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Environmental Monitoring Series

REGIONAL AIR POLLUTION STUDY
Non-Criteria Pollutant Inventory

Environmental Sciences Research Laboratory
Office of Research and Development
U.S. Environmental Protection Agency
Research Triangle Park, North Carolina 27711

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REGIONAL AIR POLLUTION STUDY
Non-Criteria Pollutant Inventory

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ABSTRACT

In conjunction with the Regional Air Pollution Study (RAPS) being conducted in the St. Louis Air Quality Control Region (AQCR), an inventory of non-criteria pollutants was assembled for point sources. The inventory was based on the following data:

1. The National Emissions Data System (NEDS) inventory for the AQCR. This inventory is based largely on 1971 and 1972 data.

2. Emission factors listed in the several reports in the series entitled "National Inventory of Sources and Emissions," which list estimated emission factors for the following 21 compounds: Arsenic, Abbestos, Barium, Beryllium, Boron, Cadmium, Chromium, Copper, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Phosphorus, Selenium, Silver, Titanium, Vanadium, Zinc, and BaP.

The non-criteria emission factors are being incorporated into the RAPS Data Handling System, and yearly point source inventories for non-criteria pollutants are available.

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1.0 INTRODUCTION

The "Clean Air" Act of 1970, as amended, establishes the achievement of clean air as a national goal. In pursuance of this goal, Air Quality Criteria were developed and Air Quality Standards established for five pollutants: sulfur dioxide, carbon monoxide, particulate materials, hydrocarbons and oxidants. These pollutants are frequently termed "criteria pollutants".

It is well known, however, that a large number of other substances occur in polluted air, some of which have known toxic or carcenogenic properties, such as mercury, asbestos or beryllium. The Clean Air Act requires the Administrator to consider other pollutants and to determine whether they are hazardous. Such a determination is conditioned on the magnitude of the health and welfare effect; it, in turn, is a function of the occurrence of the pollutant as well as its intrinsic toxicity.

Thus, one input into these considerations is an assessment of the sources of such pollutants, as well as the pollution burden they create. For this reason, a series of studies has been performed for the Environmental Protection Agency, which were issued under the general heading of "National Inventory of Sources and Emissions". ([1]) In this series, some 21 compounds were examined, and emission factors and emission inventories were developed. Though no high degree of accuracy is claimed for these factors, they can serve as a useful basis for first approximations of the emissions in a given area.

In conjunction with the Regional Air Pollution Study (RAPS) being conducted currently in the St. Louis Air Quality Control Region (AQCR), an inventory of these "non-criteria" pollutants was assembled.

([1]) See page 14 for reference

2.0 SCOPE OF THE NON-CRITERIA INVENTORY

The non-criteria inventory is based on the following data:

1. The National Emissions Data System (NEDS) inventory for the AQCR 70 (St. Louis). This inventory lists some 1300 individual sources. It is based largely on 1971 and 1972 data.
2. Emission factors listed in the several reports in the series entitled "National Inventory of Sources and Emissions", which lists estimated emission factors for all sources of the 21 compounds discussed. There is a considerable degree of uncertainty in the values of the emission factors, and this uncertainty is reflected in the values reported in this inventory.

The following pollutants are included:

Arsenic	Mercury
Asbestos	Molybdenum
Barium	Nickel
Beryllium	Phosphorus
Boron	Selenium
Cadmium	Silver
Chromium	Titanium
Copper	Vanadium
Lead	Zinc
Magnesium	Bap
Manganese	

3.0 APPROACH AND METHODOLOGY

The starting point for this study was the emission factors listed in the 21 publications referred to above. These factors are the best available estimates relating the uses of these materials, from mining to processing and ultimate consumption or disposal, with their release to the atmosphere. A discussion of the estimated accuracy of these factors is contained in each of the reports.

Each emission factor delineated in the reports was assigned one or several Source Classification Codes (SCC).[2] The SCC is an identification system developed for NEDS, upon which the point source hierarchy is structured. Any plant or process which causes air pollution can be represented by one or several SCC numbers. Table 1 shows a typical sample of SCC numbers. The SCC numbers consist of four groupings. For example:

Group I	- a single digit (3) - designates "industrial processes"
Group II	- two digits (03) - designates "primary metals"
Group III	- three digits (014) - designates "barium"
Group IV	- two digits (03) - designates "driers/calciners"

In addition the base unit upon which the emission factors are based is given; in this case, "tons processed".

Table 2 shows an example of a table of emission factors (for lead) taken from APTD 1543 "Emission Study of Industrial Sources of Lead Air Pollutants", with the appropriate SCC codes added. It indicates, for example, that in the Primary Lead Production, which in NEDS is coded 3-03-010-01 through 3-03-010-05, an emission of 5 lbs.of lead per ton of product occurs. Adding the SCC codes to the information in the "Emission Study" made it possible to determine which of these sources actually exist in the St. Louis AQCR.

A listing of emission sources for the St. Louis AQCR ordered by SCC codes, was then obtained from NEDS, and a cross-tabulation prepared, which assigned to each source category in the region a set of emission factors. These sets are shown in Appendix I. The emission factors were then transformed to correspond with the production or consumption units which appear in the NEDS

(2) See page 14 for reference

TABLE 1

NATIONAL EMISSIONS DATA SYSTEM (NEDS)
SOURCE CLASSIFICATION CODE (SCC) REPORT

SCC ID				SCC CATEGORY NAMES				
I	II	III	IV	I	II	III	IV	UNITS
3	03	014	03	INDUSTRIAL	PROCESI PRIMARY METALS	IBARIUM	IDRIERS/CALCINERS	ITONS PROCESSED
3	03	014	99	INDUSTRIAL	PROCESI PRIMARY METALS	IBARIUM	IOTHER/NOT CLASFD	ITONS PROCESSED
3	03	030	01	INDUSTRIAL	PROCESI PRIMARY METALS	IZINC SMELTING	IGENERAL	ITONS PROCESSED
3	03	030	02	INDUSTRIAL	PROCESI PRIMARY METALS	IZINC SMELTING	IROASTNG/MULT-HRTH	ITONS PROCESSED
3	03	030	03	INDUSTRIAL	PROCESI PRIMARY METALS	IZINC SMELTING	ISINTERING	ITONS PROCESSED
3	03	030	04	INDUSTRIAL	PROCESI PRIMARY METALS	IZINC SMELTING	IHORIZ RETORTS	ITONS PROCESSED
3	03	030	05	INDUSTRIAL	PROCESI PRIMARY METALS	IZINC SMELTING	IVERT RETORTS	ITONS PROCESSED
3	03	030	06	INDUSTRIAL	PROCESI PRIMARY METALS	IZINC SMELTING	IELECTROLYTIC PROC	ITONS PROCESSED
3	03	030	99	INDUSTRIAL	PROCESI PRIMARY METALS	IZINC SMELTING	IOTHER/NOT CLASFD	ITONS PROCESSED
3	03	999	99	INDUSTRIAL	PROCESI PRIMARY METALS	IOTHER/NOT CLASFD	ISPECIFY IN REMARK	ITONS PRODUCED
3	04	001	01	INDUSTRIAL	PROCESI SECONDARY METALS	IALUMINUM OPERATN	ISWEATING FURNACE	ITONS PRODUCED
3	04	001	02	INDUSTRIAL	PROCESI SECONDARY METALS	IALUMINUM OPERATN	ISMELT-CRUCIBLE	ITONS METAL PRODUCED
3	04	001	03	INDUSTRIAL	PROCESI SECONDARY METALS	IALUMINUM OPERATN	ISMELT-REVERB FNC	ITONS METAL PRODUCED
3	04	001	04	INDUSTRIAL	PROCESI SECONDARY METALS	IALUMINUM OPERATN	ICHLORINATN STATN	ITONS METAL PRODUCED
3	04	001	10	INDUSTRIAL	PROCESI SECONDARY METALS	IALUMINUM OPERATN	IFOIL ROLLING	ITONS PRODUCT
3	04	001	11	INDUSTRIAL	PROCESI SECONDARY METALS	IALUMINUM OPERATN	IFOIL CONVERTING	ITONS PRODUCED
3	04	001	20	INDUSTRIAL	PROCESI SECONDARY METALS	IALUMINUM OPERATN	ICAN MANUFACTURE	ITONS PRODUCED
3	04	001	50	INDUSTRIAL	PROCESI SECONDARY METALS	IALUMINUM OPERATN	IROLL-DRAW-EXTRUDE	ITONS PRODUCED
3	04	001	99	INDUSTRIAL	PROCESI SECONDARY METALS	IALUMINUM OPERATN	IOTHER/NOT CLASFD	ITONS PRODUCED
3	04	002	01	INDUSTRIAL	PROCESI SECONDARY METALS	IBRASS/BRONZ MELT	IBLAST FNC	ITONS CHARGE
3	04	002	02	INDUSTRIAL	PROCESI SECONDARY METALS	IBRASS/BRONZ MELT	ICRUCIBLE FNC	ITONS CHARGE
3	04	002	03	INDUSTRIAL	PROCESI SECONDARY METALS	IBRASS/BRONZ MELT	ICUPOLA FNC	ITONS CHARGE
3	04	002	04	INDUSTRIAL	PROCESI SECONDARY METALS	IBRASS/BRONZ MELT	IELECT INDUCTION	ITONS CHARGE
3	04	002	05	INDUSTRIAL	PROCESI SECONDARY METALS	IBRASS/BRONZ MELT	IREVERB FNC	ITONS CHARGE
3	04	002	06	INDUSTRIAL	PROCESI SECONDARY METALS	IBRASS/BRONZ MELT	IROTARY FNC	ITONS CHARGE
3	04	002	99	INDUSTRIAL	PROCESI SECONDARY METALS	IBRASS/BRONZ MELT	IOTHER/NOT CLASIFD	ITONS PRODUCED
3	04	003	01	INDUSTRIAL	PROCESI SECONDARY METALS	IGRAY IRON	ICUPOLA	ITONS METAL CHARGE
3	04	003	02	INDUSTRIAL	PROCESI SECONDARY METALS	IGRAY IRON	IREVERB FNC	ITONS METAL CHARGE
3	04	003	03	INDUSTRIAL	PROCESI SECONDARY METALS	IGRAY IRON	IELECT INDUCTION	ITONS METAL CHARGE
3	04	003	05	INDUSTRIAL	PROCESI SECONDARY METALS	IGRAY IRON	IANNEALING OPERATN	ITONS METAL CHARGE
3	04	003	30	INDUSTRIAL	PROCESI SECONDARY METALS	IGRAY IRON	IMISC CAST-FABCTN	ITONS PROCESSED
3	04	003	40	INDUSTRIAL	PROCESI SECONDARY METALS	IGRAY IRON	IGRINDING-CLEANING	ITONS PROCESSED
3	04	003	99	INDUSTRIAL	PROCESI SECONDARY METALS	IGRAY IRON	IOTHER/NOT CLASIFD	ITONS METAL CHARGE
3	04	004	01	INDUSTRIAL	PROCESI SECONDARY METALS	ILEAD SMELT SEC	IPOT FURNACE	ITONS PROCESSED
3	04	004	02	INDUSTRIAL	PROCESI SECONDARY METALS	ILEAD SMELT SEC	IREVERB FNC	ITONS PROCESSED
3	04	004	03	INDUSTRIAL	PROCESI SECONDARY METALS	ILEAD SMELT SEC	IBLAST/CUPOLA FNC	ITONS PROCESSED
3	04	004	04	INDUSTRIAL	PROCESI SECONDARY METALS	ILEAD SMELT SEC	IROTARY REVERB FNC	ITONS PROCESSED
3	04	004	08	INDUSTRIAL	PROCESI SECONDARY METALS	ILEAD SMELT SEC	ILEAD OXIDE MFG	ITONS PROCESSED
3	04	004	99	INDUSTRIAL	PROCESI SECONDARY METALS	ILEAD SMELT SEC	IOTHER/NOT CLASIFD	ITONS PROCESSED
3	04	005	01	INDUSTRIAL	PROCESI SECONDARY METALS	ILEAD BATTERY	IGENERAL	ITONS PROCESSED
3	04	005	99	INDUSTRIAL	PROCESI SECONDARY METALS	ILEAD BATTERY	IOTHER/NOT CLASIFD	ITONS PROCESSED
3	04	006	01	INDUSTRIAL	PROCESI SECONDARY METALS	IMAGNESIUM SEC	IPOT FURNACE	ITONS PROCESSED
3	04	006	99	INDUSTRIAL	PROCESI SECONDARY METALS	IMAGNESIUM SEC	IOTHER/NOT CLASIFD	ITONS PROCESSED
3	04	007	01	INDUSTRIAL	PROCESI SECONDARY METALS	ISTEEL FOUNDRY	IELECTRIC ARC FNC	ITONS PROCESSED
3	04	007	02	INDUSTRIAL	PROCESI SECONDARY METALS	ISTEEL FOUNDRY	IOPEN HEARTH FNC	ITONS PROCESSED
3	04	007	03	INDUSTRIAL	PROCESI SECONDARY METALS	ISTEEL FOUNDRY	IOPEN HEARTH LANCD	ITONS PROCESSED
3	04	007	04	INDUSTRIAL	PROCESI SECONDARY METALS	ISTEEL FOUNDRY	IHEAT-TREAT FNC	ITONS PROCESSED
3	04	007	05	INDUSTRIAL	PROCESI SECONDARY METALS	ISTEEL FOUNDRY	IINDUCTION FURNACE	ITONS PROCESSED
3	04	007	99	INDUSTRIAL	PROCESI SECONDARY METALS	ISTEEL FOUNDRY	IOTHER/NOT CLASIFD	ITONS PROCESSED
3	04	00M	01	INDUSTRIAL	PROCESI SECONDARY METALS	IZINC SEC	IRETORT FNC	ITONS PRODUCED

TABLE 2

EMISSION FACTORS

Source	Factor	Qualifier
Mining & Milling	0.2 lb/ton lead mined(controlled) 3-03-010-99	Plant visit
Metallurgical Industries		
Primary Lead Production	5.0 lb/ton of product(controlled) 3-03-010-01 3-03-010-03 3-03-010-05 3-03-010-02 3-03-010-04	Questionnaires
Primary Copper Production	0.6 lb/ton of Cu concentrates(controlled) 3-03-005-02 3-03-005-04 3-03-005-03	Estimate
Primary Zinc Production	0.3 lb/ton of Zn concentrates(controlled) 3-03-030-02 3-03-030-04 3-03-030-06 3-03-030-03 3-03-030-05	Estimate
Secondary Lead Production	0.7 lb/ton of product(controlled) 3-04-004-01 3-04-004-03 3-04-005-01 3-04-004-02 3-04-004-04	Questionnaires
Lead Oxide Processing	0.7 lb/ton of lead oxide(controlled) 3-04-004-08 3-04-005-01	Questionnaires
Consumer Product Manufacturing		
Storage Batteries	8.0 lb/ton of lead processed(uncontrolled)	Questionnaires
Storage Batteries	1.3 lb/ton of lead processed(controlled) 3-04-005-01	Questionnaires
Gasoline Additives	14.0 lb/ton of lead processed(controlled) 2-02-003-01 2-03-999-98	Questionnaires
Solder	3.0 lb/ton of lead processed(controlled) 3-04-999-99	Estimate
Cable Covering	2.0 lb/ton of lead processed(controlled) 3-04-999-99	Questionnaires
Type Metal	17.0 lb/ton of lead processed(controlled) 3-04-999-99	Questionnaires
Brass & Bronze	4.0 lb/ton of lead processed(controlled) 3-04-002-02 3-04-002-06 3-04-002-05	Questionnaires

printout, as, for example, the source shown in Table 3 which shows the "Annual Operating Rate" in the lower right hand corner. The final correlation is listed on the tables shown in Appendix II.

TABLE 3

FILE CREATED ON THURSDAY JUNE 19, 1975 PAGE 603

NATIONAL EMISSION DATA SYSTEM

POINT SOURCE LISTING

STATE(14): ILLINOIS AQCR(070): METROPOLITAN ST. LOUIS CITY(00000): MISSING NAME
COUNTY(5(80): MONROE CO PLANT ID: 0001 POINT ID: 01

NAME-ADDRESS: COLUMBIA QUARRY CO. VALMEYER A2295 SIC(1422): ENGAGED IN MINING OR QUARRYING CRUSHED AND BROKEN LIMESTONE
PERSONAL CONTACT: SCC(3-05-020-01): INDUSTRIAL PROCES -MINERAL PRODUCTS -STONE QUARY/PROC -PRIMARY CRUSHING

GENERAL INFORMATION

YEAR OF RECORD: 1972

OWNERSHIP: PRIVATE

IPP PROCESS:

SOURCE: PROCESS

NORMAL OPERATIONS

HOURS/DAY: 8
DAYS/WEEK: 5
WEEKS/YEAR: 52

% ANNUAL THROUGHPUT

DEC-FEB: 23 %
MAR-MAY: 27 %
JUNE-AUG: 27 %
SEPT-NOV: 23 %

% SPACE HEAT: 00.0 %

COMPLIANCE INFO

NOT SPECIFIED

SCHEDULED COMPLICE DATE: /

COMPLIANCE STATUS UPDATE: / /

EMERGENCY CONTROL ACTION PLAN

STATUS UNKNOWN

UTM GRID COORDINATES

UTM ZONE: 16

HORIZONTAL: 735.3 KM
VERTICAL: 4,243.0 KM

STACK PARAMETERS

STACK HEIGHT: 0 FT
STACK DIAMETER: 0.0 FT
GAS TEMPERATURE: 54 F
GAS FLOW RATE: 0 ACFM
PLUME HT(NO STACK): 15 FT
SAME STACK VENTS POINTS -

CONTROL DEVICE/METHOD IDENTIFICATION

PRIMARY PART: WET SCRUBBER - MEDIUM EFFICIENCY
SECOND. PART: NO CONTROL EQUIPMENT

PRIMARY SOX: NO CONTROL EQUIPMENT
SECOND. SOX: NO CONTROL EQUIPMENT

PRIMARY NOX: NO CONTROL EQUIPMENT
SECOND. NOX: NO CONTROL EQUIPMENT

PRIMARY HC: NO CONTROL EQUIPMENT
SECOND. HC: NO CONTROL EQUIPMENT

PRIMARY CO: NO CONTROL EQUIPMENT
SECOND. CO: NO CONTROL EQUIPMENT

FUEL CHARACTERISTICS

FUEL SULFUR CONTENT: 0.00 %

FUEL ASH CONTENT: 00.0 %

FUEL HEAT CONTENT:

HAND CALCULATED EMISSION ESTIMATES

PARTICULATE:	23 TONS/YR
SOX:	0 TONS/YR
NOX:	0 TONS/YR
HC:	0 TONS/YR
CO:	0 TONS/YR

EMISSION ESTIMATION METHODS

PART: EMISSION FACTOR(AP-42 OR PENDING)
SOX: NOT APPLICABLE
NOX: NOT APPLICABLE
HC: NOT APPLICABLE
CO: NOT APPLICABLE

CONTROL EFFICIENCIES

PART: 80.0 %
SOX: 00.0 %
NOX: 00.0 %
HC: 00.0 %
CO: 00.0 %

OPERATING RATES

ANNUAL OPERATING RATE: 468,000 TONS RAW MATERIAL
HOURLY MAXM DESIGN RATE:
BOILER DESIGN CAPACITY:

ALLOWABLE EMISSIONS

PARTICULATE:	62 TONS/YR
SOX:	0 TONS/YR
NOX:	0 TONS/YR
HC:	0 TONS/YR
CO:	0 TONS/YR

COMPUTER CALCULATED EMISSIONS

PART: 23 TONS/YR
SOX: TONS/YR
NOX: TONS/YR
HC: TONS/YR
CO: TONS/YR

COMMENTS:

4.0 DATA HANDLING

In order to include the information thus obtained in the RAPS data base, it was transferred to RAPS coding sheets and from there to a set of punched cards. A typical coding sheet is shown in Figure 1.

For the system to be compatible with the handling procedures developed for other facets of RAPS, the following information has to be entered for each source:

Card 1

State Code
County Code
Plant ID
Plant Name
Street Address
Zip Code
SIC
Ownership Code

Card 2

Stack ID
UTM Zone
UTM Coordinates
Area ID
Temperature
Stack Height
Boiler Design Capacity
Stack Diameter
Flow Rate

Card 3

Control Equipment and Efficiency
for all Criteria Pollutants

Card 4

Point ID
Fuel Heat Content
Sulfur
Ash
Estimation Method
Pollutant
Units

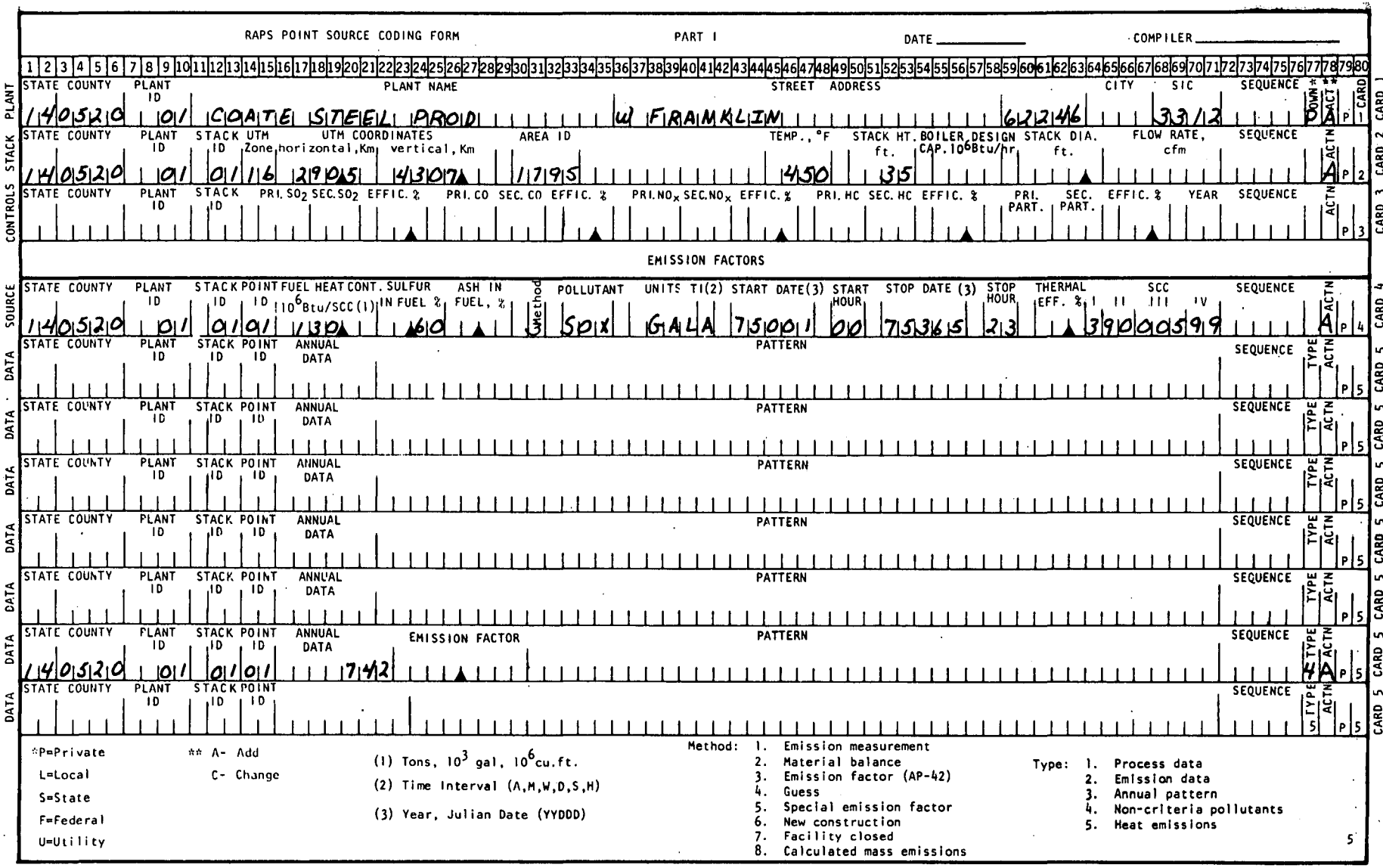

Figure 1 Example of Coding Sheet

Card 4 (Continued)

Time Increment
Start Date
Start Hour
Stop Date
Stop Hour
SCC Number

Card 5

Annual Operating Rate

An emission factor file, consisting of the 19 sets of factors for the non-criteria pollutants as shown in Appendix II, is also input into the system. This file is keyed to SCC numbers. When requested by the output program, the computer will calculate the emissions for any pollutant for a given source by multiplying its annual operating rate by the appropriate factor. It can also provide the total amount of any one pollutant by area code, county, state and AQCR. A set of punched cards representing the emission sources and the emission factor file is submitted with this report. Retrieval procedures will be described in the forthcoming RAPS Data Handling Users Manual (EPA)*.

*Document number to be assigned.

5.0 REPRESENTATIVE EMISSION INVENTORIES

Emission inventories for five compounds were hand-calculated. The results are shown in Table 4.

TABLE 4

Emission Inventory for Selected Compounds for AQCR 70

(Based on 1972 NEDS Data)

Compound	Emissions (lbs/year)
Arsenic	166,400
Cadmium	270,400
Lead	3,234,800
Mercury	5,600
Benz(a)pyrene	12,600

6.0 SUMMARY AND CONCLUSIONS

An emission inventory of 21 "non-criteria" pollutants for the St. Louis AQCR has been assembled and formatted for inclusion in the RAPS data base.

The inventory covers some 1300 sources. Information on the contribution of each source, the sources of any one pollutant, and the total amount of any pollutant in a given grid square, county, state and AQCR can be obtained from the memory bank of the Univac computer at EPA-Research Triangle Park.

7.0 REFERENCES

(1) National Inventory of Sources and Emissions

Arsenic	APTD-1507
Asbestos	APTD-70
Barium	APTD-1140
Beryllium	APTD-1508
Boron	APTD-1159
Cadmium	APTD-68
Chromium	EPA-450/3-74-012
Copper	APTD-1129
Emission Study of Industrial Sources of Lead Air Pollutants	APTD-1543
Magnesium	EPA-450/3-74-010
Manganese	APTD-1509
Mercury	APTD-1510
Molybdenum	EPA-450/3-74-009
Nickel	APTD-69
Phosphorus	EPA-450/3-74-013
Selenium	APTD-1130
Silver	EPA-450/3-74-011
Titanium	EPA-450/3-74-008
Vanadium	APTD-1511
Zinc	APTD-1139
Preferred Standards Path Report for Polycylic Organic Matter	October 1974
Emission Factors for Trace Substances	EPA-450/2-73-001

(2) NEDS Source Classification Codes and Emission Factor Listings
EPA-Office of Air Quality Planning and Standards
Research Triangle Park, July 1974

Guide for Compiling a Comprehensive Emission Inventory
EPA-APTD-1135 (1973)

Compilation of Air Pollutant Emission Factors
EPA-AP42, Appendix C

APPENDIX I

POINT SOURCES (BY SCC CODES)

AND ASSOCIATED SETS OF POLLUTANTS

SCC CODE	SET	
1-01-001-02	01	COAL (ANTHRACITE)
1-01-002-01	01	BITUMINOUS COAL
1-01-002-02	01	BITUMINOUS COAL
1-01-002-03	01	BITUMINOUS COAL
1-01-002-08	01	BITUMINOUS COAL
1-01-004-01	02	RESIDUAL OIL
1-01-005-01	03	DISTILLATE OIL
1-01-005-02	03	DISTILLATE OIL
1-01-005-03	03	DISTILLATE OIL
1-02-002-01	01	BITUMINOUS COAL
1-02-002-02	01	BITUMINOUS COAL
1-02-002-04	01	BITUMINOUS COAL
1-02-002-08	01	BITUMINOUS COAL
1-02-002-09	01	BITUMINOUS COAL
1-02-002-11	01	BITUMINOUS COAL
1-02-002-12	01	BITUMINOUS COAL
1-02-002-13	01	BITUMINOUS COAL
1-02-004-01	02	RESIDUAL OIL
1-02-004-02	02	RESIDUAL OIL
1-02-004-03	03	RESIDUAL OIL
1-02-005-01	03	DISTILLATE OIL
1-02-005-02	03	DISTILLATE OIL
1-02-005-03	03	DISTILLATE OIL

SCC CODE	SET	
1-02-009-02	04	WOOD/BARK WASTE
1-02-009-03	04	WOOD/BARK WASTE
1-03-002-09	01	BITUMINOUS COAL
1-03-002-13	01	BITUMINOUS COAL
1-03-004-01	02	RESIDUAL OIL
1-03-004-02	02	RESIDUAL OIL
1-03-004-03	02	RESIDUAL OIL
1-03-005-02	03	DISTILLATE
1-03-005-03	03	DISTILLATE
2-01-001-01	03	DISTILLATE OIL
2-01-003-01	05	DIESEL
3-01-014-01	06	PAINT MFG.
3-01-014-02	06	PAINT MFG.
3-01-018-99	07	PLASTICS
3-03-003-01	08	COKE MET. BYPRODUCT
3-03-003-02	08	COKE MET. BYPRODUCT
3-03-003-03	08	COKE MET. BYPRODUCT
3-03-003-04	08	COKE MET. BYPRODUCT
3-03-003-99	08	COKE MET. BYPRODUCT
3-03-005-99	09	COPPER SMELTING
3-03-008-01	10	IRON PRODUCTION
3-03-008-03	11	IRON PROD. SINTER
3-03-009-03	12	STEEL PROD. :BOF
3-03-009-05	13	STEEL PROD. :ELEC. ARC
3-03-010-01	14	LEAD SMELTERS

SCC CODE	SET	
3-04-002-02	15	BRASS/BRONZE MELT
3-04-003-01	16	GRAY IRON
3-04-003-03	16	GRAY IRON
3-04-003-30	16	GRAY IRON
3-04-004-03	17	LEAD SMELT SEC
3-05-006-03	18	CEMENT: KILN: OIL-FIRED
3-05-006-99	18	CEMENT: OTHER/NOT CLASSIFIED
3-05-007-01	18	CEMENT MFG. WET
3-05-007-02	18	CEMENT MFG. WET
3-05-013-01	19	FRIT MFG.
3-05-014-01	20	GLASS MFG.
3-06-002-01	21	GEN. FLUID CRACKER
3-90-002-01	01	BITUMINOUS COAL (CEMENT KILN/DRYER)
3-90-004-01	02	RESIDUAL OIL (ASPHALT DRYER)
3-90-004-99	02	RESIDUAL OIL (OTHER/NOT CLASSIFIED)
3-90-005-01	03	DISTILLATE OIL (ASPHALT DRYER)
3-90-005-05	03	DISTILLATE OIL (METAL MELTING)
3-90-005-99	03	DISTILLATE OIL (OTHER/NOT CLASSIFIED)
4-02-001-01	22	PAINT
4-02-999-99	23	OTHER/NOT CLASSIFIED
5-01-001-01	24	INCINERATOR (MUNICIPAL)
5-01-001-02	24	INCINERATOR (MUNICIPAL)
5-02-001-02	24	GENERAL INCINERATOR
5-03-001-01	24	INCINERATOR
5-03-001-02	24	INCINERATOR
5-03-001-05	24	INCINERATOR

APPENDIX II

EMISSIONS (IN LBS.) PER DESIGNATED UNIT FOR EACH SOURCE TYPE

COAL

SET	POLLUTANT	(Pounds) QUANT.	UNITS: PER	
01	ARSENIC	.0029	TON COAL	BURNED
	ASBESTOS			
01	BARIUM	.015		
01	BERYLLIUM	.00058		
01	BORON	.018		
	CADMIUM			
01	CHROMIUM	.0039		
01	COPPER	.004		
01	LEAD	.0022		
01	MAGNESIUM	.105		
01	MANGANESE	.0077		
01	MERCURY	.001		
01	MOLYBDENUM	.0015		
01	NICKEL	.0026		
01	PHOSPHORUS	.051		
01	SELENIUM	.0025		
01	SILVER	.001		
01	TITANIUM	.018		
01	VANADIUM	.0069		
01	ZINC	.017		
01	BAP	.000007		

RESIDUAL OIL

SET	POLLUTANT	(Pounds) QUANT.	UNITS: PER
02	ARSENIC		
	ASBESTOS		
	BARIUM		
02	BERYLLIUM	.0007	1000 GAL OIL BURNED
	BORON		
	CADMIUM		
02	CHROMIUM	.010	
02	COPPER	.0038	
02	LEAD	.9524	
02	MAGNESIUM	.012	
	MANGANESE		
02	MERCURY	.0004	
02	MOLYBDENUM	.008	
02	NICKEL	.4048	
02	PHOSPHORUS	.072	
02	SELENIUM	.0050	
02	SILVER	.004	
02	TITANIUM	.0044	
02	VANADIUM	1.2143	
02	ZINC	.0333	
02	BAP	.000033	

DISTILLATE OIL

SET	POLLUTANT	(Pounds) QUANT.	UNITS: PER
03	ARSENIC		
	ASBESTOS		
	BARIUM		
	BERYLLIUM		
	BORON		
	CADMIUM		
	CHROMIUM		
	COPPER		
03	LEAD	.0024	1000 GAL OIL BURNED
	MAGNESIUM		
	MANGANESE		
	MERCURY		
	MOLYBDENUM		
	NICKEL		
	PHOSPHORUS		
	SELENIUM		
	SILVER		
03	TITANIUM	.00051	
03	VANADIUM	.1190	
	ZINC		
	BAP		

WOOD BOILER

SET	POLLUTANT	(Pounds) QUANT.	UNITS: PER
04	ARSENIC		
	ASBESTOS		
	BARIUM		
	BERYLLIUM		
	BORON		
	CADMIUM		
	CHROMIUM		
	COPPER		
	LEAD		
	MAGNESIUM		
	MANGANESE		
	MERCURY		
	MOLYBDENUM		
	NICKEL		
	PHOSPHORUS		
	SELENIUM		
	SILVER		
	TITANIUM		
	VANADIUM		
	ZINC		
04	BAP	.0019	TON

DIESEL

SET	POLLUTANT	(Pounds) QUANT.	UNITS: PER
05	ARSENIC		
	ASBESTOS		
	BARIUM		
	BERYLLIUM		
	BORON		
	CADMIUM		
	CHROMIUM		
	COPPER		
	LEAD		
	MAGNESIUM		
	MANGANESE		
	MERCURY		
	MOLYBDENUM		
	NICKEL		
	PHOSPHORUS		
	SELENIUM		
	SILVER		
	TITANIUM		
	VANADIUM		
	ZINC		
05	BAP	.000136	1000 GAL

PLASTICS

SET	POLLUTANT	(Pounds) QUANT.	UNITS: PER
07	ARSENIC		
	ASBESTOS		
	BARIUM		
	BERYLLIUM		
	BORON		
07	CADMIUM	.0006	TON
	CHROMIUM		
	COPPER		
	LEAD		
	MAGNESIUM		
	MANGANESE		
	MERCURY		
	MOLYBDENUM		
	NICKEL		
	PHOSPHORUS		
	SELENIUM		
	SILVER		
	TITANIUM		
	VANADIUM		
	ZINC		
	BAP		

COKE

SET	POLLUTANT	(Pounds) QUANT.	UNITS: PER
08	ARSENIC		
	ASBESTOS		
	BARIUM		
	BERYLLIUM		
	BORON		
	CADMIUM		
	CHROMIUM		
	COPPER		
	LEAD		
	MAGNESIUM		
	MANGANESE		
	MERCURY		
	MOLYBDENUM		
	NICKEL		
	PHOSPHORUS		
	SELENIUM		
	SILVER		
	TITANIUM		
	VANADIUM		
	ZINC		
08	BAP	.0055	TON COKE PRODUCED

IRON PROD.

SET	POLLUTANT	(Pounds) QUANT.	UNITS: PER
10	ARSENIC		
	ASBESTOS		
	BARIUM		
	BERYLLIUM		
	BORON		
10	CADMIUM	.015	TON IRON PRODUCED
	CHROMIUM		
10	COPPER	.022	TON PIG IRON
	LEAD		
10	MAGNESIUM	.019	TON PIG IRON
	MANGANESE	.0225	TON PIG IRON
	MERCURY		
	MOLYBDENUM		
10	NICKEL	.0015	TON IRON
10	PHOSPHORUS	.052	TON IRON
	SELENIUM		
10	SILVER	.0001	TON PIG IRON
	TITANIUM		
10	VANADIUM	.0014	TON PIG IRON
10	ZINC	.020	TON PIG IRON
	BAP		

IRON PROD. SINTER

SET	POLLUTANT	(Pounds) QUANT.	UNITS: PER
11	ARSENIC		
	ASBESTOS		
	BARIUM		
	BERYLLIUM		
	BORON		
	CADMIUM		
	CHROMIUM		
	COPPER		
	LEAD		
11	MAGNESIUM	.06	TON SINTER
	MANGANESE		
	MERCURY		
	MOLYBDENUM		
	NICKEL		
11	PHOSPHORUS	.052	
	SELENIUM		
11	SILVER	.0002	
	TITANIUM		
	VANADIUM		
	ZINC		
	BAP		

STEEL PROD. (BASIC OXYGEN FURNACE)

SET	POLLUTANT	(Pounds) QUANT.	UNITS: PER
12	ARSENIC		
	ASBESTOS		
	BARIUM		
	BERYLLIUM		
	BORON		
12	CADMIUM	.015	TON STEEL PRODUCED
	CHROMIUM		
12	COPPER	.002	
12	LEAD	.180	
12	MAGNESIUM	.002	
12	MANGANESE	.044	
	MERCURY		
12	MOLYBDENUM	.068	
12	NICKEL	.0015	
12	PHOSPHORUS	.0087	
12	SELENIUM	.0004	
12	SILVER	.0003	
12	TITANIUM	.067	
	VANADIUM		
	ZINC		
	BAP		

STEEL PRODUCTION ELEC ARC

SET	POLLUTANT	(Pounds) QUANT.	UNITS: PER
13	ARSENIC		
	ASBESTOS		
	BARIUM		
	BERYLLIUM		
	BORON		
13	CADMIUM	.015	TON STEEL PRODUCED
	CHROMIUM		
13	COPPER	.007	
13	LEAD	.036	
13	MAGNESIUM	.10	
13	MANGANESE	.078	
	MERCURY		
13	MOLYBDENUM	.0025	
13	NICKEL	.0015	
13	PHOSPHORUS	.0087	
	SELENIUM		
13	SILVER	.0011	
13	TITANIUM	.0004	
	VANADIUM		
13	ZINC	.74	
	BAP		

LEAD SMELTERS

SET	POLLUTANT	(Pounds) QUANT.	UNITS: PER
14	ARSENIC	.8	TON LEAD
	ASBESTOS		
	BARIUM		
	BERYLLIUM		
	BORON		
14	CADMIUM	.3275	TON
	CHROMIUM		
	COPPER		
14	LEAD	5	TON LEAD
	MAGNESIUM		
	MANGANESE		
	MERCURY		
	MOLYBDENUM		
	NICKEL		
	PHOSPHORUS		
	SELENIUM		
	SILVER		
	TITANIUM		
	VANADIUM		
	ZINC		
	BAP		

BRASS/BRONZE MELT

SET	POLLUTANT	(Pounds) QUANT.	UNITS: PER
15	ARSENIC		
	ASBESTOS		
	BARIUM		
	BERYLLIUM		
	BORON		
	CADMIUM		
	CHROMIUM		
15	COPPER	.30	TON
15	LEAD	.20	
15	MAGNESIUM	.40	
	MANGANESE		
	MERCURY		
	MOLYBDENUM		
15	NICKEL	.02	
	PHOSPHORUS		
	SELENIUM		
	SILVER		
	TITANIUM		
	VANADIUM		
15	ZINC	.50	
	BAP		

GRAY IRON

SET	POLLUTANT	(Pounds) QUANT.	UNITS: PER
16	ARSENIC	.011	TON METAL CHRG
	ASBESTOS		
16	BARIUM	.005	TON PROC. WT.
	BERYLLIUM		
	BORON		
	CADMIUM		
16	CHROMIUM	.00022	TON CAST IRON
16	COPPER	.005	TON GRAY IRON PRODUCED
16	LEAD	.003	TON IRON
	MAGNESIUM		
16	MANGANESE	.33	TON CAST IRON
	MERCURY		
	MOLYBDENUM	.000018	TON CAST IRON
16	NICKEL	.00072	TON
	PHOSPHORUS		
	SELENIUM		
	SILVER		
	TITANIUM		
16	VANADIUM	.00017	TON
	ZINC		
	BAP		

LEAD SMELT (SEC)

SET	POLLUTANT	(Pounds) QUANT.	UNITS: PER
17	ARSENIC	.8	TON LEAD
	ASBESTOS		
	BARIUM		
	BERYLLIUM		
	BORON		
	CADMIUM		
	CHROMIUM		
	COPPER		
17	LEAD	.7	TON PROD.
	MAGNESIUM		
	MANGANESE		
	MERCURY		
	MOLYBDENUM		
	NICKEL		
	PHOSPHORUS		
	SELENIUM		
17	SILVER	.0015	TON PROD.
	TITANIUM		
	VANADIUM		
	ZINC		
	BAP		

CEMENT, DRY

SET	POLLUTANT	(Pounds) QUANT.	UNITS: PER
18	ARSENIC		
	ASBESTOS		
	BARIUM		
	BERYLLIUM		
	BORON		
	CADMIUM		
	CHROMIUM		
	COPPER		
18	LEAD	0.13	TON
18	MAGNESIUM	.120	
	MANGANESE		
	MERCURY		
	MOLYBDENUM		
	NICKEL		
18	PHOSPHORUS	.012	
	SELENIUM		
18	SILVER	.003	
	TITANIUM		
	VANADIUM		
	ZINC		
	BAP		

(1 BBL = 376 LBS.)

GLASS MFG

SET	POLLUTANT	(Pounds) QUANT.	UNITS: PER
20	ARSENIC	.154	TON
	ASBESTOS		
20	BARIUM	.010	TON
	BERYLLIUM		
	BORON		
	CADMIUM		
	CHROMIUM		
	COPPER		
	LEAD		
	MAGNESIUM		
	MANGANESE		
	MERCURY		
	MOLYBDENUM		
	NICKEL		
	PHOSPHORUS		
	SELENIUM		
	SILVER		
	TITANIUM		
	VANADIUM		
	ZINC		
	BAP		

FLUID CRACKER

SET	POLLUTANT	(Pounds) QUANT.	UNITS: PER
21	ARSENIC		
	ASBESTOS		
	BARIUM		
	BERYLLIUM		
	BORON		
	CADMIUM		
	CHROMIUM		
	COPPER		
	LEAD		
	MAGNESIUM		
	MANGANESE		
	MERCURY		
	MOLYBDENUM		
	NICKEL		
	PHOSPHORUS		
	SELENIUM		
	SILVER		
	TITANIUM		
	VANADIUM		
	ZINC		
21	BAP	.006	1000 BBL

(1 BBL = 42 GAL.)

INCINERATOR

SET	POLLUTANT	(Pounds) QUANT.	UNITS: PER
24	ARSENIC		
	ASBESTOS		
	BARIUM		
	BERYLLIUM		
24	BORON	.055	TON SEWAGE BURNED
24	CADMIUM	.003	SOLID WASTE
	CHROMIUM		
	COPPER		
24	LEAD	.2	CHRG.
	MAGNESIUM		
	MANGANESE		
24	MERCURY	.0014	
	MOLYBDENUM		
	NICKEL		
24	PHOSPHORUS	.046	
24	SELENIUM	.00002	
24	SILVER	.004	
24	TITANIUM	.252	
	VANADIUM		
	ZINC		
24	BAP	.013	

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4. TITLE AND SUBTITLE	5. REPORT DATE
REGIONAL AIR POLLUTION STUDY Non-Criteria Pollutant Inventory	April 1977
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15. SUPPLEMENTARY NOTES

16. ABSTRACT

In conjunction with the Regional Air Pollution Study (RAPS) being conducted in the St. Louis Air Quality Control Region (AQCR), an inventory of non-criteria pollutants was assembled for point sources. The inventory was based on the following data:

1. The National Emissions Data System (NEDS) inventory for the AQCR. This inventory is based largely on 1971 and 1972 data.

2. Emission factors listed in the several reports in the series entitled "National Inventory of Sources and Emissions," which list estimated emission factors for the following 21 compounds: Arsenic, Asbestos, Barium, Beryllium, Boron, Cadmium, Chromium, Copper, Lead, Magnesium, Manganese, Mercury, MOlybdenum, Nickel, Phosphorus, Selenium, Silver, Titanium, Vanadium, Zinc, and BaP.

The non-criteria emission factors are being incorporated into the RAPS Data Handling System, and yearly point source inventories for non-criteria pollutants are available.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
*Air pollution *Estimates *Environmental surveys	St. Louis, MO Non-criteria pollutants	13B 05J

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