9(7):643 (1975)	UW Mark III Impactor	Emissions from a Power Plant	ESP	2
26	Lee, R. E., Jr., H. L. Crist, A. E. Riley, and K. E. MacLeod, "Concentration and Size of Trace Metal Emissions from a Power Plant, a Steel Plant, and a Cotton Gin," Env. Sci. and Tech., 9(7):643 (1975)	UW Mark III Impactor	Emissions from a Steel Plant	Baghouse	2
27	Lee, R. E., Jr., H. L. Crist, A. E. Riley, and K. E. MacLeod, "Concentration and Size of Trace Metal Emissions from a Power Plant, a Steel Plant, and a Cotton Gin," Env. Sci. and Tech., 9(7):643 (1975)	UW Mark III Impactor	Emissions from a Cotton Gin	Wet Scrubber	2

Test Series No.	Report's Author and Name	Testing Equipment	Source	Control Equipment	No. of Runs
28	"St. Louis/Union Electric Refuse Fuel Project," MRI Project No. 3821-C(4), January 1975	Brink and Andersen Impactors	Coal-Fired Utility Boiler	ESP	67
29	"St. Louis/Union Electric Refuse Fuel Project,' MRI Project No. 4033-C, Monthly Report No. 1	Brink and Andersen Impactors	Coal-Fired Utility Boiler	ESP	12
30	"Test and Evaluation Program for St. Louis/Union Electric Refuse Fuel Project," MRI Project No. 4033-C, Monthly Report No. 4	Brink and Andersen Impactors	Coal-Fired Utility Boiler	ESP	43
31	"Test and Evaluation Program for St. Louis/Union Electric Refuse Fuel Project," MRI Project No. 4033-C, Monthly Report No. 11	Brink and Andersen Impactors	Coal-Fired Utility Boiler	ESP	19
32	Toca, F. M., "Lead and Cadmium Distribution in the Particulate Effluent from a Coal-Fired Boiler," Ph.D. Thesis, University of Iowa, Ames, Iowa, July 1972	Andersen Ambient Impactor	Coal-Fired Boiler	ESP	5
33	Baladi, E., "Particle Size Distribution Tests for Beker Industries Corporation," MRI Project No. 5-1379-C	Brink Impactor	Phosphate Rock Calciner	Venturi Scrubber	5
34	Gooch, J. P., and J. D. McCain, "Particulate Collection Efficiency Measurements on a Wet Electrostatic Precipitator," EPA-650/2-75-033	Brink and Andersen Impactors. Optical Particle Counter, Diffusion Battery, and CN Counter	Aluminum Reduction Cells	ESP Preceded by Spray Towers	17
35	Bradway, R. M., and R. W. Cass, "Fractional Efficiency of a Utility Boiler Baghouse," EPA-600/2-75-013-a	Andersen Impactor	Coal-Fired Boiler	Baghouse	86

Test Series No.	Report's Author and Name	Testing Equipment	Source	Control Equipment	No. of Runs
36	McKenna, J. D., J. C. Mylock, and W. O. Lipscomb, "Applying Fabric Filtration to Coal-Fired Industrial Boilers,' EPA-650/2-74-058-a	Andersen Impactor	Coal-Fired Boiler	Baghouse	28
37	McKenna, J. D., J. C. Mylock, and W. O. Lipscomb, "Applying Fabric Filtration to Coal-Fired Industrial Boilers," EPA-650/2-74-058-a	Andersen Impactor	Coal-Fired Boiler	Baghouse	7
38	McKenna, J. D., J. C. Mylock, and W. O. Lipscomb, "Applying Fabric Filtration to Coal-Fired Industrial Boilers," EPA-650/2-74-058-a	Andersen Impactor	Coal-Fired Boiler	Baghouse	5
39	McKenna, J. D., J. C. Mylock, and W. O. Lipscomb, "Applying Fabric Filtration to Coal-Fired Industrial Boilers," EPA-650/2-74-058-a	Andersen Impactor	Coal-Fired Boiler	Baghouse	11
40	McKenna, J. D., J. C. Mylock, and W. O. Lipscomb, "Applying Fabric Filtration to Coal-Fired Industrial Boilers," EPA-650/2-74-058-a	Andersen Impactor	Coal-Fired Boiler	Baghouse	7
41	McCain, J. D., "Evaluation of Centrifield Scrubber," EPA-650/2-74-129-a	Brink and Andersen Impactors, Diffusional, Optical, and Electrical Methods	Asphalt Dryer	1. Coarse Cyclone 2. Secondary Collector 3. Scrubber	31
42	Cooper, D. W., "Pentapure Impinger Evaluation," EPA-650/2-75-024-a	Andersen Impactor	Gray Iron Foundry	Pentapure Impinger	12

Test Series No.	Report's Author and Name	Testing Equipment	Source	Control Equipment	No. of Runs
43	Yost, K. J. et al., "The Environmental Flow of Cadmium and Other Trace Metals," Progress Report NSF (RANN) Grant GI-35106, Purdue University, West Lafayette, Indiana	Andersen Impactor	Zinc Coke Plant	-	1
44	Yost, K. J. et al., "The Environmental Flow of Cadmium and Other Trace Metals," Progress Report NSF (RANN) Grant GI-35106, Purdue University, West Lafayette, Indiana	Andersen Impactor	Zinc Vertical Retort	Baghouse	3
45	Yost, K. J. et al., "The Environmental Flow of Cadmium and Other Trace Metals," Progress Report NSF (RANN) Grant GI-35106,Purdue University, West Lafayette, Indiana	Andersen Impactor	Steel Mill Open Hearth Furnace	ESP	6
46	Yost, K. J. et al., "The Environmental Flow of Cadmium and Other Trace Metals," Progress Report NSF (RANN) Grant GI-35106, Purdue University, West Lafayette, Indiana	Andersen Impactor	Municipal Incinerator	Scrubber	1
48	Calvert, S., N. J. Jhaveri, and S. Yung, "Fine Particle Scrubber Performance Tests," EPA-650/2-74-093	UW Mark II and Andersen Impactors	Urea Prilling Tower	Valve Tray	12
49	Calvert, S., N. J. Jhaveri, and S. Yung, "Fine Particle Scrubber Performance Tests, EPA-650/2-74-093	UW Mark III and Andersen Impactors	Potash Dryer	Scrubber	17

Test Series No.	Report's Author and Name	Testing Equipment	Source	Control Equipment	No. of Runs
50	Calvert, S., N. J. Jhaveri, and S. Yung, "Fine Particle Scrubber Performance Tests," EPA-650/2-74-093	UW Mark III and Andersen Impactors	Coal-Fired Boiler	TCA Scrubber	6
51	Calvert, S., N. J. Jhaveri, and S. Yung, "Fine Particle Scrubber Performance Tests," EPA-650/2-74-093	UW Mark III and Andersen Impactors	Coal-Fired Boiler	Venturi Scrubber	6
52	Calvert, S., N. J. Jhaveri, and S. Yung, "Fine Particle Scrubber Performance Tests," EPA-650/2-74-093	UW Mark III and Andersen Impactors	Salt Dryer	Wetted Fiber Scrubber	16
53	Calvert, S., N. J. Jhaveri, and S. Yung, "Fine Particle Scrubber Performance Tests,' EPA-650/2-74-093	UW Mark III and Andersen Impactors	Salt Dryer	Impingement Plate Scrubber	12
54	Calvert, S., N. J. Jhaveri, and S. Yung, "Fine Particle Scrubber Performance Tests," EPA-650/2-74-093	UW Mark III and Andersen Impactors	Iron Wetting Cupola	Venturi Rod Scrubber	18
55	Calvert, S. et al., EPA-600/2-76-282	UW Mark III Impactor	Gray Iron Process	Wet Scrubber	35
56	EPA Contract No. 68-02-1814, Bechtel Corporation, San Francisco, California	MRI Model 1502 and Brink Impactors	Coal-Fired Boiler	Wet Scrubber	101
57	EPA Contract No. 68-02-1814, Bechtel Corporation, San Francisco, California	MRI Model 1502 and Brink Impactors	Coal-Fired Boiler	Wet Scrubber	75
58	Hunter, S. C. et al., EPA Contract No. 68-02-1074	Brink Impactor	Coal-Fired Boiler	None	1

Test Series No.	Report's Author and Name	Testing Equipment	Source	Control Equipment	No. of Runs
59	Hunter, S. C. et al., EPA Contract No. 68-02-1074	Brink Impactor	Residual Oil-Fired Boiler	None	5
60	Hunter, S. C. et al., EPA Contract No. 68-02-1074	Brink Impactor	Residual Oil-Fired Boiler	None	2
61	Hunter, S. C. et al., EPA Contract No. 68-02-1074	Brink Impactor	Residual Oil-Fired Boiler	None	1
62	Hunter, S. C. et al., EPA Contract No. 68-02-1074	Brink Impactor	Residual Oil Boiler	None	3
63	Hunter, S. C. et al., EPA Contract No. 68-02-1074	Brink Impactor	Coal-Fired Boiler	None	1
64	Hunter, S. C. et al., EPA Contract No. 68-02-1074	Brink Impactor	Coal-Fired Boiler	None	3
65	Hunter, S. C. et al., EPA Contract No. 68-02-1074	Brink Impactor	Coal-Fired Boiler	ESP	5
66	Hunter, S. C. et al., EPA Contract No. 68-02-1074	Brink Impactor	Distillate Oil-Fired Boiler	ESP	2
67	Hunter, S. C. et al., EPA Contract No. 68-02-1074	Brink Impactor	Residual Oil-Fired Boiler	None	2
68	Ensor, D. S. et al., EPA-600/2-75-074	Impactor and Wire Screen Diffusion Battery	Coal-Fired Boiler	Wet Scrubber	33
73	Bradway, R. M. et al., EPA-600/2-76-077A	Andersen Impactor	Nonclassified Boiler	Fabric Filter	38
74	Bradway, R. M. et al., EPA-600/2-76-077A	Andersen and UM Mark III Impactors	Nonclassified Boiler	Fabric Filter	39
75	Bradway, R. M. et al., EPA-600/2-76-077A	Andersen and UM Mark III Impactors, Rich 100-CNC	Nonclassified Boiler	Fabric Filter	82

Test Series No.	Report's Author and Name	Testing Equipment	Source	Control Equipment	No. of Runs
76	Cass, R. W., and J. E. Langley, EPA-600/7-77-023	UW Mark III and Andersen Impactors, Rich 100-CNC, Bausch and Lomb Model OPC	Electric Arc Furnace	Fabric Filter	332
77	Rei, M. T., and D. W. Cooper, EPA-600/2-76-202	Andersen Impactor, Bausch and Lomb Model OPC, Rich 100-CNC	Laboratory Analysis	Wet Scrubber	52
78	Dennis, R. et al., EPA-650/2-74-036	Andersen Impactor	Prototype Test	Novel	32
79	Werner, A. S. et al., EPA-600/7-76-017	UM Mark III Impactor	Residual Oil Boiler	Cyclone	2
80	Nichols et al., "Collection Efficiency on Three ESP's," EPA-600/2-75-056	Brink Impactor, Other CCNC, Andersen Impactor, ROYCO Model OPC	Rotary Kiln in Cement Manufacture	ESP	22
81	Gooch, J. P. et al., SORI-EAS-76-471, Draft, September 1976	Brink Impactor, Whitby Electrical Analyzer 3030, Andersen Impactor	Coal-Fired Boiler	ESP	42
82	Nichols, G. B. et al., SORI-EAS-76-511	Brink Impactor	Copper Smelter	ESP	8
83	Gooch, J. P. et al., EPA-600/2-76-141	Brink Impactor, Whitby Electrical Analyzer Model 3030	Sulfate Pulping	ESP	23
84	Gooch, J. P. et al., EPA-600/2-76-141	Brink and UW Mark II Impactors	Sulfate Pulping	ESP	13
85	Nichols, G. B., and J. D. McCain, EPA-600/2-75-056	Brink and Andersen Impactors	Unclassified Boiler	ESP	12
86	McCain, J. D., "Evaluation of Rexnord Gravel Bed Filter," EPA-600/2-76-164	Andersen Impactor, Other CNC	Clinker Cooler in Cement Manufacture	Novel	49
87	Harrisburg Municipal Incinerator	Brink and Andersen Impactors	Solid Waste Incinerator	ESP	10

Test Series No.	Report's Author and Name	Testing Equipment	Source	Control Equipment	No. of Runs
88	McCain, J. D., SORI-EAS-73-052	Other	Ceramic/Clay Dryer	Cyclone	6
89	Gooch, J. P., and G. B. Nichols, SORI-EAS-77-098	Brink and Andersen Impactors, Whitby Electrical Analyzer Model 3030	Coal-Fired Boiler	ESP	33
90	EPA Contract No. 68-02-1869	UW Mark III Impactor	Borax Fusing Furnace	Wet Scrubber	25
91	EPA Contract No. 68-02-1869	UW Mark III Impactor, Wire Screen Diffusion Battery	Gray Iron Foundry	Wet Scrubber	53
98	Monsanto Research Corporation, EPA Contract No. 68-02-1816	Brink Impactor	Coal-Fired Boiler	Mobile Fabric Filter	1
99	Monsanto Research Corporation, EPA Contract No. 68-02-1816	Brink Impactor	Coal-Fired Boiler	Mobile Fabric Filter	1
100	Monsanto Research Corporation, EPA Contract No. 68-02-1816	Andersen Impactor	Coal-Fired Boiler	Mobile Fabric Filter	5
101	Monsanto Research Corporation, EPA Contract No. 68-02-1816	Brink Impactor	Coal-Fired Boiler	Mobile Fabric Filter	18
102	Monsanto Research Corporation, EPA Contract No. 68-02-1816	Brink Impactor	Coal-Fired Boiler	Mobile Fabric Filter	24
103	Monsanto Research Corporation, EPA Contract No. 68-02-1816	Brink Impactor	Coal-Fired Boiler	Mobile Fabric Filter	14
104	Monsanto Research Corporation, EPA Contract No. 68-02-1861	Brink Impactor	Lime-Recovery Kiln	Mobile Fabric Filter	23
105	Monsanto Research Corporation, EPA Contract No. 68-02-1816	Brink Impactor	Lime-Recovery Kiln	Mobile Fabric Filter	22
106	Monsanto Research Corporation, EPA Contract No. 68-02-1816	Andersen Impactor	Lime-Recovery Kiln	Mobile Fabric Filter	41

Test Series No.	Report's Author and Name	Testing Equipment	Source	Control Equipment	No. of Runs
107	Monsanto Research Corporation, EPA Contract No. 68-02-1816	Brink Impactor	Lime-Recovery Kiln	Mobile Fabric Filter	12
108	TRC	Sierra Impactor, Optical Particle Counter	Coke-Gas Boiler	None	8
109	TRC	Sierra Impactor	Bark-Fired Boiler	Baghouse	9
110	TRC	Andersen Impactor	Incinerator	Other	2
111	TRC	Sierra Impactor, Optical Particle Counter	Coal-Fired Boiler	Cyclone	20
112	Coal and Refuse Test, SORI-EAS-75-316	Andersen and Other Impactor	Solid Wastes Coal-Fired Boiler	ESP	52
113	Confidential	Brink Impactor	Steel Foundry	Mechanical Collector	7
114	McCain, J. D., and W. B. Smith, Final Report, SORI-EAS-74-158	Andersen Impactor	Unclassified Boiler	Cyclone	7
115	McCain, J. D. et al., SORI-EAS-74-418 and SORI-EAS-75-062	Andersen and Other Impactors, Other OPC	Coal-Fired Boiler	ESP	69
116	Bird, A. N., SORI-EAS-73-124	Brink Impactor	Coal-Fired Boiler	Wet Scrubber	12
117	Bird, A. N., SORI-EAS-73-200	Brink Impactor, Climet CNC, Other CNC	Steel Foundry	None	8
118	Nichols, G. B., SORI-EAS-74-009	Brink and Andersen Impactors	Unclassified Boiler	ESP	10
119	Nichols, G. B., Company Correspondence, A1402-3005-IF	Brink Impactor	Unclassified Boiler	ESP	6
120	Nichols, G. B., and J. D. McCain, EPA-600/2-75-056	Andersen and Other Impactors	Unclassified Boiler	ESP	24
121	Nichols, G. B., and J. P. Gooch, A1364-2975	Brink Impactor	Unclassified Boiler	ESP	10

Test Series No.	Report's Author and Name	Testing Equipment	Source	Control Equipment	No. of Runs
123	McCain, J. D., SORI-EAS-73-127	Modified Brink Impactor	Other/Not Classified	Cyclone	8
124	McCain, J. D., SORI-EAS-73-127	Modified Brink Impactor	Mineral Wool Cupola	Cyclone	6
127	Dismukes, E., SORI-EAS-75-311, EPA-600/2-75-015	Andersen Impactor, Other CNC	Unclassifed Boiler	ESP	15
128	Dismukes, E., SORI-EAS-75-311, EPA-600/2-75-015	Modified Brink and Andersen Impactors	Unclassified Boiler	ESP	47

RM-5.3-15

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

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15. SUPPLEMENTARY NOTES IERL-RTP project officer is Gary L. Johnson, Mail Drop 63, 919/541-2745. This Manual replaces EPA-600/2-76-173 in its entirety.

16. ABSTRACT The report is a basic reference manual on the Fine Particle Emissions Information System (FPEIS), a computerized database on primary fine particle emissions to the atmosphere from stationary point sources. The FPEIS is a component of the Environmental Assessment Data Systems (EADS) which is designed to aid researchers in environmental assessment and fine particle control technology development activities. The FPEIS will contain source test data including particle size distributions; chemical, physical, and bioassay testing results performed on particulate samples; design and typical operating data on particulate control systems applied; process descriptions and the sources; and descriptions of the sampling equipment and techniques employed. The FPEIS, a successor to the MRI Fine Particle Inventory developed in 1971, report describes in detail the data types contained in the database. It identifies and discusses the input data requirements and protocol. A detailed catalog of analytical procedures available to users is discussed, and a list of the source types presently contained in the database is given.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS		b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air Pollution	Environmental	Air Pollution Control	13B
Standards	Biology	Stationary Sources	06F
Dust		Reference Manual	11G
Data Storage		Fine Particle Emissions	09B,05B
Sampling		Information System	14B
Size Determination		FPEIS	

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