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Final

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IOWA AIR TOXICS EMISSION INVENTORY
PHASE I

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DISCLAIMER

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EXECUTIVE SUMMARY

Numerous studies in states and metropolitan areas in the United States have demonstrated the existence of sources of toxic air pollutants ("air toxics") emissions. The potential health impacts of these emissions can include both cancer and non-cancer effects. To investigate the existence of potential sources of air toxics emissions in Iowa, the State of Iowa Department of Natural Resources (DNR) requested assistance for a study from the U.S. Environmental Protection Agency. On the basis of preliminary emissions estimates and other factors such as pollutant toxicity, population proximity, and release height, the study was designed to rank the sources identified in relative order of importance as the basis for recommendations for additional, focused air toxics program development activities.

Several results became apparent after a variety of information sources were reviewed, and a wide range of facilities (including landfills, wastewater treatment plants, hazardous waste treatment, storage disposal facilities, and area sources) were analyzed. First, area sources including mobile sources (motor vehicles) have a relatively important impact in Iowa. Second, there is a sizable group of facilities which could be significant air toxics sources in Iowa which are not documented in the computerized emission inventory system kept on other air pollution sources. Finally, the known air toxics point sources in Iowa prior to this study did rank as relatively important sources.

Based on these trends and the ranking of sources, five recommendations are being made. In summary, these recommendations are:

1. Expand efforts to develop a statewide VOC inventory - There appear to be a number of significant VOC (and air toxics) sources missing from the State's emission inventory; expansion of the VOC inventory would thus help to close this gap in the data base for analysis of air toxics.

2. Selectively send emission inventory questionnaires to "high risk" sources - It does not seem justified at this time to initiate a comprehensive statewide survey; however, this study has identified a number of sources (including VOC sources mentioned above) for which comprehensive air toxics emissions data would be useful.

3. Perform a more in-depth assessment of selected non-traditional sources - Although non-traditional sources of air toxics (including landfills and publicly owned treatment works) were not the highest ranked sources in this study, the data utilized was rather

limited; therefore looking at selected non-traditional sources to ascertain their potential impacts is needed for a more in-depth analysis.

4. Develop pilot risk assessment program - A pilot risk assessment program is strongly recommended; it would not only provide a means for evaluating the potentially "high risk" sources mentioned above, it would also provide a starting point for possibly including a form of risk assessment in permit reviews in the future.

5. Review selected source categories - Additional source categories known to be in Iowa and which need investigation include sterilizing operations (such as those in hospitals), grain fumigation, and chrome plating.

CHAPTER 1

INTRODUCTION

There has been a recognition for some time that specific air pollutants can have detrimental impacts on human health. While National Ambient Air Quality Standards (NAAQS) have been set by the U.S. Environmental Protection Agency (USEPA) for "criteria" pollutants (i.e., those for which health-based criteria have been formally defined), "non-criteria" pollutants, or "air toxics", can also have harmful effects. Depending on the pollutant, these effects may or may not be well documented. Since the passage of the Clean Air Act Amendments of 1970, the main mechanism for controlling such hazardous air pollutants has been Section 112 through National Emission Standards for Hazardous Air Pollutants (NESHAPs). After a pollutant is officially "listed" by USEPA, regulations for specific source categories are to be adopted. As of 1986, source category regulations had been adopted for radionuclides, beryllium, mercury, vinyl chloride, benzene, asbestos, and arsenic. Coke oven emissions have also been listed as a NESHAPs pollutant.

Because NESHAPs only cover a very limited number of facilities and pollutants, many state and local agencies have committed themselves to reviewing and analyzing the health impacts of additional air toxics within their jurisdictions. In a simplified form, these health impacts from air toxics can be classified into three groups:

- Cancer - Cancer effects of specific air toxics are generally understood to be dependent on both the degree of exposure to a carcinogen and that carcinogen's potency. While many models have been proposed to describe the process of carcinogenesis, analysis of cancer effects have in general included the assumption that there is no safe "threshold" exposure or concentration of a carcinogen.

- Long-term non-cancer effects - Some pollutants may cause a specific effect other than cancer, such as toxicological impairment of certain organs of the human body or detrimental reproductive effects. Frequently, threshold exposures or concentrations may be determined for such effects.

- Acute toxic effects - Large instantaneous pollutant releases in occupational environments are usually associated with accidents. Acute toxic effects are the result of short term elevated concentrations of specific pollutants. The 1984 catastrophe at the Union Carbide plant in Bhopal, India, is the most well-known example of acute toxic effects of hazardous air pollutants.

Putting together an air toxics program requires conscious planning towards minimization of these detrimental health effects, and such planning of necessity entails a review of the sources which could have an impact on a specific population. In an era of very limited resources for many State and local air pollution control agencies, identification of the facilities most likely to cause such health effects first not only aids in the effort to protect public health, but also provides the opportunity for agencies to focus and prioritize available staff activities. Creating an emissions inventory is frequently a good first step towards determining the extent and nature of the air toxics problem in any State or local area, but like any other part of an air toxics program, emissions inventory development must be carefully planned to avoid wasted effort and funds.

It was in this context that the Iowa Department of Natural Resources (DNR) decided to perform an initial air toxics emission inventory. To aid them in this effort, Iowa DNR asked USEPA Region VII for assistance in developing an inventory which utilized multiple information sources to identify both traditional and non-traditional sources of air toxics. Accordingly, in June of 1985, Engineering-Science (ES) was issued a work assignment (No. 33 of Contract No. 68-02-3888) which directed ES to develop a screening and prioritization plan based on the following data bases and documents:

- Iowa DNR's Emission Inventory System/Point Source (EIS/PS) computerized emission inventory data base
- Pre-treatment agreements between major industrial users and Publicly Owned Treatment Works (POTWs)
- Iowa DNR's landfill files
- RCRA generator files (through July 1985)
- The SRI International 1985 Chemical Producers Directory
- The Directory of Iowa Manufacturers (1985)
- Background files from Iowa DNR on Section 111(d) and NESHAPs sources
- Hazardous waste treatment, storage, and disposal (TSDF) summaries from Iowa DNR

Certain area sources and mobile sources were also reviewed.

This final report documents the results of the project and provides recommendations for further emission inventory related activities to aid in the development of an air toxics program. The report includes a description of the procedures used (Chapter 2), a characterization of the data bases reviewed (Chapter 3), an explanation of the results (Chapter 4), and a section on conclusions and recommendations (Chapter 5). A description of key facilities and suggested questionnaires for an air toxics emission inventory survey are provided as appendices.

CHAPTER 2

PROCEDURES

Emission inventories have traditionally been an integral part of air pollution control planning programs. Comprehensive inventories have been instrumental in identifying and quantifying numerous emission sources which can have an impact on the attainment and maintenance of the National Ambient Air Quality Standards (NAAQS). As concerns about air toxics have increased, air toxics emission inventories have frequently been used as a starting point for the development of air toxics programs. Clearly though, the approach taken to developing an air toxics inventory must be substantially different than the approach used for a criteria pollutant inventory. First, there are many more pollutants which must be considered, and in most cases there are fewer sources of any specific pollutant. In addition, the toxicity may be greater than with criteria pollutants; as a result, relatively "small" sources can under certain circumstances be relatively important from a health perspective. Finally, sources of air toxics may include facility types which typically have not been included in air pollutant inventories in the past.

Because of these differences in the types and characteristics of sources of air toxics and criteria pollutants, procedures for creating an air toxics inventory must be carefully planned. Experience in previous emission inventories for air toxics has provided indications that a variety of information sources can aid in the identification of potential air toxics sources. For example, if generator information is available as a result of reporting requirements from RCRA, specific wastes may provide evidence of a particular process which is known to be an air toxics source. Therefore, it was determined in performing the first comprehensive air toxics inventory in the State of Iowa that a thorough screening and prioritization of sources should be completed before any emission inventory survey forms would be sent to individual industrial facilities. Figure 2-1 illustrates the general approach taken.

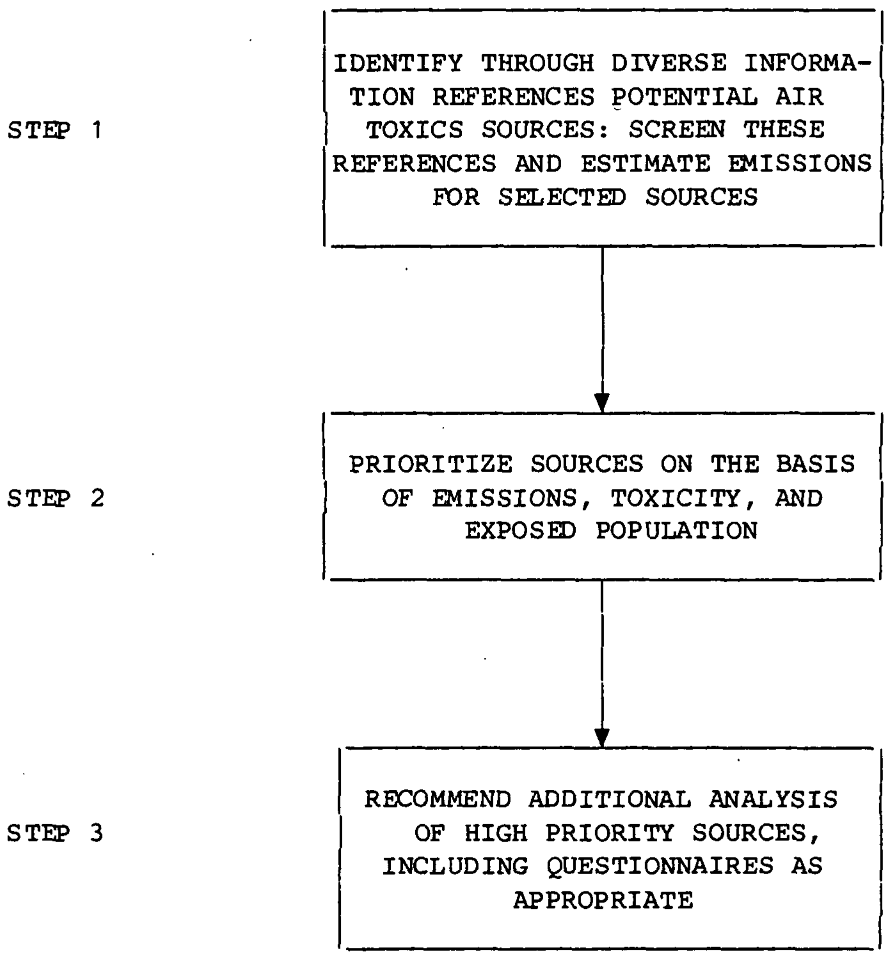
GENERAL APPROACH

In order to take the widest possible view of potential (air toxics) sources in Iowa, it was important to meet three goals:

- o Identify air toxics emissions from sources that are documented as criteria pollutant sources;

FIGURE 2-1

SCREENING AND PRIORITIZATION OF POTENTIAL IOWA AIR TOXICS SOURCES



- o Determine potential air toxics emissions from sources for which indirect information is available (such as publicly owned treatment works); and

- o Develop a methodology for identifying facilities that are not specifically documented in any data base.

It was recognized that identifying potential sources in this way does not necessarily identify <u>significant</u> sources; rather it identifies "sources" that can then be prioritized according to their potential significance.

Significance for this study was defined as potential carcinogenicity or other potential health effects. As discussed above, impact on an affected population depends on emissions, toxicity of the pollutant, and the characteristics of the pollutant's release. Accordingly, the procedures below describe how information sources were screened, how emissions were calculated for facilities in each of the three groups described above, and how emissions (and therefore facilities) were prioritized. The prioritization performed then was the basis for the recommendations included in Chapter 5.

INFORMATION SOURCES REVIEWED

There were eight main information sources that were reviewed for this study in order to identify potential sources:

1. <u>Iowa's EIS/PS</u> - EIS/PS (Emission Inventory System/Point Source) contains the State of Iowa's computerized data base of emission-related data. Iowa DNR developed a statewide emission inventory with questionnaires during 1983-1984, and sources have been updated on a case-by-case basis since then. Emissions of air toxics may result either from particulate sources or from VOC sources.

2. <u>Pre-treatment agreements between major industrial users and Publicly Owned Treatment Works (POTWs)</u> - In eighteen of the largest metropolitan areas within Iowa, industrial contributors to POTWs sign agreements to limit certain "priority pollutants" going to POTWs. Pre-treatment agreements based on these limitations are then developed between the municipal operators and Iowa DNR. Waste streams entering POTWs may contain VOCs, and VOCs may volatilize or be stripped from these waste streams. Therefore, VOCs entering a POTW may result in air toxic emissions.

3. <u>Iowa DNR landfill files</u> - Landfills may produce air toxics emissions in two ways. First, municipal refuse may include a small proportion of waste solvents which volatilize within a landfill, either with or without soil cover. Second, prior to the passage of laws regulating the generation and disposal of hazardous waste, hazardous waste was occasionally deposited into municipal landfills. Emission rates are maximized when gas is generated within a landfill.

4. RCRA generator files - Until July 1985, Iowa DNR was responsible for the regulation of the generation and disposal of hazardous wastes under the Resource Conservation and Recovery Act (RCRA). As a result, DNR files document inspection of facilities, and a computerized data base of the types of wastes generated at particular facilities until that time. Waste codes can indicate the possible existence of particular types of emission sources.

5. The SRI International 1985 Chemical Producers Directory - Because individual chemical manufacturing plants can be important air toxics sources, the SRI International 1985 Chemical Producers Directory was checked to ensure that potential sources were fully identified.

6. The Directory of Iowa Manufacturers - Industrial directories commonly list individual industrial facilities by county, and by other classifications. The key classification for screening purposes is the type of manufacturing at a facility. Specific products can determine the types of processes necessary, the types of sources present, and the type of pollutants emitted.

7. Iowa DNR files on 111(d) and NESHAPs sources - Sulfuric acid mist and fluorides must be regulated from specific sources under Section 111(d) (e.g., phosphate fertilizer plants and sulfuric acid plants). Iowa DNR has contacted these plants in the past.

8. Iowa DNR hazardous waste treatment, storage and disposal facility (TSDF) files - When hazardous waste is treated or handled, air toxic emissions can result, particularly VOC. Under RCRA, TSDFs are regulated, and the amount of hazardous waste activity at a TSDF can determine its emissions.

These eight references were chosen because they cover a broad range of potential information for criteria pollutant-emitting facilities, non-traditional sources, and other sources which have not previously been documented for any reason. Table 2.1 shows the sorts of information available from the eight references reviewed. It was recognized that the information available from these references would (and should) overlap to a certain extent. The next section describes how the information from these references was screened and how emissions were calculated on the basis of the information and data available.

In addition to the basic references reviewed above, other information related to dry cleaners, service stations, and major arterial roadways was gathered for the purpose of calculating emissions from "typical" area source facilities. A number of different governmental and non-governmental organizations were contacted, including:

- Iowa Department of Job Services
- Iowa Department of Motor Vehicles
- Iowa Department of Revenue
- Iowa Department of Transportation

TABLE 2.1

TARGETED INFORMATION FROM KEY REFERENCES

	Additional Information About Known Facilities	Non-Traditional Sources	Previously Undocumented Industry Facilities
EIS/PS	X		
POTW Treatment Agreements	X	X	
Landfill Files		X	
RCRA Generator Files	X		
SRI International 1985 Chemical Producers Directory	X		X
Directory of Iowa Manufacturers			X
111(d) and NESHAPs Sources	X		
Hazardous Waste TSDF Files		X	

- o Iowa Department of Weights and Measures
- o Iowa Gasoline Dealers Association
- o U.S. Bureau of the Census
- o U.S. Bureau of Labor Statistics

Generally, the approach utilized was to obtain data which was consistent with available emission factors so that emissions could be calculated. For the purpose of obtaining emissions, a representative dry cleaner, gasoline station, and major arterial were to be defined on the basis of information gathered.

It must be emphasized that all screening and emission calculations were based on existing information. 1985 information was used whenever possible, but when 1985 information was not available, other data (generally 1982, 1983, or 1984 data) was utilized. As a result, emissions may not be strictly representative of recent conditions at individual facilities. However, such inconsistencies were accepted as a part of the design of the analysis. The emphasis of the analysis was to maximize the potential sources considered, and not to spend substantial time on emission estimates at any one facility.

SCREENING OF REFERENCES AND CALCULATION OF EMISSIONS

At the beginning of this study, it was recognized that there is a diverse range of operations which may in fact be air toxics sources. (As discussed above, the fact that an operation is a source of air toxics may not mean that it is significant in comparison to other air toxics sources.) Among the sources which were considered in this assessment include those listed in Table 2.2. The purpose of reviewing a variety of references was to identify potentially significant air toxics emitting facilities with one or more of these sources.

Identifying Facility Operations

This study was focused specifically on screening of information, and as such was not oriented towards in-depth analysis of any one facility. Elimination of a facility at one step in the analysis does not necessarily mean that that facility might not be identified in another part of the analysis. As such, the study as a whole may in fact leave out some facilities that deserve further analysis. Nevertheless, with many potential opportunities for facility identification and emission calculation, the probability of omitting signficant facilities is minimized.

In each case, there was an attempt made to identify operations at a particular facility. Emission sources at a facility may include:

- o Process sources
- o Fugitive sources
- o Storage tanks
- o Material handling losses
- o Solvent evaporation
- o Combustion sources
- o Area sources (e.g. surface impoundments)

TABLE 2.2

POTENTIAL AIR TOXICS SOURCES

- o Documented criteria pollutant sources at industrial facilities
  - -- Process sources
  - -- Storage tanks and materials handling
  - -- Surface coating
  - -- Degreasing
- o Other industrial sources
  - -- Fugitive emissions
  - -- Wastewater treatment
- o Non-industrial facility sources
  - -- Landfills
  - -- POTWs
- o Area sources
  - -- Gasoline marketing
  - -- Mobile sources
  - -- Dry cleaning

Different references may include information on different sources. For instance, surface impoundments may not be included in EIS/PS, but they will be included in files on hazardous waste treatment, storage, and disposal facilities. Included here in Appendix B are summaries of what was found at a group of major facilities in Iowa. This information was screened and used in the following way.

EIS/PS

Iowa's EIS/PS was perhaps the single most important reference used. Based on the VOC Species Manual (USEPA/OAQPS, 1980) and other sources, a list of priority Standard Industrial Classification (SIC) codes (Office of Management and Budget, 1972) and Source Classification Codes (SCCs) (USEPA/OAQPS, 1985c) were developed. These SICs and SCCs are presented in Tables 2.3 and 2.4. A series of retrieval runs was then performed on Iowa's computerized master file, resulting in a set of emission points.

Emissions were then calculated in several ways. For VOC sources, the VOC Species Manual was used to calculate specific air toxic emissions for SCCs which were documented. Other VOC emission points were reviewed for other identifying data or information which could be used to characterize the operation. For example, degreasers often are coded with SCCs which specifically designate the degreasing solvent used. In addition, during the 1983 statewide emission inventory survey, industrial facilities were asked if they handled or emitted any of a list of more than forty substances. Similarly, for sources in Linn County, ES used summaries of field investigations to determine how VOC emissions should be speciated (USEPA Region VII, 1979). For fuel combustion sources, particulates were broken down into trace elements which are found in fuel oil and coal (USEPA/OAQPS, 1982).

In summary, emissions were calculated using available reference material whenever possible. Specific references were used on a case-by-case basis (USEPA/OAQPS, 1983a, and USEPA/OAQPS, 1984) to obtain emission factors whenever possible. Emphasis was placed on calculation of emissions for the maximum number of sources.

Publicly Owned Treatment Plants Pre-treatment Agreements

For the purposes of this study, none of the POTWs were screened out initially, as there were only nineteen to review. The pretreatment agreements focused most on heavy metals (which are also priority pollutants). It was recognized at the beginning that estimating emissions from individual POTWs based on plant-by-plant data was going to be difficult, because of the probable lack of plant-specific VOC data.

As a result, while the POTWs were individually reviewed for such characteristics as specific processes (aeration activity, especially), they were also analyzed as a whole to determine what typical values could quantitatively define POTWs in Iowa. Table 2.5 lists the POTWs reviewed. Similarly, the pretreatment agreements were reviewed for any indications of specific industrial wastewater treatment that could be the source of air toxics.

TABLE 2.3

PRIORITY STANDARD INDUSTRIAL CLASSIFICATION CODES (SICs)

SIC Code
2221 - Broad woven fabric mills, manmade fibers, and silk
2295 - Coated fabrics not rubberized
2451 - Mobile homes
2491 - Wood preserving
2752 - Commercial printing, lithographic
2821 - Plastic materials, synthetic resins, and nonvulcanizable elastomers
2822 - Synthetic rubber (vulvanizable elastomers)
2823 - Cellulosic man-made fibers
2824 - Synthetic organic fibers, except cellulosic
2834 - Pharmaceutical preparations
2842 - Specialty cleaning, polishing, and sanitation preparations
2844 - Perfumes, cosmetics, and other toilet preparations
2851 - Paints, varnishes, lacquers, enamels, and allied products
2865 - Cyclic (coal tar) crudes, and cyclic intermediates, dyes, and organic pigments
2869 - Industrial organic chemicals, not classified elsewhere
2873 - Nitrogeneous fertilizers
2874 - Phosphatic fertilizers
2879 - Pesticides and agricultural chemicals, not classified elsewhere
2891 - Adhesives and sealers
2892 - Explosives
2892 - Printing ink
2911 - Petroleum refining
2951 - Paving mixtures and blocks
2952 - Asphalt felts and coatings
2999 - Petroleum and coal products
3079 - Miscellaneous plastics
3241 - Cement
3312 - Blast furnaces, steel works, and rolling and finishing mills
3321 - Gray iron foundries
3331 - Primary smelting and refining of copper
3332 - Primary smelting and refining of lead
3333 - Primary smelting and refining of zinc
3334 - Primary smelting and refining of aluminum
3339 - Primary smelting and refining of non-ferrous metals (other than copper, lead, zinc, and aluminum)
3341 - Secondary smelting and refining of non-ferrous metals
3441 - Fabricated structural metal products
3499 - Miscellaneous fabricated metal products
3523 - Farm machinery and equipment
3531 - Construction and related equipment
3679 - Electronic components
3691 - Storage batteries
3732 - Ship and boat building and repairing

TABLE 2.3--Continued

SIC Code
3799 - Transportation equipment
4911 - Electric power generation
5171 - Petroleum bulk stations and terminals
5198 - Paints, varnishes, and supplies
7216 - Dry cleaning plants
7535 - Automobile paint shops

TABLE 2.4

PRIORITY SOURCE CLASSIFICATION CODES (SCCs)

Source Classification Code	
FUEL COMBUSTION (OTHER THAN ELECTRIC UTILITIES)	
1-02-001-**	Boilers - anthracite coal
1-02-002-** 1-03-002-**	Boilers - bituminous and sub-bituminous coal
1-02-003-** 1-03-003-**	Boilers - lignite
1-02-004-** 1-03-004-**	Boilers - residual oil
1-02-005-** 1-03-005-**	Boilers - distillate oil
1-02-006-** 1-03-006-**	Boilers - natural gas
1-02-012-01 1-03-012-01	Boilers - solid waste
1-02-013-01 1-03-013-01	Boilers - liquid waste
1-05-002-05	Space heaters - distillate oil
1-05-002-06	Space heaters - natural gas
INTERNAL COMBUSTION	
2-01-001-** 2-02-001-**	Distillate
2-01-002-** 2-02-002-**	Natural gas
2-02-003-01	Gasoline
CHEMICAL MANUFACTURING	
3-01-***-**	All
FOOD/AGRICULTURE	
3-02-016-99	Sugar beet miscellaneous
3-02-019-99	Vegetable oil refining

TABLE 2.4--Continued

Source Classification Code	
PRIMARY METALS	
3-03-001-**	Aluminum production
3-03-003-**	By-product coke
ASPHALT ROOFING	
3-05-001-01	Blowing operations
3-05-002-01	Rotary dryer (conventional plant)
MINERAL PRODUCTS	
3-05-012-**	Wool-type fiberglass
3-05-014-06	Glass forming and finishing
PETROLEUM REFINERIES	
3-06-***-**	All
FABRICATED METALS	
3-09-011-99	Solvent cleaning
DRY CLEANING	
4-01-001-03	Perchloroethylene
4-01-001-05	Trichlorotrifluoroethane
DEGREASING	
4-01-002- Open top	-02 Methyl chloroform
	-03 Perchloroethylene
	-04 Methylene chloride
	-05 Trichloroethylene
	-07 Trichlorotrifluoroethane
4-02-002- Conveyorized Vapor D/G	-22 Methyl chloroform
	-23 Perchloroethylene
	-24 Methylene chloride
	-25 Trichloroethylene

TABLE 2.4--Continued

Source Classification Code	
DEGREASING-CONTINUED	
4-01-003- Cold Solvent Cleaning/ Stripping	-02 Methylene chloride -04 Perchloroethylene -05 Methyl chloroform -06 Trichloroethylene
TEXTILE MILL PRODUCTS	
4-01-004-01	Knit fabric scouring with chlorinated solvent (perchloroethylene)
4-01-004-99	Knit fabric scouring (other solvents)
SURFACE COATING OPERATIONS	
4-02-***-**	All
PETROLEUM STORAGE - FIXED ROOF	
4-03-001-**	Gasoline storage
4-03-001-**	Other toxic vol storage
PETROLEUM STORAGE - FLOATING ROOF	
4-03-011-**	Gasoline storage
4-03-011-**	Other toxic volatile organic compounds
PRINTING - PUBLISHING	
4-05-***-**	All types
PETROLEUM MARKETING	
4-06-001-01	Gasoline loading (splash)
PETROLEUM MARKETING-CONTINUED	
4-06-001-26	Gasoline loading (submerged)
SOLVENT EXTRACTION	
4-90-001-99	All solvent types

TABLE 2.4--Continued

Source Classification Code	
SOLVENT RECOVERY	
4-90-002-**	All sources
SOLID WASTE DISPOSAL	
5-01-001-01	Municipal incinerators
5-01-005-06	Sludge incinerator
5-02-001-01	General incinerators

TABLE 2.5

PUBLICLY OWNED TREATMENT PLANTS REVIEWED IN THIS STUDY

Ames
Burlington
Cedar Falls
Cedar Rapids
Clinton
Council Bluffs
Davenport
Des Moines
Dubuque
Fort Dodge
Fort Madison
Iowa City
Keokuk
Marshalltown
Mason City
Muscatine
Ottumwa
Sioux City
Waterloo

Calculating emissions from POTWs can be a complicated undertaking, and attempting an in-depth data search was beyond the scope of this study. As a result, a simplified approach was taken to assess emissions from the nineteen POTWs. Figure 2-2 presents a basic approach for tracing potential POTW emissions associated with influent, effluent, and residual sludge. If a mass balance is performed on an individual material, the emissions of that material may be expressed simply as:

$$E_A = C_A V - C_A' V'$$

where: E_A = Emission rate of material A
C_A and C_A' = Incoming and exiting concentrations of the material in the process streams
V_A and V_A' = Incoming and exiting volumentric flow rate of material A in the process streams

In the simplest of cases, if all of the material is lost in the process, the equation then reduces to:

$$E_A = C_A V$$

Emissions were calculated in this way if no other data were available.

Landfill Files

Emissions from landfills may result from two main routes: diffusion and convection. Diffusion is minimized with soil cover, while convection is maximized when landfills are the site of codisposal, i.e., a landfill where hazardous waste and municipal waste are disposed of at the same site. Codisposal maximizes emissions because hazardous wastes frequently contain organics which volatilize, while methane and other gases are generated as municipal waste ages. This phenomenon provides a mechanism for volatilized organics to be transferred to the surface. Therefore, Iowa's landfill files were reviewed for a number of different parameters, including surface area, volumetric deposition rate, and indications of disposal of hazardous waste. Generally, it was expected that codisposal has been greatly reduced if not eliminated as a standard practice.

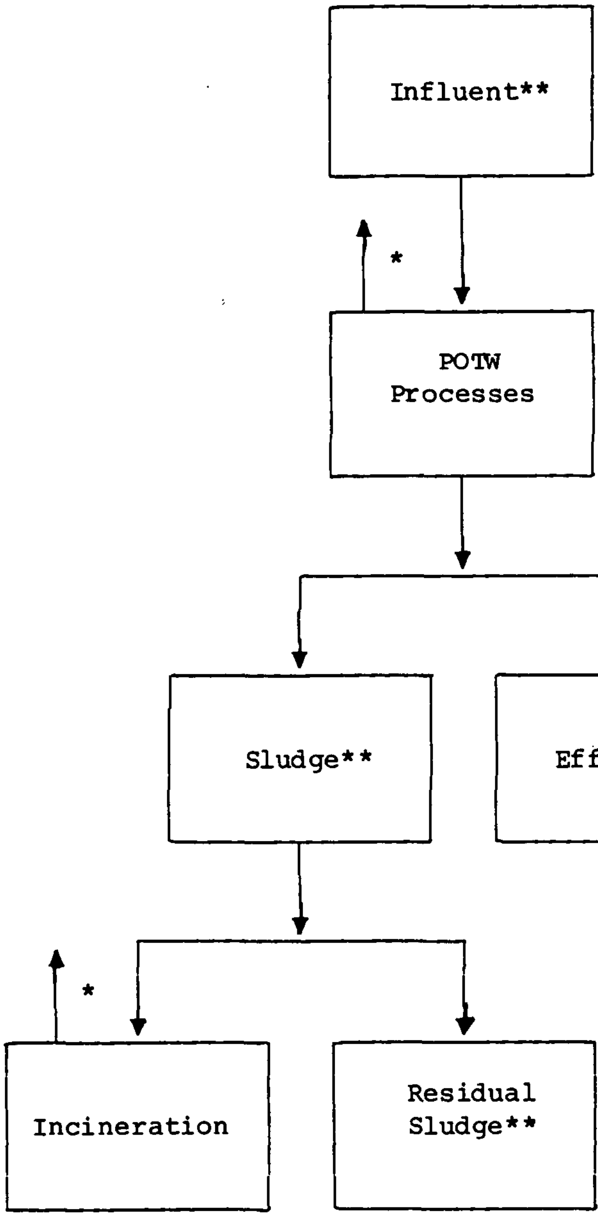
Counties for which landfills were reviewed are listed in Table 2.6. These counties are generally those which include the greatest concentrations of population in Iowa. Special waste authorizations for these landfills were studied to determine if any specific volatile organic wastes had been deposited.

In many cases, it was expected that insufficient data would be available to utilize emission estimation equations for landfills (see for example, USEPA/OAQPS, 1984). In this case, a default value of 0.13% (American City and County, 1983) of refuse was assumed to be hazardous waste, broken down into 60% perchloroethylene, 20% toluene, and 20% xylenes. Emission rates were then calculated using the following emission rate equation:

$$E_i = 6D_i\ C_{si}\ A\ P_T^{\ 4/3}\ (1/L)(W_i/W)$$

FIGURE 2.2

TRACING POTENTIAL EMISSIONS IN A POTW



* Potential emissions
** Material contains toxic organics and metals

TABLE 2.6

COUNTIES REVIEWED FOR LANDFILL EMISSIONS

Black Hawk
Des Moines (Burlington)
Cerro Gordo
Clinton
Dubuque
Henry
Johnson
Keokuk
Linn
Mahaska
Marion
Marshall
Montgomery
Muscatine
Polk
Pottawattamie
Scott
Story
Union
Wapello
Webster
Woodbury

where: E_i = Emission rate of component i (g/scc)
D_i = Diffusion coefficient of component i in air (cm^2/sec)
C_{si} = Concentration of component i in air (g/cm^3)
A = Area of landfill cover (cm^2)
P_T = Total soil porosity (dimensionless)
L = Soil depth (cm)
W_i/W = Weight fraction of component i in bulk waste (g/g) (this should properly be the mole fraction of component i)

Default values based on a selection of published data was used when data was not available (e.g., for diffusion coefficients).

RCRA Generator Data

RCRA generator data was broken down into several parts. Each part was reviewed for potential information which could characterize operations and processes at individual facilities. The information that was considered for this review were specific process descriptions, many of which it was hoped would be included on fiche (from Iowa DNR) for specific facilities. Because of the voluminous nature of the fiche files for Iowa, and because it was known that substantial amounts of marginally relevant material for emissions calculations was included within the fiche files, this information was primarily used as a back-up reference. (The fiche was not reviewed as a primary source for data for emission estimates.) Generator summaries were reviewed for unusual waste codes which would indicate specific processes at specific facilities.

SRI International 1985 Chemical Manufacturers Directory

The SRI International 1985 Chemical Manufacturers Directory was used in several ways. First, the facilities that were identified for Iowa counties were reviewed to eliminate producers of simple industrial gases (such as acetylene) and distributors of certain chemically-based products. Sources were cross-referenced against the Directory of Iowa Manufacturers (Manufacturers News, 1986) to determine the primary SIC for that facility, and to determine if any potential chemical manufacturers (which are likely sources of air toxics) had been omitted from other data bases.

Directory of Iowa Manufacturers

The Directory of Iowa Manufacturers was used as a check on the adequacy of other data bases reviewed. The same set of priority SIC codes used to review EIS/PS (Table 2.3) was used to screen the Manufacturers Directory. Newly identified facilities that could not be eliminated for any reason were then assigned emissions values based on an emissions/employment ratio, developed from facilities in identical SICs that were documented in EIS/PS. The formula used to assign emissions values is:

$$Q_{ij} = \overline{Q}_i \left(\frac{E_j}{\overline{E}} \right)$$

where: Q_{ij} = Emission rate for pollutant i and facility j;
$\overline{Q_i}$ = Average emission of pollutant i for the SIC grouping of facility j in Iowa's EIS/PS;
E_j = Employment at facility;
$\overline{E}$ = Average employment for facilities in the SIC grouping of facility j in Iowa's EIS/PS.

Iowa's 111(d) and NESHAPs Files

Emissions estimates were taken directly from Iowa's files for the facilities which had already been identified. To ensure that no facilities had been omitted, the Directory of Iowa Manufacturers was reviewed for NESHAPs and 111(d) source categories.

Hazardous Waste Treatment Storage and Disposal Facility (TSDF) Files

These files were reviewed thoroughly for waste and handling codes. Depending on the type and volatility of the waste, and mechanisms available for estimating emissions, the emission factors presented in Table 2.7 were utilized.

Mobile and Other Area Sources

Area source data was not screened as such. Rather it was gathered from a variety of organizations as discussed above so that emissions could be calculated from representative "unit" sources. The procedures used are described below.

Dry Cleaners

Emissions from dry cleaning facilities were determined in part by a perchloroethylene use factor per dry cleaning employee (Engineering-Science, 1985) of 149 gallons/employee-year. In fact, there are other solvents besides perchloroethylene (such as Stoddard solvent) which are used in dry cleaning facilites; however, because there is a unit risk factor for perchloroethylene, to be conservative it was assumed that no other substance was emitted. Based on 1277 dry cleaning employees and 191 dry cleaning facilities in Iowa (Bureau of the Census, 1985a), it could be determined that a total of 2,563,000 pounds, per year were used. AP-42 (USEPA/OAQPS, 1985a) specifies an emission factor of 27.5 pounds per 100 pounds used, yielding a total emission statewide of 352.4 tons per year. Polk County and average facility emissions then were determined proportionally against the number of facilites statewide, i.e. 35/191 and 1/191 of the statewide total.

Service Stations

Because AP-42 emission factors for service stations are dependent on throughput, emissions statewide were determined by using the July 1984-June 1985 throughput total of 917,115,803 gallons of gasoline (Rusk, 1986). To apportion the total emissions to individual counties, registration of motor vehicles was obtained from the Iowa Department of Motor

TABLE 2.7

SUMMARY OF EMISSIONS FACTORS USED FOR HANDLERS OF HAZARDOUS WASTE

S01	Container Storage	1.04 lb/1000 kg (storage only) 1.20 lb/1000 kg (disposal site)
S02	Storage Tank	4.43 lb/1000 kg
S03	Waste Pile	0.0575 lb/1000 kg
S04	Surface Impoundment	0.374 lb/1000 kg
T01	Tank Treatment	4.43 lb/1000 kg
T02	Surface Impoundment	0.374 lb/1000 kg
T03	Incinerator	0.22 lb/1000 kg
D79	Injection Well	0
D80	Landfill (use equation)	Municipal - 0.055 lb/1000 kg Hazardous Waste - 4.11 lb/1000 kg Co-Disposal - 24.7 lb/1000 kg
D81	Land Application	None documented in Iowa
D82	Ocean Disposal	N/A
D83	Surface Impoundment	0.22 lb/1000 kg
T94	Heat Treatment	0.22 lb/1000 kg
T95	Chemical Treatment	4.43 lb/1000 kg
T96	Physical Separation"	0.0575 lb/1000 kg
T05	Other Treatment (assumed same as tank treatment)	4.43 lb/1000 kg
S05	Storage Other (assumed same as container)	1.04 lb/1000 kg
T04	Other Treatment (assumed as tank treatment)	4.43 lb/1000 kg

Vehicles (Landy, 1986), and total VOC emissions were apportioned according to the proportion of the state's motor vehicles in each county. Based on 164 service stations in Polk County, an average station's emissions were calculated, i.e. 1/164 of the Polk County total. Benzene, xylene, and toluene fractions were based on the VOC Species Manual (USEPA/OAQPS, 1980).

Mobile Sources/Arterial Highways

Calculating emissions from a "typical" arterial highway is dependent on defining a length of highway to be analyzed. To make the calculation more meaningful, a specific arterial highway in Polk County was chosen. Based on ten specific segments identified by the Iowa Department of Transportation (Pencock, 1986), a set of simplified calculations was performed to determine the maximum VOC emission for a particular segment. Using a set of simplified emission factors (LDGV-1.725 g/mi, LDGT1-2.305 g/mi, LDGT2-2.012 g/mi, and HDGV-8.774 g/mi) based on emission factors from MOBILE 3 (USEPA/OAQPS, 1985a), the segment chosen was Fleur Drive from Grande to Locust in Des Moines, with a total average daily traffic (ADT) of 54,600 vehicles per day. VOC emissions were calcuated assuming a maximum of gasoline-fueled vehicle traffic (100%) with 97% of total vehicle miles traveled being associated with light duty vehicles (Penncuck, 1986). To calculate emissions of products of incomplete combustion of products of incomplete combustion (PICs), all of the VMT associated with heavy duty vehicles was assumed to be heavy duty diesel vehicle (HDDV) VMT.

PRIORITY RANKING OF FACILITIES

Besides emission estimates, data needed for the priority ranking of sources include data that indicate the potency of health effects of specific pollutants, population data by county, and release characteristics (specifically stack heights). Because excess cancer is such an important impact, this analysis was split between carcinogens and non-carginogens. For carcinogens, potency is defined by the unit risk value* (represented by the parameter U in the expressions used to generate screening values). U values were obtained by reviewing summaries generated by the U.S. Environmental Protection Agency's Carcinogen Assessment Group (CAG). There are currently 55 substances for which unit risk values have been generated. Table 2.8 provides a list of all U values used.

For non-carcinogenic health effects, analysis of potential impacts is somewhat more difficult. Analysis of such impacts in many states has been performed using adjustments to Threshold Limit Values (TLVs) published by the American Conference of Government and Industrial Hygienists (ACGIH). There are substantial methodological problems with such an approach, particularly given ACGIH's indication that TLVs should not be used in a general

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* A unit value is defined as the probability of the occurrence of an excess cancer due to a continuous exposure for 70 years to a unit concentration (e.g., one microgram per cubic meter) of a given substance.

TABLE 2.8

SUMMARY OF "U" VALUES

POLLUTANT	U (DIMENSIONLESS)*
Acrylonitrile	72
Arsenic	4,500
Benzene	15
Benzo(a)pyrene	3,400
Beryllium	780
1,3 Butadiene	0.46
Cadmium	2,300
Carbon tetrachloride	39
Chloroform	21
Chloromethane	0.14
Chromium	12,000
Coke oven emissions	650
1,1 Dichloroethane	42
Ethylene dibromide	2,400
Ethylene dichloride	20
Ethylene oxide	1,000
Formaldehyde	6.4
F001**	9.1
F002**	4.6
Gasoline vapors	0.75
Methylene chloride	4.1
Perchloroethylene	0.58
Products of incomplete combustion	42,000
Propylene oxide	120
Styrene	0.29
1,1,2,2 Tetrachloroethane	57
1,2 Trans-dichloroethylene	300
1,1,1 Trichloroethane (methyl chloroform)	0.46
1,1,2 Trichloroethane	16
Trichloroethylene	1.3
U044**	21
U122**	6.4
U226**	0.46
Vinyl chloride	5.2
Vinylidene chloride	42

* Values have been rounded to two significant digits.

** Emissions from waste handling are assumed to be equally divided among possible constituents of that waste. See Table 2.10 for descriptions of wastes associated with each code.

way to determine acceptable ambient concentrations of particular pollutants. However, as a starting point, TLVs can be used to develop acceptable inhalation values ("A" values). Table 2.9 presents a summary of all of these "A" values generated from TLVs and used in the S3 prioritization equation (see below). Waste codes utilized in this analysis are presented in Table 2.10.

Population data was taken by county from July 1, 1984 census summaries (Bureau of the Census, 1985a). The effect of using this data versus 1980 data was that the air toxics impacts of sources in Johnson, Muscatine, and Polk Counties were magnified, because these three counties were the fastest growing in Iowa during these four years. (Many counties actually lost population during this time.)

Utilizing this data, a priority ranking scheme was developed to take into account these three parameters -- emissions, toxicity, and population -- as well as release height to account for dispersion. Table 2.11 presents the screening value equations developed for the following screening values:

S1 - Carcinogens (total)
S2 - Carcinogens (within the county of release)
S3 - Non-carcinogens

These equations were based on the following assumptions:

- toxicity is related to unit risk values and inhalation criteria developed by USEPA;
- population at risk (for S2 and S3) are within the county of release;
- dispersion increases as the square of the release height, and no effective dispersion because of stack height occurs until the stack is at least 25 feet tall.

Release height data was taken from EIS/PS for facilities documented in the system. If multiple points contributed to the total air toxics emissions from a particular facility, then an average of the release height was taken. If no release height was known for a particular facility, then it was assumed that the release height was less than 25 feet. It should be noted that this assumption probably underestimates release height for certain facilities (such as some of those found in the Directory of Iowa Manufacturers) for which little, if any, specific information was known.

TABLE 2.9

SUMMARY OF "A" VALUES

POLLUTANT	A (DIMENSIONLESS)*
Acrylonitrile	160
Arsenic	7.1
Benzene	1,100
Cadmium	1.8
Chlorobenzene	100
Chloroethane	93,000
Chloroform	1,800
Chromium	1.8
1,1 Dichloroethane	710
1,3 Dichloropropylene	18
D009**	2
D016**	880
Ethylbenzene***	16,000
Fluorides****	8.9
Formaldehyde	54
F001**	25,000
F002**	13,000
F003**	10,000
F005**	2,400
Methanol	7,100
Methyl ethyl ketone	730
Methyl isobutyl ketone	7,300
Methylene chloride	12,000
Perchloroethylene	12,000
P039**	3.6
Sulfuric acid****	22
1,1,2,2 Tetrachloroethane	250
Toluene	3,000
1,2 Trans-dichloroethylene	28,000
1,1,1 Trichloroethane (methyl chloroform)	68,000
1,1,2 Trichloroethane	1,600
Trichloroethylene	9,600
Trichlorofluoroethane	2,400
U044**	1,800
U121**	2,400
U122**	54
U154**	7,100
U220**	3,000
U226**	68,000
Xylene	16,000

* Values have been rounded to two significant digits.

** Emissions from waste handling are assumed to be equally divided among possible constituents of that waste. See Table 2.10 for descriptions of wastes associated with each code.

*** "A" value for ethylbenzene was assumed to be equal to that for xylene.

**** Based on adjusted inhalation TLV's and uncertainty factor of 10.

TABLE 2.10

SUMMARY OF WASTE CODES*

EPA Hazardous Waste Number	Contaminants/Hazardous Waste
D009	Mercury
D016	2,4 - Dichlorophenoxyacetic acid
F001	One or more of the following spent solvents used in degreasing: tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; and sludges from the recovery of these solvents in degreasing operations.
F002	One or more of the following spent halogenated solvents: tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, and trichlorofluoromethane; and the still bottoms from the recovery of these solvents.
F003	One or more of the following spent non-halogenated solvents: xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; and the still bottoms from the recovery of these solvents.
F005	One or more of the following spent non-halogenated solvents: toluene, methyl ethyl ketone, carbon disulfide, isobutanol, and pyridine; and the still bottoms from the recovery of these solvents.
P039	O-O-Diethyl S-[2-(ethylthio)ethyl] phosphorodithioate
U044	Chloroform
U121	Trichlorofluoromethane
U122	Formaldehyde
U154	Methanol
U220	Toluene
U226	1,1,1-Trichloroethane

* Codes and descriptions taken from 40 CFR Part 261.

TABLE 2.11

SCREENING VALUE EQUATIONS

S1- Carcinogens

$$S1 = QU$$

where: Q = Emission rate in pounds per year
U = Unit risk values (Table 2.8)

Note: Sum all S1 values for each facility.

S2- Carcinogens

$$S2 = \frac{QUP}{(h')^2}$$

where: Q and U are as above
P = The population in the county of release
h' = (h/25) when H (the release height) is more than 25 feet
= 1 when H is 25 feet or less

Note: Sum all S2 values for each facility.

S3- Other Effects

$$S3 = \frac{QP}{A(h")^2}$$

where: A = The "inhalation criterion" (Table 2.9)
h" = h' except associated with noncarcinogen release

Note: Sum all S3 values for each facility.

CHAPTER 3

CHARACTERIZATION OF INFORMATION SOURCES

As expected, the quantity and quality of data and other information sources varied. In order to interpret the results of this analysis properly (see Chapter 4), it is important to understand the limitations of the data that went into the analysis.

EIS/PS

As previously discussed, EIS/PS was screened for certain Standard Industrial Classification (SIC) codes and certain Source Classification Codes (SCCs). As a result, there were numerous points that were identified for air toxics review. Most of the points identified were for particulates; although particulate sources can, of course, be significant air toxics sources, many of the particulate sources within the Iowa inventory were not (e.g., grain handling operations). When the Iowa point source inventory was assembled in 1983-1984, the emphasis was on sources which had already been identified (USEPA Region VII, 1984). As a result, because relatively few VOC sources were included in the list of facilities to receive questionnaires, the final EIS/PS inventory (at that time) was heavily weighted towards particulate sources and fuel combustion sources. This concentration towards particulates was verified when questionnaire responses frequently did not identify additional, new VOC emission points which might have been anticipated at certain facilities.

An additional piece of information available as a result of questionnaire responses in 1983 was whether facilities used or emitted any of the materials on USEPA's original "list" of 37 materials for study under NESHAPs. While many facilities did not respond at all, and some facilities responded in a very limited way, a few facilities responded in great detail. This information was useful on a case-by-case basis (for example, identifying a particular solvent used in a degreaser).

PRE-TREATMENT AGREEMENTS FOR POTWS

There are 126 priority pollutants for POTWs and many, if not most, are VOCs. However, the pollutants of greatest concern for POTWs for their continued successful operation are removal of heavy metals. The Iowa pretreatment agreements (nineteen in all) generally were based on an industrial survey of the users of the treatment plant. The depth of these surveys varied greatly, particularly in terms of what pollutants were contributed by which facilities. "Pretreatment" in fact is something of a misnomer, because the

the background documents did not identify what facilities actually treated their wastewater prior to discharge to the POTW. In addition, to the extent that they identified pollutants coming from particular industrial contributors, the pollutants they identified were generally metals. (Except in specific instances, VOC is the pollutant of concern from wastewater treatment operations). As a result, pretreatment information gave virtually no indication of the potential emissions from industrial wastewater treatment. Because the typical incoming concentration of certain organic constituents was available from certain POTWs, it was possible to indirectly determine the potential air toxics emission potential of certain plants.

To determine default values for POTW parameters, all of the POTWs were reviewed. The primary pollutants of concern were:

* Benzene
* 1,1,1-trichloroethane
* 1,1-dichloroethane
* 1,1,2-trichloroethylene
* Chloroethane
* Chloroform
* 1,2-transdichloroethylene
* Ethyl benzene
* Methylene chloride
* Dichloro-bromo-methane
* Perchloroethylene
* Toluene
* Trichloroethylene
* Phenol
* 1,3-transdichloropropylene
* Acrylonitrile
* Acrolein

A range of concentrations was determined for each one of these pollutants, based on reported values at the nineteen POTWs, and an overall average was calculated. Because there was generally insufficient data to perform an in-depth analysis at each POTW, the following procedure was followed.

1. Organic content was assumed to be that reported by each POTW for each substance. If no concentration was reported, then the concentration was assumed to be the average of the range reported at Iowa POTWs.

2. 100% of the organic content was assumed to be lost as a result of process at the POTW.

LANDFILL FILES

Since the early 1970's, landfills in Iowa have been regulated by DNR and its predecessor agencies. Waste authorizations have been historically required for "special" wastes, including certain hazardous wastes. However, the extent to which volatile hazardous wastes were deposited prior to 1970, or improperly deposited during the 1970's and 1980's is unknown.

Given the soil cover of the last fifteen years and the degree of documentation in the files showing the regulatory control which DNR has exercised over hazardous waste disposal, it is reasonable to expect that the chance is minimal that there are significant undocumented volatile hazardous wastes over the last fifteen years in Iowa landfills. As a result, the only landfill which should be expected to have potentially significant air toxics emissions from undocumented waste would be Black Hawk County landfill (the only one in Iowa recently accepting hazardous waste). As described in Chapter 2, the air toxics potential of other landfills can be estimated through analysis of other key parameters, such as throughput rate.

RCRA GENERATOR FILES

Information on hazardous waste generators came from three separate documents:

* the biannual Iowa hazardous waste generation report;
* the computerized listing of waste generation by facility; and
* the actual files from Iowa DNR on generator compliance with RCRA.

As discussed in Chapter 2, hazardous waste generation data is only useful to confirm other information about the processes at a plant. Theoretically, specific wastes can indicate specific processes at a plant; however, within Iowa no processes were identified in this way because hazardous waste generation summaries did not include references to process-specific wastes. While the bulk of the RCRA files were comprised of inspection reports and were not focused on particular processes; on a case-by-case basis, they were used to resolve discrepancies about operation at particular facilities.

As stated above, generator summaries offered very few clues as to the specific processes at individual plants. One general observation that can be made is that there were a substantial number of facilities which (at least as of 1984-1985) were generating halogenated solvents waste. Such wastes are frequently a result of degreasing, which frequently does not show up in EIS/PS. Degreasing solvents often include such substances as trichloroethylene, perchloroethylene, and methyl chloroform (1,1,1-trichloroethane), three solvents that are frequently reviewed as potential air toxics. This situation suggests that there could be substantially more emission sources of these substances than the current Iowa VOC inventory would suggest.

SRI INTERNATIONAL 1985 CHEMICAL PRODUCERS DIRECTORY

The SRI International 1985 Chemical Producers Directory lists between 50 and 100 entries for the State of Iowa. Some entries, like Monsanto in Muscatine, list specific products (such as ABS resins) that determine what raw materials and therefore what emissions could be expected at a particular facility.* Others, such as facilities which produce certain inorganic industrial gases could be eliminated from further consideration, because their processes generally do not involve air toxics. Other possible facilities were cross-referenced with the Directory of Iowa Manufacturers (see below). The result of this review was that several facilities, such as Salsbury Laboratories in Charles City, could not be eliminated from further consideration as an air toxics source.

DIRECTORY OF IOWA MANUFACTURERS

Review of the Directory revealed over 100 facilities within priority SIC codes not included within EIS/PS. By itself, this result does not indicate that there are numerous significant air toxic sources in the State. Rather, it indicates that there is a substantial area which needs to be investigated further, not only for air toxics, but also for VOCs.** The original plan was to identify these potential facilities and develop "surrogate" emission estimates based on employment and emission estimates that had been made for EIS/PS facilities in identical SIC codes. What had not been expected was the number of the facilities which would be identified in this way. Machinery manufacturing (3523) and miscellaneous plastic products (3079) were among the SICs most heavily represented. In addition, many of the facilities were classified in SIC codes for which no facilities were identified in EIS/PS; as a result, calculation of "surrogate" emission estimates was not possible for these facilities (e.g. 2834 -pharmaceutical manufacturing). Nevertheless, there is a substantial group of facilities that potentially could be as significant (in the sense of health impacts) as facilities which have been previously documented as criteria pollutant sources.

HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES FILES

TSDF information for Iowa facilities generally reflects on-site treatment and storage; disposal usually occurs off-site. (The one apparently significant disposal facility in Iowa for hazardous waste is the Black Hawk County Landfill). Most of the entries in the Iowa summaries are for storage, and because storage time is limited on-site, air toxics emissions are minimized on-site.

Based on the emission factors used, air toxics emissions as a result of the handling and processing of hazardous waste (see Chapter 2) for facilities in Iowa was very small. The reason is that many of the facilities have low throughputs in hazardous waste processes and the emission factors themselves are generally not large. The resulting air toxics emissions estimates were nevertheless included in total emission estimates for individual facilities.

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* The recent inspection report for the Monsanto facility, however, was used to define emissions for this study (USEPA/OAQPS, 1985b).

** Iowa DNR has already started this analysis; see February 1986 memorandum regarding VOC sources in Iowa from John Vedder to George Welch.

IOWA DNR FILES ON 111(d) AND NESHAPS SOURCES

Iowa DNR has previously surveyed specific known 111(d) facilities and has fairly detailed emission estimates for these facilities. No specific NESHAPs sources had been identified prior to this analysis, so the Directory of Iowa Manufacturers was reviewed to determine if any potential NESHAPs (and 111(d)) sources had been missed. On the basis of this review, Climax Molybdenum (Ft. Madison) could be further analyzed for possible applicability of 111(d).

MOBILE SOURCES AND OTHER AREA SOURCES

Several simplifying assumptions were made in the analysis of mobile and other area sources. For dry cleaners, the total emissions in the State of Iowa were calculated using the assumption that 100% of the solvents used was perchloroethylene, and that average per employee solvent use derived from Idaho data (149 gallons of solvent per dry cleaning employee) was appropriate for Iowa. In fact, perchloroethylene on average accounts for less than half the solvent used in dry cleaning. Therefore, though the single dry cleaning plant emission estimate may be representative for a perchloroethylene dry cleaning plant, the Polk County emission estimate probably overstates the county's actual perchloroethylene emissions. Also though there is no reason to believe that Idaho dry cleaning plants are significantly better than Iowa's, Iowa-specific data would of course be preferable.

With respect to service stations, it would be useful to know the actual gasoline pumped county-by-county. When a variety of Iowa governmental and non-governmental bodies were contacted, this information was not available. Given the screening nature of this analysis, the indirect method of apportioning statewide gasoline totals by county vehicle registration totals should give an acceptable approximation for purposes of estimating emissions, but county-specific gasoline data would be preferable.

Finally, the estimates here for mobile sources include many simplifying assumptions. Based on the relative importance of air toxics emissions from mobile sources (see Chapter 4), a more in-depth analysis of mobile source emissions (utilizing the most up-to-date emission factors and correction factors) would probably be justified.

HEALTH DATA ("U" AND "A" VALUES)

Generally, either unit risk values ("U" values) or acceptable inhalation values ("A" values) were available for every pollutant for which emissions were estimated. For some pollutants both "U" and "A" values were available (i.e., both the carcinogenic and non-carcinogenic effects of a particular pollutant could be assessed). However, it must be stressed that unit risk values are only currently available for about 55 pollutants. The carcinogenic potential of certain pollutants cannot be assessed at this time without a unit risk value (or the equivalent). As a result, summaries of S1 and S2 values in Appendix C must omit facilities which emit only pollutants which are nominal non-carcinogens. As more unit risk value data becomes available, the analysis presented here could be expanded.

CHAPTER 4

RESULTS

As described in Chapter 2, the results of S1, S2, and S3 (or screening parameters 1, 2, and 3, respectively) were designed to give a rough measure of the following descriptions of "significance":

- S1 - "total" carcinogenic potential, regardless of whether impacts occur within or outside the county where the pollutants are emitted (Table C.1);
- S2 - "local" carcinogenic potential, within the county where the pollutants are emitted (Table C.2); and
- S3 - potential for noncarcinogenic effects (Table C.3)

All tables are presented in Appendix C. In discussing and analyzing the results of this analysis, several points need to be made. First, this analysis is based on screening. As such, it is possible that some potentially significant sources were inadvertantly eliminated early from consideration. (Given the overlapping nature of the data bases, this possibility should be minimized.) Second, screening values will be dependent on the amount of information available on a particular source. This situation is true for emission estimates; if a facility has been thoroughly studied, all potential emissions may have been identified, thereby maximizing the chances for high screening values. Finally, the actual numerical scores associated with individual facilities should not be analyzed in too much detail, because in many cases the input assumptions are rough approximations. Differences by orders of magnitude are probably significant; differences of less than an order of magnitude may not be significant. For this reason, the results presented here are limited to two significant digits.

EXPANDED ANALYSES

The results presented in Tables C.1, C.2, and C.3 reflect expanded analyses which were performed after the original analyses were completed. Mobile and other area sources were looked at in two ways - as "unit" sources (a single arterial highway, a single dry cleaner, and a single service station) and as countywide sources in Polk County. Both results are included in the tables. In addition, because of the large unit risk value for products of incomplete combustion (PICs), multiple calculations were performed to determine the sensitivity of the rankings to this key parameter. While exclusion of the effects of PICs does affect the rankings, the overall impact was nominal, leaving the relative ranking very similar to the ranking including the effect of PICs. The tables presented here include the PICs contribution.

DISCUSSION

A review of the results in Tables C.1, C.2, and C.3 shows that the potential impact of certain area sources (particularly mobile sources and service stations) within Iowa could be significant when compared to other sources in the state. Within S1 (the first screening parameter) among the noteworthy sources were two chemical companies, an electronics firm, four coal-fired power plants, one John Deere plant, a cement plant, a tool manufacturer, and several POTWs. Landfills and other hazardous waste TSDFs did not appear very high on the list. Relative to other area sources, dry cleaning also was not very significant. In contrast, several facilities which are not currently documented in EIS/PS, such as Freeman Resins (Burlington), ranked relatively high.

In comparing the results of S1 (the first screening parameters) versus the results of S2 (the second screening parameter), several observations could be made. (As indicated above, S2 takes into account the local exposed population, and the release height of the emissions.) As expected, sources without tall stacks became more important. The most important "source" in this ranking was mobile sources in Polk County, undoubtedly because of the substantial air toxics emissions emitted near ground level in a populated county. While arterial highways may present a fairly small risk one-by-one, the combination of arterials, expressways, and local roads together can be important. Other sources with known stack heights tended to rank lower in the S2 rankings compared to the S1 rankings. For example, the ranking of coal-fired power plants such as the George Neal Station (Salix), Iowa Power and Light (Council Bluffs), and Iowa Southern Utilities (Ottumwa) dropped substantially because their average stack heights average well over 200 feet.

S3, the noncarcinogenic effect parameter, showed a substantially different ranking because the input variables (especially the pollutants involved) were substantially different than those for S1 and S2. Among the highest ranked facilities are two that are identified as 111(d) sources in Iowa: Occidental Chemical (Buffalo), and Agrico Chemical (Fort Madison). The high rankings for these facilities are clearly due to well documented emissions and a relatively low acceptable daily intake ("A") value. Even more than the S1 and S2 rankings, the S3 rankings included facilities which have not been documented in EIS/PS as criteria pollutant sources. Notable examples include Sheller Globe (Iowa City), Stone Container Corporation (Des Moines), and Mid-Central Plastics (West Des Moines). Other sources such as Salsbury Laboratories (Charles City) could have been included if there were similar sources in Iowa for comparison. It should be noted that the S3 ranking includes many surface coating sources which did not rank high in the S1 and S2 summaries. The reason for this situation is that surface coating solvents are generally not carcinogens, as represented by unit risk values developed by USEPA/CAG. Therefore, if surface coating sources are well-documented, the potential non-carcinogenic impact will be relatively large.

ANALYSIS

To put the results presented in Tables C.1, C.2, and C.3 in proper perspective, the nature of the screening parameter equations should be understood. Emission estimates in many cases are very rough and in some cases are "surrogate" values, i.e., they are not associated with any data specific to that plant, but rather are indirect approximations based on plants in the same industrial category. The health data used (Tables 2.2 and 2.3) is limited by the data available on carcinogenic potential from CAG (and a few other sources), and the minimal information developed on non-carcinogenic effects. Within the S2 and S3 rankings, relatively few facilities were identified with specific release heights, thereby overestimating the importance of certain facilities. Sources with air toxics emissions which were not specifically documented in EIS/PS were assigned a default release height of 25 feet or less, thereby maximizing their ranking in Tables C.2 and C.3. In addition, plume rise was not taken into effect, which maximizes the ranking of power plants and other sources with release temperatures above ambient conditions. Finally, because total county populations were used in S2 and S3 rankings, sources on the edge of metropolitan areas may be over-emphasized, while small sources in densely populated areas (such as dry cleaners) may be underemphasized.

In reviewing the results, it is important to note that the relative ranking of facilities were assigned with respect to other sources in Iowa. This analysis was developed as a means to prioritize future air toxics program activities in Iowa (particularly emission inventory activities). A key, unanswered question is the relative risk which the State of Iowa faces compared to other states. If Iowa, in fact, is a relatively low risk state, even some of the facilities which appear relatively high in the rankings may not be "significant". Such an assessment would require a more in-depth analysis.

Nevertheless, the rankings point out several key trends:

* Area sources of air toxics in Iowa are potentially important, particularly mobile sources.

* There is a sizable group of facilities which could be significant air toxics sources in Iowa that are not documented in EIS/PS as criteria pollutant sources.

* Known, well-documented air toxics sources in Iowa do rank relatively high.

To be sure, a prioritization approach such as the one presented here is biased towards well-documented sources. For example, Monsanto (Muscatine) has been studied extensively because it is a source of acrylonitrile, the first pollutant chosen by USEPA in its pilot program to "refer" certain specific toxic air pollutants to the states. An in-depth inspection and analysis of the emissions of this plant was performed in 1984, and the results of that work (USEPA/OAQPS, 1985b) were used in the prioritization results presented in Tables C.1, C.2 and C.3. As a result, relative to other plants in EIS/PS, air toxics emission estimates at Monsanto were comprehensive.

Other specific chemical plants may also pose a local risk. Freeman Resins (Burlington) appears high in the rankings because it is the same Standard Industrial Classifiction (SIC) code as Monsanto. Its emission estimates are "surrogate" emission estimates and as a result shows up as an acrylonitrile source when in fact it probably is not. This facility is therefore a good example of a source for which additional information is needed, and a specific questionnaire requesting emission-related information is probably justified.

As more information on individual facilities become available, this assessment could be expanded. For example, there are no facilities currently in EIS/PS in SIC code 2834 (pharmaceutical manufacturing). As a result, even for large facilities such as Salsbury Laboratories (Charles City), under the analysis presented here there was no information (except for employment data) which could be used to estimate emissions. Such facilities, if they are to be contacted by questionnaire, could be contacted for both criteria pollutant and air toxics information simultaneously.

As mentioned above, rankings in the tables presented here are not sufficient by themselves to indicate that individual facilities necessarily pose a significant risk. Coal-fired plants, for example, rank relatively high on S1 and S2 rankings. However, risks associated with coal combustion are tied in a large part to chromium emissions due to trace chromium concentrations in coal (as well as to emissions of PIC's). Carcinogenesis of chromium is tied to its chemical state. Hexavalent chromium has a known carcinogenic potential, while trivalent chromium does not. The emission estimates and subsequent analysis presented here are based on the conservative assumption that all chromium emitted is hexavalent, an assumption that clearly produces a high estimate of the potential relative impact.

Finally, with respect to the expanded analyses in this study, it has been determined that with or without PICs, combustion sources (including mobile sources) are relatively significant. Risk assessment on these sources, particularly using local or facility-specific data, would help to clarify the actual impacts of these souces. In addition, while the expanded mobile source calculations were performed for Polk County, it is reasonable to expect that other urbanized counties in the State would be ranked high as well if they had been included in the analysis.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Several observations may be made about the data bases reviewed and the sources identified. First, the review of multiple data bases did in fact identify potential air toxic sources which might not have been identified in other ways. In particular, the review of the Directory of Iowa Manufacturers indicated numerous potential VOC sources which had not been in Iowa EIS/PS. This result appears to confirm the appropriateness of the basic approach taken in the development of this study. Second, the data available in many data bases was not necessarily the data needed to calculate emissions. While this result in many cases was expected, and default values for key parameters could be assumed, a more in-depth review of specific facilities would most likely provide a less conservative assessment of emissions. Third, as the study proceeded, it became evident that several potentially important source categories could have been included in the study, but had not been. These categories include chrome plating (a source of chromium), sterilizers (using ethylene oxide), and grain fumigation. Chrome plating is apparently an undocumented source category due to fairly frequent references to plating operations in some of the State's hazardous waste summaries. Ethylene oxide has been identified as a potential problem in other studies, and none of the data bases here effectively addressed its use as a sterilant. Similarly, grain fumigation was never addressed as a subject in this study. Given Iowa's status as one of the largest producers of agricultural products in the country, grain fumigation should probably be reviewed, particularly if it is determined that fumigants used in Iowa are potential carcinogens.

Nevertheless, this screening study provided a comprehensive review of point, area and mobile sources of air toxics within Iowa and provided a consistent way of comparing the risks inherent in specific air toxics emissions. Both traditional and non-traditional sources were included and potential missing sources of criteria pollutants were identified. Based on the prioritization scheme, it appears that three major source groupings of concern for air toxics are mobile sources, coal-fired power plants, and selected industrial facilities.

The rankings discussed in Chapter 4 and presented in Appendix C indicate relative risks in Iowa. While they do not indicate absolute risks and they do not indicate risks of sources in comparison to sources in other states, they do provide evidence for prioritizing further activities towards development of an air toxics program in Iowa. The following recommendations address both the gaps in key data which were found and additional activities focused the priority sources which have already been identified.

1. <u>Expand Efforts to Develop a Statewide VOC Inventory</u>

Many air toxics also are VOC. This study indicated many specific facilities which are likely VOC sources, but which are not documented in EIS/PS. Expanding the VOC inventory would not only provide a data base for assessing air toxics for these facilities, but if an emission inventory survey is sent out to these facilities, then VOC and air toxics data could be gathered simultaneously.

2. <u>Selectively Send Emission Inventory Questionnaires to "High Risk" Sources</u>

Sending questionnaires to numerous facilities across the state would be desirable eventually. However, given the fact that in-depth risk assessments have not been done on many (if any) facilities in Iowa, it would be appropriate first to study a few high risk facilities to determine how extensive a survey is justified. Accordingly, in-depth emissions data for several facilities chosen on the basis of the ranking is needed. It is recommended that a thorough emission inventory of the facilities chosen be performed to establish a foundation for the risk assessment discussed below (item 4).

3. <u>Perform a More In-depth Assessment on Selected Non-traditional Sources</u>

The highest ranking POTWs were the Linn and Polk County plants. As with most POTWs in Iowa, data for the purpose of evaluating plant-specific emissions was largely unavailable and most emissions were calculated with default values as concentrations for key priority pollutants which were also VOC. To test this assumption, it would be useful to analyze one POTW in the state as a test case. Using a POTW in an urbanized county with a mix of industry (such as Linn or Polk Counties) would be an appropriate candidate.

Based on the rankings, landfill emissions generally did not appear to be a problem. When special waste authorizations were approved, generally they were focused on materials which did not offer a large potential for air toxics emissions. The one possible exception to this observation was the Black Hawk County landfill where it is known that hazardous waste has been deposited in past years. One of the problems that will be encountered in terms of an emissions assessment of this facility will be the actual materials deposited. It is therefore recommended that potential ways of investigating the landfill be considered.

4. <u>Development a Pilot Risk Assessment Program</u>

Perhaps the most significant unanswered question in this study was the level of risks from the sources which ranked high as a result of the prioritization analysis. Risk assessments therefore should be performed to determine whether the sources or source categories identified here in fact pose a significant risk (when compared to similar sources in other parts of the country) or if in fact Iowa has a relatively minimal air toxics problem.

To start, a pilot risk assessment program could be based on the emissions developed for high priority sources through the questionnaires identified above (Item 2). Results could be compared to similar sources as documented in USEPA's National Air Toxics Information Clearing House (NATICH) or similar sources. In addition to providing a start to quantitatively assessing the magnitude and nature of air toxics impacts in Iowa, it would also provide an opportunity to develop potential approaches to be used in permit reviews in the future. As the pilot program develops, risks from mobile sources could also be studied.

5. Review Selected Source Categories

As mentioned above, several source categories received little emphasis in this study though they could pose potential problems. It is therefore recommended that as available resources allow chrome plating, sterilizing, and grain fumigation be investigated.

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APPENDIX A

SUGGESTED QUESTIONNAIRES

APPENDIX A

SUGGESTED QUESTIONNAIRES

	Background for Assessing Publicly Owned Treatment Works: a Preliminary Questionnaire
TABLE A	Potential Toxic Air Contaminant Use and Disposal Information
TABLE B	Use of Waste or Recycled Oils and Solvents for Fuel
SECTION 1	Non-Criteria Substance Storage Tanks and Loading Racks
SECTION 2	Processing and Manufacturing Operations Emitting Non-Criteria Substances
SECTION 3	Surface Coating Operations Emitting Non-Criteria Substances
SECTION 4	Solvent Degreasing Operations Emitting Non-Criteria Substances
SECTION 5	Dry Cleaning Operations Emitting Non-Criteria Substances
SECTION 6	Graphic Arts and Printing Operations Emitting Non-Criteria Substances

APPENDIX A

BACKGROUND FOR ASSESSING PUBLICLY OWNED TREATMENT WORKS AND A PRELIMINARY QUESTIONNAIRE

As discussed in Chapter 2, there are two main types of potential sources of emissions. Within a POTW are sludge incinerators and process sources. For incinerators, emissions depend on the composition of the sludge and the design of the incinerator; heavy metals are the main pollutants of concern. For process sources, volatile organics are the primary focus, and emissions can be determined by knowing the specific organic content and flow of the influent, the effluent, and the residual sludge. Partitioning of organics through these streams is the key to emissions assessment of POTW. A preliminary questionnaire to allow assessment of these sources is provided here; review of this questionnaire should be done with the help of references as available (e.g., USEPA/OWWM, 1982 and USEPA/OWWM, 1986).

PUBLICLY OWNED TREATMENT WORKS
AIR EMISSIONS SURVEY

A. SLUDGE INCINERATORS

1. Do you have a sludge incinerator on-site?

2. If the answer is yes, answer the following questions (if there is more than one incinerator on-site, make as many copies as necessary)

   a. Type of incinerator ______________________________

   b. Type of control equipemnt ______________________________

   c. Estimated control efficiency - TSP __________
   - VOC __________
   - OTHERS __________ (specify)

   d. Amount of sludge incinerated per year __________________

   e. Sludge composition (priority pollutants)

Pollutants	Composition
________	________
________	________
________	________
________	________
________	________
________	________
________	________
________	________
________	________
________	________
________	________
________	________
________	________
________	________

	Pollutants	Composition
f. Sludge ash composition (priority pollutants)	____________	____________
	____________	____________
	____________	____________
	____________	____________
	____________	____________
	____________	____________
	____________	____________
	____________	____________
	____________	____________
	____________	____________
	____________	____________
	____________	____________
	____________	____________
	____________	____________

B. PROCESS DESCRIPTION

Describe the processes at the treatment plant. Indicate whether processes are aerated. Include any processes which biologically degrade priority pollutants.

____

____

____

____

____

____

____

____

C. COMPOSITION OF STREAMS
(Priority Pollutants)

Priority Pollutants	Influent (Average Flow) ( )	Effluent (Average Flow) ( )	Sludge (Average Generation) ( )

TABLE A

POTENTIAL TOXIC AIR CONTAMINANT USE AND DISPOSAL INFORMATION

Material Identification No.	Description of Use	Total Amount Entering Your Facility	Total Amount Recovered or Recycled off site	Method of Disposal of Waste Material

TABLE B
USE OF WASTE OR RECYCLED OILS AND SOLVENTS FOR FUEL

Combustion Unit Name	Emission Pt. Reference No. from Section __, if any	Total Amount of Waste Oils and Solvents burned in unit	Average Composition of all Waste Oils or Solvents burned in unit	
			Matl ID No.	%
			Oil, distillate, etc.	
			Matl ID No.	%
			Oil, distillate, etc.	
			Matl ID No.	%
			Oil, distillate, etc.	

Section 1 has three pages; it is designed for registration of storage tanks containing non-criteria substances with capacities greater than 250 gallons and loading facilities for liquid non-criteria substances.

1. Company Name, Company Address, Registration Number, Facility Operating Schedule, Information for Calendar Year, Person Completing Form, Date. List company name, mailing address, registration number, facility operating schedule for the source as a whole, the year the information is given using the most recent calendar year available, name of person completing form and date.

2. Reference Number. Assign an identifying number to each tank so that questions regarding these tanks may be identifiable. If these tanks are already registered with the SAPCB (Section E-5 Form 7) then use the same reference numbers.

3. Tank Type. Use codes 1* at bottom of page.

4. Seal Type. Use codes 2* at bottom of page.

5. Operating Pressure. This is the pressure at which the tank's relief values are set. Note units.

6. Average Vapor Space Height. Height of the portion of the tank above the average liquid level.

7. Color. Color of tank shell and roof.

8. Material Stored. Non-criteria substance name: toluene, benzene, etc.

9. Tank Diameter. Inside tank diameter in feet.

10. Tank Capacity. Tank holding capacity in 10,000 gallons.

11. Maximum True Vapor Pressure. True vapor pressure of substance at 60° F if known.

12. Vapor Molecular Weight. Molecular weight of vapor if known.

13. Liquid Density. Density of liquid material stored in pounds per gallon, if known.

14. Annual Throughput. The number of gallons of material which pass through the tank each year.

15. Estimated Emissions. Estimate the pounds per hour of the non-criteria which escapes from the tank due to storage, breathing, and working losses.

16. Person Completing Form, Date, Registration Number. Name of person completing form, date, and registration number.

17. Reference Number. Use the same numbers as on page one of this form to identify information for the same tank.

18. <u>Vent/Stack or Exhaust Data</u>

a. Vent height in feet above ground level. If there is no stack or vent as such, estimated height of emission point and state as such. If there are two or more vents for the same tank, list separately, giving the data for each, using the same reference number to show they belong to the same unit.

b. Vent Inside Exit Diameter in feet.

c. Vent Exit Velocity in feet per minute.

d. Vent Gas Exit Volume in actual cubic feet per minute.

e. Vent Gas Temperature of Exit in degrees Fahrenheit.

19. <u>Air Pollution Control Equipment</u>

a. Manufacturer and Model Number. Nameplate data from control equipment.

b. Type. Use codes 1* at bottom of page. If type not listed, enter (99) and specify type.

c. Collection Efficiency. List the efficiency in percent control that the equipment was designed to control. Also, list the actual percent control if tests have been made to determine the efficiency.

For control measures which are unconventional, note this as such.

LOADING RACKS -

1. Person Completing Form, Date, Registration Number. Name of person completing form, date, and registration number.

2. Name of Material Loaded from Rock and Reid Vapor Pressure (Summer). Specify the name of the liquid non-criteria substance loaded from the rack and the Reid vapor pressure of the substance under summer conditions, if known.

3. Type of Loading. Specify type of loading method, using code 1* at the bottom of the form.

4. Maximum Liquid Loaded Daily. Specify the maximum number of gallons of each material that could be loaded from the rack during a work day.

5. Bulk Temperature of Liquid Loaded. Temperature of liquid in degrees Rankine. $^{\circ}R = {}^{\circ}F + 459.69$.

6. True Vapor Pressure of Liquid. Vapor pressure at bulk liquid conditions.

7. Vapor Molecular Weight. Molecular weight of vapor if known.

8. Method of Vapor Recovery. Use codes 2* at the bottom of the form to specify type of collection system used to collect vapors displaced during filling operations. If no collection system is used, enter code (7) indicating the vapors escape directly to the air.

9. Non-Criteria Substance(s) Emitted from Loading Operations. Specify the non-criteria substance(s) that is (are) emitted as vapor during the loading operation.

10. Quantity of Non-Criteria Substances Lost. Specify in pounds per day the amount of non-criteria substances emitted to the air from loading operations.

11. Basis of Emission Estimates. Specify the basis for arriving at the emission estimates above, such as material balances, tests, emission factors, etc.

SECTION 1 NON-CRITERIA SUBSTANCE STORAGE TANKS AND LOADING RACKS

Company Name 1		Company Address		Registration Number
Facility Operating Schedule _____ Hours/Day _____ Days/Week _____ Weeks/Year		Information for Calendar Year 19_____	Person Completing Form	Date

STORAGE TANKS (LIQUID FUELS, SOLVENTS, HYDROCARBONS, AND OTHER VOLATILE ORGANIC COMPOUNDS)

2	3	4	5	6	7		8	9	10	11	12	13	14	15
Reference Number	Tank Type (use codes 1*)	Seal Type (use codes 2*)	Oper. Pressure (note units)	Average Vapor Space Height (ft)	Color		Material Stored	Tank Diameter (ft)	Tank Capacity (10^3 gal)	Maximum True Vapor Press. (psia)	Vapor Molecular Weight	Liquid Density (lb/gal)	Annual Thruput (10^3 gal)	Estimated Emission (lb/hr)
					Shell	Roof								

1* STORAGE TANK TYPE CODES

1. Fixed roof
2. Floating roof (internal or external cover)
3. Variable vapor space
4. Pressure tank
5. Underground - splash loading
6. Underground - submerged loading
7. Underground - submerged loading, balance

2* SEAL TYPE CODES

1. Metallic shoe, primary seal only
2. Metallic shoe, shoe mounted secondary seal
3. Metallic shoe, rim mounted secondary seal
4. Liquid mounted resilient, primary seal only
5. Liquid mounted resilient, with weather shield
6. Liquid mounted resilient, rim mounted secondary seal
7. Vapor mounted resilient, primary seal only
8. Vapor mounted resilient, with weather shield
9. Vapor mounted resilient, rim mounted secondary seal

99. Other (specify)

Person Completing Form	Date	Registration Number
16		

SECTION I NON-CRITERIA SUBSTANCE STORAGE TANKS AND LOADING RACKS (Cont.)

17 18 19

	Tank Vent/Stack or Exhaust Data					Air Pollution Control Equipment			
								Collection Efficiency	
Reference Number	Vent/ Stack Height (feet)	Inside Exit Diameter (feet)	Exit Gas Velocity (feet/min)	Exit Gas Volume (acfm**)	Exit Gas Temperature (°F)	Manufacturer and Model Number	Type (use codes 1*)	Design	Actual

** acfm = actual cubic feet per minute

1* AIR POLLUTION CONTROL EQUIPMENT IDENTIFICATION CODES

1. Catalytic afterburner
2. Direct flame afterburner
3. Vapor absorption system
4. Vapor adsorption system
5. Vapor compressor - condenser system
16. Refrigerated liquid scrubber
99. Other (specify)

Person Completing Form	Date	Registration Number
1		

SECTION 1 NON-CRITERIA SUBSTANCE STORAGE TANKS AND LOADING RACKS (Cont.)

2	3	4	5	6	7	8		9	10	11
Name of Material Loaded from Rack and Reid Vapor Pressure (Summer)	Type of Loading (use codes 1*)	Maximum Liquid Loaded Daily (10^3 gal/day)	Bulk Temperature of Liquid Loaded (°R)	True Vapor Pressure of Liquid** (psia)	Vapor Molecular Weight (lb/lb-mole)	Method of Vapor Recovery		Non-Criteria Substances Emitted from Loading Operations	Quantity of NCS Lost (lb/day)	Basis of Emission Estimates
						Use (codes 2*)	Efficiency			

1* LOADING TYPE CODES
1. Submerged loading of a clean cargo tank
2. Splash loading of a clean cargo tank
3. Submerged loading, normal dedicated service
4. Splash loading, normal dedicated service
5. Submerged loading, dedicated vapor balance service
6. Splash loading, dedicated vapor balance service

** At bulk liquid conditions

2* VAPOR RECOVERY METHOD CODES
1. Incineration
2. Refrigerated liquid scrubber
3. Vapor balance - return system
4. Vapor absorption system
5. Vapor adsorption system
6. Vapor compressor - condenser system
7. None - open to air
99. Other (describe)

Section 2 has four pages; each is a continuation of the information from the page before; fill in as completely as possible listing all operations, whether manufacturing or processing which emit non-criteria substances into the air.

1. Company Name, Company Address, Registration Number, Facility Operating Schedule, Information for Calendar Year, Person Completing Form, Date. List company name, mailing address, registration number, facility operating schedule for the source as a whole, the year for which the information is given using the most recent calendar year available, name of person completing form and date.

2. Reference Number. Assign an identifying number to each manufacturing or processing operation which has a potential for emission of non-criteria pollutants into the air. Use the same reference number as used in any previous submittals to the SAPCB; also use the same number for information for the same operation on each of the four pages of Section 2.

3. Process or Operation Name. Identify by name the processing equipment section manufacturing operation for which information is being given (coke, oven, Nylon Reactor, Acid Plant, etc.)

4. Maximum Rated Capacity. In tons per hour, list the maximum rated capacity of the process or operation or the maximum actual operating rate, whichever is greater.

5. Normal Feed Input. Give in pounds per hour and tons per year, the maximum hourly and the normal annual amount of materials fed into the process or operation listed.

6. Number of Emission Points Into the Air. The number of stacks, vents, transfer points, etc. in the processing or operating section described.

7. Normal Product Output. The pounds per hour and tons per year of product or finished material which exists from the process or operation described.

8. Person Completing Form, Date, Registration Number. Name of person completing form, date, and registration number.

9. Reference Number. Use the same numbers as on page one of this form to identify information for the same tank.

10. Vent/Stack or Exhaust Data

    a. Vent height in feet above ground level. If there is no stack or vent as such, estimated height of emission point and state as such. If there are two or more vents for the same tank, list separately, giving the data for each, using the same reference number to show they belong to the same unit.

b. Vent Inside Exit Diameter in feet.

c. Vent Exit Velocity in feet per minute.

d. Vent Gas Exit Volume in actual cubic feet per minute.

e. Vent Gas Temperature of Exit in degrees Fahrenheit.

11. Air Pollution Control Equipment

a. Manufacturer and Model Number. Nameplate data from control equipment.

b. Type. Use codes 1* at bottom of page. If type not listed, enter (99) and specify type.

c. Collection Efficiency. List the efficiency in percent control that the equipment was designed to control. Also, list the actual percent control if tests have been made to determine the efficiency.

For control measures which are unconventional, note this as such.

12. Person Completing Form, Date, Registration Number. Name of person completing form, date, and registration number.

13. Reference Number. Use the same reference numbers as on pages four and five of this form to identify information for the same operation.

14. Maximum Hourly Emission Rates. List in pounds per hour the maximum hourly emission rates of each non-criteria substance emitted from the process or operation identified by the reference number. This is the amount of the substance actually emitted into the air, not the amount of material collected by control equipment.

15. Basis of Emission Estimates. List the basis on which these emission estimates are made using code 1* at the bottom of the form.

16. Person Completing Form, Date, Registration Number. Name of person completing form, date, and registration number.

17. Reference Number. Use the same reference numbers as on pages four, five and six of this form to identify information for the same operation.

18. Percent of Annual Usage by Season. List the percentage of operation by each season of the year. They are divided as December - February (Winter), March - May (Spring), June - August (Summer), and September - November (Autumn). The normal seasonal percentage of operation should be listed for each individual process or operation.

19. Normal Operating Schedule. For each operation or process, list the hours per day, days per week, and weeks per year that it operates.

SECTION 2 PROCESSING AND MANUFACTURING OPERATIONS EMITTING NON-CRITERIA SUBSTANCES

Company Name	Company Address		Registration Number
1			
Facility Operating Schedule ____ Hours/Day ____ Days/Week ____ Weeks/Year	Information for Calendar Year 19____	Person Completing Form	Date

2	3	4	5		6	7	
Reference Number	Process or Operation Name	Maximum Rated Capacity* tons/hour	Normal Feed Input		Number of Emission Points into Air	Normal Product Output	
			lbs/hour	tons/year		lbs/hour	tons/year

* If units other than tons are used, specify units.

Person Completing Form	Date	Registration Number
8		

SECTION 2 MANUFACTURING OPERATIONS EMITTING NON-CRITERIA SUBSTANCES

9 10 11

Reference Number	Stack or Exhaust Data: Stack Height (feet)	Inside Exit Diameter (feet)	Exit Gas Velocity (feet/min)	Exit Gas Volume (acfm**)	Exit Gas Temperature (°F)	Air Pollution Control Equipment: Manufacturer and Model Number	Type (use codes 1*)	Collection Efficiency: Design	Actual

** acfm = actual cubic feet per minute

1* AIR POLLUTION CONTROL EQUIPMENT IDENTIFICATION CODES

1. Settling chamber
2. Cyclone
3. Multicyclone
4. Cyclone scrubber
5. Orifice scrubber
6. Mechanical scrubber
7. Venturi scrubber
8. Mist eliminator
9. Electrostatic precipitator
10. Baghouse (fabric filter)
11. Catalytic afterburner
12. Direct flame afterburner
13. Packed tower
14. Carbon adsorption
15. Refrigerant condenser
16. Refrigerated liquid scrubber
99. Other (specify)

For wet scrubbers, list gallons per minute water flow and inches water pressure drop across scrubber, if known.

Person Completing Form	Date	Registration Number
12		

SECTION 2 MANUFACTURING OPERATIONS EMITTING NON-CRITERIA SUBSTANCES

13 Reference Number	14 Maximum Hourly Emission Rates (List Emissions of Each Non-Criteria Substance in Pounds per Hour)								15 Basis of Emission Estimates (use codes 1*)

1* EMISSION ESTIMATION METHOD CODES

1. Stack test
2. Material balance
3. Emission factor

99. Other

Person Completing Form	Date	Registration Number
16		

SECTION 2 MANUFACTURING OPERATIONS EMITTING NON-CRITERIA SUBSTANCES

17	18				19			
	% of Annual Throughput by Season				Normal Operating Schedule			
Reference Number	December --------- March	March ----- May	June ------ August	September --------- November	hours/day	days/week	weeks/year	(FOR AGENCY USE ONLY)

Section 3 has three pages; each is a continuation of the information from the page before; fill in as completely as possible, listing all surface coating operations and processes.

1. Company Name, Company Address, Registration Number, Facility Operating Schedule, Information for Calendar Year, Person Completing Form, Date. List company name, mailing address, registration number, facility operating schedule for the source as a whole, the year for which the information is given, using the most recent calendar year available, name of person completing form, and date.

2. Surface Coating Line Name, Reference Number. Identify by name the surfac coating process operation for which information is being given (hot airless spray, flow coating, etc.). Page 1 of this section should contain only information pertinent to the identified coating process. The blank page may be copied and completed for cases where more than one coating process exists. A reference number should be assigned to each identified coating process which has the potential to emit non-criteria pollutants into the air.

3. Name of Coating/Thinner Used, List each different coating and thinner used for each coating operation, including thinners. Where possible, give identifying names and numbers.

4. Gallons/Year. Give in gallons per year the volume of all coatings and thinners consumed for this particular coating operation in 1984. If volumes are given in pounds per year, indicate this on the questionnaire.

5. Name and Volume Percent of Non-Criteria Substances in Coating/Thinner. Identify the name and volume percent of each non-criteria substance contained in each coating and thinner. In the example, Duron's Red Paint #65-AF contains 18.07% Xylene and 51.46% Toluene. If the units for number 4 (above) are pounds per year, give the name and weight percent of each non-criteria substance contained in each ink and solvent and indicate this on the questionnaire.

6. Person Completing Form, Date, Registration Number. Name of person completing form, date and registration number.

7. Reference Number. Use the reference numbers from page 1, with appropriate alphabetic characters to identify the correspondence of stacks/vents to each coating process. In the example, Reference Numbers 1A and 1B are assigned to the two stacks associated with the conventional spray coating process identified by Reference Number 1 on page 1.

8. Stack or Exhaust Data.

   a. Stack Height in feet above ground level. If there is no stack or vent as such, estimated height of emission point and state as such. If there are two or more stacks for the same coating process, list separately, giving the data for each, using the reference numbers from page 1 with appropriate alphabetic character to show they belong to the same unit.

b. Stack Inside Exit Diameter in feet.

c. Stack Exit Velocity in feet per minute.

d. Stack Gas Exit Volume in actual cubic feet per minute.

e. Stack Gas Temperature of Exit in degrees Fahrenheit.

9. Air Pollution Control Equipment

a. Manufacturer and Model Number. Nameplate data from control equipment

b. Type. Use codes 1* at bottom of page. If type not listed, enter (99) and specify type.

c. Collection efficiency. List the efficiency in percent control that the equipment was designed to control. Also, list the actual percent control if tests have been made to determine the efficiency.

For control measures which are unconventional, note this as such.

10. Person Completing Form, Date, Registration Number. Name of person completing form, date and registration number.

11. Reference Number. Use the reference number from page 1 to identify which emissions result from which processes.

12. Maximum Hourly Emission Rates. Identify each of the 61 non-criteria substances emitted from your facility by labeling each column with an appropriate substance. Copies of the page may be made and completed for cases where additional columns are necessary. List in pounds per hour the maximum hourly emission rates of each non-criteria substance emitted from the coating process identified by the reference number. This is the amount of substance actually emitted into the air, not the amount of material collected by control equipment.

13. Basis of Emission Estimates. Use codes 1* at bottom of page. If basis not listed, enter (99) and specify basis.

SECTION 3 SURFACE COATING OPERATIONS EMITTING NON-CRITERIA SUBSTANCES

Company Name		Company Address	Registration Number
1 Facility Operating Schedule _____ Hours/Day _____ Days/Week _____ Weeks/Year	Information for Calendar Year 19_____	Person Completing Form	Date

2 SURFACE COATING LINE NAME ______________________ REFERENCE NUMBER ______________

3	4	5						
		Coating/Thinner Used in 1984						
		List Name and Volume % of each Non-Criteria Substance in Coating/Thinner						
Name	gal/yr	Xylene	Toluene					

SECTION 3 SURFACE COATING OPERATIONS EMITTING NON-CRITERIA SUBSTANCES

1	Company Name	Company Address		Registration Number
	Facility Operating Schedule _____ Hours/Day _____ Days/Week _____ Weeks/Year	Information for Calendar Year 19_____	Person Completing Form	Date

2 SURFACE COATING LINE NAME Dip Coating REFERENCE NUMBER ____________

3	4	5					
		Coating/Thinner Used in 1984					
		List Name and Volume % of each Non-Criteria Substance in Coating/Thinner					
Name	gal/yr	Xylene	Toluene				

[redacted]

6

SECTION 3 SURFACE COATING OPERATIONS EMITTING NON-CRITERIA SUBSTANCES (Cont.)

7	8					9			
	Stack or Exhaust Data					Air Pollution Control Equipment			
								Collection Efficiency	
Reference Number	Stack Height (feet)	Inside Exit Diameter (feet)	Exit Gas Velocity (feet/min)	Exit Gas Volume (acfm**)	Exit Gas Temperature (°F)	Manufacturer and Model Number	Type (use codes 1*)	Design	Actual

** acfm = actual cubic feet per minute

1* AIR POLLUTION CONTROL EQUIPMENT IDENTIFICATION CODES
1. Catalytic afterburner
2. Direct flame afterburner
3. Packed tower
4. Carbon adsorption
5. Refrigerant condenser
6. Refrigerated liquid scrubber
99. Other (specify)

Person Completing Form	Date	Registration Number
10		

SECTION 3 SURFACE COATING OPERATIONS EMITTING NON-CRITERIA SUBSTANCES (Cont.)

11	12								13
Reference Number	Maximum Hourly Emission Rates (List Emissions of Each Non-Criteria Substance in Pounds per Hour)								Basis of Emission Estimates (use codes 1*)
	Xylene	Toluene	Benzene						

1* EMISSION ESTIMATION METHOD CODES

1. Stack test
2. Material balance
3. Emission factor

99. Other

Section 4 has three pages; each is a continuation of the information from the page before; fill in as completely as possible, listing all degreasing operations.

1. Company Name, Company Address, Registration Number, Facility Operating Schedule, Information for Calendar Year, Person Completing Form, Date. List company name, mailing address, registration number, facility operating schedule for the source as a whole, the year for which the information is given, using the most recent calendar year available, name of person completing form, and date.

2. Solvent Degreasing Operation Name, Reference Number. Identify by name the solvent degreasing operation for which information is being given (cold cleaner, open top vapor degreaser). Page 1 of this section should contain only information pertinent to the identified degreasing operation. The blank page may be copied and completed for cases where more than one degreasing operation exists. A reference number should be assigned to each identified degreasing operation which has the potential to emit non-criteria pollutants into the air.

3. Name of Solvent Degreaser Used. List each different solvent used for each degreasing operation, including cleanup solvents. Where possible, give identifying names and numbers.

4. Gallons/Year. Give in gallons per year the volume of all degreasing solvents consumed for this particular degreasing operation in 1984. If volumes are given in pounds per year, indicate this on the questionnaire.

5. Name and Volume Percent of Non-Criteria Substances in Degreaser. Identify the name and volume percent of each non-criteria substance contained in each degreaser. In the example, Varsol contains 5.00% Benzene. If the units for numer 4 (above) are pounds per year, give the name and weight percent of each non-criteria substance contained in each ink and solvent and indicate this on the questionnaire.

6. Person Completing Form, Date, Registration Number. Name of person completing form, date and registration number.

7. Reference Number. Use the reference numbers from page 1, with appropriate alphabetic characters to identify the correspondence of stacks/vents to each degreasing process. In the example, Reference Numbers 1A and 1B are assigned to the two stacks associated with the cold cleaner degreasing operation identified by Reference Number 1 on page 1.

8. Stack or Exhaust Data.

   a. Stack Height in feet above ground level. If there is no stack or vent as such, estimated height of emission point and state as such. If there are two or more stacks for the same degreasing operation, list separately, giving the data for each, using the reference numbers from page 1 with appropriate alphabetic character to show they belong to the same unit.

b. Stack Inside Exit Diameter in feet.

c. Stack Exit Velocity in feet per minute.

d. Stack Gas Exit Volume in actual cubic feet per minute.

e. Stack Gas Temperature of Exit in degrees Fahrenheit.

9. Air Pollution Control Equipment

a. Manufacturer and Model Number. Nameplate data from control equipment

b. Type. Use codes 1* at bottom of page. If type not listed, enter (99) and specify type.

c. Collection efficiency. List the efficiency in percent control that the equipment was designed to control. Also, list the actual percent control if tests have been made to determine the efficiency.

For control measures which are unconventional, note this as such.

10. Person Completing Form, Date, Registration Number. Name of person completing form, date and registration number.

11. Reference Number. Use the reference number from page 1 to identify which emissions result from which processes.

12. Maximum Hourly Emission Rates. Identify each of the 61 non-criteria substances emitted from your facility by labeling each column with an appropriate substance. Copies of the page may be made and completed for cases where additional columns are necessary. List in pounds per hour the maximum hourly emission rates of each non-criteria substance emitted from the degreasing operation identified by the reference number. This is the amount of substance actually emitted into the air, not the amount of material collected by control equipment.

13. Basis of Emission Estimates. Use codes 1* at bottom of page. If basis not listed, enter (99) and specify basis.

SECTION 4 SOLVENT DEGREASING OPERATIONS EMITTING NON-CRITERIA SUBSTANCES

1 Company Name	Company Address		Registration Number
Facility Operating Schedule _____ Hours/Day _____ Days/Week _____ Weeks/Year	Information for Calendar Year 19_____	Person Completing Form	Date

2 SOLVENT DEGREASING OPERATION NAME ______________________ REFERENCE NUMBER ______________

3	4	5					
		Solvent Degreaser Used in 1984					
		List Name and Volume % of each Non-Criteria Substance in Degreaser					
Name	gal/yr	Benzene	CFC 113	Trichloroethylene			

Person Completing Form	Date	Registration Number
6		

SECTION 4 SOLVENT DEGREASING OPERATIONS EMITTING NON-CRITERIA SUBSTANCES (Cont.)

7	8					9			
	Stack or Exhaust Data					Air Pollution Control Equipment			
								Collection Efficiency	
Reference Number	Stack Height (feet)	Inside Exit Diameter (feet)	Exit Gas Velocity (feet/min)	Exit Gas Volume (acfm**)	Exit Gas Temperature (°F)	Manufacturer and Model Number	Type (use codes 1*)	Design	Actual

** acfm = actual cubic feet per minute

1* AIR POLLUTION CONTROL EQUIPMENT IDENTIFICATION CODES

1. Catalytic afterburner
2. Direct flame afterburner
3. Packed tower
4. Carbon adsorption
5. Refrigerant condenser
6. Refrigerated liquid scrubber

99. Other (specify)

10 Person Completing Form	Date	Registration Number

SECTION 4 SOLVENT DEGREASING OPERATIONS EMITTING NON-CRITERIA SUBSTANCES (Cont.)

11 Reference Number	12 Maximum Hourly Emission Rates (List Emissions of Each Non-Criteria Substance in Pounds per Hour)							13 Basis of Emission Estimates (use codes 1*)
	Trichloroethylene	Benzene	Freon 113					

1* EMISSION ESTIMATION METHOD CODES

1. Stack test
2. Material balance
3. Emission factor

99. Other

Section 5 has three pages; each is a continuation of the information from the page before; fill in as completely as possible, listing all dry cleaning operations.

1. Company Name, Company Address, Registration Number, Facility Operating Schedule, Information for Calendar Year, Person Completing Form, Date. List company name, mailing address, registration number, facility operating schedule for the source as a whole, the year for which the information is given, using the most recent calendar year available, name of person completing form, and date.

2. Dry Cleaning Facility Name, Reference Number. Identify by name the dry cleaning facility for which information is being given (transfer, dry-to-dry). Page 1 of this section should contain only information pertinent to the identified dry cleaning facility. The blank page may be copied and completed for cases where more than one dry cleaning facility exists. A reference number should be assigned to each identified dry cleaning facility which has the potential to emit non-criteria pollutants into the air.

3. Name of Dry Cleaning Solvents Used. List each different solvent used at each dry cleaning facility. Where possible, give identifying names and numbers.

4. Gallons/Year. Give in gallons per year the volume of all dry cleaning solvents consumed at this particular dry cleaning facility in 1984. If volumes are given in pounds per year, indicate this on the questionnaire.

5. Name and Volume Percent of Non-Criteria Substances in Dry Cleaning Solvent. Identify the name and volume percent of each non-criteria substanc contained in each dry cleaning solvent. In the example, Reference Number 2 uses Dupont Freon 113 which contains 100% CFC 113. If the units for nu ber 4 (above) are in pounds per year, give the name and weight percent of each non-criteria substance contained in each ink and solvent and indicat this on the questionnaire.

6. Person Completing Form, Date, Registration Number. Name of person completing form, date and registration number.

7. Reference Number. Use the reference numbers from page 1, with appropriate alphabetic characters to identify the correspondence of stacks/vents to each dry cleaning facility. In the example, reference numbers 2A and 2B are assigned to the two stacks associated with the dry-to-dry dry cleaning facility identified by reference number 2 on page 1.

8. Stack or Exhaust Data.

   a. Stack Height in feet above ground level. If there is no stack or vent as such, estimated height of emission point and state as such. If there are two or more stacks for the same dry cleaning facility, list separately, giving the data for each, using the reference numbers from page 1 with appropriate alphabetic character to show they belong to the same unit.

b. Stack Inside Exit Diameter in feet.

c. Stack Exit Velocity in feet per minute.

d. Stack Gas Exit Volume in actual cubic feet per minute.

e. Stack Gas Temperature of Exit in degrees Fahrenheit.

9. Air Pollution Control Equipment

a. Manufacturer and Model Number. Nameplate data from control equipment

b. Type. Use codes 1* at bottom of page. If type not listed, enter (99) and specify type.

c. Collection efficiency. List the efficiency in percent control that the equipment was designed to control. Also, list the actual percent control if tests have been made to determine the efficiency.

For control measures which are unconventional, note this as such.

10. Person Completing Form, Date, Registration Number. Name of person completing form, date and registration number.

11. Reference Number. Use the reference number from page 1 to identify which emissions result from which facilities.

12. Maximum Hourly Emission Rates. Identify each of the 61 non-criteria substance emitted from your facility by labeling each column with an appropriate substance. Copies of the page may be made and completed for cases where additional columns are necessary. List in pounds per hour the maximum hourly emission rates of each non-criteria substance emitted from the dry cleaning facility identified by the reference number. This is the amount of substance actually emitted into the air, not the amount of material collected by control equipment.

13. Basis of Emission Estimates. Use codes 1* at bottom of page. If basis not listed, enter (99) and specify basis.

SECTION 5 DRY CLEANING OPERATIONS EMITTING NON-CRITERIA SUBSTANCES

1 Company Name	Company Address		Registration Number
Facility Operating Schedule ____ Hours/Day ____ Days/Week ____ Weeks/Year	Information for Calendar Year 19____	Person Completing Form	Date

2 DRY CLEANING FACILITY NAME ________________ REFERENCE NUMBER ________

3 4 5

Dry Cleaning Solvents Used in 1984							
		List Name and Volume % of each Non-Criteria Substance in Dry Cleaning Solvent					
Name	gal/yr	CFC 113					

Person Completing Form	Date	Registration Number
6		

SECTION 5 DRY CLEANING OPERATIONS EMITTING NON-CRITERIA SUBSTANCES (Cont.)

7	8					9			
	Stack or Exhaust Data					Air Pollution Control Equipment			
								Collection Efficiency	
Reference Number	Stack Height (feet)	Inside Exit Diameter (feet)	Exit Gas Velocity (feet/min)	Exit Gas Volume (acfm**)	Exit Gas Temperature (°F)	Manufacturer and Model Number	Type (use codes 1*)	Design	Actual

** acfm = actual cubic feet per minute

1* AIR POLLUTION CONTROL EQUIPMENT IDENTIFICATION CODES
1. Catalytic afterburner
2. Direct flame afterburner
3. Packed tower
4. Carbon adsorption
5. Refrigerant condenser
6. Refrigerated liquid scrubber
99. Other (specify)

SECTION 5 DRY CLEANING OPERATIONS EMITTING NON-CRITERIA SUBSTANCES

1 Company Name	Company Address		Registration Number
Facility Operating Schedule _____ Hours/Day _____ Days/Week _____ Weeks/Year	Information for Calendar Year 19_____	Person Completing Form	Date

2 DRY CLEANING FACILITY NAME ________________________ REFERENCE NUMBER ________________

3 4 5

Dry Cleaning Solvents Used in 1984							
		List Name and Volume % of each Non-Criteria Substance in Dry Cleaning Solvent					
Name	gal/yr	Perchloroethylene					

Person Completing Form	Date	Registration Number
10		

SECTION 5 DRY CLEANING OPERATIONS EMITTING NON-CRITERIA SUBSTANCES (Cont.)

11 Reference Number	12 Maximum Hourly Emission Rates (List Emissions of Each Non-Criteria Substance in Pounds per Hour)								13 Basis of Emission Estimates (use codes 1*)
		Perchloroethylene							

1* EMISSION ESTIMATION METHOD CODES

1. Stack test
2. Material balance
3. Emission factor

99. Other

Section 6 has three pages; each is a continuation of the information from the page before; fill in as completely as possible, listing all printing operations and processes.

1. Company Name, Company Address, Registration Number, Facility Operating Schedule, Information for Calendar Year, Person Completing Form, Date. List company name, mailing address, registration number, facility operating schedule for the source as a whole, the year for which the information is given, using the most recent calendar year available, name of person completing form, and date.

2. Printing Process Name, Reference Number. Identify by name the printing process operation for which information is being given (rotogravure, web offset lithography, etc.). Page 1 of this section should contain only information pertinent to the identified printing process. The blank page may be copied and completed for cases where more than one printing process exists. A reference number should be assigned to each identified printing process which has the potential to emit non-criteria pollutants into the air.

3. Name of Solvent/Ink Used. List each different ink and solvent used for each printing operation, including thinners and cleanup solvents. Where possible, give identifying names and numbers.

4. Gallons/Year. Give in gallons per year the volume of all inks and solvents consumed for this particular printing operation in 1984. If volumes are given in pounds per year, indicate this on the questionnaire.

5. Name and Volume Percent of Non-Criteria Substances in Solvent/Ink. Identify the name and volume percent of each non-criteria substance contained in each ink and solvent. In the example, Johnson's Black Ink #4237 contains 25.55 volume % toluene, and 35.19 volume % Xylene. If the units for number 4 (above) are pounds per year, give name and weight percent of each non-criteria substance contained in each ink and solvent and indicate this on the questionnaire.

6. Person Completing Form, Date, Registration Number. Name of person completing form, date and registration number.

7. Reference Number. Use the reference numbers from page 1, with appropriate alphabetic characters to identify the correspondence of stacks/vents to each printing process. In the example, Reference Numbers 1A, 1B and 1C are assigned to the three stacks associated with the rotogravure printing process identified by Reference Number 1 on page 1.

8. Stack or Exhaust Data.

   a. Stack Height in feet above ground level. If there is no stack or vent as such, estimated height of emission point and state as such. If there are two or more stacks for the same printing process, list separately, giving the data for each, using the reference numbers from page 1 with appropriate alphabetic character to show they belong to the same unit.

b. Stack Inside Exit Diameter in feet.

c. Stack Exit Velocity in feet per minute.

d. Stack Gas Exit Volume in actual cubic feet per minute.

e. Stack Gas Temperature of Exit in degrees Fahrenheit.

9. Air Pollution Control Equipment

a. Manufacturer and Model Number. Nameplate data from control equipment

b. Type. Use codes 1* at bottom of page. If type not listed, enter (99) and specify type.

c. Collection efficiency. List the efficiency in percent control that the equipment was designed to control. Also, list the actual percent control if tests have been made to determine the efficiency.

For control measures which are unconventional, note this as such.

10. Person Completing Form, Date, Registration Number. Name of person completing form, date and registration number.

11. Reference Number. Use the reference number from page 1 to identify which emissions result from which processes.

12. Maximum Hourly Emission Rates. Identify each of the 61 non-criteria substance emitted from your facility by labeling each column with an appropriate substance. Copies of the page may be made and completed for cases where additional columns are necessary. List in pounds per hour the maximum hourly emission rates of each non-criteria substance emitted into the air, not the amount of material collected by control equipment.

13. Basis of Emission Estimates. Use codes 1* at bottom of page. If basis not listed, enter (99) and specify basis.

SECTION 6 GRAPHIC ARTS AND PRINTING OPERATIONS EMITTING NON-CRITERIA SUBSTANCES

1

Company Name	Company Address		Registration Number
Facility Operating Schedule _____ Hours/Day _____ Days/Week _____ Weeks/Year	Information for Calendar Year 19____	Person Completing Form	Date

2 PRINTING PROCESS NAME ____________________ REFERENCE NUMBER 1

3	4	5					
		Solvent/Ink Used in 1984					
		List Name and Volume % of each Non-Criteria Substance in Solvent/Ink					
Name	gal/yr	Toluene	Xylene	Benzene			

Person Completing Form	Date	Registration Number

6

SECTION 6 GRAPHIC ARTS AND PRINTING OPERATIONS EMITTING NON-CRITERIA SUBSTANCES (Cont.)

7 8 9

Reference Number	Stack or Exhaust Data: Stack Height (feet)	Inside Exit Diameter (feet)	Exit Gas Velocity (feet/min)	Exit Gas Volume (acfm**)	Exit Gas Temperature (°F)	Air Pollution Control Equipment: Manufacturer and Model Number	Type (use codes 1*)	Collection Efficiency: Design	Actual

** acfm = actual cubic feet per minute

1* AIR POLLUTION CONTROL EQUIPMENT IDENTIFICATION CODES

1. Catalytic afterburner
2. Direct flame afterburner
3. Packed tower
4. Carbon adsorption
5. Refrigerant condenser
6. Refrigerated liquid scrubber
99. Other (specify)

Person Completing Form	Date	Registration Number
10		

SECTION 6 GRAPHIC ARTS AND PRINTING OPERATIONS EMITTING NON-CRITERIA SUBSTANCES (Cont.)

11	12								13
	Maximum Hourly Emission Rates (List Emissions of Each Non-Criteria Substance in Pounds per Hour)								
Reference Number	Toluene	Xylene	Benzene						Basis of Emission Estimates (use codes 1*)

1* EMISSION ESTIMATION METHOD CODES
1. Stack test
2. Material balance
3. Emission factor
99. Other

APPENDIX B

FACILITY SUMMARIES

APPENDIX B

FACILITY SUMMARIES

The following listing consists of summaries of major facilities and categories reviewed during the screening and prioritization process described in the text of the final report. In total, about 350 facilities and categories were assessed in varying degrees of detail.

During the review, it became apparent that some facilities which could be significant had inadvertantly been omitted as a by-product of the design of the screening procedure. These facilities are listed in Appendix D, and include only those facilities with over 100 employees except potential NESHAPs facilities. The four potential NESHAPs facilities include facilities with employment as low as 10.

One of the SIC codes included in Appendix D is pharmaceutical manufacturing (2834). This category is significant for two reasons: VOC and air toxics. With a hypothetical pharmaceutical plant as a starting point, a sample calculation can be set up to demonstrate how a screening parameter (e.g. S2) is determined. A summary example is presented below.

3120 XXXX Sample Pharmaceutical Facility, Des Moines

FACILITY ID - (RCRA ID)
SIC - 2834
EIS/PS - (brief description of facility and processes included in EIS)
POLLUTANTS LISTED - (from plant comments in EIS)
TSDF DATA - (from TSDF data base plus generator data base if relevant to air toxics emissions sources)
EMISSIONS - (plant-wide by pollutant)
Example: Benzene: 1 ton
Methylene chloride: 10 tons

h' = 1.2 (for an example release height of 30 feet)

$$S2 = \frac{QUP}{(h')^2} \quad \text{(summed for all pollutants)}$$

Where: Q for benzene is 2,000 pounds
Q for methylene chloride is 20,000 pounds
U for benzene is 15
U for methylene chloride is 4.1
P for Des Moines (Polk County) is 303,170

$(h')^2$ is $(1.2)(1.2) = 1.44$

$$\text{Therefore} \quad S2 = \frac{((2{,}000)(15) + (20{,}000)(4.1))(311{,}600)}{1.44}$$

$$\approx 2.4 \times 10^{10}$$

Several observations may be made about these summaries. First, there are numerous potential air toxics facilities in Iowa which manufacture machinery (especially SICs 3523 and 3531). Many of these facilities can be expected to have degreasing, but in many instances degreasing is undocumented if indeed it does exist. Second, there are many miscellaneous plastics processing and manufacturing plants (SIC-3079), most of which are not in Iowa's EIS. Emissions from these plants vary with the processes included, and may in fact be quite small. The limited sources in EIS generally reflect surface coating solvents, and other pollutants such as styrene (e.g. Cedar Manufacturing in Cedar Rapids) could be emitted as well.

Concentrations of air toxics sources in Iowa are rather limited except for Cedar Rapids, Des Moines, and several cities along the Mississippi River (e.g., Clinton/Camanche, Ft. Madison, Muscatine, and Quad Cities). For example, Clinton appears to have a concentration of plastics processing plants, while several 111(d) facilities (sulfuric acid and fluorides) are located in Ft. Madison. Major surface coating operations are located in Waterloo, Des Moines, and several other cities.

Foundries and other metals operations exist throughout Iowa, and especially seem to be concentrated in Keokuk. Such operations can be sources of many trace metals, including manganese. Based on emission factors of 0.003 lb Mn per ton of metal charged for cupolas, one of the most significant facilities appears to be Griffin Pipe in Council Bluffs. Alloy Metal Products and Alcoa, both in Scott County can be expected to be metals sources as well.

Coal-fired power plants can also be expected to be the source of trace metals, including such elements as cadmium, beryllium, arsenic, and chromium. Two of the most significant within Iowa are the George Neal Station in Salix and the Ottumwa station of Iowa Southern Utilities. In both cases, over 2,000,000 tons of coal per year were burned (1984). The metal emissions shown in the summaries reflect this fuel use, as do the reported PICs emissions.

Finally, there appear to be at least three municipal sludge incinerators in Iowa which could be the subject of further investigation. These incinerators are located at:

* Cedar Rapids Water Pollution Control Facility
* Davenport Water Pollution Control Plant
* Dubuque Sewage Treatment Plant

All three plants are currently in EIS. As there may be a large range of heavy metals in sludge to be incinerated (e.g. an order magnitude for many metals), no emissions were estimated for these plants. To evaluate each of the plants, an assessment of each plant's sludge would have to be performed first.

A key to county codes is provided as page B-28.

0180 Union Carbide, Centerville

FACILITY ID - N/A
SIC - 2879 and 3079 (plastic bags and other food casing)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 68 tons
Xylene: 47 tons
Methyl ethyl ketone: 122 tons

0340 0080 John Deere Component Works, Waterloo

FACILITY ID - IADØØ5289806
SIC - 3523
EIS/PS - Farm machinery manufacturing (including an epoxy coating system and degreasing)
POLLUTANTS LISTED - Benzene, asbestos, trichloroethylene
TSDF DATA - Significant waste handling; no handling codes
EMISSIONS - Trichloroethylene: 3 tons
Xylene: 3.6 tons
Toluene: 8.8 tons
Methyl ethyl ketone: 1.7 tons
h' = 2
h" = 1.56

0340 0083 John Deere Engine Works, Waterloo

FACILITY ID - IADØØØ6714Ø4
SIC - 3519
EIS/PS - Diesel engine production (including paint booths)
POLLUTANTS LISTED - Toluene, mineral spirits
TSDF DATA - Primarily container storage
EMISSIONS - Xylene: 7.8 tons
Methyl ethyl ketone: 1.2 tons
Toluene: 6.6 tons
h' = N/A
h" = 1.64

0340 0084 John Deere Tractor Works, Waterloo

FACILITY ID - N/A
SIC - 3523
EIS/PS - Tractor production (including spray booths)
POLLUTANTS LISTED - Antimony, cadmium, chlorobenzene, chloroform, formaldehyde, methylene chloride, nickel, phenol, PCBs, toluene
TSDF DATA - Substantial wastes, primarily container storage
EMISSIONS - Benzene: 5.1 tons
Toluene: 288 tons
Xylene: 116 tons
Methyl ethyl ketone: 54 tons

0340 0155 Waterloo Industries, Waterloo

FACILITY ID - IADØØ5277959
SIC - 3499 (EIS/PS); also 2599, 3444, and 3469
EIS/PS - Cabinet production (including paint, spray booths, and baking ovens)
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 79 tons
Xylene: 32 tons
Methyl ethyl ketone: 15 tons
h' = N/A
h" = 1.12

0340 Clay Equipment, Cedar Falls

FACILITY ID - N/A
SIC - 3523 (Farm equipment)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Benzene: 0.06 tons
Toluene: 4.3 tons
Xylene: 1.6 tons
Methyl ethyl ketone: 0.8 tons
Trichloroethylene: 2.6 tons

0340 Control-O-Fax, Waterloo

FACILITY ID - N/A
SIC - 3079
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 36 tons
Xylene: 25 tons
Methyl ethyl ketone: 65 tons

0340 Black Hawk County Landfill

FACILITY ID - IADØ75848085
THROUGHPUT - 477 tons/day
TYPE OF DISPOSAL - Co-disposal (historically)
EMISSIONS - Toluene: 16.4 tons
Xylene: 4.3 tons
Perchloroethylene: 34.1 tons

0340 Waterloo POTW

THROUGHPUT - 17 mgd
PLANT-SPECIFIC POLLUTANT CONCENTRATIONS - N/A

EMISSIONS (over 1 ton) - Chloroform: 5.3 tons
Ethyl benzene: 2.6 tons
Toluene: 7.0 tons
Xylene: 4.6 tons

0420 Koehring Crane and Excavator, Waverly

FACILITY ID - N/A
SIC - 3531 (excavator and crane manufacturing)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Benzene: 0.27 tons
Toluene: 94 tons
Xylene: 38 tons
Methyl ethyl ketone: 18 tons
Trichloroethylene: 1.3 tons
Methyl chloroform: 0.66 tons

0680 0035 Lehigh Portland Cement, Mason City

FACILITY ID - IAPØØØØØØØ2
SIC - 3241
EIS/PS - Cement production
POLLUTANTS LISTED: N/A
TSDF DATA - N/A
EMISSIONS - Nickel: 0.05 tons
Manganese: 0.03 tons
Chromium: 0.007 tons

0680 0060 Northwestern States Portland Cement, Mason City

FACILITY ID - N/A
SIC - 3241
EIS/PS - Cement production
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Chromium: 0.005 tons
Manganese: 0.02 tons
Nickel: 0.04 tons

0680 David Manufacturing, Mason City

FACILITY ID - N/A
SIC - 3523 (produces grain stirring machinery and parts)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Benzene: 0.06 tons
Toluene: 4.3 tons
Xylene: 1.6 tons
Methyl ethyl ketone: 0.8 tons
Trichloroethylene: 26 tons

0940 0020 Chemplex, Clinton

FACILITY ID - IADØ45372836
SIC - 2821
EIS/PS - Polyethylene production and plastic resins
POLLUTANTS LISTED - Asbestos, benzene, acetonitrile, chloroform
TSDF DATA - Numerous wastes (chloroform, trichlorofluoromethane, methanol, etc.) stored in containers.
EMISSIONS - Neglible amounts of emissions occur as a result of waste handling. Depending on the uses of the materials listed, other air toxics emissions may also occur; polyethylene production results primarily in emissions of monomer.
h' = 1
h" = 1

0940 0065 Hawkeye Chemical, Camanche

FACILITY ID - N/A
SIC - 2873
EIS/PS - Primarily ammonium nitrate production
POLLUTANTS LISTED - Formaldehyde, nickel
TSDF DATA - N/A
EMISSIONS - This facility may be a formaldehyde source if it is involved in the production of solid urea and ureaform fertilizers. Available information implies that it is not involved in these operations.

0940 0075 Interstate Power, Clinton

FACILITY ID - N/A
SIC - 4911
EIS/PS - Electric power generation (including coal-fired boilers)
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Cadmium: 0.048 tons
Beryllium: 0.38 tons
Arsenic: 0.095 tons
Chromium: 0.27 tons
PIC's: 0.099 tons
h' = 9.8
h" = 9.8

0940 DuPont, Camanche

FACILITY ID - N/A
SIC - 3079
EIS/PS - Film and cellophane manufacturing
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 53 tons
Xylene: 37 tons
Methyl ethyl ketone: 113 tons

0940 Carlon, Clinton

FACILITY ID - N/A
SIC - 3079 (plastic fittings and electric conduits)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 45 tons
Xylene: 31 tons
Methyl ethyl ketone: 80 tons

0940 Custom Pak, Clinton

FACILITY ID - N/A
SIC - 3079 (plastic carrying cases and other miscellaneous products)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 29 tons
Xylene: 20 tons
Methyl ethyl ketone: 52 tons

1140 0023 Prestolite Battery, Manchester

FACILITY ID - IADØ69619765
SIC - 3691
EIS/PS - Battery manufacturing (no degreasing indicated)
POLLUTANTS LISTED - Arsenic, lead, methylene chloride
TSDF DATA - Primarily container storage
EMISSIONS - (Other than lead) - Manganese: 2.2 tons

1200 Freeman Resins, Burlington (H.H. Robertson)

FACILITY ID - N/A
SIC - 2821 (resins, urethane prepolymers, and highway expansion joint fillers)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Benzene: 0.2 tons
Toluene: 0.03 tons
Chlorobenzene: 0.6 tons
Acrylonitrile: 8.8 tons

1280 0065 John Deere, Dubuque

FACILITY ID - IADØØ5269527
SIC - 3531
EIS/PS - Farm machinery (including degreasing and paint booths)
POLLUTANTS LISTED - Antimony, chlorobenzene, fluorides, trichloroethylene, methylchloroform, formaldehyde, PCBs, toluene, asbestos, xylenes,

lead, radionuclides, manganese, methyl chloroform, methylene chloride, perchloroethylene, phenol

TSDF DATA - N/A
EMISSIONS - Trichloroethylene: 22 tons
Methlyl chloroform: 12 tons
Toluene: 150 tons
Methyl ethyl ketone: 28 tons
Xylene: 60 tons
h' = 1.28
h" = 1.40

1280 0105 Koch Sulfur Products (U.S. Industrial Chemicals), Dubuque

FACILITY ID - N/A
SIC - 2819
EIS/PS - Sulfuric acid production
POLLUTANTS LISTED - Asbestos
TSDF DATA - N/A
EMISSIONS - Sulfuric acid: 0.6 tons
h" = 3.6

1280 Regency Thermographers, Dubuque

FACILITY ID - N/A
SIC - 2752 (Commercial printing and thermography)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 18 tons
Methyl ethyl ketone: 2.4 tons
Methylene chloride: 3.4 tons

1480 0050 White Farm Equipment, Charles City

FACILITY ID - IADØ6521734
SIC - 3523
EIS/PS - Farm machinery (including paint booths and some degreasing <u>without</u> <u>throughputs</u>)
POLLUTANTS LISTED - Radionuclides
TSDF DATA - N/A
EMISSIONS - Toluene: 5.6 tons
Methyl ethyl ketone: 1.0 tons
Xylene: 2 tons
h' = N/A
h" = 1.40

1560 Sukup Manufacturing, Sheffield

FACILITY ID - N/A
SIC - 3523 (agricultural heaters and handling equipment)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Benzene: 0.05 tons
Toluene: 3.7 tons
Xylene: 1.4 tons
Methyl ethyl ketone: 0.6 tons
Trichloroethylene: 2.3 tons

1660 Norwesco Industries, Grundy Center

FACILITY ID - N/A
SIC - 3079 (molded plastic parts)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 18 tons
Xylene: 13 tons
Methyl ethyl ketone: 33 tons

1660 Ritchies Industries, Conrad

FACILITY ID - N/A
SIC - 3523 (valves, space heaters, and miscellaneous products)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Benzene: 0.08 tons
Toluene: 5.3 tons
Xylene: 2 tons
Methyl ethyl ketone: 0.9 tons
Trichloroethylene: 32 tons

1980 Kinze Manufacturing, Williamsburg

FACILITY ID - N/A
SIC - 3523 (seed planters)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Benzene: 0.08 tons
Toluene: 5.3 tons
Xylene: 2 tons
Methyl ethyl ketone: 0.9 tons
Trichloroethylene: 32 tons

2060 0050 Maytag Co., Newton

FACILTY ID - IAT2ØØØ1Ø585
SIC - 3633
EIS/PS - Appliance manufacture (spray booths, dipping and painting tanks, but no documented degreasing)
POLLUTANTS LISTED - Methyl chloroform, antimony, bromine, cadmium, fluorine, manganese, trichloroethylene, and other organic materials
TSDF DATA - Substantial tank storage of characteristic waste (D002)
EMISSIONS - Toluene: 4000 tons
Xylene: 1620 tons
Methyl ethyl ketone: 756 tons
h' = 1.6
h" = 1.6

2060 Vernon Co., Newton

FACILITY ID - N/A
SIC - 2752 (signs, calendars, and advertising materials)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 63 tons
Methyl ethyl ketone: 0.9 tons
Trichloroethylene: 32 tons

2120 0125 H.P. Smith Paper Co., Iowa City

FACILITY ID - N/A
SIC - 2621
EIS/PS - Paper production (including coating operations)
POLLUTANTS LISTED - N/A
TSDF DATA - Primarily container storage of non-halogenated solvent wastes
EMISSIONS - Diethylbenzene: 19 tons
Ethylbenzene: 17 tons
Methyl ethyl ketone: 28 tons

2120 Sheller Globe, Iowa City

FACILITY ID - N/A
SIC - 3079 (automotive foam and padded and plastisol safety products)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 217 tons
Xylene: 151 tons
Methyl ethyl ketone: 389 tons

2240 0015 Agrico Chemical, Ft. Madison

FACILITY ID - N/A
SIC - 2873
EIS/PS - Sulfuric acid production
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Sulfuric acid: 16.8 tons
Fluorides: 1.2 tons
h' = N/A
h" = 6

2240 0030 Chevron Chemical Division (Ortho), Ft. Madison

FACILITY ID - IADØØ5173992
SIC - 2873
EIS/PS - Phosphate fertilizer production (ammonia and nitrogen based)
POLLUTANTS LISTED - N/A
TSDF DATA - Primarily container storage of P039
EMISSIONS - The Directory of Chemical Producers indicates that this facility produces urea. As such, it would probably be a source of formaldehyde; insufficient information is available for the calculation of formaldehyde emissions.
Fluorides: 0.4 tons

2240 0102 Climax Molybdenum, Ft. Madison

FACILITY ID - N/A
SIC - 2819
EIS/PS - Sulfuric acid, tungsten, and ammonia compounds production
POLLUTANTS LISTED - NA
TSDF DATA - N/A
EMISSIONS - As a sulfuric acid producer, this facility is presumably a sulfuric acid source. However, there was insufficient information to calculate emissions. It is not now apparently regulated under Section 111(d) NSPS.

2280 0055 Cherry Burrell, Cedar Rapids

FACILITY ID - N/A
SIC - 3999
EIS/PS - Food equipment manufacture (including paint booth and degreasing)
POLLUTANTS LISTED - Trichloroethylene
TSDF DATA - N/A
EMISSIONS - Xylene: 1 ton
Trichloroethylene: 3 tons
h' = 1
h" = 1.32

2280 0061 Rockwell Collins, Cedar Rapids*

FACILITY ID - N/A
SIC - 3679
EIS/PS - Electronic equipment (including numerous spray booths, but no documented degreasing)
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 1.5 tons
Xylene: 5.4 tons
Methyl ethyl ketone: 3.5 tons
Methylene chloride: 75 tons
Trichloroethylene: 55 tons
h' = 1
h" = 2.1
*Emissions determined in part from Linn County inspection report (USEPA/Region VII, 1979).

2280 0081 FMC Corporation, Cedar Rapids*

FACILITY ID - N/A
SIC - 3523
EIS/PS - Machinery production
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Perchloroethylene: 1.3 tons
Toluene: 12 tons
Xylene: 8 tons
Methyl ethyl ketone: 21 tons
h' = 1
h" = 1
*Emissions determined in part from Linn County inspection report (USEPA Region VII, 1979).

2280 0095 Cryovac (W.R. Grace), Cedar Rapids

FACILITY ID - IADØ22Ø17112
SIC - 3079
EIS/PS - Printing presses for plastics
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Diethylbenzene: 6.9 tons
Methanol: 6 tons
Ethylbenzene: 6 tons
h'= 1.04
h"= 1.04

2280 0130 Iowa Manufacturing, Cedar Rapids

FACILITY ID - N/A
SIC - 3531
EIS/PS - Road equipment manufacturing (including paint booth)
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 23 tons
Xylene: 2.4 tons
h' = 1

2280 0155 Rockwell Graphic Systems Division, Cedar Rapids

FACILITY ID - N/A
SIC - 3861
EIS/PS - Paint shops and printing presses
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Xylene: 5.2 tons
Toluene: 5.2 tons
Methyl ethyl ketone: 13.2 tons
Perchloroethylene: 13.2 tons
Methyl isobutyl ketone: 6.6 tons
h'= 1
h"= 1

2280 0200 Quaker Oats, Cedar Rapids

NOTE - Quaker Oats' air toxics emissions are primarily furfural for which there is insufficient health-related information.

2280 0230 Square D, Cedar Rapids

FACILITY ID - N/A
SIC - N/A
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Trichloroethylene: 19 tons
Xylene: 14 tons

2280 Cedar Manufacturing, Cedar Rapids*

FACILITY ID - N/A
SIC - 3261 (laminated plastic tub and shower enclosures)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Styrene: 30 tons
*Emissions taken from Linn County inspection report (USEPA/Region VII, 1979).

2280 Fischer Printers, Cedar Rapids

FACILTY ID - N/A
SIC - 2752 (printing)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 20 tons
Methyl ethyl ketone: 2.0 tons
Methylene chloride: 3.8 tons

2280 Universal Hammermill

FACILITY ID - N/A
SIC - 3523 (rubbish and automobile shredders)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Benzene: 0.13 tons
Toluene: 8.8 tons
Xylene: 3.3 tons
Methyl ethyl ketone: 1.6 tons
Trichloroethylene: 54 tons

2280 Cedar Rapids POTW

THROUGHOUT - 35 mgd
PLANT-SPECIFIC POLLUTANT CONCENTRATIONS - N/A
EMISSIONS (over 1 ton) - Chloroform: 10.9 tons
Ethyl benzene: 5.3 tons
Toluene: 14.5 tons
Trichloroethylene: 1.1 tons
Xylene: 94 tons

2380 International Material Handling Equipment, University Park

FACILTY ID - N/A
SIC - 3523 (aggregate material handling equipment)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Benzene: 0.05 tons
Toluene: 3.7 tons
Xylene: 1.4 tons
Methyl ethyl ketone: 0.6 tons
Trichloroethylene: 23 tons

2460 Vermeer, Pella

FACILITY ID - N/A
SIC - 3531 (treemovers, stump cutters, and other equipment)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Benzene: 0.3 tons
Toluene: 108 tons
Xylene: 44 tons
Methyl ethyl ketone: 21 tons
Trichloroethylene: 1.5 tons

2480 0135 Marshalltown Trowel

FACILITY ID - N/A
SIC - 3423
EIS/PS - Trowels and other hand tools (including degreasing)
POLLUTANTS LISTED - N/A
TSDF DATA - Primarily container storage
EMISSIONS - Trichloroethylene: 150 tons
h'= 1

2740 0036 North Star Steel, Wilton

FACILITY ID - N/A
SIC - 3312
EIS/PS - Steel making
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - There is insufficient information to calculate emissions. However, it is known that North Star Steel has an electric arc furnace which can be expected to produce emissions of both chromium and manganese.

2740 0045 Monsanto, Muscatine

FACILITY ID - IADØØ5273594
SIC - 2821
EIS/PS - Production of ABS resins
POLLUTANTS LISTED - Acetylchloride, chlorobenzene, ethyldichloride, styrene, cicrylonitrile, butadiene, formaldehyde
TSDF DATA - Substantial container storage and incineration of characteristic waste (over 2,000,000 kg)
EMISSIONS - Benzene: 9.3 tons
Toluene: 1.3 tons
Chlorobenzene: 16.3 tons
Acrylonitrile: 429 tons
h' = 1.8
h" = 2.0

NOTE - Acrylonitrile estimate is taken from the 1985 USEPA inspection report.

2740 Letica, Muscatine

FACILITY ID - N/A
SIC - 3079 (plastic industrial shipping containers)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 21 tons
Xylene: 15 tons
Methyl ethyl ketone: 37 tons

2740 Thatcher Plastic Packaging, Muscatine

FACILITY ID - N/A
SIC - 3079 (plastic injection molding and squeeze tubes)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 81 tons
Xylene: 56 tons
Methyl ethyl ketone: 145 tons

3120 0010 American Can, Des Moines

FACILITY ID - IADØØ181327
SIC - 3079
EIS/PS - Plastics production (including extruders, printing presses, and laminators)
POLLUTANTS LISTED - Toluene
TSDF DATA - Container storage of non-halogenated solvents
EMISSIONS - American Can does not appear to be producing polymerized plastics, but rather printing on plastic which is supplied to them.
Toluene: 63 tons
Xylene: 44 tons
Methyl ethyl ketone: 113 tons
h"= 1

3120 0250 Firestone Tire and Rubber, Des Moines

FACILITY ID - IADØ73494296
SIC - 3011
EIS/PS - Pneumatic tire manufacturing (including green tire spraying with both water-based and solvent-based coatings, cementing operations, and incinerator of class "O" rubber oil
POLLUTANTS LISTED - N/A
TSDF DATA - Less than 1 ton of container storage of halogenated solvents; other storage is of characteristic waste
EMISSIONS - Benzene: 3.4 tons
Toluene: 1.4 tons
h'= 1.08
h"= 1.08

3120 0390 John Deere, Des Moines

FACILITY ID - IADØ696245ØØ
SIC - 3523
EIS/PS - Farm equipment manufacturing (including vapor degreasing, zinc and chrome platers, heat treating furnaces, paint spray booths and dip tanks)
POLLUTANTS LISTED - Chromium, benzene, lead, methyl chloroform, PCBs, toluene, and xylene
TSDF DATA - Generally oriented towards characeristic wastes
EMISSIONS - Point 1 is specifically designated as a methyl chloroform degreaser emitting a total of 3,000 tons.

Methyl chloroform: 3000 tons
Toluene: 39 tons
Benzene: 1.9 tons
Xylene: 2.9 tons
Methyl ethyl ketone: 1.4 tons

h'= 1.76
h"= 1.60

3120 0410 Monarch Cement, Des Moines

FACILITY ID - N/A
SIC - 3241
EIS/PS - Cement production (including kilns and other typical processes)
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Nickel: 0.005 tons
Chromium: 0.0006 tons
Manganese: 0.003 tons

3120 0420 Meredith Printing, Des Moines

FACILITY ID - IADØØ5279799
SIC - 2751
EIS/PS - Commercial printing (web offset and rotogravure, plus unspecified degreasing solvents and one chrome plater)
POLLUTANTS LISTED - Toluene
TSDF DATA - N/A, though the facility generates characteristic wastes and non-halogenated solvent wastes, including toluene.
EMISSIONS - Methylene chloride: 44 tons
Toluene: 233 tons
Methyl ethyl ketone: 31 tons

h'= 2.04
h"= 1

3120 Commercial Printing, Des Moines

FACILITY ID - N/A
SIC - 2752 (commercial printing)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 18 tons
Methyl ethyl ketone: 2.4 tons
Methylene chloride: 3.4 tons

3120 Delevan, West Des Moines

FACILITY ID - N/A
SIC - 3523 (Industrial and agricultural equipment)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Benzene: 0.18 tons
Toluene: 12.3 tons
Xylene: 4.6 tons
Methyl ethyl ketone: 2.1 tons
Trichloroethylene: 75 tons

3120 En-Save, Grimes

FACILITY ID - N/A
SIC - 3523 (water conditioning systems)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Benzene: 0.05 tons
Toluene: 3.6 tons
Xylene: 1.3 tons
Methyl ethyl ketone: 0.6 tons
Trichloroethylene: 22 tons

3120 Little Giant and Shovel, Des Moines

FACILITY ID - N/A
SIC - 3531 (industrial and construction equipment)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Benzene: 0.05 tons
Toluene: 19 tons
Xylene: 7.9 tons
Methyl ethyl ketone: 3.7 tons
Trichloroethylene: 26 tons

3120 Mid-Central Plastic, West Des Moines

FACILITY ID - N/A
SIC - 3079 (plastic injection molding and extrusions)
EIS/PS -N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 18 tons
Xylene: 13 tons
Methyl ethyl ketone: 33 tons

3120 Stone Container, Des Moines

FACILITY ID - N/A
SIC - 3079 (polyethylene and multi-wall bags, grocery, and shopping sacks)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 58 tons
Xylene: 41 tons
Methyl ethyl ketone: 105 tons

3120 POLK COUNTY - AREA SOURCES

The following description provides the key assumptions and the results of the area source analyses.

Dry Cleaning
- Total solvent use in Iowa (1984): 192,073 gallons
- 191 facilities in Iowa, including 35 in Polk County
- Total solvent use in Polk County (1984): 469,660 lbs
- 0.275 lb emitted/lb used
- Emissions -Perchloroethylene: 64.6 tons (Polk County)
  -Perchloroethylene: 1.84 tons (Single Facilty)

Mobile Sources
- 97% light duty vehicles, 3% heavy duty vehicles
- No light duty diesel trucks
- Annual VMT of sample arterial is 19,929,000 (over a two-mile link)
- Light duty vehicles are categorized as follows: LDGV -85.7%; LDGTI -9.0%; and LDGT2 -5.3%
- Annual VMT for Polk County (1983): 2,076,460,000
- Emissions - (Polk County)
  -Benzene: 82 tons
  -PICs: 2.3 tons
  -Toluene: 459 tons
  -Xylene: 147 tons
  -Butyl-benzene: 2.2 tons
  -Trimethyl benzene: 84 tons
  -Ethyl benzene: 33 tons
  -Formaldehyde: 306 tons
  - Arterial
  -Benzene: 0.79 tons
  -PICs: 0.022 tons
  -Toluene: 4.4 tons
  -Xylene: 1.4 tons
  -Butyl-benzene: 0.02 tons
  -Trimethyl benzene: 0.8 tons
  -Ethyl benzene: 0.3 tons
  -Formaldehyde: 2.9 tons

Service Stations
- Total gallons purchased in Iowa (7/84-7/85): 933,000,000 gallons
- Percentage of Iowa fleet in Polk County: 10.5%
- VOC emission factor: 20.0 lb/10^3 gallons throughput (submerged filling)

Service Stations - (continued)
- 164 service stations in Polk County
- Emissions (Polk County) -Benzene: 23.5 tons
  -Toluene: 138 tons
  -Xylene: 133 tons
  -Total vapors: 980 tons
- (Single Facility) -Benzene: 0.14 tons
  -Toluene: 0.84 tons
  -Xylene: 0.81 tons
  -Total vapors: 6.0 tons

3120 Metro East Landfill (Polk County)

FACILITY ID - N/A
THROUGHPUT - 1200 tons/day
TYPE OF DISPOSAL - Municipal waste
EMISSIONS - Toluene: 8.8 tons
Xylene: 2.3 tons
Perchloroethylene: 18.2 tons

3120 Des Moines POTW

THROUGHPUT - 35 mgd (assumed)
PLANT-SPECIFIC POLLUTANT CONCENTRATIONS
- Methyl chloroform: 25 ug/l
- 1,1,2 trichloroethane: 21 ug/l
- 1,2 trans-dichloroethylene: 1.4 ug/l
- Ethyl benzene: 200 ug/l
- Methylene chloride: 22 ug/l
- Dimethyl benzene: 360 ug/l
- 1,1,2,2 tetrachloroethane: 3.4 ug/l
- Chlorobenzene: 3.0 ug/l

EMISSIONS (over 1 ton) - Methyl chloroform: 1.3 tons
1,1,2 trichloroethane: 1.1 tons
Chloroform: 10.9 tons
Ethyl benzene: 10.6 tons
Methylene Chloride: 1.2 tons
Toluene: 14 tons
Xylene: 19 tons

3140 0015 Iowa Power & Light Council Bluffs

FACILITY ID - N/A
SIC - 4911
EIS/PS - Electric power generation (including coal-fired boilers)
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Cadmium: .063 tons
Beryllium: .50 tons
Arsenic: .13 tons
Chromium: .36 tons
PIC's: 0.45 tons
h' = 22
h" = 22

3140 0095 Griffin Pipe Products - Council Bluffs

FACILITY ID - IADØ22Ø79446
SIC - 3321
EIS/PS - Cast iron production (including cupola)
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Manganese: 1.5 tons

3140 Cresline Plastic Pipe, Council Bluffs

FACILITY ID - N/A
SIC - 3079 (plastic pipe manufacturing)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 18 tons
Xylene: 13 tons
Methyl ethyl ketone: 33 tons

3140 Future Foam, Council Bluffs

FACILITY ID - N/A
SIC - 3079 (polyurethane foam and carpet underlay)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 23 tons
Xylene: 16 tons
Methyl ethyl ketone: 42 tons

3140 Omaha Standard, Council Bluffs

FACILITY ID - N/A
SIC - 3523 (hoist manufacturing)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Benzene: 0.05 tons
Toluene: 3.6 tons
Xylene: 0.6 tons
Methyl ethyl ketone: 0.6 tons
Trichloroethylene: 22 tons

3160 Farmhand, Grinnell

FACILITY ID - N/A
SIC - 3523 (agricultural equipment)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Benzene: 0.05 tons
Toluene: 37 tons
Xylene: 1.4 tons
Methyl ethyl ketone: 0.6 tons
Trichloroethylene: 23 tons

3280 0005 Alloy Metal Products, Davenport

FACILITY ID - N/A
SIC - 3341
EIS/PS - Production of nickel alloys including electronic furnace
POLLUTANTS LISTED - Nickel
TSDF DATA - N/A
EMISSIONS - Alloy Metal Products is a potential manganese and nickel source; there was, however, insufficient information to calculate emissions.

3280 0030 Caterpillar Tractor, Bettendorf

FACILITY ID - IADØØ5262639
SIC - 3531
EIS/PS - Farm equipment manufacturing (paint booths but no documented degreasing)
POLLUTANTS LISTED - Xylenes, asbestos, methyl chloroform
TSDF DATA - Almost 15 mkg of characteristic waste handled (TO5)
EMISSIONS - Toluene: 3.7 tons
Xylene: 1.7 tons
Methyl ethyl ketone: 0.3 tons
h"= 1

3280 0105 J.I. Case, Bettendorf

FACILITY ID - IADØØ5265863
SIC - 3531
EIS/PS - Construction equipment manufacturing (paint booths but no documented degreasing)
POLLUTANTS LISTED - Lead, methyl chloroform, methylene chloride, xylene, PCBs
TSDF DATA - N/A
EMISSIONS - Benzene: 4.7 tons
Methyl ethyl ketone: 3.9 tons
Xylene: 4.8 tons
Toluene: 11.4 tons
h'= 1.4
h"= 1.6

3280 0106 John Deere, Davenport

FACILITY ID - IADØ73489726
SIC - 3531
EIS/PS - Farm machinery production (paint booths but no documented degreasing)
POLLUTANTS LISTED - Lead, hydrogen fluoride, methyl chloroform, phenol
TSDF DATA - Over 37,000 kg of characteristic waste handled (TO5)
EMISSIONS - Toluene: 70 tons
Xylene: 28 tons
Methyl ethyl ketone: 13 tons
h" = 2.2

3280 0150 Occidental Chemical, Buffalo

FACILITY ID - IADØ91382648
SIC - 2819
EIS/PS - Fluorides processing (calcium phosphates and hydrofluosilicic acid)
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Fluorides: 4.6 tons
h"= 1

3280 0160 Alcoa, Riverdale (Davenport)

FACILITY ID - IADØØ5270160
SIC - 3353/3362
EIS/PS - Aluminum products manufacturing processes
POLLUTANTS LISTED - Perchloroethylene, aluminum
TSDF DATA - N/A, but generated nearly 50,000 kg of halogenated solvent waste
EMISSIONS - As a secondary aluminum processing facility, Alcoa is a potential source of nickel as well as other trace metals. There was, however, insufficient information available to calculate emissions.

3280 0206 Caterpillar Tractor, Davenport

FACILITY ID - IADØ49997125
SIC - 3531
EIS/PS - Farm machinery manufacturing (including paint booths but no documented degreasing)
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 1481 tons
Xylene: 599 tons
Methyl ethyl ketone: 280 tons
h"= 1.6

3280 0210 Davenport Cement, Buffalo

FACILITY ID - N/A
SIC - 3241
EIS/PS - Cement manufacturing (including kiln)
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Nickel: 0.09 tons
Chromium: 0.012 tons
Manganese: 0.05 tons
h'= 11.6
h"= 11.6

3280 Davenport POTW

THROUGHPUT - 20 mgd
PLANT-SPECIFIC POLLUTANT CONCENTRATIONS - N/A

EMISSIONS (over 1 ton) - Chloroform: 6.2 tons
Ethyl benzene: 3.1 tons
Toluene: 8.3 tons
Xylene: 54 tons

3380 Dethmers Manufacturing, Boyden
FACILITY ID - N/A
SIC - 3523 (miscellaneous garden and lawn products)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Benzene: 0.06 tons
Toluene: 4.3 tons
Xylene: 1.6 tons
Methyl ethyl ketone: 0.8 tons
Trichloroethylene: 26 tons

3680 0027 Iowa Southern Utilities, Ottumwa

FACILITY ID - N/A
SIC - 4911
EIS/PS - Electric power generation (including coal-fired boilers)
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Cadmium: 0.05 tons
Beryllium: 0.40 tons
Arsenic: 0.10 tons
Chromium: 0.28 tons
PICs: 0.38 tons
h' = 24
h" = 24

3680 0030 John Deere, Ottumwa

FACILITY ID - IADØØ5291182
SIC - 3523
EIS/PS - Farm machinery manufacturing (including several paint spray booths, an incinerator with an undocumented fuel, and no documented degreasing)
POLLUTANTS LISTED - Asbestos, lead, cadmium, nickel, phenol, methylene chloride
TSDF DATA - Substantial generation and treatment of characteristic waste
EMISSIONS - Toluene: 73 tons
Xylene: 29 tons
Methyl ethyl ketone: 14 tons
h" = 1

3700 Herschel, Indianola

FACILITY ID - N/A
SIC - 3523 (agricultural machinery)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Benzene: 0.12 tons
Toluene: 8.4 tons
Xylene: 3.1 tons
Methyl ethyl ketone: 8.5 tons
Trichloroethylene: 51 tons

4020 0190 George Neal Station, Salix

FACILITY ID - N/A
SIC - 4911
EIS/PS - Electric power generation (including coal-fired boilers)
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Cadmium: 0.053 tons
Beryllium: 0.43 tons
Arsenic: 0.11 tons
Chromium: 0.30 tons
PICs: 0.60 tons
h' = 12
h" = 12

4020 Weller Plastics, Sioux City

FACILITY ID - N/A
SIC - 3079 (miscellaneous plastic products)
EIS/PS - N/A
POLLUTANTS LISTED - N/A
TSDF DATA - N/A
EMISSIONS - Toluene: 19 tons
Xylene: 13 tons
Methyl ethyl ketone: 34 tons

IOWA COUNTY CODE

0020	ADAIR	2100	JEFFERSON
0040	ADAMS	2120	JOHNSON
0100	ALLAMAKEE	2140	JONES
0180	APPANOOSE	2180	KEOKUK
0240	AUDUBON	2220	KOSSUTH
0300	BENTON	2240	LEE
0340	BLACK HAWK	2280	LINN
0400	BOONE	2300	LOUISA
0420	BREMER	2320	LUCAS
0440	BUCHANAN	2340	LYON
0460	BUENA VISTA	2360	MADISON
0500	BUTLER	2380	MAHASKA
0520	CALHOUN	2460	MARION
0560	CARROLL	2480	MARSHALL
0580	CASS	2540	MILLS
0600	CEDAR	2580	MITCHELL
0680	CERRO GORDO	2600	MONONA
0760	CHEROKEE	2620	MONROE
0780	CHICKASAW	2640	MONTOMGERY
0840	CLARKE	2740	MUSCATINE
0860	CLAY	2820	O'BRIEN
0880	CLAYTON	2940	OSCELOA
0940	CLINTON	3000	PAGE
0980	CRAWFORD	3020	PALO ALTO
1040	DALLAS	3080	PLYMOUTH
1080	DAVIS	3100	POCAHONTAS
1100	DECATUR	3120	POLK
1140	DELAWARE	3140	POTTAWATTAMIE
1200	DES MOINES	3160	POWESHIEK
1240	DICKINSON	3200	RINGGOLD
1280	DUBUQUE	3240	SAC
1360	EMMET	3280	SCOTT
1460	FAYETTE	3300	SHELBY
1480	FLOYD	3380	SIOUX
1560	FRANKLIN	3480	STORY
1580	FREMONT	3520	TAMA
1620	GREENE	3540	TAYLOR
1660	GRUNDY	3600	UNION
1680	GUTHRIE	3640	VAN BUREN
1700	HAMILTON	3680	WAPELLO
1740	HANCOCK	3700	WARREN
1760	HARDIN	3740	WASHINGTON
1800	HARRISON	3820	WAYNE
1840	HENRY	3840	WEBSTER
1860	HOWARD	3960	WINNEBAGO
1900	HUMBOLDT	3980	WINNESHIEK
1920	IDA	4020	WOODBURY
1980	IOWA	4040	WORTH
2040	JACKSON	4060	WRIGHT
2060	JASPER		

APPENDIX C

RANKING OF SOURCES

The following three tables are presented in the following order:

Table C-1 - S1 Values (total carcinogenic potential)
Table C-2 - S2 Values (local carcinogenic potential)
Table C-3 - S3 Values (local non-carcinogenic potential)

The reader is urged to review the text of this report to properly interpret the results.

TABLE C-1

SUMMARY OF S1 VALUES

"TOTAL" CARCINOGENIC SCREENING VALUES

Polk County Mobile Sources (w/PIC's)	2.0×10^8
Monsanto, Muscatine	6.1×10^7
George Neal Station, Salix	6.0×10^7
Iowa Power & Light, Council Bluffs	4.9×10^7
Iowa Southern Utilities, Ottumwa	4.0×10^7
Interstate Power, Clinton	1.6×10^7
John Deere, Des Moines	2.8×10^6
Polk County-Single Arterial (w/PIC's)	1.9×10^6
Service Stations in Polk County (using "gasoline vapor" U value)	1.5×10^6
Freeman Resins, Burlington	7.6×10^5
Rockwell Collins, Cedar Rapids	7.6×10^5
Polk County POTW	7.3×10^5
Cedar Rapids POTW	6.2×10^5
Davenport POTW	4.2×10^5
Marshalltown Trowel, Marshalltown	3.9×10^5
Waterloo POTW	3.6×10^5
Davenport Cement, Buffalo	2.9×10^5
Delevan, West Des Moines	2.0×10^5
Lehigh Portland Cement, Mason City	1.7×10^5
John Deere Tractor Works, Waterloo	1.5×10^5
Universal Hammermill, Cedar Rapids	1.4×10^5
Herschel, Indianola	1.4×10^5

(Table C-1 continued)

Northwestern States Portland Cement, Mason City	1.2×10^5
Firestone Tire & Rubber, Des Moines	1.0×10^5
Ritchies Industries, Conrad	8.6×10^4
Kinze Manufacturing, Williamsburg	8.6×10^4
Meredith Printing, Des Moines	8.8×10^4
Vernon Co., Newton	8.3×10^4
Highway Equipment Co., Cedar Rapids	8.0×10^4
Little Giant and Shovel, Des Moines	8.0×10^4
Polk County - Dry Cleaning Total	7.5×10^4
Farmhand, Grinnell	7.1×10^4
John Deere, Dubuque	7.0×10^4
Clay Equipment, Cedar Falls	6.9×10^4
David Manufacturing, Mason City	6.9×10^4
Dethmers Manufacturing, Boyden	6.9×10^4
International Material Handling Equipment, University Park	6.1×10^4
En-Save, Grimes	5.9×10^4
Omaha Standard, Council Bluffs	5.9×10^4
Square D, Cedar Rapids	4.9×10^4
Black Hawk County Landfill	4.0×10^4
Collegiate Pacific, Ames	3.6×10^4
Fischer Printers, Cedar Rapids	3.1×10^4
Commercial Printing, Des Moines	2.8×10^4
Regency Thermographers, Dubuque	2.8×10^4
Cedar Manufacturing, Cedar Rapids	1.7×10^4

(Table C-1 continued)

Rockwell Graphic Systems, Cedar Rapids	1.5×10^4
Vermeer, Pella	1.4×10^4
J. I. Case, Bettendorf	1.4×10^4
Monarch Cement, Des Moines	1.4×10^4
Koehring Crane and Excavators, Waverly	1.2×10^4
Single Gasoline Station in Polk County (using "gasoline vapor" U value)	9.0×10^3
Cherry Burrell, Cedar Rapids	7.8×10^3
John Deere Component Works, Waterloo	7.8×10^3
Sukup Manufacturing, Sheffield	7.4×10^3
Polk County - Single Dry Cleaning Facility	2.1×10^3
FMC Corporation, Cedar Rapids	1.5×10^3

TABLE C-2

SUMMARY OF S2 VALUES

"LOCAL" CARCINOGENIC SCREENING VALUES

Polk County-Mobile Sources (w/PIC's)	6.1×10^{13}
Monsanto, Muscatine	7.9×10^{11}
Polk County - Single Arterial (w/PIC's)	5.9×10^{11}
Polk County - Gasoline Stations (using "gasoline vapor" U value)	4.6×10^{11}
John Deere, Des Moines	2.8×10^{11}
Des Moines POTW	1.9×10^{11}
Rockwell Collins, Cedar Rapids	1.3×10^{11}
Cedar Rapids POTW	1.2×10^{11}
Davenport POTW	6.7×10^{10}
Freeman Resins, Burlington	5.6×10^{10}
Waterloo POTW	4.9×10^{10}
George Neal Station, Salix	4.2×10^{10}
John Deere, Dubuque	3.8×10^{10}
Firestone Tire and Rubber, Des Moines	2.7×10^{10}
Little Giant & Shovel, Des Moines	2.5×10^{10}
Universal Hammermill, Cedar Rapids	2.4×10^{10}
Polk County - Dry Cleaning Total	2.3×10^{10}
John Deere Tractor Works, Waterloo	2.1×10^{10}
En Save, Grimes	1.8×10^{10}
Marshalltown Trowel, Marshalltown	1.6×10^{10}

(Table C-2 continued)

Highway Equipment Co., Cedar Rapids	1.3×10^{10}
Interstate Power, Clinton	9.6×10^{9}
Clay Equipment, Cedar Falls	9.5×10^{9}
Iowa Power & Light, Council Bluffs	8.8×10^{8}
Commercial Printing, Des Moines	8.7×10^{9}
Square D, Cedar Rapids	8.4×10^{9}
Lehigh Portland Cement, Mason City	8.2×10^{9}
Meredith Printing, Des Moines	6.6×10^{9}
Northwestern States Portland Cement, Mason City	5.8×10^{9}
Black Hawk County Landfill	5.4×10^{9}
Fischer Printers, Cedar Rapids	5.3×10^{9}
Omaha Standard, Council Bluffs	5.2×10^{9}
Herschel, Indianola	5.0×10^{9}
Monarch Cement, Des Moines	4.4×10^{9}
David Manufacturing, Mason City	3.4×10^{9}
Vernon Co., Newton	3.0×10^{9}
Cedar Manufacturing, Cedar Rapids	2.9×10^{9}
Iowa Southern Utilities, Ottumwa	2.8×10^{9}
Single Gasoline Station in Polk County (using "gasoline vapor" U value)	2.8×10^{9}
Rockwell Graphic Systems, Cedar Rapids	2.6×10^{9}
Regency Thermographers, Dubuque	2.6×10^{9}
Collegiate Pacific, Ames	2.6×10^{9}

(Table C-2 continued)

Dethmers Manufacturing, Boyden	2.2×10^9
International Material Handling Equipment, University Park	1.4×10^9
Kinze Manufacturing, Williamsburg	1.3×10^9
Cherry Burrell, Cedar Rapids	1.3×10^9
Ritchies Industries, Conrad	1.2×10^9
J. I. Case, Bettendorf	1.2×10^9
Polk County-Single Dry Cleaning Facility	6.7×10^8
Vermeer, Pella	4.1×10^8
Davenport Cement, Buffalo	3.5×10^8
Koehring Crane and Excavators, Waverly	3.0×10^8
John Deere Component Works, Waterloo	2.7×10^8
FMC Corporation, Cedar Rapids	2.6×10^8
Farmhand, Grinnell	1.3×10^8
Sukup Manufacturing, Sheffield	9.4×10^7

TABLE C-3

SUMMARY OF S3 VALUES

"LOCAL" NON-CARCINOGENIC SCREENING VALUES

Polk County - Mobile Sources	3.7×10^9
Occidental Chemical, Buffalo	1.7×10^8
Polk County - Gasoline Stations (using A values for benzene, toluene and xylene)	1.7×10^8
Stone Container, Des Moines	1.3×10^8
American Can, Des Moines	1.1×10^8
Caterpillar Tractor, Davenport	1.1×10^8
Sheller Globe, Iowa City	1.0×10^8
Agrico Chemical, Ft. Madison	7.7×10^7
Meredith Printing, Des Moines	7.6×10^7
Maytag, Newton	6.9×10^7
Monsanto, Muscatine	6.0×10^7
John Deere Tractor Works, Waterloo	5.0×10^7
Des Moines POTW	4.3×10^7
Polk County - Single Arterial	3.5×10^7
Mid-Central Plastics, West Des Moines	3.1×10^7
Control-O-Fax, Waterloo	2.4×10^7
duPont, Camanche	2.0×10^7
Thatcher Plastic Packaging, Muscatine	1.9×10^7
John Deere, Des Moines	1.9×10^7
Cedar Rapids POTW	1.5×10^7
Carlon, Clinton	1.4×10^7
Waterloo Industries, Waterloo	1.1×10^7

(Table C-3 continued)

FMC Corporation, Cedar Rapids	1.1×10^7
Future Foam, Council Bluffs	1.1×10^7
Weller Plastics, Sioux City	1.0×10^7
Custom Park, Clinton	9.2×10^6
Little Giant & Shovel, Des Moines	9.1×10^6
Cresline Plastic Pipe, Council Bluffs	8.8×10^6
John Deere, Dubuque	8.7×10^6
Davenport POTW	8.3×10^6
Rockwell Graphic Systems, Cedar Rapids	7.2×10^6
H.P. Smith Paper, Iowa City	6.6×10^6
Waterloo POTW	6.0×10^6
Commercial Printing, Des Moines	5.8×10^6
Union Carbide, Centerville	5.7×10^6
Freeman Resins, Burlington	5.6×10^6
Highway Equipment Co., Cedar Rapids	4.9×10^6
Letica, Muscatine	4.8×10^6
Rockwell Collins, Cedar Rapids	4.2×10^6
Koehring Crane & Elevator, Waverly	4.0×10^6
Vermeer, Pella	4.0×10^6
Chevron Chemical, Ft. Madison	3.9×10^6
Universal Hammermill, Cedar Rapids	3.8×10^6
Vernon Co., Newton	3.7×10^6
Fischer Printers, Cedar Rapids	3.5×10^6
Polk County-Dry Cleaning Total	3.3×10^6
J. I. Case, Bettendorf	3.1×10^6

(Table C-3 continued)

John Deere, Davenport	2.8×10^6
En-Save, Grimes	2.7×10^6
Iowa Manufacturing, Cedar Rapids	2.6×10^6
Black Hawk County Landfill	2.4×10^6
Monarch Cement, Des Moines	2.1×10^6
Collegiate Pacific, Ames	1.8×10^6
Regency Thermographers, Dubuque	1.7×10^6
Clay Equipment, Cedar Falls	1.5×10^6
Norwesco Industries, Grundy Center	1.4×10^6
Polk County - Single Gasoline Station	7.0×10^6
Omaha Standard, Council Bluffs	7.7×10^5
Cherry Burrell, Cedar Rapids	7.3×10^5
John Deere Component Works, Waterloo	6.5×10^5
David Manufacturing, Mason City	5.8×10^5
John Deere Engine Works, Waterloo	4.4×10^5
Caterpillar Tractor, Bettendorf	3.8×10^5
Herschel, Indianola	3.8×10^5
International Material Handeling Equipment, University Park	3.1×10^5
Square D, Cedar Rapids	3.0×10^5
Dethmers Manufacturing, Boyden	2.7×10^5
Firestone Tire & Rubber, Des Moines	2.5×10^5
Cryovac, Cedar Rapids	2.5×10^5
Interstate Power, Clinton	2.2×10^5
Kinze Manufacturing, Williamsburg	2.0×10^5

(Table C-3 continued)

Ritchies Industries, Conrad	1.8×10^5
George Neal Station, Salix	1.7×10^5
Farmhand, Grinnell	1.7×10^5
Koch Sulfur Products, Dubuque	1.3×10^5
White Farm Equipment, Charles City	1.3×10^5
Davenport Cement, Buffalo	1.2×10^5
Polk County-Single Dry Cleaning Facility	9.6×10^4
Iowa Power and Light, Council Bluffs	9.2×10^4
Sukup Manufacturing, Sheffield	6.0×10^4
Iowa Southern Utilities, Ottumwa	3.8×10^4
Lehigh Portland Cement, Mason City	3.8×10^2
Northwestern States Portland Cement, Mason City	2.8×10^2

APPENDIX D

OTHER SELECTED SOURCES OF INTEREST

APPENDIX D

OTHER SELECTED SOURCES OF INTEREST

The following list of sources includes facilities which were not evaluated, generally because they were categorized in a SIC code which was not previously documented in EIS. Included are facilities with an employment of over 100 which could be significant VOC and/or air toxics sources, and facilities with an employment of over 10 which could potentially be liable to specific existing NESHAPs regulations.

City	Facility	SIC	Employment
Ames	Hach Co.	2817	175
Ames	3-M Co.	3219	400
Britt	Britt Tech Corp. (N)	2819	60
Burlington	Exide Battery	3692	250
Burlington	U.S. Borax (N)	2844	65
Camanche	Central Steel Tube	3312	350
Carroll	General Electric	3613	500
Cedar Falls	Container Corp.	3823	140
Cedar Falls	Doerfer (Container Corp.)	3444	125
Cedar Falls	H&H Machine Tool of Iowa	3544	150
Cedar Rapids	Clyde Industries	3674	150
Cedar Rapids	Weyerhauser	2653	110
Charles City	Salsbury Laboratories	2834	450
Clinton	International Paper	2653	500
Council Blutts	Barton Solvents (N)	2819	25
Des Moines	Basic Chemicals, Inc. (N)	2819	40
Ft. Dodge	Centralab	3613	400
Ft. Dodge	Ft. Dodge Laboratories	2834	400
Ft. Dodge	Sundstrand Hydrotransmission	3494	535
Ft. Madison	Consolidated Packaging	2653	150
Ft. Madison	DuPont	2851	250
Ft. Madison	Gleason Corp.	3499	150
Ft. Madison	Sheaffer Eaton	3951	1300
Iowa City	Proctor and Gamble	2842	440
Iowa City	Moore Business Forms	2751	250
Iowa City	National Computer Systems	3674	385
Madison City	Alexander Manufacturing Co.	3691	175
Red Oak	Union Carbide	3692	500
Sioux City	Prince Manufacturing	3494	150
Sioux City	Rochester Products	3714	300
Sioux City	Sioux Tools	3423	450
Sioux City	Wilson Tractor	3715	300
Spirit Lake	Berkley Co.	3949	450
West Burlington	General Electric	3613	850

(N) = potential NESHAPs source

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

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