Environmental Concerns for Small Business

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EXECUTIVE SUMMARY

This report consists of three parts. The first part, labeled Part I, describes the process by which the other two parts were developed. The second part, labeled Part II, consists of four case studies. The third part, labeled Appendix, is a memorandum prepared for SBA discussing details of the regulations developed by EPA to implement Title V of the Clean Air Act Amendments which dealt with permits for sources of air pollution emissions. The four case studies of Part II are summarized here.

1. Dry Cleaning Industry NESHAP for PCE and 1,1,1-TCA

The dry cleaning industry is composed of industrial dry cleaners, commercial dry cleaners, and coin-operated dry cleaners. This study focuses predominately on commercial dry cleaners.

The commercial dry cleaning industry takes in dirty clothes and cleans them using as a solvent either perchlorethylene (PCE) or 1,1,1-trichloroethane. Equipment used in the industry is of two types. Transfer equipment consists of a separate washer and dryer. Laundry is transferred from the washer to the dryer while it is damp with solvent. Dry-to-dry equipment consists of a single drum in which both washing and drying takes place. Vented dry-to-dry equipment releases some solvent through a vent. Unvented dry-to-dry equipment releases no solvent, except as fugitive emissions when the door is first opened.

The 29,300 dry cleaners (including all three categories) are comprised mostly of area sources (29,000) with approximately one percent (300) considered as major sources (sources emitting over 10 tons of any hazardous air pollutant or 25 tons of any combination of hazardous air pollutants). The industrial sector (0.5 percent) is comprised of only major sources while the coin operated facilities (11.5 percent) are all area sources (sources emitting less hazardous air pollutants than major sources).

The basic recommendation for a National Emission Standard for Hazardous Air Pollutants (NESHAP) for dry cleaners expected from the U.S. Environmental Protection Agency (EPA) is an equipment standard. Maximum Available Control Technology (MACT) will be required on all dry cleaning establishments classified as major sources. MACT for transfer equipment, used by 33 percent of the industry, will be installation of a carbon adsorber which will reduce the release of vapors by 95 percent, or replacement of the transfer equipment with unvented dry-to-dry equipment. MACT for vented dry-to-dry equipment, used by 67 percent of the industry, will be installation of a carbon adsorber or of a refrigerated condenser. Either of these controls will reduce vapor release by 95
percent. Owners of vented dry-to-dry equipment may also comply with the NESHAP by replacing their equipment with unvented dry-to-dry equipment.

With respect to area sources EPA may require all area sources to install MACT or, at the administrator's discretion, impose a more lenient standard known as Generally Available Control Technology (GACT). For area sources subject to GACT that use transfer equipment, the allowable control is expected to be carbon adsorbers. If the source has already installed a refrigerated condenser, which removes 85 percent of vapors from transfer equipment, EPA will consider the source to be in compliance. For users of vented dry-to-dry equipment, GACT will consist of either a carbon adsorber or a refrigerated condenser. EPA may also choose to exempt some area sources from compliance with MACT or GACT. EPA is considering exempting sources with less than $100,000 in annual sales or 300 gallons per year in solvent consumption if a facility uses transfer equipment and 220 gallons per year in solvent consumption if a facility uses dry-to-dry equipment.

The cost of the controls vary with the amount of clothes cleaned annually. Because solvent recovered with the controls can be reused, the cost of solvent is reduced. For sufficiently large quantities of clothes cleaned, the savings can be larger than the annualized costs of the control equipment. For transfer equipment, the break even point is 37,500 pounds of clothes ($112,500 gross receipts if consumers are charged $3.00 a pound) when an adsorber is installed or 75,000 pounds of clothes annually ($225,000 gross receipts) when the firm switches to unvented dry-to-dry equipment. For vented dry-to-dry equipment the break even point is again 37,500 pounds ($112,500 gross receipts) when a control is added or 93,750 pounds ($281,250 gross receipts). Savings for the largest quantities of clothes cleaned included in the study vary from $0.21 per 40 pound load to $0.62 per 40 pound load.

In assessing the costs of the regulation to the dry cleaning industry three categories were considered. The first is exempted firms. They will incur no costs due to the regulation. The next category consists of firms large enough they would have to add controls and small enough that they do not experience savings. Firms in this category using transfer equipment average $41.12 in annual net costs, although some will clearly experience higher costs and some lower costs. Those using dry-to-dry will experience $50.00 in annual net costs. Firms above the break even point will save money. Firms in this category using transfer equipment will average $1,106.85 in annual net savings due to compliance with the regulation. Those using dry-to-dry will save an average of $913.80. For commercial dry cleaners as a whole, the savings will be $5.8 million.
Stage I for gasoline marketers consists of recovering the gasoline vapors into the delivery truck that would otherwise have been vented into the atmosphere when a service station gasoline storage tank is being filled. The EPA has identified two technologies for doing this: the coaxial system in which there is only one hole and the two point system in which there are two holes. The coaxial system is less expensive for the service station owner than the two point system, but more expensive for the truck company that has to purchase equipment compatible with a coaxial system. However, total annualized costs for the two systems are nearly identical. EPA's rules will allow either system to be used as they both reduce vapor releases from filling gasoline station storage tanks by ninety-five percent. Costs used in this study are the average of the costs for the coaxial system and the two point system.

The major alternative considered by EPA is whether to exempt some service stations from installing stage I controls. Costs of controls vary by the size of the throughput. The cost of gasoline is increased by $0.04 per gallon for stations with 0 to 5,000 gallons per month throughput and decreases, as throughput increases, to $0.0005 per gallon for throughputs of over 100,000 gallons per month. EPA is considering two alternatives. The first is to allow no exemptions. It would cost $206 million per year and affect 199,000 sources and reduce volatile organic compounds (VOCs) by 196,000 Mg per year and hazardous air pollutants (HAPs), a subset of VOCs, by 28,000 Mg per year. The cost-effectiveness ratio for VOCs is $1,050 per Mg and for HAPs is $9,550 per Mg. The second alternative is to exempt all service stations with a throughput of less than 10,000 gallons per month. It will cost $53 million per year and affect 51,000 sources, reducing HAP emissions by 19,000 Mg per year and VOC emissions by 173,000 Mg per year. The cost-effectiveness ratio for HAPs is $2,798 per Mg and for VOCs is $308 per Mg. These values are much better than those for alternative 1.

A third alternative discussed in the study, but not considered by EPA, is to allow states to exempt stations with throughputs between 10,000 and 25,000 gallons per month. It was assumed that half of these stations would be exempted. Alternative 3 would cost $44 million and affect 43,000 stations. The cost-effectiveness ratios for HAPs would be $2,484 per Mg and for VOCs would be $273 per Mg. These ratios are slightly better than for alternative 2. It was concluded that alternative 2 was very much better than alternative 1 and that EPA might give thought to including more stations in the exemption. It was assumed that, under alternative 3, states would exercise their option by exempting rural gasoline stations. Many of these stations are not in non-attainment areas and not close to other sources of HAPs. The states would not have to exempt any station that contributed to any type of air
pollution.

This study considered what features of Irvine's ban on Ozone-Depleting Compounds (ODCs) contributed to its cost-effectiveness, what is the best form for a local ODC ordinance, and whether localities should adopt measures to reduce the release of ODCs. It also presents data on the cost of meeting the ban.

Irvine's ban was considered to be cost-effective because it is a performance based standard and it allows exemptions and extensions when warranted. The City worked closely with firms granted extensions to help them determine an approach to eliminating ODCs. Thus firms that had identified a cost-effective means of eliminating ODCs but needed an extra year or two were given the extra time. The performance standard means that no specific method for eliminating ODCs is imposed on the firm. Each firm may use the most cost-effective method given its own circumstances.

Irvine's approach was judged to be superior to alternative approaches. Compared to an inflexible requirement that specifies specific technologies and allows no exemptions, the performance standard and exemptions granted by Irvine result in a much more cost-effective approach. Compared to a product labeling requirement such as passed in Cambridge, Massachusetts, Irvine's approach again is superior. One reason is that because labeling requires that industry keep track of any input to the product, it is as costly to comply with a local labelling requirement as a national one. Because start-up costs are large, for both the firm and the government, a labeling program is best done at the national level, so that the costs can be spread over a larger number of units sold and a single approach to labeling followed.

A final option is to have no local ordinance, but to rely on federal and international laws to deal with ODCs. Even though Irvine's ordinance constitutes, perhaps, the best form for a local ordinance, it was considered that it could be very difficult for a firm to deal separately with numerous jurisdictions in which they may have activities.

Regarding the costs of meeting the ban, different firms had very different experiences. The firms contacted in the study made electronic components. Some approaches they used for complying with the ban had positive effects on the product and some had negative effects. For several firms, the ban
increased their costs of production, but in one case the firm experienced a cost reduction by implementing a new process that did not release ODCs.

4    Ozone Depleting Substances: Non-Essentials

EPA was required by the Clean Air Act Amendments of 1990 to identify and ban non-essential products that released ozone depleting substances. One product EPA identified was halon fire extinguishers. Most of the producers of halon fire extinguishers are small businesses, and all would likely go out of business unless an additional year or two were provided for them to develop a good substitute for halon in their products. This study demonstrates that halon fire extinguishers are not currently non-essential in some categories of use.

Halon is currently the only fire extinguishant that does not require significant clean up after use in order to prevent corrosion of electronic equipment. Other extinguishants may cause damage to electronic equipment in rooms well away from the fire. Until new halon substitutes are developed, halon will be the choice of persons seeking to protect extensive investments in electronic gear.

The economic analysis of halon fire extinguishers shows that the price persons would pay for a halon fire extinguisher equals the expected cost of purchasing an alternative extinguisher plus the expected cost of clean-up. The expected cost of clean-up equals the probability of a fire times the probable cost of cleaning up from the use of the extinguisher and replacing damaged equipment. An increase in either factor will increase the premium persons will pay for halon. Price data shows that the price of a halon unit with a 5BC rating and 2.5 pounds of extinguishant is $33.25 while the same size of multipurpose dry chemical fire extinguisher with a 1A10BC rating is $15.25. This shows that a premium is currently paid by those who purchase halon fire extinguishers. Taxing the halon would reduce the number of persons who would benefit from using it, but would not eliminate them entirely unless the tax were very high.

The alternatives to the ban are no regulation, postponed regulation, and a modified regulation. No ban on halon fire extinguishers is legally possible because the Congress did not specify that halon fire extinguishers must be banned. They are already taxed under another measure and will be phased out by the turn of the century, along with all other ozone depleting substances. Postponing the ban will allow firms to complete research needed to bring alternatives with properties similar to halon fire extinguishers to market.
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Part I

Introduction and Summary
1 Background

This report explores the varied economic effects on small businesses of federal, state and local regulations governing atmospheric emissions. The three elements of this report reflect three stages of work completed in cooperation with SBA.

The first stage, discussed in this introduction, consists of the identification of "industry-regulatory" pairs. This stage includes the identification of a particular regulation, what industries it affects, whether small businesses are likely to be significantly impacted, and whether there is a potential option to alleviate such an impact. Based on these judgements, the regulation was either dropped from the study or subjected to further consideration. The first stage was ongoing as the study team's assessment of these factors continued to change as more information was uncovered.

The second stage of the work was an intensive review of Title V of the U.S. Clean Air Act Amendments of 1990 (CAAA) which detailed the permitting process. Title V will affect every firm in the United States that releases emissions into the atmosphere. Title V and associated topics are discussed briefly in this introduction and the entire memorandum and attachments delivered to SBA are included as an appendix.

The third stage of the work was to focus on specific industry-regulatory pairs. As a result of stages 1 and 2, much information had been collected regarding the potential of regulations to impact industries. Those with the greatest potential to impact small businesses were selected. Part II of this report, "Specific Evidence of the Varied Impacts of Air Emission Regulations on Small Business," consists of individual case studies of industry-regulatory pairs.

2 Stages of Work

2.1 Identification of Industry Regulatory Pairs

Regulations initially considered had one thing in common; they concerned regulatory requirements to reduce atmospheric emissions. They included measures to reduce the emissions contributing to the depletion of the ozone layer growing out of the Montreal Protocol, the possibility of regulations targeting the greenhouse effect, state and local ordinances -- especially from California where regulations concerning atmospheric emissions are more stringent than elsewhere, and regulations from Titles I (criteria air pollutants), II (mobile source emissions), III (hazardous air pollutants), and V
(permits) of the CAAA. While a great many regulations were initially considered, the list was quickly reduced to ten. Industries were then identified that were likely to be affected by each regulation. The industry list was further narrowed by choosing those with significant participation of small businesses (based on the percentage of small businesses in the industry) and those in which small businesses would likely be disadvantaged by the regulation. Further manipulations of the list were based on judgement as to the impact of the regulation on small businesses. Those considered to have only minor impacts were dropped. One version of the list is shown in Table 1.

2.2 Title V: Permits

One aspect of the CAAA that potentially affects all small businesses is Title V. Title V deals with the programs states must develop for providing emission permits to all point sources of air emissions. Although a well designed permit program has the potential to streamline the permit process and ease the implementation of other programs such as emission trading, several aspects of the CAAA led to the possibility that the permit program would instead complicate matters. Potential outcomes harmful to small businesses included the separation of permit programs from State Implementation Plan development leading to duplication of effort by small businesses and possibly more than one set of regulatory requirements, the potential divergence of state and federal permit requirements accompanied by separate state and federal permit programs, onerous requirements for submitting permit applications, and long waits (up to one and a half years) for permit approvals that could stifle industrial flexibility and drain the resources of small business subjected to them.

For these reasons, SBA wished to scrutinize the development of the Title V regulation to be sure that its final form did not unduly harm small businesses. Analysis of Title V indicated that six elements of the rules had the greatest potential to affect small businesses. These are discussed in the Appendix, a memorandum to the SBA. One measure in particular was identified as being especially important to small businesses. The CAAA states that states may develop a general permit for sources that have simple or uniform characteristics and standard procedures for meeting air pollution limits. SBA urged EPA to develop a model general permit program and to vigorously promote it among the states. At the end of the appendix are two examples of what a general permit could look like. The general permit program will greatly reduce the cost and time required to obtain a permit and insulate firms from many of the more contentious issues raised in Title V.
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<td>2.</td>
<td>MACT: Dry Cleaning Industry (2360)</td>
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<td>Plumbers, Wholesalers or other fleet operators</td>
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2.3 Case Studies

The third element of the project was to examine specific regulatory-industry pairs. It consists of the chapters in Part II. The pairings selected for case studies were those judged to provide information that would provide the greatest impact toward protecting small businesses. For each pairing, a different aspect of regulatory costs is observed.

The discussion in Chapter 1, "Dry Cleaning Industry NESHAPS for PCE and 1,1,1-TCA" considers the selection of the cutoff point for exempting small firms from the regulation. When regulations such as the one considered in Chapter 1 result in reduced use of inputs, there will be a savings for firms with large throughputs.

For Chapter 2, "National Emission Standard for Hazardous Air Pollutants (NESHAP) for Stage I Gas Marketing", the issue is again to set limits on exemptions granted to firms. How large a throughput should be exempt and how much additional emissions can be allowed? How can the regulation be targeted on areas with the greatest need for reduced hazardous emissions? In this case, unlike Chapter 1, the recovery of vapors does not lead to a "break-even point".

For Chapter 3, "Irvine, California's Ordinance Governing the manufacture, Distribution, Sale, and Recycling of Products which Utilize Ozone-Depleting Compounds," the issues are whether a municipality is the best level of government for implementation of a measure targeted at a global phenomenon, how exemptions and cooperation between the city and industry can help to alleviate the costs of the measure, and the diversity of costs experienced by individual firms for eliminating the emissions of ozone depleting substances. The range is from an actual savings from the new production system developed at one plant to costs high enough to cause one firm to consider relocation.

The most clearcut case of severe damage done to an industry by a regulation is the ban on halon fire extinguishers as being nonessential discussed in chapter 4, "Ozone Depleting Substances: Nonessentials." Under some versions of the regulation during its development, the regulation would have forced all of the small firms out of the industry (the industry was nearly all small businesses) about a year before their research and development efforts would have produced a substitute. Other substitutes to halon fire extinguishers failed to meet the needs of some users of halon fire extinguishers. The study shows that some of these consumers would be willing to pay a very high price to have the properties that, to date, only halon fire extinguishers offer.
Conclusion

The issues studied point to three broad conclusions. First, there are numerous cases in which regulators will concoct a regulation that damages some small businesses. Usually they will change it once the problems are pointed out. This happened with regard to Title V general permits, and halon fire extinguishers, two regulations in which regulators modified their position when the issues were presented to them. Second, because production requirements differ so greatly from firm to firm, it is difficult to state that regulations governing air quality emissions will necessarily cost industry substantial amounts. There are examples where this is true and where it is not true. A well crafted regulation can bring about substantial emission reductions without unduly harming small businesses. Finally, an attentive watch over the regulators makes a vital difference to small businesses. To the extent that general permits are available to small businesses, SBA's efforts are to be credited.
Part II

Case Studies
1.1 Introduction

Title III of the Clean Air Act, as amended in 1990, lists 189 hazardous air pollutants to be regulated by the EPA. According to the Act, "... the Administrator shall promulgate regulations establishing emission standards for each category or subcategory of major sources and area sources of hazardous air pollutants listed for regulation... Emissions standards promulgated under this subsection and applicable to new or existing sources of hazardous air pollutants shall require the maximum degree of reduction in emissions of the hazardous air pollutants subject to this section (including a prohibition on such emissions, where achievable) that the Administrator, taking into consideration the cost of achieving such emission reduction, and any non-air quality health and environmental impacts and energy requirements, determines is achievable for new or existing sources..." Two of the 189 pollutants listed as hazardous air pollutants in Title III of the Clean Air Act are perchloroethylene (PCE) and 1,1,1 - trichloroethane (1,1,1 - TCA), two basic solvents used by the dry cleaning industry in the United States. According to the mandate of the Act, the EPA is proposing a NESHAP for the dry cleaning industry to regulate PCE and 1,1,1 - TCA. The NESHAP to regulate PCE and 1,1,1 - TCA is the subject of this chapter. Following the introduction which provides an overview of the legislation requiring a NESHAP, there is a discussion of alternatives to the proposed regulation, the cost-effectiveness of the proposed regulation, and the cost of the proposed regulation.

Under the Clean Air Act, emission standards for major sources take the form of what is commonly referred to as maximum available control technology (MACT). A major source is defined as a "stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants." Within the category of major sources, MACT standards can differ for new and existing sources. According to the Clean Air Act, as amended in 1990, "The maximum degree of reduction in emissions that is deemed achievable for new sources in a category or subcategory shall not be less stringent than the emission control that is achieved in practice by the best controlled similar source, as determined by the Administrator. Emission standards promulgated under this subsection for existing sources in a category or subcategory may be less stringent than standards for new sources in the same category or subcategory but shall not be less stringent, and may be more stringent than - (A) the average emission limitation achieved by the best performing 12 percent of the existing sources...(B) the average emission limitation achieved by the best performing 5 sources...
in the category or subcategory of categories or subcategories with fewer than 30 sources." The EPA Administrator is defining "similar source" for major sources based on the type of machine used by a dry cleaning facility.

Under the Clean Air Act, area sources, which are stationary sources of hazardous air pollutants that are not major sources, may be subject to a different emission standard, commonly known as generally available control technology (GACT). With respect to area sources the EPA Administrator "may...elect to promulgate standards or requirements applicable to sources in such categories or subcategories which provide for the use of generally available control technologies or management practices by such sources to reduce emissions of hazardous air pollutants." The decision of whether or not to regulate a particular category or subcategory of area sources depends upon an EPA finding of an adverse impact on health and the environment from the particular category or subcategory of impacts in question. In the case of emissions of hazardous air pollutants from dry cleaners that are area sources, the EPA has determined a finding of adverse impact on health and the environment, and regulation will be proposed for area sources.

The MACT and GACT standards for PCE and 1,1,1 - TCA will affect some 29,300 dry cleaning facilities in the United States, 29,000 of which are area sources and 300 of which are major sources. Within the dry cleaning industry, the industrial sector (0.5%) is comprised of only major sources and the coin-operated sector (11.5%) is comprised of only area sources. The commercial sector is comprised of mostly area sources, with approximately one percent of commercial dry cleaners being considered major sources. It has been estimated that the 300 major sources emit 7,400 tons of hazardous air pollutants per year, while the 29,000 area sources emit 86,200 tons of hazardous air pollutants per year.

The basic recommendation for the content of the NESHAP expected from EPA is an equipment standard, because the most easily controlled emissions of PCE and 1,1,1 - TCA come from vents on dry cleaning equipment that can be restricted with the proper control equipment. Two basic types of dry cleaning equipment are utilized by the dry cleaning industry: transfer (33% of industry) and dry-to-dry (67% of industry). Transfer equipment includes a separate washer and dryer, while dry-to-dry equipment combines the washer and dryer into one piece of machinery. In addition, there are two types of dry-to-dry machines. The first, vented dry-to-dry machines, vent residual vapors to the air after completing a drying cycle. The second, ventless dry-to-dry machines, vent vapors into the air only when the door is opened for loading and unloading.
The MACT for major sources will require that both new and existing sources are controlled at the 95% level. For vented emissions from transfer units, this would require installation of a carbon adsorber. Carbon adsorbers trap vapors onto activated carbon. The carbon has to be stripped regularly to remove the built up pollutants. It is estimated that such adsorbers can reduce hazardous air pollutant vapors in dryer exhaust by 95%. For vented dry-to-dry units a carbon adsorber or a refrigerated condenser may be installed. A refrigerated condenser chills vapors until they condense and reduces emissions by approximately 95% on dry-to-dry equipment. Major sources can also come into compliance by replacing their equipment with ventless dry-to-dry units.

The GACT for area sources differs depending on the type of dry cleaning equipment. Identical to the MACT for major sources, area sources which use dry-to-dry equipment must control emissions at the 95% level. Accordingly, a carbon adsorber or a refrigerated condenser is required for dry-to-dry equipment. If an area source has transfer equipment that has never been controlled before, the source is required to install a carbon adsorber which will control emissions at the 95% control level. If the area source has transfer equipment that has been controlled with a refrigerated condenser (which only controls emissions at the 85% level), the source is not required to install a carbon adsorber. If an existing area source purchases a reconditioned piece of transfer equipment, that equipment is regulated based on how it was controlled when purchased. If emissions from the reconditioned machinery were captured with a refrigerated condenser, the source is not required to install a carbon adsorber. If a major source purchases a reconditioned piece of transfer equipment that has previously controlled emissions with a refrigerated condenser, the refrigerated condenser must be replaced with a carbon adsorber in order to reach a 95% emission control level.

Additional emissions of PCE and 1,1,1-TCA by the dry cleaning industry come from fugitive emissions from evaporation during clothing transfer and handling, equipment leaks, solvent transfer, and evaporation of solvent from stored solid wastes. The EPA regulation of these sources of emissions is expected to take the form of a work practice standard. Dry cleaning facilities, major and area sources, will be required to complete weekly inspections of the sources of fugitive emissions that are expected to take approximately 40 to 45 minutes.

In addition to the equipment standard and the fugitive emissions work practice, EPA is considering exempting smaller firms from complying with the standard. The cut-off for the exemption is $100,000 in annual sales or 300 gallons/year in solvent consumption if a facility uses transfer equipment and 220 gallons/year in solvent consumption if a facility uses dry-to-dry equipment.
1.2 Alternatives to the Proposed Regulation

This regulation has been developed with good cooperation between EPA and the dry cleaning industry. The requirements of Title III of the 1990 Clean Air Act Amendments have been achieved with no cost to 60% of dry cleaners because they already use the required equipment, no cost to those with revenue below $100,000 because of their exemption, and as will be shown, savings for those whose reduction in fluid consumption results in savings greater than their equipment cost. For those wishing to keep older equipment in use, the required adsorbers or condensers are much less costly in terms of capital expenditure than purchasing a new un-vented dry-to-dry unit.

1.2.1 Definition of the Alternatives

Title III of the 1990 Clean Air Act requires EPA to establish "...emission standards for each category or subcategory of major sources and area sources of hazardous air pollutants listed for regulation...." The EPA has answered this legislative mandate with the proposed MACT and GACT standards outlined in previous sections of this chapter. A discussion of regulatory alternatives to those which EPA has proposed follows. It is important to note that while the EPA has chosen an equipment standard to define the NESHAP for PCE and 1,1,1 - TCA, any source with alternative controls that meets the emission levels implied by the standard are also in compliance.

1.2.1.1 Alternative A: No Regulation or a 5 year Exemption

The MACT was mandatory for major sources and EPA has made a finding of adverse impact on health and the environment for area sources. There could, however, have been a 5 year exemption for the area sources.

1.2.1.2 Alternative B: Exemptions to Compliance Based on the Size of the Firm

EPA has proposed exemption of sources based on their sales. Smaller sources that have low sales revenues and would therefore be likely to experience financial difficulty in complying with the standard would be exempt. Alternative size standards for sources eligible for the exemption are considered.
1.2.1.3 Alternative C: Require all Dry Cleaners to Install No-vent Dry-to-dry Units with Refrigerated Condensers.

The EPA proposal allows different source types among dry cleaners different ways of meeting the equipment standard. An alternative to that is a uniform requirement that every dry cleaner have the same no-vent dry-to-dry units with refrigerated condensers or meet the emission limit equivalent to that of the ventless dry-to-dry units with refrigerated condensers.

1.2.2 Discussion of the Alternatives

Exemption of small sources is a standard regulatory remedy endorsed by the Regulatory Flexibility Act. Given that smaller dry cleaners are unlikely to operate at an efficient scale and are on the edge of financial solvency, the requirement to install and operate control equipment may put them out of business. The proper size for the exemption is best determined in light of cost data on various sizes of equipment and operating parameters such as number of pounds cleaned per day, and the requirements of the Clean Air Act.

Information provided by the International Fabricare Institute (IFI) and the EPA allows development of a simple version of the costs of controlling emissions from dry cleaning establishments. EPA has prepared a more elaborate cost study, but it is not currently available. The first step in determining the costs of controlling emissions from dry cleaning establishments is to determine the cost factors for dry cleaning equipment and fluid. This is done in Table 1.1, in which the total cost of capital equipment and fluid required to clean 75,000 pounds of clothes is presented for each configuration of dry cleaning equipment. The typical dry cleaner cleans 75,000 pounds of clothes annually, in 40 pound loads. The cost of each type of equipment, and its longevity, were provided by IFI. Ventless dry-to-dry units cost $30,000 and are expected to last 15 years. Standard dry-to-dry units cost $21,000 and last 20 years. The cleaning unit of transfer equipment costs $4,000 and is expected to last 15 years while the tumbler costs $4,000 and lasts 10 years. A carbon adsorption vent costs $7,000 and is expected to last 15 years. Annualized costs were computed for each of these items using a real cost of the loan of 5 percent for the expected life of the equipment. The capital costs used here are consistent with EPA's January 1991 report on NESHAPs for dry cleaners. The EPA report did not provide information on the longevity of the units or the interest rates used in their studies.
Table 1.1. Cost Factors for Dry Cleaning Equipment and Fluid

<table>
<thead>
<tr>
<th>Equipment Configuration</th>
<th>Annualized Capital Cost</th>
<th>Cost of Fluid/Year</th>
<th>Total Annual Cost</th>
<th>Pounds of Clothes/Year</th>
<th>Use of Fluid per 100 lb of Clothes</th>
<th>Gallons of Fluid per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer Equipment</td>
<td>$778.22</td>
<td>$4,312.50</td>
<td>$5,090.72</td>
<td>75000</td>
<td>11.5</td>
<td>1078</td>
</tr>
<tr>
<td>Transfer + Adsorber</td>
<td>$1,452.62</td>
<td>$2,887.50</td>
<td>$4,340.12</td>
<td>75000</td>
<td>7.7</td>
<td>722</td>
</tr>
<tr>
<td>Vented Dry-to-dry</td>
<td>$1,685.09</td>
<td>$3,037.50</td>
<td>$4,722.59</td>
<td>75000</td>
<td>8.1</td>
<td>759</td>
</tr>
<tr>
<td>Vent. D-D + Adsorber</td>
<td>$2,151.76</td>
<td>$1,933.12</td>
<td>$4,084.89</td>
<td>75000</td>
<td>5.2</td>
<td>483</td>
</tr>
<tr>
<td>Unvented Dry-to-dry</td>
<td>$2,890.27</td>
<td>$1,950.00</td>
<td>$4,840.27</td>
<td>75000</td>
<td>5.2</td>
<td>488</td>
</tr>
</tbody>
</table>
The EPA gives expected reductions in loss of dry cleaning fluid, which according to IFI costs $4.00 per gallon. Including quantities that become solid waste, about 2.5 pounds of fluid per 100 pounds of clothes cleaned, uncontrolled transfer equipment loses 11.5 pounds of fluid per 100 pounds of clothes cleaned. With an adsorber added, the fluid use drops to 7.7 pounds. Vented dry-to-dry machines use 8.1 pounds per 100 pounds of clothes, and vented dry-to-dry machines with an adsorber use 5.2 pounds per 100 pounds of clothes. Switching to a ventless dry-to-dry machine, the total fluid loss is also 5.2 pounds per 100 pounds of clothes.

Table 1.2 develops the average cost per 40 pound load for various levels of activity for the five configurations of dry cleaning equipment shown in Table 1.1: (1) transfer equipment, (2) transfer equipment with a carbon adsorber, (3) vented dry-to-dry, (4) vented dry-to-dry with carbon adsorber or refrigerated condenser and (5) ventless dry-to-dry. According to the draft regulation, configurations (1) and (3) must be upgraded. Configuration (2) is considered a fix for configuration (1), and configuration (4) is a fix for configuration (3). Configuration (5) and is a fix for either (1) or (3). Table 1.2 also shows the difference in cost per 40 pound load between configurations (1) and (2), (1) and (5), (3) and (4), and (3) and (5).

Table 1.2 is illustrated by Figure 1.1. For either remedy, the fix for uncontrolled transfer equipment reduces costs for average sized (75,000 pounds annually) and larger dry cleaners. For configuration 2 in which emissions are vented through a carbon adsorber and partially recovered, the breakeven point, the point at which it becomes more expensive to install control equipment in $ per 40 pound load, is at around 40,000 pounds of clothes cleaned annually. At the $3.00 per pound charge to customers estimated by IFI, this would be equal to an annual revenue of $120,000. If an operator of transfer equipment were to replace his equipment with ventless dry-to-dry units, he would breakeven if he cleaned an average amount of clothes, around 75,000 pounds, annually. The revenue for this level of activity is $225,000 per year. Figure 1.2 also illustrates Table 1.2. Here the average cost per load for a vented dry-to-dry machine is compared to the average cost per load of a vented dry-to-dry machine with control and to the average cost per load of a ventless dry-to-dry machine. The breakeven point between the vented dry-to-dry machine and the vented dry-to-dry machine with control is at 37,500 pounds of clothes per year, which corresponds to a revenue of $112,500. The breakeven point when comparing the vented dry-to-dry machine configuration to the ventless dry-to-dry configuration occurs at about 85,000 pounds of clothes cleaned per year, or $255,000.

Figures 1.1 and 1.2 show how exemptions can be set. Given the data and assumptions on which these figures were based, a dry cleaner cleaning 75,000 pounds of clothes annually would need no
Table 1.2. Cost per 40 pound load for various configurations of dry cleaning equipment.

<table>
<thead>
<tr>
<th>Pounds of Clothes/yr</th>
<th>Equipment Adsorber (1)</th>
<th>T. E. w/ Vented (2)</th>
<th>Dry-to-dry w/ control (3)</th>
<th>Dry-to-dry Unvented (4)</th>
<th>Control Options</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(2)-(1)</td>
<td>(5)-(1)</td>
<td>(4)-(3)</td>
<td>(5)-(3)</td>
<td></td>
</tr>
<tr>
<td>131,250</td>
<td>$2.54</td>
<td>$1.98</td>
<td>$2.13</td>
<td>$1.69</td>
<td>$1.92</td>
</tr>
<tr>
<td>112,500</td>
<td>$2.58</td>
<td>$2.06</td>
<td>$2.22</td>
<td>$1.80</td>
<td>$2.07</td>
</tr>
<tr>
<td>93,750</td>
<td>$2.63</td>
<td>$2.16</td>
<td>$2.34</td>
<td>$1.95</td>
<td>$2.27</td>
</tr>
<tr>
<td>75,000</td>
<td>$2.72</td>
<td>$2.31</td>
<td>$2.52</td>
<td>$2.18</td>
<td>$2.58</td>
</tr>
<tr>
<td>56,250</td>
<td>$2.85</td>
<td>$2.57</td>
<td>$2.82</td>
<td>$2.56</td>
<td>$3.10</td>
</tr>
<tr>
<td>37,500</td>
<td>$3.13</td>
<td>$3.09</td>
<td>$3.42</td>
<td>$3.33</td>
<td>$4.12</td>
</tr>
<tr>
<td>18,750</td>
<td>$3.96</td>
<td>$4.64</td>
<td>$5.21</td>
<td>$5.62</td>
<td>$7.21</td>
</tr>
</tbody>
</table>
IV. Information on other pollutants

A. To determine what other regulated pollutants exist at your facility, please check the boxes next to any of the following sources of regulated pollutants operate on the premises of your facility.

☐ gas stove  
☐ gas operated refrigeration unit  
☐ gas heat  
☐ gas powered electric generator  
☐ lawnmower

Are you aware of any other sources of regulated pollutants operated at the location of the woodstove. If so, please list. ________________________________  

______________________________________________________________


B. To determine what other regulated pollutants exist at your dry cleaning facility, please check the boxes next to the following raw materials which exist at your facility.

☐ gasoline  
☐ bleach  
☐ paint  
☐ varnish  
☐ motor oil  
☐ cleaning solvent A  
☐ natural gas  
☐ other—Please specify material and quantity. ________________________________  

______________________________________________________________
Model General Permit for Woodstoves

I. General Information
Woodstove Owner: [70.5(b)(1)]
Woodstove Owner's Address: [70.5(b)(1)]
Location of Woodstove/s: [70.5(b)(1)]
SIC code:[70.5(b)(1)]

II. Legislation Information
Citation and description of applicable State and Federal air pollution control requirements [[70.5(b)(4)(i)]

III. Emissions Information
A. Woodstove Information

Woodstove 1

a) Brand and model of woodstove [70.5(b)(2)]
b) A determination of emissions from the woodstove based on inputs from the brand and model of woodstove (which determines pollution control equipment and emissions outputs of the stove) and application (i.e. days of use, area of house, limitations on operation) [70.5(b)(2)(i)(ii)(iii)(v)(vi)(vii)]

Woodstove 2

a) Brand and model of woodstove [70.5(b)(2)]
b) A determination of emissions from the woodstove based on inputs from the brand and model of woodstove (which determines pollution control equipment and emissions outputs of the stove) and application (i.e. days of use, area of house, limitations on operation) [70.5(b)(2)(i)(ii)(iii)(v)(vi)(vii)]

B. Calculations on which the woodstove information was based [70.5(b)(2)(viii)]

C. Other pollutant information

1. Raw Materials: List of raw materials and the quantity of each which exists at the location of the woodstove. [70.5(b)(2)(iv)]
2. Pollution Emitting Equipment: List of pollution emitting equipment which exists at the location of the woodstove. [70.5(b)(2)(i)]

IV. Compliance Information
A. Applicant

In signing this permit, I agree to all of the following:

- I agree that all of the information I provided in the permit application is true. [70.5(a)]
- I agree to operate my woodstove(s) according to the manual(s) provided with the woodstove(s), understanding that the failure to do so would lead to changes in the emission of pollutants from my woodstove(s) and invalidate this permit. [70.5(b)(8)]
- I agree to have my woodstove maintained by a reputable woodstove maintenance person once a year and to keep records of such maintenance. [70.5(b)(8)]
- I agree to send in the attached postcards to the permitting authority once a year saying that my woodstove or woodstoves have been checked by a woodstove maintenance person and are operating in good condition. [70.5(b)(8)]
- I agree not to sell or move my woodstove(s) without contacting the permitting authority and changing the permit. [70.5(a)]
- I agree to promptly submit any relevant facts or new information on my woodstove(s) that becomes available to me.

Signature of Woodstove Owner:
Date:

B. Responsible Official[70.5(b)(8)(i)]

To the best of my knowledge, information, and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete.

Signature of Responsible Official:
Date:
Woodstove General Permit Notes

Notes:

- Permits are written one permit per location of a woodstove or woodstoves. A single permit is sufficient where there are woodstoves in different buildings at the same location.
- If certain fuels (such as green wood) are not allowed for proper use of a woodstove, they should be left on list III B. on the general permit application with a zero* under quantity. At the bottom of the page, an asterisk paragraph should explain that this type of fuel is illegal.
- Part III. C. of the permit and part IV. of the permit application would change based on the definition of de minimis for criteria and toxic air pollutants. If the de minimis level is very low, the lists will be long and could include things like lawnmowers and varnish. If the de minimis level is high, this section could be simplified for businesses or deleted for residences.

Regulations we determined were not applicable to woodstove general permits.

- Description of any applicable test method for determining compliance with each requirement. [Part 70.5(b)(4)(ii)]
- Additional information as necessary to define reasonably anticipated alternative operating scenarios [Part 70.5(b)(6)]
- A compliance plan for sources that are not in compliance with all applicable requirements [Part 70.5(b)(7)]
- The use of nationally standardized forms for acid rain portions of permit applications and compliance plans, as required by Part 72 of this chapter. [Part 70.5(b)(9)]
III. Stove and Fuel Use Information

A. Please check the box which completes the following sentence. As part compliance with the State and Federal laws necessitating this permit, I only use my woodstove.

Woodstove 1

☐ 0-45 days a year
☐ 46-90 days a year
☐ 91-135 days a year
☐ 136-180 days a year

Woodstove 2

☐ 0-45 days a year
☐ 46-90 days a year
☐ 91-135 days a year
☐ 136-180 days a year

B. Please check the box next to the following fuels you will use in your wood or woodstoves and estimate the quantities of each fuel you will use annually.

<table>
<thead>
<tr>
<th>Fuel</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood (as fuel)</td>
<td></td>
</tr>
<tr>
<td>a) hardwood</td>
<td></td>
</tr>
<tr>
<td>☐ dry</td>
<td></td>
</tr>
<tr>
<td>☐ green</td>
<td></td>
</tr>
<tr>
<td>b) softwood</td>
<td></td>
</tr>
<tr>
<td>☐ dry</td>
<td></td>
</tr>
<tr>
<td>☐ green</td>
<td></td>
</tr>
<tr>
<td>c) synthetic wood</td>
<td></td>
</tr>
<tr>
<td>☐ presto logs</td>
<td></td>
</tr>
<tr>
<td>☐ hot logs</td>
<td></td>
</tr>
<tr>
<td>d) newspaper</td>
<td></td>
</tr>
<tr>
<td>e) lighter fluid</td>
<td></td>
</tr>
<tr>
<td>f) Other-- Please specify material and quantity used annually.</td>
<td></td>
</tr>
</tbody>
</table>
II. Please answer the following questions about the building in which the woodstove is located. If you own woodstoves which are located in more than one building, please photocopy this page and fill it out for each building and designate here which woodstove (by brand, model, and Year) is in that building. (Woodstove model______________________)

a) The building in which the woodstove is located is approximately ___ square feet.

b) The building in which the woodstove is located has:

☐ 1 floor  ☐ 2 floors  ☐ 3 floors  ☐ Other, Please explain. ____________________________________________________________________________
_____________________________________________________________________________________________________________________________________
_____________________________________________________________________________________________________________________________________


c) The building in which the woodstove is located has:

☐ 1 chimney  ☐ 2 chimneys  ☐ Other-- Please explain. ____________________________________________________________________________
_____________________________________________________________________________________________________________________________________


d) Please describe the approximate height above the ground of each chimney in question c) ____________________________________________________________________________
_____________________________________________________________________________________________________________________________________
_____________________________________________________________________________________________________________________________________


Dry Cleaner General Permit Notes

Notes:
- Part III D. of the permit and part IV. of the permit application would change based on the definition of de minimis for criteria and toxic air pollutants. If the de minimis level is very low, the lists will be long and included things like lawnmowers and varnish. If the de minimis level is high, this section could be simplified.

Regulations we determined were not applicable to general permits for dry cleaners:
- Description of any applicable test method for determining compliance with each requirement. [Part 70.5(b)(4)(ii)]
- A compliance plan for sources that are not in compliance with all applicable requirements [Part 70.5(b)(7)]
- The use of nationally standardized forms for acid rain portions of permit applications and compliance plans, as required by Part 72 of this chapter. [Part 70.5(b)(9)]
Title V Model General Permit Application for Woodstove

I. General Information

A. 70.5(b)1

Owner's Name

(Last) (First) (M.I.)

Owner’s Address

(Street) (City) (State)

B. Location of Woodstove 70.5(b)2

(This permit application is directed towards the multiple woodstove owner. If you disregard any questions that do not apply to you.)

1. Is the location of the woodstove(s) a business or residence?

Woodstove(s)  □ residence  □ business

*(Standard Industrial Classification #)

2. What is the address of woodstove(s) location?

Woodstove

(Street) (City) (State) (Zip)

C. Please check the box which corresponds to the model of your woodstove

Woodstove 1

70.5(b)2  □ Model ABC 1991  □ Model ABC 1990
 □ Model ABC 1989  □ Model XYZ 1991
 □ Model XYZ 1990  □ Model XYZ 1989
 □ Other-- Please specify

Woodstove 2

□ Model ABC 1991  □ Model ABC 1990
 □ Model ABC 1989  □ Model XYZ 1991
 □ Model XYZ 1990  □ Model XYZ 1989
 □ Other-- Please specify
Model General Permit for Dry Cleaners

I. General Information
Dry Cleaner Name: [70.5(b)(1)]
Location of Dry Cleaner: [70.5(b)(1)]
Dry Cleaner Owner: [70.5(b)(1)]
Dry Cleaner Owner’s Address: [70.5(b)(1)]
Designated Representative: [70.5(b)(1)]
Designated Representative’s Address: [70.5(b)(1)]
SIC code: [70.5(b)(1)]

II. Legislation Information
Citation and description of applicable State and Federal air pollution control requirements [70.5(b)(4)(i)]

III. Emissions Information
A. Brand and model of dry cleaning equipment [70.5(b)(2)]
B. A determination of emissions from the dry cleaner based on inputs from the brand and model of the dry cleaner’s equipment (which explain pollution control equipment and the emissions outputs of the equipment) and from the application (limitations on operation and fuel and raw material use) [70.5(b)(2)(i)(ii)(iii)(v)(vi)(vii)]
C. Calculations on which the dry cleaner information was based [70.5(b)(2)(viii)]
D. Other pollutant information
   1. Raw Materials: List of raw materials which exists at the dry cleaning facility. [70.5(b)(2)(iv)]
   2. Pollution Emitting Equipment: List of pollution emitting equipment which exists at the dry cleaning facility. [70.5(b)(2)(i)]

IV. Compliance Information
A. Applicant

In signing this permit, I agree to all of the following:
- I agree that all of the information I provided in the permit application is true. [70.5(a)]
- I agree to operate my dry cleaning equipment within the operation hours I listed and at the capacity that I stated, understanding that the failure to do so would lead to changes in the emission of pollutants from my facility and invalidate this permit. [70.5(b)(8)]
- I agree to have my dry cleaning equipment maintained by a reputable maintenance company x times per time period and to keep records of such maintenance. [70.5(b)(8)]
- I agree to send in the attached postcards to the permitting authority x times per time period saying that my dry cleaning equipment has been checked by a reputable maintenance company and is operating in good condition. [70.5(b)(8)]

Signature of Dry Cleaner
Owner:______________________________ Signature of
Designated Representative: ________________________
Date:______________________________

B. Responsible Official [70.5(b)(8)(i)]

To the best of my knowledge, information, and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete.

Signature of Responsible Official:______________________________
Date:______________________________
II. Equipment and Fuel Use Information

A. For the equipment listed in Part II. of this permit application, please state what capacity (0–100%) this piece of machinery is operated. (0% = Equipment at facility but is not operated. 100% = Equipment is used at maximum capacity).

<table>
<thead>
<tr>
<th>Model #</th>
<th>% of capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B. Please check the box next to the following fuels and raw materials associated with your dry cleaning equipment which are sources of regulated pollutants.

<table>
<thead>
<tr>
<th>Material</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perchloroethylene</td>
<td></td>
</tr>
<tr>
<td>abc solution</td>
<td></td>
</tr>
<tr>
<td>cdf solution</td>
<td></td>
</tr>
</tbody>
</table>

C. 1. Please check the box beside the maximum number of hours your facility operates during a normal week.

- [ ] <10
- [ ] 10-15
- [ ] 16-20
- [ ] 21-25
- [ ] 26-30
- [ ] 31-35
- [ ] 35-40
- [ ] 41-45
- [ ] 46-50
- [ ] 50-55
- [ ] 56-60
- [ ] > than 60; Please specify

2. How many times a year does your facility exceed this maximum weekly average and by how much each time? ______________________________
IV. Information on other pollutants

A. To determine what other regulated pollutants exist at your facility, please check the boxes next to any of the following sources of regulated pollutants operate on the premises of your facility.

☐ gas stove
☐ gas operated refrigeration unit
☐ gas heat
☐ gas powered electric generator
☐ lawn mower

Are you aware of any other sources of regulated pollutants operated at your dry cleaning facility. If so, please list. ____________________________________________

B. To determine what other regulated pollutants exist at your dry cleaning facility, please check the boxes next to the following raw materials which exist at your facility.

☐ gasoline
☐ bleach
☐ paint
☐ varnish
☐ motor oil
☐ cleaning solvent A
☐ natural gas
☐ other—Please specify material and quantity. ____________________________________________

__________________________________________
Model General Permit Application for Dry Cleaners

1. General Information

Company Name: ____________________________________________

Location: (Street) (City) (State) (Zip)

Owner's Name: ____________________________________________

(Last) (First) (M.I.)

Owner's Address: __________________________________________

(Street) (City) (State)

Designated Representative: __________________________________

(Last) (First) (M.I.)

Designated Representative's Address: ____________________________

(Street) (City) (State)
II. Equipment

Please check the box which corresponds to the model of your facility's dry cleaning equipment and the number of these models your facility operates.

Model ABC
My Facility operates □ 1 □ 2 □ 3 other (Please specify.)

Model XYZ
My Facility operates □ 1 □ 2 □ 3 other (Please specify.)

Model 123
My Facility operates □ 1 □ 2 □ 3 other (Please specify.)

Model 456
My Facility operates □ 1 □ 2 □ 3 other (Please specify.)

Model DEF
My Facility operates □ 1 □ 2 □ 3 other (Please specify.)

Model 456
My Facility operates □ 1 □ 2 □ 3 other (Please specify.)

Other: If the type of equipment your facility operates is not listed above, please give a detailed description of your equipment.________________________________________________________
________________________________________________________
by 40 CFR Part 70 to be permitted unless they are part of a SIP.

D. Discussion

The key issue under exemptions is to find language that would define the minimum set of sources that all states must permit. This set should not include sources that do not present problems except in a few locations. The language should also clarify the circumstance in which the generally exempted source should be permitted.
turn to with questions. Similarly, if non-major sources are not deferred, states may not have had time to establish general permits.

C. Available Alternatives

1. Leave the 7 day fast track approval process as optional to states but strongly encourage them to adopt it, or make the 7 day fast track approval process mandatory.

2. Leave the adoption of general permits as optional but strongly encourage states to adopt general permit programs by publishing a list of sources that would be good applicants for general permits and model permits for at least some of these industries. Or, make it mandatory that states adopt general permits for a fixed group of sources. Perhaps sources who feel they are especially qualified for a general permit could pay a one time fee to cover the initial fixed cost of writing a general permit for their industry. Whether the EPA leaves the program as it is now or mandates general permits for some sources, the agency needs to begin to determine which sources may be able to utilize a general permit. The following is a list of sources who have been suggested by various associations as particularly appropriate for general permit use.

- dry cleaners (NEDA, AEA, & IFI)
- metal fabricators (NEDA & AEA)
- small printing operations (NAM, NEDA, & AEA)
- metal finishing operations (NAM, NEDA, & AEA)
- small textile mills (NAM, NEDA, & AEA)
- small electronics facilities (NAM, NEDA, & AEA)
- electroplating (NAM, NEDA, & AEA)
- batch chemical (NEDA & AEA)
- batch food processing (NEDA & AEA)
- metal furniture (NAM, NEDA, & AEA)
- batch plastics (NAM, NEDA & AEA)
- machinery manufacturing (NAM, NEDA, & AEA)
- batch metal manufacturing (NAM)
- pharmaceutical (NAM)

3. Leave permit shields as optional to states but make a greater effort to explain to states how a permit shield would work and the economic benefits of certainty for a business.

4. Unless a non-major source wishes to be permitted:
   a) Propose deferral for non-major sources at least until model general permits have been established for certain categories.
   b) Propose deferral for non-major sources at least until states have an established small business stationary source technical and environmental compliance assistance program.
   c) For states which already have an air quality program which permits some small sources, continue with the state's permit system until a time when a) and b) have been accomplished.
D. Discussion

If certain parts of EPA's proposed rule for the Operating Permit Program which ensure operational flexibility are not adopted by states, the EPA's determination that the small business economic impact from the Title V. permitting program will be insignificant should be reevaluated.

Comment VI. Exemptions

A. Issue

The regulation of concern here is Section 502(a) It reads, "The Administrator may, in the Administrator's discretion and consistent with the applicable provisions of this Act, promulgate regulations to exempt one or more source categories (in whole or in part) from the requirements of this subsection if the Administrator finds that compliance with such requirements is impracticable, infeasible, or unnecessarily burdensome on such categories, except that the Administrator may not exempt any major source from such requirements."

B. Implications for Small Business

As of the proposed Part 70 regulations which appeared in the Federal Register on May 10, 1991 no sources had been exempted. We believe there is a possibility that asbestos demolition and removal should be considered as a possible exemption. EPA already has legislation (Requirement to Inspect and Requirement to Notify) which examines the temporary release of air pollutants from asbestos demolition and removal sites. (See the November 20, 1990 Federal Register) Developing permit programs for these temporary ventures when there is already a program in place is redundant and may be a waste of the EPA's time.

Also there are some non-major source types, such as wood stoves, that contribute to air quality problems in some regions (for example Vermont) but not others (perhaps Florida). Unless these are exempted, all such sources will have to be permitted, even if they are not part of the SIP for the region.

C. Available Alternatives

Exempt asbestos demolition and removal from needing a permit and continue to implement EPA's Requirement to Inspect and Requirement to Notify.

Exempt source types that are typically non-major and contribute to pollution concerns in only some regions. State in the regulations that exempted sources would have to have permits in a region if that region included them in their SIP.

Go the next step -- State that non-major sources are not required
3. Section 504 (f) of the Act defines the permit shield provision of Title V, which enables States and the Administrator to provide sources with greater certainty as to their legal obligations under the Act. This section establishes that "the permit shall be deemed in compliance with all other applicable provisions of this Act which relate to the permittee if-- (1) the permit includes the applicable requirements of such provision, or (2) the permitting authority in acting on the permit application makes a determination relating to the permittee that such other provisions (which shall be referred to in such determinations) are not applicable and the permit includes the determination or a concise summary thereof. In the proposed rule, the EPA writes, "The EPA encourages States to employ the "permit shield" routinely to help stabilize the permit process and give greater certainty to the regulated community." "

4. The EPA has proposed to defer non-major sources for five years. They receive the authority to make this suggestion from Title V. Section 502 (a) which reads, "The Administrator may, in the Administrator's discretion and consistent with the applicable provisions of this Act, promulgate regulations to exempt one or more source categories (in whole or in part) from the requirements of this subsection if the Administrator finds that compliance with such requirements is impracticable, infeasible, or unnecessarily burdensome on such categories, except that the Administrator may not exempt any major source from such requirements." In the preamble to the proposed rule the EPA writes, "The EPA proposes to use the authority available under section 502(a) to defer initially the applicability of the Title V program to all sources that would otherwise be subject but are not major or affected sources under the Act. The EPA finds that without this deferral, compliance by all these non-major sources with the permitting requirements would be "impracticable" and "infeasible" within the meaning of Section 502 (a)."

B. Implications for Small Business

1. Without the 7 day fast track approval process for minor modifications, small business will have to spend more time on permit modification. A possible 18 month permit modification process for a minor modification which leads only to a de minimis change in emissions could keep sources from making quick changes to take advantage of changing markets or from making a new product to take advantage of an anticipated consumer demand.

2. Without general permits all industry, including small sources with similar emissions profiles, would have to go through an extensive permit application process. This is not necessary if a group of sources employ the same equipment and work practices and share similar emissions profiles. The state permitting authority does not need every single dry cleaner to explain how its equipment works and what its air pollution controls will be, because all dry cleaners basically have the same equipment. Left optional to the states, it is possible that some states will not have the time to develop general permit programs. The National Environmental
Development Association's Clean Air Regulatory Project and American Electronics Association write, "States, left by EPA rules, with the task of characterizing each small industry group in the state and devising general permit rule, but meeting only once every one to two years, often with limited sessions and constitutional mandates to deal with revenue matters and redistricting, will never consider legislation on general permits and states will not have ability to devise such rules, particularly without guidance from EPA on source categories." This would be unfortunate because both states and business benefit from general permits. State agencies have to spend less administrative time and money. Even the EPA benefits. General permits are easy to view and monitor, if the EPA wishes to check for state compliance on some issue.

3. Without strong encouragement from the EPA, the states may not adopt permit shields. Based on conversations with state air quality officials, we find that all of these officials view the permit shield as a clause that exempts sources from being regulated. Without a permit shield, permitted sources will have less faith in the completeness of their permit and worry that they may be required to comply with some regulation they have never heard of before. This rule was meant to shield permittees from unanticipated changes in regulations. It would ensure that until a permit is renewed or modified, the source would have a clear definition of its rights and duties. Permits should be viewed as a negotiated contract between states and permittees, with some benefit to both. Both sides benefit from certainty; permittees know their obligations, and states know the emissions limit for the source.

4. According to the Regulatory Impact Analysis and Regulatory Flexibility Act Screening Analysis for Proposed Title V Operating Permits Regulations dated February 12, 1991 "approximately 80% of state and local air pollution control agencies already have some kind of operating permit program in place. Of those States with programs in place, 88% permit small sources emitting 25 tons per year and 79% permit sources which emit less than 25 tons per year." It is probable that states which already have established permit programs in place and already permit some small sources will not defer non-major sources for five years. Based on the large percentage of states with such programs, the small business community cannot make a blanket assumption that all states will defer non-major sources. Furthermore, if non-major sources are not deferred for at least a few years, the small business stationary source technical and environmental compliance assistance program may not be established when small sources have to apply for permits. Non-major sources would not have an organized program to

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6See the Testimony of David A. Chittick, AT&T Corporate Environment and Safety Vice President, on behalf of The National Environmental Development Association's Clean Air Regulatory Project and the American Electronics Association, before the Environmental Protection Agency, June 4, 1991.
small business stationary source technical and environmental compliance assistance program are outlined. The program must offer:

1. Mechanisms for developing information concerning compliance methods and programs to encourage lawful cooperation among such sources.
2. Mechanisms to assist such sources with pollution prevention and accidental release detection and prevention.
3. A State ombudsman for such sources to aid in implementation of the Act.
4. A compliance assistance program to help such sources determine applicable requirements and receive permits.
5. Mechanisms to assure that such sources receive notice of their rights under the Act.
6. Mechanisms to assure that such sources are informed of their obligations under the Act, including referrals to qualified auditors.
7. Procedures to consider requests from such sources to modify work practice or technological compliance methods, or the milestones for implementing such methods.

B. Implications for Small Business

There are several problems with the regulation as it now stands. First, it is possible that a state might not adopt a program. In such a case, small business assistance and information would be provided by a federal small business stationary source technical and environmental compliance assistance program. We do not believe that a federal program could be as responsive to needs of state business as a state program could be. The federal program office would not only have to be able to assist with federal laws and regulations but also with a particular state's air pollution laws and regulations.

Also, the regulation as proposed only suggests a brief outline of what a state program should be. More detail has been provided since that time in the EPA's Guidelines for the Implementation of Section 507 of the 1990 Clean Air Act Amendments. But, small business does not know how these guidelines will be interpreted and cannot depend on quality programs being developed in the states. The program will differ from state to state, and may be ineffective. Will states disseminate information using fact sheets and hire only one small business ombudsman? Conversely, will states create a small business stationary source technical and environmental compliance assistance office with multiple resource personnel and access to the governor, attorney general, and air pollution control authority?

Without a small business stationary source technical and environmental compliance assistance program in each state, small business will spend more time and labor determining which permits apply to them, how to fill them out, and if applicable who to hire to fill them out.
C. Available Alternatives

Establish stronger guidelines on what a quality small business stationary source technical and environmental compliance assistance program is. Based on discussion with a state air quality official, we suggest that the guidance recommend that the program be autonomous from the state air quality office and any economic development office that the state may operate. An independent office, with access to the governor would have the most leeway to offer a balanced perspective to small business.

D. Discussion

The SBAP can potentially reduce permit and control costs to small businesses by providing advice and assistance. These offices should assist small business to promote general permits, emission trading, innovative approaches to permit writing, etcetera. The offices should be staffed by persons dedicated to making each element of the permitting program work smoothly for small business.

Comment V. Operational Flexibility

A. Issue

The following four things have been suggested in the Regulatory Flexibility Analysis performed for Title V. of the Clean Air Act Amendments on November 15, 1990 or in the proposed part 70 regulation as ways to minimize the impact of Title V. on small business, but they are only optional to the States.

1. Section 502 (b) 10 of Title V. establishes fast track approval for minor modifications to permits. It reads, "These are changes which go beyond the activities allowed in the original permit that increase the total emissions allowed under the permit (for any regulated pollutant from emissions units addressed by the permit), but do not rise to the level of modifications subject to Title I NSR procedures and do not violate any applicable Federal requirements. Under such a "fast track" process for minor permit amendments, States are free to adopt procedures to allow such changes to take effect automatically after a specified period of time (no less than 7 days), as long as the permitting authority does not object during this period."

2. Section 504(d) of Title V. establishes general permits. It reads, "The permitting authority may, after notice and opportunity for public hearing, issue a general permit covering numerous similar sources. Any general permit shall comply with all requirements applicable to permits under this title." On the topic of general permits, the preamble to the proposed permit regulations reads, "For those small business still required to obtain, or those opting to obtain, a permit, and for other appropriate source categories, EPA is promoting the use of general permits where possible."
per ton and must do so if additional funds are necessary to cover the costs of the program."

B. Implications for Small Business

In much of the debate on the proposed Part 70 of Chapter I of Title 40 of the Code of Federal Regulations, we believe there has been a misunderstanding on the part of some commenters of the definition of potential emissions." People have misconstrued potential emissions to be those emissions that result from a source operating at their absolute maximum potential, regardless of operational limits. For instance, the International Fabricare Institute, an association which represents dry cleaners and launderers across in the United States, explains that potential emission estimates for dry cleaners "grossly" overestimate actual emissions. They write, "Dry cleaners do not run their equipment 60 seconds a minute, 60 minutes an hour, 24 hours a day, 7 days a week, 365 days a year normally associated with emitting potential." But the proposed 40 CFR does not define potential emissions this way. Part 70.2(y) of the proposed CFR defines "Potential to emit" to mean "the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of a source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation is federally-enforceable." Potential emissions should be thought of as allowable emissions— the emissions from a source operating within its normal business hours and within all laws affecting its operation.

Presumably using the misunderstood definition of potential emissions, many sources have argued that permit fees should be based on actual emissions rather than potential emissions. It is true that actual emissions will always be less than the misconstrued definition of potential emissions, and that actual emissions should always be lower than or equal to the regulation's definition of potential. But, commenters are possibly burdening themselves with expensive monitoring costs when they suggest that permit fees be based on actual emissions.

Determining actual emissions from a source can be quite costly if it means installing expensive monitoring equipment. In areas where emissions monitoring is not already done or where the cost of such monitoring would be great, it is possible that the cost of determining actual emissions could be greater than the permit fee. For example, the Northeast States for Coordinated Air Use Management, the members of which are 8 Northeast air pollution control agencies, writes, "We caution that if the proposal goes as proposed state agencies may require additional continuous

"See the Testimony of the International Fabricare Institute on the Proposed Regulations for the Operating Permits Program."
monitoring at sources to monitor a source's level of actual emissions. This may end up costing a source more than if fees were based on potential emissions. It is not in the spirit of the Clean Air Act, which strives to minimize its impact on small business, to impose monitoring costs greater than the permit fee. It is already necessary for a source's "potential" emissions to be a part of its permit as it is required in Title V. It would be simpler for some sources to use this amount of emissions for determining their fee, than to go to the extra cost of determining their actual emissions.

C. Available Alternatives

1. Allow sources to choose whether to determine their permit fee based on actual or allowable emissions based on the cost effectiveness of doing so for each source.

2. Give industries the option of trying to negotiate with their state permitting authority a flat fee for their industrial category. Similar to the other fees, this fee could be corrected by the Consumer Price Index and renegotiated on a regular basis. This is supported by the preamble to the proposed part 70 regulation which states, "States are free to use different approaches" than charging $25/ton, but it should be made more explicit.

D. Discussion

A flat fee or fee based on allowable emissions could keep the costs of determining actual emissions from overwhelming small business and becoming more costly than their actual fee. While the $/ton fee in some small way acts as an incentive for the producers of pollutants to reduce emissions, it is not large enough to really act as an economic incentive. Replacing it with a flat fee for small businesses or those businesses with excessive monitoring costs (not required in another part of the Act) will not exclude a major economic incentive component of the Act.

Comment IV. Small Business Stationary Source Technical and Environmental Compliance Assistance Program

A. Issue

The Title V Sections of concern here are Sections 507(a) and (b). Section 507 of the Amendments creates a small business stationary source technical and environmental compliance assistance program. 507(a) outlines the responsibilities of the state Program, while 507(b) outlines the responsibilities of the Federal Program. In the proposed Part 70 of Chapter I of Title 40 of the Code of Federal Regulations, the requirements for EPA approval of a state
2. Encourage the establishment of emissions trading networks by establishing comprehensive guidance to regions developing SIPs in order to increase the flexibility of the permits and decrease the number of sources who have to go through modification processes. The way the proposed regulation is written a source does not have to go through permit revision to participate in emissions trading. Part 70.6(a)(8) states that a permit must contain "A provision stating that no permit revision shall be required for increases in emissions allowed through emissions trading to the extent such trades are authorized by the applicable requirements of the Act, including any applicable implementation plan."

D. Discussion

Permit renewal is necessary for two major reasons: determining how new rules and regulations apply to a source whose permit is up for renewal and evaluating any changes the regulated source wishes to make to its permit. 18 months is not necessary for evaluating changes the regulated source would like to make to its permit, because any major modifications that the permitted entity has made since its last permit approval will have undergone a permit modification process and been incorporated into the permit already. It is possible that some industries will wait for their permit renewal time to come around before making such changes. This is doubtful, however, since most permits will have a length of three to five years, and 3 to 5 years is a long time for an industry to wait to make a change. 18 months is not necessary to determine how new rules or regulations apply to a permitted source either. If permits were written to last for more than 3 years, the permits may already have been reopened to incorporate all the new rules and regulations at the time of permit expiration. (A permit can be reopened to incorporate new rules and regulations if it has 3 or more years remaining in it's life when new rules and regulations are passed that are applicable to it. Title V. Sec. 502 (b) (9))

If however there are new rules and regulations that apply to the permitted source when a permit expires or the industry does wish to make significant changes during permit renewal, why is 18 months necessary? Once the affects of new rules and regulations have been determined for several representatives of one type of industry, the process for other members of that industrial grouping should not take as long. Title V. Sec. 502(b)(6) of the Clean Air Act calls for "adequate, streamlined, and reasonable procedures... and for expeditious review of permit actions including applications, renewals, or revisions..." Furthermore, much of the detailed information necessary to determine how a change in an industrial process or change in a regulation will affect a permit will already be in the permit as the minimal permit requirements are excessive.

It is possible that regulators intend to use part of the proposed 18 month renewal period to determine compliance for enforcement purposes. The permit renewal period should not be used for enforcement purposes. The State agency should monitor compliance more often than every time a permit is to be renewed. If the State
has difficulty doing so, perhaps it is not efficiently using the funds accruing to it from the permit fees, or perhaps the permit fees are too low.

It is understandable that some permit modifications may be complex and require an 18 month approval period. We believe, however, that the major category is too broad and could be narrowed by creating a "more than minor but less than major" modification category. The inclusion of a "more than minor but less than major" modification category would alleviate the burden on groups of source's who are modifying their industrial process in similar ways or who are being brought into compliance with the same regulation. For example, if all dry cleaners are switching from current equipment to a dry to dry system, why should each one have to go through a long permit modification process to explain the procedure to the state permitting authority. Similarly, once a new rule or regulation has been applied to a few dry cleaners, it should not be difficult to determine how to apply it to other dry cleaners. All dry cleaners use practically the same equipment and have similar emission profiles.

Based on the inflexibility of the permit modification process as it is proposed in the proposed Part 70 regulation, sources may decide to overestimate their emissions. They would have to pay a greater permit fee, but $25/ton is not excessive. It may be cost effective for a source to pay the larger permit fee in order to be able to take advantage of changes in the market for their products without going through a permit modification process. This would unfortunately decrease the certainty of the data upon which air quality models are based and regulations determined. Establishing extensive emissions trading networks and promoting their effectiveness, may keep sources from providing themselves with extra flexibility in their permits. A working, efficient emissions trading program would not only benefit business, but decrease the administrative burden on EPA.

Comment III. Using Actual Emissions to Determine Permit Fees

A. Issue

The Section of Title V which creates permit fees is Section 502(b) 3. This Section establishes a permit fee "sufficient to cover all reasonable (direct and indirect) costs required to develop and administer the permit program requirements of this title[V]..." In the preamble for the Part 70 proposed rule, released to the public on May 10 in the Federal Register, the EPA writes, "The program must presumptively collect a fee amount from all permitted sources equal to at least $25 per ton (1990 baseline) for the actual emissions of each regulated pollutant... The program need not collect the $25 per ton amount if it can provide a demonstration that a lesser amount will adequately support the direct and indirect costs of the program[502(b) 3 (B) (iv)]. Conversely, States are free to use different approaches or charge more than $25
modification period is its length. 18 months is too long. Once the permit modification application is filled out, the source has to possibly wait 18 months before it knows if it can or cannot make the change. While the implications for small industry are variable, several small industries would be particularly affected by an 18 month permit modification process. Chemical batch processors who make a variety of products for among others, the pharmaceutical industry, chemical industry, agricultural industry, plastic industry, solvent, paint, sealer, and varnish industry, and paper industry, need maximum flexibility. A study done by the Synthetic Organic Chemicals Manufacturing Association outlines the reasons why chemical batch processors need flexibility. The reasons include the need to develop a product for a specific application, the need to fill an order for a small volume of a chemical which is not normally made by one piece of dedicated equipment, the need to supply seasonal demand, the need to supply a customer when they have a shortfall in raw materials, the need to supply a customer's emergency requirement, the need to match a competitor's product, and the need to gain the confidence of prospective customers.

In general, the costs to all small business of an 18 month permit modification process are the following opportunity costs:

a) Idle resource costs - For example, suppose a chemical batch processor gets an order to make chemical abc for a pharmaceutical company that has discovered a new miracle drug. Because the batch processor did not expect this demand for chemical abc and producing the chemical necessitates operational change, the batch processor must apply for a permit modification. For up to 18 months, the equipment at the chemical batch processor sits unused.

b) Lost business opportunities - For example, suppose a chemical batch processor fails to make a product that satisfies a customer. A different batch processor is offered the opportunity to manufacture a replacement batch but cannot do so quickly because of the 18 month permit modification process. The former chemical batch processor remakes the product and the opportunity is lost.

C. Available Alternatives

1. Establish a permit modification and renewal schedule based on the complexity of the permit

a) Renewal

(1) General permits -

Complete general permit renewal applications must be filed with the appropriate state government authority two months before the current permit expires. The State authority would have up to 2 months from the time the complete application was filed to act on the application.

(2) Regular permits -

(a) For regular permits in which substantial changes* will be made, complete permit renewal applications must be filed with the appropriate state government authority no less than 6 months before the current permit expires. The State authority would have up to 18 months from the time the complete permit application was filed to act on the application.

(b) For regular permits in which only minor changes** will be made, complete permit renewal applications must be filed with the appropriate state government authority 6 months before the current permit expires. The State authority would have 6 months from the time the complete application was filed to act on the application.

*Substantial change is defined as a change which results from both:
   a) new rules and regulations
   b) source desire to make a modification as defined in Sec. 111 or 112 of Title V.)

**Minor change is defined as a change which is not substantial.

b) Modification

(1) General permits - Complete general permit modification applications such as the purchase of a new dry-to-dry machine for which a general permit has been developed must be filed with the appropriate state government authority one month before the permittee wishes to make the modification.

(2) Regular permits - There are currently two classes of modification, minor and major. We proposed adding a third. For lack of a better term, we will call them more than minor but less than major changes*. If the permitted source wishes to make a more than minor but less than major modification, he/she must file an application for modification 6 months before he/she wishes to be able to make the modification. The state authority has six months from the time the completed application is received to act on the application.

*More than minor but less than major is defined as a potentially large modification which is not a major modification because the modification has been done before by an industry of the same SIC code.
On the other hand, once the permit is in place, this measure ensures that a business has flexibility to make changes that are consistent with the permit. The permit can be developed in such a way that this clause provides a great number of options to the business.

C. Available Alternatives

Leave Section 70.6(d)(3)(iv) of the proposed regulation to read the way it does now, but encourage states to refrain from spending an excessive amount of time trying to determine every detail that might affect permits on a case by case basis. Encourage states to add a phrase or paragraph to the permit which states that all permittees are responsible for being in compliance with all state laws concerning air pollution. If necessary, include those laws in an appendix of the permit.

States should not believe that by doing this they will be underregulating sources. A source should not have to ask federal, state, or local authorities before making changes in its operations which do not violate the law. All areas and all ways in which a state wishes to regulate a source of air pollutants should be part of a regulation. States should not feel they can limit a source's actions in ways not incorporated into law or regulation.

D. Discussion

This clause implies both a cost (possibly a small one) and a (potential) benefit to business. The cost, burdening the permit with possibly copious detail, buys the firm the option of designing a permit that will cover a number of future operating scenarios. This could be a valuable tool for industries like chemical batch processors. The cost (of including extra regulatory detail) can be kept low if it is realized that the extra detail is "boiler plate," and can be put in an appendix or incorporated by reference. State air pollution officials we talked to have no problem with inclusion by reference.

Comment II. 18 Month Permit Renewal/Modification Process

A. Issue

The time between a firm's decision to alter its production process and the day it can actually begin to operate the new process may be unnecessarily lengthened. The following parts of the proposed Part 70 Chapter I of Title 40 of the Code of Federal Regulations are part of the EPA's interpretation of Title V of the Clean Air Act and are pertinent to the following discussion.

70.5 (a) "For purposes of permit renewal...a timely application is one that is submitted 18 months prior to the date of permit expiration, or such other time as may be approved by the Administrator...in no event shall a time less than 6 months before
permit expiration be approved."

70.7 (a) (2) "...the program shall provide that the permitting authority take final action on each permit application (including request for permit modification or renewal) within 18 months after receiving a complete application."

70.7 (d) (3) "Permit modifications shall be subject to the same procedural requirements, including those for public comment and Federal oversight, as original permit issuance, except that the required review shall cover only the proposed changes rather than the unchanged activities of the permittee."

A permit modification is defined as a change in its process that increases criteria pollutants above a de minimis level (Sec. 112) or a physical change or change in a method of operations that results in an increase in the source's hourly emissions rates (Sec. 111).

B. Implications for Small Business

1. 18 Month Permit Renewal Period

The principal problem to small business of the 18 month permit renewal period is its length. 18 months is too long. For a small source in which only minimal changes or modifications will be made to the permit, having to submit an application for permit renewal 18 months before the other one expires is bothersome. If permits are written for a three year period, sources would be in a process of permit renewal half of the time, even more if you count the time necessary to fill out a permit renewal application. Furthermore, if a permit renewal application is due 18 months before a permit expires, much of the information contained on the application may change during the review process. This will call for changes and additions to the permit renewal application during 18 month review process which have the potential to create burdens on both industry and regulators. Even if the state permitting authority reviews a permit renewal application the first month of the 18 month period and approves it, it cannot renew the permit for 17 months. Close to the end of the 18 month time period, the permitting authority would definitely want to review the application again to make sure there are no changes. Why should the permit sit in the state office becoming outdated just to be reviewed twice?

2. 18 Month Permit Modification Period

The predominant problem to small business of the 18 month permit
MEMORANDUM

June 25, 1991

To: Kevin Bromberg, SBA
From: Eric VanDeVerg, JFA
Re: Comments on 40 CFR Part 70, Permitting of Sources of Air Pollution, from the perspective of small business.

INTRODUCTION

Title V of the Clean Air Act Amendments of 1990, P.L. 101-549, enacted on November 15, 1990 requires the EPA to promulgate regulations within 12 months of enactment that require and specify the minimum elements of State operating permit programs. A new Part 70 of Chapter I of Title 40 of the Code of Federal Regulations will contain the provisions to carry out Title V. The draft version of 40 CFR Part 70 published in the Federal Register May 10, 1991 has the potential to severely impede the ability of American firms to respond to developments in the market place. It also has the potential to streamline some response mechanisms and incentives to efficient application of emission control options, such as emission trading. Whether the first potential is avoided and the second realized depends on how a number of issues not completely spelled out in 40 CFR Part 70 are resolved. This discussion (testimony) makes the case for several alternatives to the current language of 40 CFR Part 70 that will streamline the regulation and protect the economic viability of both small and big business.

Examples of the potential to retard business include the possibility that even small businesses with the simplest of applications would have to wait one and a half years for permit renewals or modifications that would allow them to alter their production process, that the amount of information they must include in their permits grows extra large due to rulings on the de minimus size of emission points they must include in their permit, and the number of regulatory requirements they must cite in the permit becomes large and complex. The approach should be to reduce permit application and review time by making each permit as simple as possible within the limits defined by Title V.

Potential to streamline changes in the production process includes the statement that a source may at any time switch to any alternative production and pollution control scenario listed in its permit, that emission trading does not require permit (or SIP??) modification, and that a number of initiatives are to be undertaken to ease the permit burden on small sources, including the use of general permits, the establishment of a small business assistance program, and temporary exemptions for non-major sources. These measures will help streamline the permitting process and, in some cases, help to reduce the total cost of meeting air quality goals, but only if program elements to achieve these ends are aggressively developed. General permits should be strongly promoted to the
states by EPA, emission trading networks developed in key regions where they are most likely to be needed, and strong efforts made to ensure that the SBAP are in place and equipped to assist small business with all these programs (i.e., general permits, emission trading, and design of permits to ensure maximum flexibility).

We also state our hope that the final regulation will provide firms with a single permit that covers all state and federal emission control requirements. Requiring sources to fill out state applications separate from federal applications and wait for state permit approval, renewal, and modification as well as federal permit approval, renewal, and modification would be burdensome for sources.

In the following sections, we describe six issues stating how they affect small business, what alternatives we propose, and the pros and cons of the alternatives.

Comment I. Permits in General

A. Issue

Section 70.6(d)(3)(iv) reads, "Neither notification nor permit revision is required for changes at the source that are allowed for and regulated by the permit, or that are not regulated or prohibited by the permit."

B. Implications for Small Business

Section 70.6(d)(3)(iv) could lengthen and complicate permits. NESCAUM, the Northeast States for Coordinated Air Use Management, writes, "For the record we note that if EPA proceeds with exempting a source from all conditions not explicitly mentioned in a permit, states will be forced to greatly lengthen their permits to include all potential conditions needed to restrict source activities to those within the purview of their permit. Obviously this will impede the timely review and completion of permits and we believe was not intended by Congress or EPA in the drafting of this proposal."

If the proposed regulation does not change and NESCAUM's prediction is realized, small business would be negatively impacted by Section 70.6(d)(3)(iv). If states attempt to include every detail they believe will affect a source's emissions in the permit, drafting permits would become an extremely lengthy and demanding process for the state permitting authorities. The granting of permits would be likely to take the maximum amount of time state agencies are allowed for review. Long waiting periods for permits means less flexibility for small business. Starting a new business, expanding a business to capture a sudden increase in demand, or modifying a current business practice becomes a long, laborious process.

See NESCAUM's comments on the proposed Part 70 regulations.
Rather than determine that residential halon fire extinguishers are nonessential and ban the sale of residential halon fire extinguishers, the EPA could achieve a reduction of emissions by November 1992 from residential halon fire extinguishers and put off the ban until November of 1994. The EPA could determine industry guidelines for the manufacturers of residential halon fire extinguishers during this time. These guidelines could include leak detection tests for all units and labels on units requiring their return to a manufacturer when the product's guarantee ends or when the product has been partially used. When such units are returned to the manufacturers, the manufacturers could be required to recycle halon. Such a recycling system is likely to be put in place by the manufacturers of halon products in any case as a result of the increase in the cost of halon. The benefit of this alternative is that it allows time for the development of substitutes to residential halon fire extinguishers using the returns from halon fire extinguisher sales, so that manufacturers could make it through 1993, while decreasing the amount of halon escaping into the atmosphere to cause ozone depletion.

4.6 Conclusion

Residential halon fire extinguishers are not nonessential products. The purpose of residential halon fire extinguishers are to save lives and damages that result from fires. Substitutes with the same effectiveness and properties (lack of clean-up costs) are not yet available. Furthermore, the EPA analysis greatly underestimates the cost of the ban of halon fire extinguishers for residential users. This is because EPA failed to account for an important segment of the market -- those consumers who can avoid high clean-up costs after a fire only if a halon (or other "clean") fire extinguisher is available. This market segment will provide enough revenue to the industry to give it a good chance of surviving the tax. However, the industry's prospect of surviving the ban is not as good, given that its revenues will be reduced to zero for a year or more. The present value of lost revenue is estimated to be between $23 million and $393 million depending on which scenario occurs.
The major benefit of this alternative is that it allows the manufacturers of residential halon fire extinguishers time to develop, test, and market substitutes for halon extinguishers before the increased excise tax on halon in 1994 using returns from sales of halon fire extinguishers to the sector of the residential halon market with inelastic demand for halon extinguishers. Without this time, our analysis above shows that the industry may not survive. In addition, the cost of removing a Megagram of halon under this approach is very high. Perhaps it would be more cost effective to control ozone-depleting chemical emissions elsewhere or to concentrate on developing an efficient recycling program for halon.

There are two problems with this alternative. First, without a ban on the sale or manufacture of residential halon fire extinguishers, the halon used in such extinguishers would still be released into the atmosphere in the case of a fire where it would contribute to ozone depletion. But, sales of residential halon fire extinguishers are likely to decrease with the onset of January 1994 tax increase on halon. Factors affecting the magnitude of this decline were discussed above. Without recycling, a 27 percent decline in the number of units sold is expected, according to our analysis above. EPA expects a 100 percent decline. Secondly, the manufacturers of residential halon units may not proceed as quickly with substitute research and development if they receive relief from a ban of their halon products. This seems unlikely, however, due to the increasing excise tax on halon which will increase even more in the future, the fact that halon use must be discontinued by 2000, and in light of research already conducted by the industry into new product development (discussed below).

Additionally, the cost of a ban on residential halon fire extinguishers is large compared to the gain in terms of halon reduction attributable to a ban. Residential halon fire extinguishers account for only 0.16 percent of the total ozone depletion potential attributable to the Halon/CFC market in the United States. Furthermore, they account for only 1.3 percent of the total United States halon market. The cost of eliminating these emissions could very well be the domestic residential halon fire extinguisher manufacturing industry. In light of expected future reductions in halon use, it would be nearly as effective for the EPA to conduct outreach programs for the residential halon manufacturing industry on recycling and halon substitutes. All members of the Association of Factory Sealed Manufacturers, which represents six of the eight manufacturers of residential halon fire extinguishers, have already established halon recovery and reclaim systems.
A second alternative would be to maintain the status quo until the effects of the January 1, 1994 excise tax increase are known. At such a time if the sales of residential halon fire extinguisher do not decline or discontinue, a decision to ban the manufacture and sale of residential halon fire extinguishers could be reevaluated. This alternative is less effective than the ban in that it allows the continued sale of residential halon fire extinguishers until the effects of the January 1994 tax could be determined. The benefit of this alternative is that it allows time for the development of alternative products using returns from the manufacturer's sales of halon fire extinguishers to the sector of the market with very inelastic demand for halon fire extinguishers. The analysis shown in Tables x.2–x.4 shows that the development and marketing of new residential (and commercial) products soon after a ban is essential to the survival of the residential halon fire extinguisher manufacturing industry. The analysis shows that if the industry produces a product with similar properties at a similar price to those of the halon extinguishers they can expect to return to 1987 levels of sales and revenues. Getting through 1993 is the major obstacle to this.

According to the Association of Factory Sealed Fire Extinguisher Manufacturers, which represents six of the eight manufacturers of residential halon fire extinguishers, member companies have invested considerable sums of money and effort into the development and testing of alternatives to halon such as FM 100, FM 200, and DuPont's 232. Safety Plus, one of the manufacturers of residential halon extinguishers, has already spent over $30,000 fire testing substitute products. Tests have been carried out at Underwriters' Laboratories, and resources have been invested in the evaluation of compatible plastic and rubber components necessary for these substitutes. The long-term testing of models based on these substitutes has begun. Studies include tests for toxicity and chemical availability as well as assessments of compliance with UL and NFPA standards. The development of substitute products is a lengthy process, however. Banning residential halon fire extinguishers under the proposed rule might force many of the manufacturers of residential halon fire extinguishers out of business before the development of these substitutes was complete. Although the losses due to the ban in Scenario I, when compared to the revenues without a ban are relatively small (about five percent of total revenue for the period), they constitute the entire revenue for the year of 1993. Most of the industry's resources would be idle for that year or employed in another industry, making restart difficult or impossible.

4.5.3 Modified Regulation

10 Letter from Glyn Miller, April 10.
Table 4.6 Costs to the Residential Halon Manufacturing Industry of a Ban on Residential Halon Fire Extinguishers for Scenarios I and II

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Residential</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I - Non-halon alternative products developed and marketed</td>
<td>$22,526,791</td>
<td>$22,772,631</td>
</tr>
<tr>
<td>II - No non-halon alternative products developed and marketed</td>
<td>$363,946,423</td>
<td>$392,802,272</td>
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</table>
Secondly, attributing a reduction of 450,000 pounds of halon to this regulation overstates the probable halon reduction and therefore underestimates the cost-effectiveness ratios given here. By using the 450,000 pound value, we assume that the amount of halon used annually by the residential halon manufacturing industry will not decrease from its 1991 value by 1993 and that all of the halon 1211 that would have been used to make the banned fire extinguishers in 1993 would have been released to the environment. It is possible, however, that halon recycling might increase by 1993. In addition, only a percentage of fire extinguishers purchased by residential homeowners are ever used to extinguish fires. It is not possible to determine a more realistic number for the amount of halon reduction that can be expected to result from this regulation. To do so, assumptions would have to be made about halon recycling rates and the rate at which halon is released from fire extinguishers as extinguishant and from leaks. We do not possess the information necessary to make reasonable assumptions about these rates. In addition, if we do assume that some of the halon used by the residential halon fire extinguisher manufacturing industry is recycled, our cost values would change since the cost determination in Section x.3 assumed zero percent recycling. To change the cost values to incorporate recycling, it would be necessary to make assumptions about the costs to manufacturers of recycling and the costs of purchasing recycled halon. We do not possess the information to make reasonable assumptions about these costs. It is expected, however, that a recalculation of the cost-effectiveness values given above that took into account recycling and assumed that only a percentage of the halon in fire extinguishers was released as extinguishant or leaks would yield higher cost-effectiveness ratios than those determined above.

4.5 Alternatives to a Ban of Residential Halon Fire Extinguishers

4.5.1 No Regulation

A major alternative to a ban on residential halon fire extinguishers would be to maintain the status quo and not regulate residential halon manufacturers. This can be done if it is determined that residential halon fire extinguishers are not nonessential. The analysis above explains why residential halon fire extinguishers are essential. Their intended use is very important -- putting out fires. Most importantly, there are no substitutes for halon extinguishers with the same properties as halon extinguishers. There is a segment of the population of consumers of residential halon manufacturers with a very inelastic demand for the extinguishers, people who own expensive electronic equipment, computers, or other materials that would be damaged by a multipurpose dry chemical fire extinguisher, people who would face significant clean-up costs.
the percent of the halon not recycled and therefore subject to the tax is one-hundred percent. If half the halon is recycled the impact of the tax is only half as large. Table x.5 shows these assumptions, and how the halon tax affects residential customers' purchases. Overall, the tax increases the price by fifty-eight percent, assuming it is all passed through to consumers. Revenues from residential customers decline by twelve percent, as shown by the twelve percent decrease in revenue for the 1993 year without the ban in Scenarios I and II. Revenues net of the tax decline by forty-four percent. The associated decline in quantity purchased is twenty-seven percent. It is possible or even likely, that the industry could survive the tax increase for a year or two until alternative products are available that would not be subject to the tax, especially if recycling would reduce the proportion of the halon content of the fire extinguishers subject to the tax.

When residential and commercial sales of the old products end in 1994, sales of the new non-halon products increase at the same rate as sales of residential halon products decreased from 1987 to 1991 until they reach the 1987 level of sales in 1999. This is based on the assumption that the new non-halon product has a price similar to that of halons and offers the same easy clean-up qualities as halon fire extinguishers. It is also assumed that halon fire extinguisher manufacturers continue to sell the same quantity of fire extinguishers in the non-residential market as they do currently, about five percent of the 1987 residential level.

With the ban, the scenarios are similar in that they both assume that sales of the old residential and commercial products cease when the ban is instituted in 1992. Beginning in 1993 sales of the old commercial and residential products are zero. Scenario I and II are illustrated by Tables x.3 and x.4 respectively. The scenarios differ in that Scenario I assumes that new residential and commercial products are marketed in 1994, while Scenario II assumes the production and marketing of no residential or commercial product after the year 1992; the industry did not survive long enough to market new products. In Scenario I, new residential product revenues increase at the same rate halon revenues decreased from 1987 to 1992 until they reach the 1987 level in 1999. The new non-residential product is assumed to have the same sales as the old non-residential product.

The purpose of looking at these two scenarios with and without the ban is to consider how the ban will affect the industry. Table x.6 shows the results of the comparison in the present value of the

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8 Halon can be recycled if manufacturers or other facilities recapture the halon in fire extinguishers that have not been used to extinguish a fire and have reached the end of their lifetime. The halon recovered from these extinguishers can be used in new extinguishers or to fill extinguishers from which the extinguishant has been discharged.
costs of the ban, calculated with a discount rate of .01. Costs are revenues without the ban minus revenues with the ban. For both Scenario I and Scenario II, total net revenues without the ban are $483,317,295; total net residential revenues are $445,840,968. In Scenario I, total net revenue with the ban decreases to $460,544,664, and total net residential revenue with the ban decreases to $423,314,177. In Scenario II, total net revenue without the ban decreases to $90,515,023, and total net residential revenue decreases to $81,894,545. Total losses then for Scenario I of residential revenues over the period 1991-1999 with the ban are $23 million in 1991 dollars. In Scenario II, total losses of residential revenues for this period are $364 million in 1991 dollars. When total revenues are used, Scenario I figures change slightly. The Scenario II cost, however, increases to $393 million. The extra $29 million represents lost non-residential sales. Contrary to the EPA's conclusion, both of these analyses show a significant impact on the residential fire extinguisher manufacturing industry with a ban.

4.4 Cost-Effectiveness of a Ban on Halon Fire Extinguishers

As discussed above, the opportunity cost to business in the form of lost revenues during the period 1991-1999 is $23 million in 1991 dollars if the industry survives the ban to produce its substitute product and $393 million if it does not. Using these figures as well as the total reduction of halon 1211 projected to result from a ban, it is possible to determine the cost-effectiveness of a ban. It has been estimated that in 1991 residential halon fire extinguisher manufacturers used 400,000-500,000 pounds of halon 1211. An average of this estimate, 450,000 pounds, will be used as the halon reduction that would result from a ban on residential halon fire extinguishers. Assuming the industry survives to produce a substitute product (Scenario I), the cost-effectiveness of the ban is $51 per pound of halon 1211 ($111,567/Mg). Assuming the industry does not survive (Scenario II), the cost-effectiveness of the ban is $873 per pound of halon 1211 ($1,924,401/Mg).

These cost-effectiveness measures have several weaknesses. First, the use of lost revenues or opportunity cost in this analysis results in a debatable measure of cost-effectiveness. A measure of lost consumer surplus should have been used in place of lost revenues. The data required to calculate consumer surplus for halon fire extinguishers was not available, but there is reason to believe that demand will be inelastic and consumer surplus high.

Table 4.4 (Continued)

<table>
<thead>
<tr>
<th>Year</th>
<th>Old Non-Residential Product</th>
<th>New Non-Residential Product</th>
<th>Total Non-Residential Sales</th>
<th>Non-Residential &amp; Residential Net Revenues</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Revenue</td>
<td>Tax</td>
<td>Net</td>
<td>Revenue</td>
</tr>
<tr>
<td>1987</td>
<td>$4,375,000</td>
<td>$0</td>
<td>$4,375,000</td>
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</tr>
<tr>
<td>1988</td>
<td>$4,375,000</td>
<td>$0</td>
<td>$4,375,000</td>
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</tr>
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<td>NPV</td>
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Table 4.5 Assumptions Concerning the Effect of a Tax on Halon on the Purchase of Halon Fire Extinguishers by the Three Categories of Residential Consumers Defined for the Analyses of Tables 4.2, 4.3, 4.5

<table>
<thead>
<tr>
<th>Demand classifications</th>
<th>Very elastic</th>
<th>Slightly inelastic</th>
<th>Very inelastic</th>
<th>Total</th>
</tr>
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<td>Category</td>
<td>4</td>
<td>1.1</td>
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<tr>
<td>% of unit sales</td>
<td>10</td>
<td>50</td>
<td>40</td>
<td>100</td>
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<tr>
<td>Initial quantity</td>
<td>250,000</td>
<td>1,250,000</td>
<td>1,000,000</td>
<td>2,500,000</td>
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<tr>
<td>Initial revenue</td>
<td>$8,312,500</td>
<td>$41,562,500</td>
<td>$33,250,000</td>
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<tr>
<td>Reduction in quantity (due to tax)</td>
<td>250,000</td>
<td>796,053</td>
<td>57,895</td>
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<td>Resulting quantity</td>
<td>0</td>
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<td>Resulting revenue</td>
<td>$0</td>
<td>$23,832,237</td>
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<td>Loss of revenue</td>
<td>$8,312,500</td>
<td>$17,730,263</td>
<td>($16,210,526)</td>
<td>$9,832,237</td>
</tr>
</tbody>
</table>

Percent halon taxed 100%
Amount of halon pre-extinguisher 2.5 pounds
Tax per pound $7.70
Total tax $19.25

Lost revenue/initial revenue 12%

Initial price $33.25
Tax $19.25
New price $52.50
% change in price 58%
Tax as % of new price 37%
Table 4.3 (Continued)

<table>
<thead>
<tr>
<th>Year</th>
<th>Old Non-Residential Product</th>
<th>New Non-Residential Product</th>
<th>Total Non-Residential Sales</th>
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<tbody>
<tr>
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<td>Revenue</td>
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<tr>
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NPV: $14,937,044, $2,316,074, $12,620,970
NPV: $24,609,517, $0, $24,609,517
NPV: $39,546,561, $2,316,074, $37,230,487
NPV: $460,544,664
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<th>Year</th>
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Table 4.4 Revenue Projections for the Residential Halon Manufacturing Industry Assuming a Ban and Assuming No New Non-Halon Residential Product Development and Sales (Scenario II)
<table>
<thead>
<tr>
<th>Year</th>
<th>Old Non-Residential Products</th>
<th>New Non-Residential Products</th>
<th>Total Non-Residential Sales</th>
<th>NPV</th>
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<tr>
<td>2000</td>
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Table 4.3 Revenue Projections for the Residential Halon Manufacturing Industry Assuming a Ban and Assuming New Non-Halon Residential Product Development and Sales (Scenario 1)

<table>
<thead>
<tr>
<th>Year</th>
<th>Old Residential Product</th>
<th>New Residential Product</th>
<th>Total Residential Sales</th>
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</thead>
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<tr>
<td></td>
<td>Revenue</td>
<td>Tax</td>
<td>Net</td>
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<tr>
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<tr>
<td>1991</td>
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</tr>
<tr>
<td>2000</td>
<td>NPV</td>
<td>$81,894,545</td>
<td>$0</td>
</tr>
</tbody>
</table>
tax to be imposed in January of 1994 may or may not have the same effect. An analysis of the impact of a ban on the halon fire extinguisher market was performed based on sales of 2.5 million units of residential halon fire extinguishers in the base year 1987 at a selling price of $33.25 per 2.5 pound unit.\footnote{The 2.5 million quote was received from Glyn Miller of the American Association of Factory Sealed Fire Extinguishers in a phone conversation September 18, 1991. The $33.25 price was received from Maryland Fire Equipment Corporation for a 2.5 pound halon fire extinguisher with a 5BC rating.} Multiplying the number of units by the sales price gives 1987 revenues of approximately $83,000,000 in 1991 dollars. 1987 is used as the base year because the EPA's Draft Notice of Proposed Rulemaking on 40 CFR Part 82 (6/4/91) maintains that sales of portable residential halon fire extinguishers has been reduced in 1991 to fifty percent of what it was in 1987. The analysis also assumes that within the residential halon manufacturing industry, the percent of business attributable to residential sales is ninety-five percent of sales. This assumption is based on the EPA's Draft Background Document on Identification of Nonessential Products that Release Class I Substances (5/91). The analysis, shown in Tables x.2, x.3, and x.4, projects the sales of residential halon fire extinguisher manufacturers from 1991 to 1999 with and without a ban on the sale of residential halon fire extinguishers for two scenarios. Scenario I assumes that with the ban, new non-halon products, commercial and residential, are developed by the halon fire extinguisher manufacturers, whereas Scenario II assumes that with a ban, there is no new product development.

The projections without the ban, shown in Table x.2, are the same for Scenario I and Scenario II. Without the ban it is assumed that sales of the old (current) residential and commercial products decline until they reach zero during and after the year 1994, but that sales of a new residential and commercial product using a halon alternative will begin in 1994. The revenues for the old halon product declines from 1992 to 1993 due to a tax increase of $7.70 per pound of halon. The magnitude of the decline depends on three assumptions. First, there is no change in the number of units sold to "non-residential" customers. Secondly, residential customers, who accounted for the purchase of 2.5 million units in 1987, are divided into three groups with different price sensitivities and different shares of the market. Forty percent of them have a need for a very clean fire extinguisher because they have fine art works, or valuable electronic or photographic equipment that would be hard to clean and hard to replace. Their demand for halon or something else just as "clean" is highly inelastic. Fifty percent have slightly elastic demand for halon, meaning the total revenues collected from them after a price increase would decline by a relatively small amount, and ten percent have highly elastic demand for halon, meaning there would be a major decline in revenues collected from them. Thirdly,
Table 4.2 Revenue Projections for the Residential Halon Manufacturing Industry Without a Ban on Residential Halon Units

<table>
<thead>
<tr>
<th>Year</th>
<th>Old Residential Products</th>
<th>New Residential Products</th>
<th>Total Residential Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Revenue</td>
<td>Tax</td>
<td>Net</td>
</tr>
<tr>
<td>1987</td>
<td>$83,125,000</td>
<td>$0</td>
<td>$83,125,000</td>
</tr>
<tr>
<td>1988</td>
<td>$74,812,500</td>
<td>$0</td>
<td>$74,812,500</td>
</tr>
<tr>
<td>1989</td>
<td>$66,500,000</td>
<td>$0</td>
<td>$66,500,000</td>
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<tr>
<td>1990</td>
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<td>$0</td>
<td>$41,562,500</td>
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<tr>
<td>1992</td>
<td>$41,562,500</td>
<td>$0</td>
<td>$41,562,500</td>
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<tr>
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<tr>
<td>2000</td>
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</tr>
<tr>
<td>NPV</td>
<td>$117,463,162</td>
<td>$13,041,826</td>
<td>$104,421,335</td>
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their home and subsequently encounter large cleaning bills. Accordingly, in examining the market for halons and the economic impact of withdrawing them, consumers should be divided into groups depending on the value and nature of the property they are trying to protect. For each group, a willingness to pay for a "clean" halon fire extinguisher can be calculated, based on the expected cleaning bill using a "dirty" substitute and the probability of a fire.

This analysis, shown in Table x.1, demonstrates that there are consumers who would pay a high price for clean fire extinguishers. Various probabilities of fire are shown along the top of the table and cleanup costs due to "dirty" fire extinguishers on the side. Each segment of the consumer population can be defined with a unique pairing of these factors. For each combination of factors, the maximum price that the consumer is willing to pay for the halon unit is presented. At this price the expected cost of purchasing the halon unit, including the expected cost of cleanup given the probability of fire ($0 since halon is used), just equals the expected cost of utilizing and cleaning up after the substitute. For any combination of probability of fire and cost of cleanup for a dirty unit that results in a price shown below line A in Table x.1, the expected cost of utilizing a halon unit costing $33.25 is less than that of utilizing a multipurpose dry chemical unit costing $15.25. For any consumer facing those combinations of risk and cleanup cost, the ban on halon units would result in an economic cost. If a tax on halon is imposed the price of utilizing a halon unit increases, and the set of people for whom halon units exhibit lower expected costs than dry chemical units gets smaller (those under line B), but there are still numerous combinations. For example, if the clean-up cost is $40,000 and the probability of fire is 0.001, the consumer would be willing to pay $55.25 for the halon unit, which exceeds its $52.50 after tax price.

Additionally, in evaluating other relevant factors, the EPA's conclusion that a ban would cause "no significant impact" on the manufacturers of residential fire extinguishers is also mistaken. In the January 16, 1992 proposed rule, the EPA states "EPA has received information from industry representatives that it would be extremely disadvantageous to the industry to require a total phaseout of halon use in residential fire extinguishers prior to January 1, 1994. The ban on residential halon fire extinguishers would take effect in November of 1992 and have a significant impact on the manufacturers of such products by prohibiting the sale of the manufacturer's principle products and possibly closing some of the manufacturers. This impact should not be minimalized just because the

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6 The $33.25 and the $15.25 price were received from Maryland Fire Equipment Corporation for a 2.5 pound halon fire extinguisher with a 5BC rating and a 2.5 pound multipurpose dry chemical fire extinguisher with a 1A10BC rating.
### Table 4.1 Consumer Willingness to Pay for Halon Fire Extinguishers

<table>
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<th>Price</th>
<th>$15.25</th>
<th>$33.25</th>
<th>$32.50</th>
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<tr>
<td>Price of substitute</td>
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</tr>
<tr>
<td>Price of halon</td>
<td>$33.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price of halon with tax</td>
<td>$32.50</td>
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<td></td>
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</table>

#### Probability of use of fire extinguisher

<table>
<thead>
<tr>
<th>Expected clean-up cost for substitute</th>
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<th>0.0001</th>
<th>0.0005</th>
<th>0.001</th>
<th>0.005</th>
<th>0.01</th>
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<td>$15.35</td>
<td>$15.75</td>
<td>$16.25</td>
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<td>$15.75</td>
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<tr>
<td>$100,000</td>
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<td>$65.25</td>
<td>$115.25</td>
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<td>$4015.25</td>
<td>$8015.25</td>
</tr>
<tr>
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<td>$515.25</td>
<td>$1015.25</td>
<td>$5015.25</td>
<td>$10015.25</td>
</tr>
</tbody>
</table>

Note: For any combination of probability of use of fire extinguisher and cost of cleanup for a multipurpose dry chemical unit that results in a price shown below line A, the expected cost of utilizing a halon unit costing $33.25 is less than that of utilizing a multipurpose dry chemical unit costing $15.25. If a tax on halon is imposed, the set of conditions for which halon units exhibit lower expected costs than dry chemical units decreases to the set of people under line B.
halon was not the least costly type of fire extinguisher available for residential use. According to the EPA, residential halon fire extinguishers were popular in the market because of their ease of use and cleanliness, not because they were inexpensive.

4.3 Discussion of the EPA’s Rationale in the June Draft Proposed Rule and the January Proposed Rule

The substitute products the EPA describes as "currently available and widely used" do not have the attributes of halon. Multipurpose dry chemical fire extinguishers and other powder extinguishers, unlike halon extinguishers, may require significant clean up after use in order to prevent corrosion of electronic equipment. This is a point that the Association of Factory Sealed Fire Extinguisher Manufacturers, Inc. believes the EPA understates. According to the Association, "statistics show more and more electrical and electronic goods are being purchased by the average U.S. citizen and the use of a halon extinguisher does not lead to damage of such equipment whether directly involved in the fire or in another room of a dwelling. Discharge of a halon or a powder extinguisher in a particular room will always lead to extinguishant being distributed all around the house, consequently, powder can cause serious corrosion damage to electrical/electronic equipment in rooms well away from the source of the fire." Multipurpose dry chemical and other powder fire extinguishers also require service checks to make sure the substances inside the extinguisher have not caked, possibly causing the extinguisher to fail to release extinguishant during an emergency situation. Such maintenance does not always occur in residential settings, where many consumers overlook the maintenance of fire extinguishers.

Until such time as a perfect substitute for halon fire extinguishers is developed, it is incorrect to classify halon fire extinguishers as non-essential. It is possible that substitute products currently being developed by the halon industry may have the same fire-fighting and clean-up properties as halon fire extinguishers. If so, these products would be perfect substitutes, and halon could be classified as nonessential once these products are on the market.

In the January 16, 1992 proposed rule published in the Federal Register, the E.P.A. softens its argument that substitute products are "currently available and widely used." They write that "EPA

4 Letter from Glyn Miller of the Association of Factory Sealed Fire Extinguisher Manufacturers Inc., April 3, 1991 to Dan Blank, United States EPA. Note that all information from the Association of Factory Sealed Manufacturers was obtained from this source unless otherwise noted.

believes that halon substitutes will be available for most applications in the near future." (Emphasis added.) They request "comments on the effectiveness of halons and the substitutes on the different types of fires."

By concluding that they are unaware of any safety or health problems associated with the use of multipurpose dry chemical fire extinguishers when evaluating the decision to ban residential halon fire extinguishers using the safety and health criteria in the OMB Review Draft of the EPA's Notice of Proposed Rulemaking for 40 CFR Part 82, the EPA overlooked an earlier conclusion it drew about the safety of multipurpose dry chemical fire extinguishers. In the Draft Background Document on Identification of Nonessential Products that Release Class I Substances the EPA writes, "Dry chemical extinguishers, when used in a small unventilated area may reduce visibility for a period of up to several minutes." The EPA continues to overlook this difference in its January 16, 1992 proposed rule.

The EPA's conclusion that the downturn in the residential halon fire extinguisher market reflects that the use of such extinguishers is nonessential, when evaluating the purpose or intended use of such extinguishers, is inappropriate. The EPA infers that the downturn reflects that substitutes are available and widely used. Two points can be made about the downturn. First, stores such as K-mart that were the major outlet for many of the halon units discontinued them for reasons of store policy. Hence, demand is not directly revealed by the downturn. Secondly, even though halon fire extinguishers are more expensive than their substitutes and less widely available, a market still exists. This implies that the market that remains is very likely a loyal one, that has strong reasons for using halon units. The intended use of halon units is to put out fires in situations where the collateral damage of substitute products is unacceptable.

In the January 1992 proposed rule, the EPA states that the substantial downturn in the market for halon residential fire extinguishers combined with the large imminent tax burden on these substances "raises questions as to whether the intended use of halons in this product area is nonessential and whether a ban is necessary." (Emphasis added.)

The EPA's conclusion then that there would be no economic impact on consumers from a ban on residential halon fire extinguishers when evaluating other relevant factors is mistaken. The economic impact of a ban on consumers may not be felt in the market at the time of purchase since halon extinguishers are more expensive than their substitutes, but may be felt by those consumers of multipurpose dry chemical extinguishers or other powder extinguishers who release extinguishant in
chloroform, carbon tetrachloride, and the "other CFCs" of the amended Montreal Protocol. In addition, Title VI of the Clean Air Act was amended in 1990 to contain the legislation necessary to comply with the amended Montreal Protocol in the United States. The amended Clean Air Act requires regulations restricting ozone depleting substances, including provisions to reduce emissions of controlled substances to the "lowest achievable level" in all use sectors, to ban nonessential products, to mandate warning labels, and to establish a safe alternatives program.

The banning of nonessential products is the focus of this chapter. Section 610(b) of the Clean Air Act requires the EPA to "identify nonessential products that release Class I substances into the environment (including any release during manufacture, use, storage, or disposal) and prohibit any person from selling or distributing any such product, or offering any such product for sale or distribution, in interstate commerce" after November 15, 1992. Section 610(b) may be applied to both consumer and commercial products. Class I substances include CFCs, halons, carbon tetrachloride, and methyl chloroform. The criteria to be used in determining non-essentiality include: "the purpose or intended use of the product, the technological availability of substitutes for such product and for such Class I substance, safety, health, and other relevant factors." The Clean Air Act explicitly banned chlorofluorocarbon propelled plastic party streamers and noise horns and chlorofluorocarbon-containing cleaning fluids for noncommercial electronic and photographic equipment as nonessential products.

In June of 1991 the EPA released a draft proposed rule on the banning of nonessential products. In the June draft proposed rule, the EPA determined three product categories to be non-essential. They included flexible and packaging foam using CFCs, aerosols and other pressurized dispensers containing CFCs, and residential fire extinguishers containing halons. In January of 1992, the EPA published the proposed rule in the Federal Register. In the January proposed rule, the EPA did not determine that halon fire extinguishers were nonessential. They remained neutral and asked for comment on the issue. The following sections of this chapter discuss issues surrounding the ban on November 15, 1992 of residential halon fire extinguishers as proposed in the June draft proposed rule, how the January proposed rule is different from the June 1991 draft proposed rule, the cost of banning the extinguishers, and alternatives to the banning of the extinguishers.

4.2 The EPA's Ban on Residential Halon Fire Extinguishers in the June Draft Proposed Rule

The EPA states that its primary reason for proposing the ban on residential halon fire extinguishers is that substitute products are "currently available and widely used." According to the EPA adequate
substitutes include multipurpose dry chemical, powders, and water. The leading alternative is the multipurpose dry chemical fire extinguisher, a type of powder fire extinguisher, with an ammonium phosphate based agent that is electrically non-conductive and non-toxic and has no ozone-depleting potential.\(^2\) In evaluating the decision to ban residential halon fire extinguishers using the safety and health criteria, the EPA states that they are unaware of any health dangers associated with multipurpose dry chemical fire extinguishers. They do however mention that halon can produce toxic gases when used on very hot fires. In evaluating the purpose or intended use of residential halon fire extinguishers, the EPA states that residential halon fire extinguishers serve a very important service. They conclude, however, that the huge imminent tax burden on these products as well as the downturn in the market of the products, demonstrate that the use is inessential. The imminent tax burden the EPA refers to is the scheduled increase in the tax on halons. On January 1, 1994 the excise tax on halons increases from $0.25 to $7.95 per pound for halon 1211 and $26.50 per pound for halon 1301. This will most likely increase the price of residential halon fire extinguishers.

When evaluating the proposed ban using the other relevant factors criteria, the EPA focuses on the economic impact of such a ban on small business and consumers. The EPA estimates that the impact on the manufacturers of residential halon fire extinguishers will be minimal. According to the EPA’s Draft Background Document on Identification of Nonessential Products that Release Class I Substances (May 1991), the majority of residential halon fire extinguishers are made by eight factory sealed fire extinguisher manufacturers, which are considered small businesses. The average number of employees at the eight facilities is twenty-five. According to the EPA, three of the eight facilities are in financial distress and are expected to go out of business. There is then no impact on those manufacturers. Of the remaining manufacturers, the EPA quotes the Association of Factory Sealed Fire Equipment Manufacturers as saying "if a suitable chemical alternative is not identified and commercialized for use by January 1, 1994, the ... halon tax will effectively force the remaining manufacturers out of business."\(^3\) The EPA then "does not believe there to be a significant impact on this industry from the proposed rule because these facilities are expected to close in the near future even without the proposed rule, due primarily to the tax on halons." The EPA also states that banning the use of residential halon fire extinguishers will have little economic impact on consumers, because

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\(^3\)The Association of Factory Sealed Fire Equipment Manufacturers represents six of the eight manufacturers of residential halon fire extinguishers.
First, flexible regulation is good regulation. The exemption categories provided by Irvine's Ordinance were broad enough to flush out those companies that were having trouble complying with the law because of a lack of alternatives or a lack of resources. By not mandating that such firms discontinue the use of ozone-depleting compounds, regardless of cost or availability of substitute factors, Irvine's ordinance allowed the companies that were having difficulty determining effective alternatives the time to research the best compliance program for their company. The ordinance is also flexible in that it does not dictate any particular approach to compliance -- i.e., it does not impose an equipment standard -- and thus allows any approach that eliminates ODCs.

Second, the worst form of a regulation of ODCs at the local level is product labeling. It imposes costs on industries wishing to operate in a community that are nearly equal to the costs they would bear if the labeling requirement were national. Furthermore, a national labeling requirement is being promulgated, making the local efforts truly superfluous.

Third, the regulation of emissions of ODCs is best left to higher levels of government. If the emissions had a local effect, this would not necessarily be true. But for emissions whose only effects are global, having a similar rule in a number of cities would rapidly and unnecessarily increase regulatory burdens.

Irvine has framed its ODC regulation correctly, and has implemented it well. But there is still the question of whether Irvine should have implemented such an ordinance at all.
4 Ozone Depleting Substances: Non-Essentials

4.1 Introduction

The stratospheric ozone layer protects the earth from harmful ultraviolet radiation. According to the EPA, "national and international consensus has developed that certain human-made halocarbons (including chlorofluorocarbons (CFCs), halons, carbon tetrachloride, and methyl chloroform) can transport chlorine and bromine to the stratosphere and there contribute to the depletion of the ozone layer."\(^1\) Depletion of the ozone layer, in that it allows more ultraviolet radiation to reach the earth, is harmful to human health and has the potential to lead to increased incidence of skin cancer, suppression of the immune system, and other health problems. Ozone depletion also has the potential to damage crops and aquatic organisms.

Realizing the threat that ozone depletion poses to human health and the environment, the United States has established regulations governing ozone depleting substances since the late 1970s. In 1978 the United States banned the use of CFC as aerosol propellants in all but "essential applications." In 1987, the United States was one of the twenty-two nations who signed the Montreal Protocol, an international agreement to reduce ozone depleting products in the atmosphere. By signing the Protocol, the United States pledged to freeze the production and consumption of CFC-11, -12, -113, -114, -115, and halon 1211, 1301, and 2402 at 1986 levels, and to a phased reduction of CFCs to 50 percent of 1986 levels by 1998. To institute this international pledge, the EPA created a system of tradable allowances of the controlled substances and monitored industry's compliance with the production and consumption limits with record keeping and quarterly reporting requirements. In 1989, the EPA further regulated chlorofluorocarbons by levying an excise tax on the sale of CFCs and other ozone depleting substances, with specific exemptions for exports and recycling.

Amendments to the Montreal Protocol in 1990, commonly called the London amendments, have lead to new regulations on ozone depleting substances and products. The amendments call for a complete phase-out of the regulated CFCs and halons by 2000, a phase-out of carbon tetrachloride and "other CFCs" by 2000, and a phase-out of methyl chloroform by 2005. As a result of these amendments, the Internal Revenue Service expanded the excise tax on ozone depleting substances to include methyl

\(^{1}\) OMB Review Draft of the EPA's Notice of Proposed Rulemaking for 40 CFR Part 82, 6/4/91. Note that all information on past ozone-depleter regulation, the EPA, and the EPA's intent concerning the proposed ban on nonessentials are from this source unless otherwise noted.
reduced their costs or improved the quality of their product. Rosemont Analytical achieved savings with no effect on product quality. Ricoh Electronics improved product quality after a $750,000 capital expenditure. These opportunities would have not been realized without the exemption.

3.6.2 Alternative 2: An Equipment Standard Instead of a Performance Standard

An even worse outcome would have occurred had Irvine imposed specific control technologies. Table x.1 illustrates that in cases where 1,1,1 - TCE is controlled the best control options identified for any facility are not duplicated elsewhere. Each facility has its own special problems so even if an equipment standard attempted to isolate specific applications, the only way it could match the preferred outcome obtained by the ordinance is to develop a unique equipment standard for each facility. The less the equipment standard tries to do this and thus save cost of regulatory development, the more costs it imposes on the firms. An equipment standard would also retard development of new ways of controlling ODCs.

3.6.3 Alternative 3: A Labeling/Public Awareness Program

A labeling program has several advantages and disadvantages. One disadvantage is that labeling programs are difficult to implement. Many products, somewhere in their production, contact an ozone-depleting substance or process. Are all of these products to be labelled? If so, determining which products to label, whether labels should differ based on the amount of ozone-depletion the product causes, and how to quantify differences in ozone-depleting potential all become issues. Because labeling requires that industry keep track of any input to the product, it is as much work to comply with a local labeling ordinance as with a national one. Because start-up costs are large, for both the firm and the government, a labeling program is best done at the national level, so that the costs can be spread over a larger number of units sold and a single approach to labeling followed. Furthermore, reductions in ODCs cannot be traced directly to the labels. There is an intermediate step in which individuals decide whether they want to reduce their consumption of the product if it contains ODCs. Then there is the problem of demonstrating that any decline in the use of labeled products was due to the labeling as opposed to other factors such as the recession, changes in taste, or new substitute products. A firm will have the choice of doing all the work to label its products or not selling them in the town that requires the labeling. Finally, many regulators see labeling programs as less burdensome on manufacturers than ozone depleting chemical bans or equipment/performance standards to reduce ozone-depleting chemical emissions; since the labeling programs are
often seen as less burdensome, a labeling regulation might be applied to a greater number (wider range) of sources than a ban or equipment standard regulation.

In addition, in instances where a set of similar products are made by the same process (a process using ozone depleting chemicals) or with the same substances (an ozone-depleting substance) and all of the products are labeled, the consumer is left with no choice. In the short run, he must by the ozone-depleting product or not buy the product at all.

An advantage of a labeling program is that companies are not required to purchase new, possibly expensive technology, that may be outdated by the time it is put into practice. On balance product labeling is a poor choice for local governments.

3.6.4 Alternative 4: No Ordinance at the Local Level

Irvine's Ordinance has compelled numerous local firms to reduce or eliminate their release of ODCs while garnering the praise of many who would normally oppose regulation, but what if many cities adopted a similar ordinance? If there were any form of equipment standard or if the exemptions incorporated in the urban ordinances were not as flexible as Irvine's it could lead to the situation large national corporations fear: having a large number of different local requirements to deal with, each in a different way. Even if Irvine's ordinance were adopted by each city without change, there would still be a large number of persons the firms must deal with to verify their compliance with each local rule. Because the effects of ODCs are global, not local, the rule would work better if administered by a few larger entities like states or the federal government, rather than by hundreds of individual cities. That way a firm with facilities in several cities could ascertain the compliance for all of them by talking with the same group of people.

3.7 Conclusions

Irvine's Ordinance Governing the Manufacture, Distribution, Sale, and Recycling of Products which Utilize Ozone-Depleting Compounds is a well conceived regulation that achieves its basic goals in a cost-effective way. However, a proliferation of such ordinances would lead to excessive cost to industry relative to the benefits conferred on the global environment. Three significant conclusions can be drawn from this analysis of Irvine's Ordinance.
sometimes inferior to the original product and sometimes superior. There is no set pattern beyond
the uniqueness of each situation encountered.

3.5 Alternatives to Irvine's Ordinance

Although Irvine has already passed its ordinance and is not, so far as we know, considering
alternatives to it, consideration of alternative forms the Irvine regulation could have taken provides
insight concerning the merits of various aspects of Irvine's regulation. This will be of use in assessing
ordinances proposed by other localities.

3.5.1 Alternative 1: An Inflexible Regulation

The Alliance for Responsible CFC Policy is a coalition of the industries which produce CFCs and the
industries which manufacture products which use CFCs. Michael Stripe of the Alliance believes the
dangerous alternative to ozone governing regulations like Irvine's are regulations which do not provide
flexibility, education, or assistance to industry in complying with the regulation. He notes that
Irvine's regulation has been handled well. There are exemption clauses for facilities which must use
ozone-depleting compounds for military or health applications, and there are exemptions for facilities
which can find no alternative or cannot afford an alternative. Additionally, Michael Brown, Irvine's
Environmental Program Administrator, has visited industries, discussed alternatives with them, and
advised them on alternative technologies. For the first alternative, we will consider an ordinance like
Irvine's ordinance but absent its flexibility (exemption clauses) and absent its education and assistance
efforts.

3.5.2 Alternative 2: An Equipment Standard Instead of a Performance Standard

An equipment standard specifies the type of control equipment required in a certain industrial
process. It is the most inflexible and hence the most costly version of environmental control. The
Irvine ordinance is in the form of a performance standard in that it specifies an outcome -- no release
of ODCs -- that the City wishes the firm to achieve, but does not specify that the goal must be
achieved by a specific means. An equipment standard is examined as the second alternative.

3.5.3 Alternative 3: A Labeling/Public Awareness Program
As mentioned earlier, the city of Cambridge, Massachusetts recently passed a law requiring that all products containing or manufactured with ozone-depleting compounds be labelled as such. A labeling program depends on public awareness of the danger of ozone depletion. The public is expected to use their purchasing power to compel industry to move away from products that directly or indirectly cause ozone-depletion. Having a labeling/public awareness program is the third option.

3.5.4 Alternative 4: No Ordinance at the Local Level

Having a different environmental regulation in each town and village may be unnecessarily burdensome, especially if the pollutant is effectively regulated at the national level. Since ODCs have a global and not a local effect, it may be better that localities not regulate them. Having no ordinance at the local level is the fourth alternative.

3.6 Cost-Effectiveness of the Ordinance

The Irvine ordinance is inherently cost-effective in that it meets its goal in the least cost manner. There are two features of the ordinance that contribute to this conclusion. The first is the fact that the ordinance is a performance standard. It places no constraints on complying firms that would require them to use any other than the firm's preferred method for achieving the goal. The second feature is that the ordinance allows a number of exemptions. The most important aspect of the exemption is that it allows extra time for those firms which have not identified a satisfactory method for eliminating ODC to do so. In the following we contrast Irvine's ordinance with the alternatives to it.

3.6.1 Alternative 1: An Inflexible Regulation

If Irvine's ordinance lacked its exemptions, Table x.1 indicates some of the costs that firms would have borne. These costs consist of a degradation in the product or a more expensive manufacturing process. For example, Sharp Microelectronic identified a Rosin Flux Remover as the best way of meeting the goal at an additional cost of $15/gallon over their original flux remover. The change had a negative effect on product quality. Absent an exemption, these costs -- the slight increase due to the more expensive input and the degradation of the product -- would have had to be borne, or the facility would have had to have moved its operation out of the city, by the initial deadline set by the ordinance. In other cases, Table x.1 shows that some of the firms eventually found methods that
Product Technology Incorporated is a small business that is a subcontractor for large manufacturers. They manufacture electronic circuit assemblies. In 1989 they used 165 gallons of 1,1,1-TCE to deflux printed circuit boards. Product Technology was granted an exemption from Irvine's regulation because military specifications call for their use of 1,1,1-TCE. When Irvine's regulation was first passed, the company hired a consultant for advice on complying with the law. They were told that an aqueous cleaning system would be effective and non-ozone-depleting. The costs to Product Technology of switching to an aqueous system were prohibitive, however, and the company did not switch although they are still evaluating whether or not to switch. They would have had to purchase an industrial dishwasher and have their building replumbed to accommodate such a dishwasher. Additionally, Product Technology would have had to hire an outside consultant to do resistive testing. Resistive testing measures between one circuit and another to see if there is any flux remaining. If flux remains, it can cause a circuit to short out. Resistive testing is not necessary when 1,1,1-TCE is used.11

3.4.5 Summary

Table x.1 summarizes the information collected from companies in Irvine. It briefly describes the industry by presenting the name of the business, the size of the business, and the product made by the business. At least three of the businesses we surveyed were small businesses. Information is also presented on the type of ozone-depleting substance used by the business, the cost of the ozone-depleting substance or process using the substance, the substitute considered by the business, and the cost of the substitute. In most cases, the cost of the current ozone-depleting product or process of the businesses was unknown, but the cost of researched substitutes was often known. Where possible, the additional cost of the substitute over the product in current use is determined. Additionally, the table describes whether the substitute will have a negative, positive, or neutral effect on the business's product. The best substitute would of course have a positive or neutral effect on the product of the business. Three of the businesses we talked to had tested products that would have a negative effect on their product.

Table x.1 demonstrates that among electronics firms in Irvine a variety of ODCs are used and a wider variety of substitute inputs and processes that have been considered. The substitutes are sometimes more costly than the ODC and sometimes less costly. The product produced using the substitutes is

11 Conversation with Shirley Turturro, Quality Manager, at Product Technology, Inc. on September 20, 1991.
<table>
<thead>
<tr>
<th>Firm</th>
<th>Small Business</th>
<th>Type of Product</th>
<th>Ozone-Depleting Substance Used</th>
<th>Cost of Ozone-Depleting Substance or Process</th>
<th>Substitute Considered</th>
<th>Cost of Substitute</th>
<th>Increment of cost of Substitute to Ozone-depleting Substance or Process</th>
<th>Effect on Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit Assembly Corp.</td>
<td>Yes</td>
<td>Connectors</td>
<td>1,1,1 - TCE</td>
<td>Unknown</td>
<td>Change in Manufacturing Process</td>
<td>$0</td>
<td>Unknown</td>
<td>Neutral</td>
</tr>
<tr>
<td>Sharp Microelectronics</td>
<td>No</td>
<td>None - Research Facility</td>
<td>1,1,1 - TCE</td>
<td>$30</td>
<td>Rosin Flux Remover</td>
<td>$180</td>
<td>Unknown</td>
<td>Negative</td>
</tr>
<tr>
<td>Ricoh Electronics</td>
<td>No</td>
<td>Photocopy Drums</td>
<td>CFC-113</td>
<td>Unknown</td>
<td>Change in Manufacturing Process</td>
<td>$750,000</td>
<td>Unknown</td>
<td>Positive</td>
</tr>
<tr>
<td>Ball Corporation</td>
<td>Unknown</td>
<td>Rubidium Oscillators</td>
<td>CFC-11</td>
<td>Unknown</td>
<td>MS 242</td>
<td>Unknown</td>
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<td>Unknown</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>CFC-12</td>
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<td>Carbon Dioxide</td>
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<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CFC-113 and 1,1,1 - TCE</td>
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<td>Miller-Stephenson System</td>
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<td>Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CFC-113 and 1,1,1 - TCE</td>
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<td>Allied Signal System</td>
<td>Unknown</td>
<td>$10,000</td>
<td>Unknown</td>
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<td>Prece Inc.</td>
<td>Yes</td>
<td>Hydraulic Hoses</td>
<td>CFC-111</td>
<td>$630</td>
<td>Freon MCA</td>
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<td>Unknown</td>
<td>Negative</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>1,1,1 - TCE</td>
<td>Unknown</td>
<td>VNPNAPTHA</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Negative</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>CFC-111</td>
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<td>Vertrel 245</td>
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<td>$0</td>
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</tr>
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<td>Rosemont Analytical</td>
<td>No</td>
<td>Analytical Instrumentation</td>
<td>1,1,1 - TCE</td>
<td>Unknown</td>
<td>Change in Manufacturing Process</td>
<td>Unknown</td>
<td>Savings</td>
<td>Neutral</td>
</tr>
<tr>
<td>Kaiser Electroprecision</td>
<td>No</td>
<td>Motor Missile Cases</td>
<td>CFC-113</td>
<td>Unknown</td>
<td>Relocation</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Neutral</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aircraft Parts</td>
<td>1,1,1 - TCE</td>
<td>Unknown</td>
<td>Substitute Vapor</td>
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<td>Unknown</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unknown</td>
<td>Degreasing Equipment</td>
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<td>CFC-11</td>
<td>Unknown</td>
<td>None</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,1,1 - TCE</td>
<td>Unknown</td>
<td>Terpenes</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Product Technology</td>
<td>Yes</td>
<td>Electronic Circuit Assemblies</td>
<td>1,1,1 - TCE</td>
<td>Unknown</td>
<td>Aqueous System</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Negative</td>
</tr>
</tbody>
</table>
Ball Corporation. In 1989 Ball also used 410 gallons of CFC-113 (emitted 300 gallons) and 50 gallons of TCA for degreasing and defluxing respectively. Ball has an exemption for this use of CFC-113. They are currently looking at different brands of equipment that provide alternative cleaning processes. It was estimated that the capital cost of the equipment for the alternative cleaning process is $10,000 more than the capital cost of the equipment currently in use.6

Preece Incorporated is a small business that manufactures hydraulic hose for the military. In 1989 the company used 25 gallons of freon (CFC-111) for degreasing the quick disconnect assembly at the end of their hydraulic hoses and 220 gallons of 1,1,1-TCE for thinning the glue that attaches braids to hoses. With an exemption from Irvine's regulation, Preece continues to use CFC-111 and 1,1,1-TCE in both of these processes. Preece has an ongoing study in place to search for alternative substances for both processes. In place of 1,1,1-TCE, Preece tested VMNPNAPTHA, but it was not an effective substitute. Dupont is continuing to look into alternatives to 1,1,1-TCE for Preece. Freon MCA was tested as a replacement for freon. It was determined unacceptable, however, because it has the potential to dissolve o-rings. Another alternative tested, Vertrel 245, a non-ozone depleting substance, was rejected because of its cost. Preece currently spends $126 for a 5 gallon container of freon. Vertrel 245 is $1600 per 5 gallon container.7

Rosemont Analytical is a subsidiary of Emerson Corporation. They manufacture analytical instrumentation. Rosemont obtained an exemption from Irvine's regulation in order to evaluate alternatives to their vapor degreasing process which used trichlorfluorethylene. Rosemont decided to comply with Irvine's regulation by changing their manufacturing process to eliminate their need for vapor degreasers. As a replacement, the company switched to a water soluble flux. This change did not negatively impact Rosemont's product and saved the company money. Expenses were reduced because expenditures were no longer necessary for the labor and solvent necessary to operate the company's two vapor degreasers.8

3.4.3 Health Exemptions

6Conversation with Pat Kailey of Ball Corporation 9/16/91.
7Conversation with Mary Neil of Preece, Inc. on September 20, 1991.
8Conversation with Dave Parrish of Rosemont Analytical on September 23, 1991.
Representatives of the electronics industry who had been granted health exemptions were not available for comment. In general, of the 130 exemptions granted in Irvine as of June 11, 1991, fourteen were granted as health exemptions. The authors are aware of one electronics company, Pfizer Laser Systems, who obtained a health exemption from Irvine's Ordinance. Pfizer uses CFC-113 to degrease the electronic components in laser medical devices. They expect to use HCFC, a less-ozone depleting alternative, when it is available. Other health care exemptions of which the authors are aware were granted to facilities who used ozone-depleting compounds to degrease medical device implants or medical instruments. In most cases, FDA approved non-ozone depleting alternatives to the ozone-depleting compound were not available.

3.4.4 Military Exemptions

Kaiser Electroprecision manufactures rocket motor missile cases and aircraft parts. In 1989 they used 564 gallons of CFC-113 and emitted 554 gallons to degrease printed circuit boards. Kaiser also uses 1,1,1-TCE for vapor degreasing. The company has continued to use chlorofluorocarbons by obtaining two one-year exemptions from Irvine's regulation since it was passed in 1989. Primarily for other reasons but also in order to comply with the Irvine regulation, Kaiser Electroprecision is relocating their degreasing of printed circuit boards process out of the Irvine area. They are pursuing alternate solutions for the vapor degreasing process. At the current time, they have estimates for alternative vapor degreasing equipment ranging from $137,000 to $450,000. Any alternatives they adopt which affect their military contracts will require military approval. 9

Raytheon Service Co. is a subsidiary of Raytheon Corporation, which manufactures Sea-Sparrow guided missile systems and ground approach radar systems for the U.S. military. Raytheon Service Co. overhauls and repairs such systems. In 1989 Raytheon Service Co. used 1,000 pounds of CFC-11 in foam packaging and 220 pounds of 1,1,1-TCE primarily for the degreasing of printed circuit boards. They obtained an exemption from Irvine's regulation because no alternatives were available which met military specifications. Not only Raytheon Service Co., Raytheon's subsidiary in Irvine, but also Raytheon Corporation, are looking for alternative packaging and decreasing their use of 1,1,1-TCE by substituting terpenes. Terpenes are effective at degreasing printed circuit boards, but have a noxious odor. 10

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10 Conversation with Raytheon Service Co. on September 20, 1991.
As of June 11, 1991 there had been 130 exemptions granted in Irvine. Fifty-seven percent were granted as de minimis exemptions, and twenty-seven percent were granted as general exemptions. General exemptions and De Minimis exemptions are granted under Section IV.Q-601 of Ordinance 89-21. General exemptions are the exemption given when it is determined that no feasible alternative to the use of an ozone-depleting compound exists. De minimis exemptions, while not explicitly mentioned in Section IV.Q-601, are a standard operating procedure within Ordinance 89-21. De minimis exemptions can be granted to those establishments in Irvine who use less than 55 gallons or 450 pounds of the ozone depleting substances covered in Irvine's regulation. Eleven percent of the exemptions were granted to licensed health care facilities or manufacturers of drugs or medical devices. Such exemptions are categorized as "health exemptions." Six percent of the exemptions were granted to companies manufacturing products or components under contract to the U.S. Armed Forces. Such exemptions are categorized as "military exemptions." To collect information on the type of electronics companies applying for exemptions and the processes they use that require ozone-depleting compounds, we conducted an informal phone survey of several Irvine electronic facilities that applied for exemptions from Irvine's regulation. The information we collected is described below.

3.4 Examples of Electronics Firms that Utilized the Exemptions

Firms discussed below received exemptions of the following types: (1) De Minimis Exemptions, (2) General Exemptions, (3) Health Exemptions, and (4) Military Exemptions. Nine firms responded to our telephoned request for information and we obtained some data on two others. The firms applying for exemptions were those that had problems meeting the requirements on the original schedule.

3.4.1 De Minimis Exemptions

Circuit Assembly Corporation is a small business that manufactures connectors and cable assemblies. Circuit Assembly applied and was granted an exemption for their use of 1,1,1 - TCE in cleaning printed circuit boards. In 1989 they used 80 gallons of 1,1,1 -TCE as a defluxing agent and emitted 80 gallons. The company recently complied with the Irvine regulation by changing from their
previous soldering process to a low flux soldering process, thereby reducing/eliminating the need
degreasing. It was estimated that this modification occurred at little cost to the company. 3

**Sharp Microelectronics** is a research and development center for Sharp Corporation that was granted
a de minimis exemption from Irvine's regulation. They use less than 10 gallons of 1,1,1 - TCE
annually for degreasing printed circuit boards. To reduce use of 1,1,1 - TCE at Sharp, the company
is partially substituting a rosin flux remover, composed of 75-69-4 trichloromoneffluoremethane and
75-71-8 dichlorodifluoromethane. The rosin flux remover is not as effective as 1,1,1 - TCE and costs
more than 1,1,1 - TCE. It was estimated that 1,1,1 - TCE costs $3 a gallon, whereas the rosin flux
remover costs $18 a gallon. The only alternative for Sharp which would completely eliminate the use
of ozone-depleting compounds is a hot water bath (approximately $2,000) for degreasing printed
circuit boards. With such a minimal use of ozone-depleting compounds, the company believes this
investment is unwarranted. 4

3.4.2 General Exemptions

**Ricoh Electronics**, Inc. manufactures photocopy drums for photocopiers. In 1989 they used 2,032
gallons of CFC-113 and emitted 1,338 gallons of CFC-113. The company has continued to use
chlorofluorocarbons by obtaining two one-year exemptions from Irvine's regulation since it wa_
passed in 1989. Ricoh uses CFC-113 for degreasing. In order to come into compliance with the
regulation, Ricoh is modifying its manufacturing process to delete the degreasing step requiring CFC-
113. This modification will cost Ricoh Electronics, Inc., a large outfit with 8 manufacturing facilities
approximately $750,000. The modification will improve the quality of Ricoh's product in addition
to bringing Ricoh into compliance with Irvine's regulation. 5

**Ball Corporation** makes rubidium oscillators, better known as atomic clocks. In 1989, they used ozone
deleting compounds in three ways. Ball used 18 gallons of CFC-11 to cool circuits in 1989. For this
process, CFC-11 has been replaced with a non-ozone depleting substitute, MS 242. In 1989 Ball
Corporation used 96 gallons of CFC-12 as an aerosol propellant for an acrylic based coating for
printed circuit boards. Carbon dioxide has replaced CFC-12 as the propellant at little or no cost to

---

3 Conversation with John McCallister of Circuit Assembly Corporation on September 17, 1991.
(a) no establishment shall use any ozone-depleting compound in any process or activity involving the manufacture, production, cleansing, degreasing, or sterilization of any substance or product, except as otherwise provided in this section

(b) no establishment shall package any product with rigid or flexible foam containing or utilizing an ozone-depleting compound, except as otherwise provided in this section

(c) no establishment shall purchase, obtain, store, sell, distribute or otherwise provide to any person any CFC food packaging material, except as otherwise provided in this section.

The next two sections prohibit the use of ozone-depleting compounds in new and replacement building insulation and establish mandatory recovery and disposal of ozone-depleting compounds contained in discarded building insulation. The following three sections address ozone-depleting compounds found in cooling systems. They include requirements to recycle ozone-depleting compounds used as coolants in refrigeration and/or air conditioning units, restrictions on the sale of ozone-depleting compounds used as coolants, and restrictions on the disposal of refrigeration or air conditioning units or systems. The next sections discuss halon used as a fire extinguishant and require a permit to release halon to test fire extinguishing equipment and require the reclamation of halons from portable fire extinguishers during servicing. Additional sections create the position of Environmental Program Coordinator, create a Science Advisory Committee, address exemption criteria, and create enforcement guidelines.

3.3.2 Exemptions from the Regulation

Section IV.Q-201 of Ordinance 89-21 exempts the prohibition of manufacture, sale, and distribution of products using halons and chlorofluorocarbons for the following uses:

- Use in the study and/or research of the effect of the release of ozone-depleting compounds into the environment and/or the development of alternative technologies

- Use of any compound used as a coolant in refrigeration or air conditioning unit or system
Use by any licensed health care facility including any medical research conducted at such facilities (The exemption is only valid until safe and effective alternatives are found.)

Use by manufacturers of any drug or medical device (The exemption is only valid until safe and effective alternatives are found. In addition, manufacturers are responsible for developing recycling systems for ozone-depleting compounds used by their facility.)

Use by any person manufacturing a product or component product under contract with any branch of the United States Armed Forces or with any establishment under contract with such branch where applicable military specifications requires the use of an ozone-depleting compound. (Manufacturers are responsible for developing recycling systems for ozone-depleting compounds used by their facility.)

If a manufacturer, distributor, or retailer of a product containing or made with an ozone-depleting substance or a use of a such a product does not qualify for an exemption under Section IV.Q-201, such person may still apply for an exemption if there are no currently available technically or economically feasible alternatives for such person's use or if such person's use of an ozone-depleting compound is de minimis. Section IV.Q-601 lists the criteria for other exemptions. The criteria used by the City Council to evaluate these applications include:

1. the technical, practical, and economic viability of the alternative

2. the health, safety and environmental impact of the alternative

3. the length of time for which the exemption is sought and the length of time needed before a technically and economically feasible non-ozone depleting alternative can be implemented

4. the measures already taken or to be taken by the applicant to minimize and/or eliminate the release of an ozone-depleting compound, including whether and when a reclamation and/or recycling system has been or is to be implemented, as well as the effectiveness of any such system

5. the hardship that will result to the applicant in the event the exemption is not granted
This discussion focuses on electronics firms1 in Irvine and is based in part on an informal phone survey conducted of several such firms. The firms were questioned about the impact of the Ordinance on their establishment. The information received from the firms is more accurate than information from firms that face a future regulation. Since the regulation has been in place for two years, information received is the result of research on various technical options.

The following analysis describes the regulation, presents the information provided by firms, presents alternatives to Irvine's regulation, and discusses the alternatives in terms of their cost-effectiveness. The chapter closes with presentation of conclusions.

3.2 Background

In 1989, the City of Irvine, one of the 200 largest cities in the United States, passed an ordinance regulating the use of ozone depleting chemicals within city limits. The City Council of Irvine advanced several reasons for doing so. Primarily, the City Council was aware of scientific evidence that the release of chlorofluorocarbons and halons into the atmosphere depleted the earth's ozone layer and that such depletion allows increased ultraviolet radiation to enter the earth's atmosphere. This radiation poses danger to human health and the environment by increasing harms such as skin cancers, cataracts, suppression of the immune system, damage to crops and aquatic life, and related effects. The City Council was also concerned about the widespread use of halons in testing fire extinguishing systems, chlorofluorocarbons in refrigeration and air conditioning systems, and the lack of alternatives for most of these uses. The Council saw potential benefits in recycling halons and chlorofluorocarbons used for such purposes.

Passage of the legislation was also driven by the United States ratification of the Montreal Protocol on Substances that Deplete the Ozone Layer on April 21, 1988. The Protocol calls for reductions in the production, importation, and exportation of CFCs and halons. The City Council of Irvine believed that in light of the current and future limitations on the production of CFCs both nationally and internationally, the early development and utilization of environmentally safe alternatives to CFCs would create a competitive advantage to those businesses electing to utilize such alternatives.

1 The electronics industry in the United States used an estimated 80 million kilograms of CFC-113 to remove flux from printed circuit boards in 1986, representing 45 percent of worldwide CFC-113 consumption at that time. (Information obtained from a FAX from Robin Sellers of the Naval Avionics Center, October, 1, 1991)
prior to the effective date of any comprehensive international, federal, state, or local regulation banning the use of CFCs and halons. Furthermore, the City Council of Irvine believed that the reductions set forth in the Montreal Protocol may not have been sufficient to remedy the "global health and safety risk" created by halons and CFCs.

According to Dr. Frances E. Winslow of the City Manager's Office of Irvine, the drive to pass much of the regulation was based on Irvine's belief that effective implementation of international and national standards for the reduction of ozone depletion requires active local cooperation. In a brief paper on Irvine's Ordinance Governing the Manufacture, Distribution, Sale, and Recycling of Products which Utilize Ozone-Depleting Compounds, Dr. Winslow writes:

"Each point source of CFC emissions lies within the jurisdiction of a local or county government. Developing an implementation plan that is suitable for the entire world, or even for the whole United States, will be a lengthy process. During the development, CFCs will continue to be released into the atmosphere. Local governments can work with the local community to effectively create local regulations that reduce CFC emissions quickly. While each municipality may release only a small portion of the world-wide total of ozone depleting compound emissions, each molecule of CFC that is recycled or destroyed is a contribution to the health of the stratospheric ozone layer."²

3.3 The Ordinance

For this discussion we are dividing the ordinance in two parts. The first describes the prohibitions and the second describes the exemptions.

3.3.1 The Ban on Ozone-Depleting Compounds

The ordinance "Governing the Manufacture, Distribution, Sale, and Recycling of Products which Utilize Ozone-Depleting Compounds" (No. 89-21) was passed by the City Council of Irvine on August 22, 1989. Following the first section on definitions, there are twelve sections. The second section outlines the specifics of the prohibition of manufacturing, selling, or distributing products utilizing ozone-depleting compounds. It reads that within the City of Irvine,

² Dr. Frances E. Winslow, City Manager's Office, City of Irvine, California, "CFC Pollution: Repairing the Ozone Hole Through Municipal Legislation."
Two alternatives are being examined by EPA, alternative 1 and alternative 2. Alternative 2, a NESHAP for all gasoline stations except for those with a throughput of less than 10,000 gallons a month, is clearly the better regulation. Alternative 1 (no exemptions) is more costly than alternative 2. Additionally, alternative 1 is less cost-effective for both VOC and HAP than alternative 2. Furthermore, the cost-effectiveness ratios of alternative 2 are more in line with the cost-effectiveness values of other federal regulations regulating VOC emissions than are those of alternative 1. Finally, alternative 1 has the potential to negatively impact small businesses more than alternative 2.

Alternative 3, which is not one of the alternatives advanced by EPA, allows additional exemptions by states for gasoline stations with throughputs of 10,000 to 25,000 gallons per month so long as the stations are not in populated areas and do not contribute in conjunction with other sources to high ambient levels of HAPs. This alternative allows an element of risk-benefit analysis to inform the final decision on exemptions.

The only advantage the adoption of alternative 1 has over the other alternatives is that it achieves a 13 percent greater HAP emissions reduction than alternative 2 and a 20 percent greater reduction than alternative 3. But eighty-four percent of the stations exempted under alternative 2 are small "private" gasoline stations with low emissions because they have a throughput range of 0-5,000 gallons a month. "Private" stations are stations maintained by governmental, commercial, and industrial consumers for their own fleet operations as well as stations owned by utility companies, taxi fleets, rental car fleets, school buses and corporate fleets. Sixteen percent of the stations exempted under alternative 2 are public gas stations. According to Dave Haddad Sr., President of the Service Station Dealers of America, a trade association representing independent gasoline dealers who sell gasoline under the brand name of their supplier, public stations with a throughput of 0-5,000 gallons of gasoline a month, if they are pure gas stations (i.e. not convenience stores with a gas pump), are very, very rural. With such a low throughput, he believes it would be impossible for such a gas station to survive in an urban or suburban area. Very, very rural gas stations would likely be the gas stations most unable to obtain the financing necessary for Stage I vapor recovery installation and maintenance expenditures. Thus alternatives 2 and 3 are superior to alternative 1 in their treatment of small businesses.
Irvine, California's Ordinance Governing the Manufacture, Distribution, Sale, and Recycling of Products Which Utilize Ozone-Depleting Compounds

3.1 Introduction

This chapter discusses an existing municipal ordinance, enacted by Irvine, California, in 1989, that bans emissions of ozone depleting compounds (ODCs). The ban is all encompassing, but it is moderated by exemption clauses that greatly reduce the cost to industry by allowing time, in cases where it is needed, for the firm to find the most cost-effective approach to control of ozone depleting compounds in its operations. In discussing the ordinance, the following issues are considered:

- What features of a ban contribute to cost-effectiveness,
- What is the best form for a local ODC ordinance -- i.e., is a product labeling ordinance superior to a local ban, and
- Whether localities should adopt measures to reduce the release of ozone depleting substances.

New regulations to control emissions from ozone-depleting compounds are emerging in localities all across the United States. The town of Nashua, New Hampshire passed an ordinance "Regulating The Manufacture, Distribution, Sale And Recycling Of Products Which Utilize Ozone-Depleting Compounds" in 1990. The city of Cambridge, Massachusetts recently passed a law requiring that products made with or emitting ozone-depleting compounds be labelled. In light of this growth in regulation, Irvine is an example that shows why regulatory flexibility is necessary. Irvine's exemption clause as well as several other aspects of Irvine's regulation have substantially reduced the cost of this ban on the release of ozone depleting compounds without causing a major slippage in the goals of the regulation. Irvine's ordinance is also a good focus for a discussion of alternative local approaches to reducing releases of ozone depleting compounds including the option of not regulating ODCs -- a global, not a local, pollutant -- at the local level.
Table 2.5 The Effect of Stage I Regulation on the Gasoline Prices of Various Sized Gas Marketers (1991 Dollars)

<table>
<thead>
<tr>
<th>Fuel Throughput per month (a) (gallons)</th>
<th>Average Fuel Throughput per year (gallons)</th>
<th>Annualized Coaxial Cost</th>
<th>Annualized Two Point Cost</th>
<th>Increased Cost per gallon coaxial</th>
<th>Increased Cost per gallon two point</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5,000</td>
<td>24,000</td>
<td>$1,011.00</td>
<td>$1,058.00</td>
<td>$0.04213</td>
<td>$0.04408</td>
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<tr>
<td>5,000-10,000</td>
<td>72,000</td>
<td>$1,011.00</td>
<td>$1,058.00</td>
<td>$0.01404</td>
<td>$0.01469</td>
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<tr>
<td>10,000-25,000</td>
<td>240,000</td>
<td>$1,011.00</td>
<td>$1,058.00</td>
<td>$0.00421</td>
<td>$0.00441</td>
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<tr>
<td>25,000-50,000</td>
<td>420,000</td>
<td>$1,011.00</td>
<td>$1,058.00</td>
<td>$0.00241</td>
<td>$0.00252</td>
</tr>
<tr>
<td>50,000-100,000</td>
<td>780,000</td>
<td>$1,011.00</td>
<td>$1,058.00</td>
<td>$0.00130</td>
<td>$0.00136</td>
</tr>
<tr>
<td>&gt;100,000</td>
<td>2,220,000</td>
<td>$1,011.00</td>
<td>$1,058.00</td>
<td>$0.00046</td>
<td>$0.00048</td>
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</tbody>
</table>

(a) Plant fuel throughput per month and average fuel throughput per year information was obtained from the EPA's preliminary draft of "Gasoline Marketing Industry (Stage I) - Background Information for Proposed Standards" November, 1991.
Figure 2.1 Increased Gasoline Cost Per Gallon for Various Sized Gas Marketers

![Graph showing increased gasoline cost per gallon for various sized gas marketers. The x-axis represents average fuel throughput per month (gallons) in thousands, ranging from 0 to 200. The y-axis represents increase in gas cost per gallon ($), ranging from 0 to 0.045. Two lines are shown: one for Coaxial and one for Two Point.]
Table 2.4 Cost-Effectiveness Values for Federal Control Technology Guidelines (CTG) That Reduce VOC Emissions Compared to Stage I Cost-Effectiveness Values (1991 Dollars)

<table>
<thead>
<tr>
<th>CTG</th>
<th>Smallest Model Plant Cost-effectiveness ($/Mg of VOC) (a)</th>
<th>Largest Model Plant Cost-effectiveness ($/Mg of VOC)</th>
<th>Ratio of Largest Model Plant Cost-effectiveness to $2,000/Mg of VOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Appliances</td>
<td>$0</td>
<td>$0</td>
<td>0.0</td>
</tr>
<tr>
<td>Fixed Roof Petrol Tanks</td>
<td>$0</td>
<td>$0</td>
<td>0.0</td>
</tr>
<tr>
<td>Miscellaneous Refinery Sources</td>
<td>$0</td>
<td>$0</td>
<td>0.0</td>
</tr>
<tr>
<td>Dry Cleaning: petroleum</td>
<td>$0</td>
<td>$0</td>
<td>0.0</td>
</tr>
<tr>
<td>SOCMII Equipment Leaks</td>
<td>$0</td>
<td>$0</td>
<td>0.0</td>
</tr>
<tr>
<td>Natural Gas Process Equipment Leaks</td>
<td>ERR</td>
<td>$0</td>
<td>0.0</td>
</tr>
<tr>
<td>Cutback Asphalt</td>
<td>$0</td>
<td>$0</td>
<td>0.0</td>
</tr>
<tr>
<td>Fabric Coating</td>
<td>$0</td>
<td>$34</td>
<td>0.0</td>
</tr>
<tr>
<td>Paper Coating</td>
<td>$0</td>
<td>$34</td>
<td>0.0</td>
</tr>
<tr>
<td>Gasoline Bulk Plants</td>
<td>$0</td>
<td>$34</td>
<td>0.0</td>
</tr>
<tr>
<td>Metal Coils</td>
<td>$0</td>
<td>$196</td>
<td>0.1</td>
</tr>
<tr>
<td>Gasoline Loading Terminals</td>
<td>$140</td>
<td>$247</td>
<td>0.1</td>
</tr>
<tr>
<td>Solvent Metal Cleaning</td>
<td>$0</td>
<td>$280</td>
<td>0.1</td>
</tr>
<tr>
<td>Polymers Production</td>
<td>$34</td>
<td>$460</td>
<td>0.2</td>
</tr>
<tr>
<td>Service Stations Stage I</td>
<td>$39</td>
<td>$460</td>
<td>0.2</td>
</tr>
<tr>
<td>Magnet Wire</td>
<td>$196</td>
<td>$471</td>
<td>0.2</td>
</tr>
<tr>
<td>Dry Cleaning: perchloroethylene</td>
<td>$0</td>
<td>$516</td>
<td>0.3</td>
</tr>
<tr>
<td>Flat Wood Panelling</td>
<td>$337</td>
<td>$651</td>
<td>0.3</td>
</tr>
<tr>
<td>STAGE I VAPOR RECOVERY (II)</td>
<td>$94</td>
<td>$868</td>
<td>0.4</td>
</tr>
<tr>
<td>STAGE I VAPOR RECOVERY (III)</td>
<td>$94</td>
<td>$868</td>
<td>0.4</td>
</tr>
<tr>
<td>Metal Furniture</td>
<td>$314</td>
<td>$875</td>
<td>0.4</td>
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<tr>
<td>Volatile Liquid Storage</td>
<td>$0</td>
<td>$1,459</td>
<td>0.7</td>
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<tr>
<td>Petroleum Refinery Equipment Leaks</td>
<td>$0</td>
<td>$1,683</td>
<td>0.8</td>
</tr>
<tr>
<td>Float Roof Petrol Tanks</td>
<td>$247</td>
<td>$1,683</td>
<td>0.8</td>
</tr>
<tr>
<td>Auto &amp; Light Duty Trucks</td>
<td>$123</td>
<td>$2,513</td>
<td>1.3</td>
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<tr>
<td>SOCMII Air Oxidation</td>
<td>$112</td>
<td>$2,917</td>
<td>1.5</td>
</tr>
<tr>
<td>Miscellaneous Metal Parts</td>
<td>$0</td>
<td>$5,318</td>
<td>2.7</td>
</tr>
<tr>
<td>STAGE I VAPOR RECOVERY (I)</td>
<td>$94</td>
<td>$8,675</td>
<td>4.3</td>
</tr>
<tr>
<td>Rubber Tires</td>
<td>$280</td>
<td>$12,230</td>
<td>6.1</td>
</tr>
<tr>
<td>Publication Rotogravure</td>
<td>$0</td>
<td>$12,903</td>
<td>6.5</td>
</tr>
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</table>

STAGE I VAPOR RECOVERY (I) - No exemptions
STAGE I VAPOR RECOVERY (II) - Exemption for throughput less than 10,000 gallons a month
STAGE I VAPOR RECOVERY (III) - Exemption for throughput less than 10,000 gallons a month
and a local option for exempting sources with a throughput of 10,000-25,000 gallons a month

(a) All values except for STAGE I values were originally in 1988 dollars. They were inflated to 1991 dollars using an inflation rate of 12.2%.

Source: Information from Kevin Bromberg, U.S. Small Business Administration
a throughput of less than 10,000 gallons a month) cost-effectiveness ratios are used. The cost effectiveness ratio for alternative 1 (no exemptions), however, is much higher than that for alternative 2. Additionally, alternative 1 is one of only three of the twenty-nine rulemakings with a cost-effectiveness of over $8,000/Mg of VOC emissions reduced for the smallest model plant. The highest comparable cost-effectiveness for the other regulations is $5,318. This indicates that alternatives 1 and 2 are not very cost-effective relative to most other regulations with regard to VOC reductions. Because HAP reductions are highly correlated to VOC reductions for Stage I, this result indicates that alternatives 1 and 2 are not very cost-effective for HAPs reductions either.

Alternative 3 brings the cost-effectiveness ratio for the total regulation down to 2,484 $/Mg. This is close to the cost-effectiveness ratio for model plant 5. But more importantly, alternative 3 allows exemptions to be targeted to gasoline stations in areas where the additional risk imposed by the exemption is minimized due to the isolated nature of the emission and the low density of the local population.

Table x.5 and Figure x.1 evaluate the effect of Stage I regulation on the gasoline prices of various sized service stations. It is assumed that the entire cost of installing Stage I vapor recovery equipment is passed to the consumer through increased gasoline prices. The fuel throughput per month and average fuel throughput per year categories were again obtained from EPA's preliminary draft of Gasoline Marketing Industry (Stage I) - Background Information for Proposed Standards, November, 1991. For service stations with a fuel throughput of 0 to 5,000 gallons, the price of gasoline per gallon would increase by approximately 4.4 cents per gallon. For service stations with a throughput of 5,000 to 10,000 gallons, the price of gasoline per gallon would increase by approximately 1.5 cents per gallon. For larger stations, the largest increase seen is .05 cents per gallon. If small gasoline stations (those with a throughput per month of 0-10,000 gallons/month) are not exempted from this regulation and the whole price of Stage I vapor recovery is passed on to the consumer, gasoline prices at the small stations could be 3.3 cents a gallon higher than those at larger stations. This is a price difference large enough to affect a gasoline station's business. Small stations could lose business because their prices are higher than others' prices. Figure x.1 illustrates Table x.5. The graph shows that the curve is very steep for gasoline stations which have monthly throughput of 0-25,000 gallons. Without an exemption for smaller gasoline stations, such stations are likely to be negatively impacted by the regulation.
### Table 2.3 Cost-Effectiveness Ratios for Three Alternative Regulations

#### ALTERNATIVE 1

<table>
<thead>
<tr>
<th>Model Plant #</th>
<th>Number of Sources Affected by Alternative 1</th>
<th>Annual Aggregate Cost ($/yr)</th>
<th>AGGREGATE REDUCTIONS (Mg/yr)</th>
<th>COST-EFFECTIVENESS RATIO ($/Mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>HAPs</td>
<td>VOCs</td>
</tr>
<tr>
<td>1</td>
<td>124,443</td>
<td>128,735,766</td>
<td>1,632</td>
<td>14,839</td>
</tr>
<tr>
<td>2</td>
<td>23,075</td>
<td>23,871,088</td>
<td>908</td>
<td>8,255</td>
</tr>
<tr>
<td>3</td>
<td>16,864</td>
<td>17,445,808</td>
<td>2,212</td>
<td>20,109</td>
</tr>
<tr>
<td>4</td>
<td>16,256</td>
<td>16,816,832</td>
<td>3,731</td>
<td>33,923</td>
</tr>
<tr>
<td>5</td>
<td>11,616</td>
<td>12,016,752</td>
<td>4,952</td>
<td>45,017</td>
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<tr>
<td>6</td>
<td>6,688</td>
<td>6,918,736</td>
<td>8,115</td>
<td>73,769</td>
</tr>
<tr>
<td>Total</td>
<td>198,942</td>
<td>205,804,982</td>
<td>21,550</td>
<td>195,912</td>
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#### ALTERNATIVE 2

<table>
<thead>
<tr>
<th>Model Plant #</th>
<th>Number of Sources Affected by Alternative 1</th>
<th>Annual Aggregate Cost ($/yr)</th>
<th>AGGREGATE REDUCTIONS (Mg/yr)</th>
<th>COST-EFFECTIVENESS RATIO ($/Mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>HAPs</td>
<td>VOCs</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>3</td>
<td>16,864</td>
<td>17,445,808</td>
<td>2,212</td>
<td>20,109</td>
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<td>16,256</td>
<td>16,816,832</td>
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<tr>
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<td>11,616</td>
<td>12,016,752</td>
<td>4,952</td>
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</tr>
<tr>
<td>6</td>
<td>6,688</td>
<td>6,918,736</td>
<td>8,115</td>
<td>73,769</td>
</tr>
<tr>
<td>Total</td>
<td>51,424</td>
<td>53,198,128</td>
<td>19,010</td>
<td>172,818</td>
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#### ALTERNATIVE 3

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<tr>
<th>Model Plant #</th>
<th>Number of Sources Affected by Alternative 1</th>
<th>Annual Aggregate Cost ($/yr)</th>
<th>AGGREGATE REDUCTIONS (Mg/yr)</th>
<th>COST-EFFECTIVENESS RATIO ($/Mg)</th>
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<tr>
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<td></td>
<td></td>
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<td>VOCs</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>8,432</td>
<td>8,722,904</td>
<td>1,106</td>
<td>10,055</td>
</tr>
<tr>
<td>4</td>
<td>16,256</td>
<td>16,816,832</td>
<td>3,731</td>
<td>33,923</td>
</tr>
<tr>
<td>5</td>
<td>11,616</td>
<td>12,016,752</td>
<td>4,952</td>
<td>45,017</td>
</tr>
<tr>
<td>6</td>
<td>6,688</td>
<td>6,918,736</td>
<td>8,115</td>
<td>73,769</td>
</tr>
<tr>
<td>Total</td>
<td>42,992</td>
<td>44,475,224</td>
<td>17,904</td>
<td>162,763</td>
</tr>
</tbody>
</table>
preliminary draft of *Gasoline Marketing Industry (Stage I) - Background Information for Proposed Standards*, November, 1991, as are the hazardous air pollutant and volatile organic compound emissions reductions. Only PEI cost values are used. Cost-effectiveness figures in dollars per metric ton of VOC and HAP reduced were determined for each model plant by dividing the aggregate annual Cost of Stage I vapor recovery capital and maintenance by the aggregate annual HAP or VOC emission reduction. Total cost-effectiveness was computed by dividing the aggregate cost summed over all model plants by the aggregate emission reductions summed over all model plants. The aggregates were computed by multiplying the corresponding values in Table x.2 by the number of sources affected by each alternative for each model plant. The number of sources affected was determined in light of the amount of throughput in states with no Stage I requirements and with Stage I requirements that exempt model plants numbers 1 and 2. Alternative 1 requires that all source in states with no regulations be controlled along with the exempted sources in the other states. Alternative 2 requires that states with no Stage I requirement mandate controls on model plants 3 through 6. Alternative 3 is like alternative 2 except that it is assumed that states opt to exempt controls on half of the sources in the model plant 3 category.

Under regulatory Alternative 1 the cost per Mg of reducing HAP emissions is 3.4 times greater than the cost of removing HAP emissions under regulatory Alternative 2 and 3.9 times as much as for Alternative 3. The cost-effectiveness ratio in the case of Stage I is inversely related to the size of the throughput due to the fact that cost of installing Stage I controls is not related to throughput. Hence, cost-effectiveness is a continuous function with a range from near zero for very large throughputs and approaching infinity for very small throughputs. There is no rule for selecting the optimum level of exemption based on cost-effectiveness alone. To select an appropriate exemption point depends on an outside consideration, such as perhaps the value of the benefit stream of the control. Environmental benefits will depend on the specific gasoline stations exempted.

Cost-effectiveness measures for VOC removal can also be compared for Alternatives 1, 2, and 3. Cost-effectiveness measures in terms of dollars per megagram of VOC are relevant even though the purpose of the Title III Stage I regulation is to regulate HAPs. This is because VOCs and HAPs are correlated to each other and measures of the cost-effectiveness of reducing VOC emissions under regulatory Alternatives 1, 2, and 3 can be compared to the cost-effectiveness of reducing VOC emissions with other federal rulemakings. Table x.4 shows the highest and lowest cost-effectiveness ratios for model plants defined in EPA analyses of federal rulemakings which affect VOC emissions. Stage I vapor recovery cost-effectiveness for VOC are among the highest cost-effectiveness ratios on the table, whether Alternative 1 (no exemptions) or alternative 2 (exemption for gasoline stations with
it is not possible to examine where the capital costs differ. PEI's maintenance costs are a little more
than one-third of EPA's maintenance cost. Again, a breakdown of EPA's maintenance costs are not
provided in the preliminary draft background information document so it is not possible to examine
where PEI and EPA maintenance costs differ. When final annual costs to a gas station of installing
Stage I vapor recovery equipment are determined, PEI and EPA figures do not differ greatly. The
largest difference is approximately $127.

To calculate the costs, VOC removals, and HAP removals for alternative scenarios, the costs and the
emission reductions of VOC and HAP emissions must be broken down by service station size. It is
standard practice for EPA to define distinct size models within an industry facing regulation so that
the differential impacts of the regulation on facilities of various sizes can be measured. The models
used here are those determined by EPA in the preliminary draft of Gasoline Marketing Industry
(Stage I) - Background Information for Proposed Standards, November, 1991.

There are six sizes of model plants based on throughput measured in gallons per month. Model plant
1 is defined as a service station with throughput ranging from zero to five thousand gallons per
month. For model plant 2 the range is from five thousand to ten thousand gallons per month. Model
plant 3 ranges from ten thousand to twenty-five thousand gallons per month; model plant 4, from
twenty-five thousand to fifty thousand; model plant 5, from fifty thousand to one hundred thousand;
and model plant 6 has throughput of over one hundred thousand gallons per month.

In Table x.2 annual measures of cost of vapor recovery and average gasoline throughput are presented
for each model plant size. With vapor recovery, the reductions of both HAPs and VOCs are calculated
for individual model plants. Although there is some variation in the HAP and VOC emissions from
a gallon of throughput from various gasoline blends, and local environments, a single factor is used
in each calculation. The factors used are the same as those used by EPA. Table x.2 shows emission
removals for each model plant given 95 per cent removal efficiency. The annualized costs for the six
model plants are an identical $1,034.50, based on the PEI survey and reflecting the assumption that
nearly all gasoline stations have three tanks, one for each blend of gasoline marketed. Finally the
cost-effectiveness ratio for each model plant is shown. As can be seen, the cost per unit of HAP
emissions removed from the smaller model plant (78,868 $/Mg) is very much higher than the cost of
removing a unit of HAP from the largest model plant (853 $/Mg).

Table x.3 presents information on the cost-effectiveness of the three alternative Stage I regulations
described above. The number of facilities needing control are computed using data from the
Table 2.2 Emission Reductions, Costs and Cost-Effectiveness Ratios for Six Model Plants

<table>
<thead>
<tr>
<th>Model Plant #</th>
<th>Monthly Throughput Range (gal/mo)</th>
<th>Average Throughput (gal/yr)</th>
<th>Total Number of Sources</th>
<th>95% REMOVAL</th>
<th>Plant Annual Cost ($/yr)</th>
<th>VOCs Cost ($/Mg)</th>
<th>HAPs Cost ($/Mg)</th>
<th>Cost-Effectiveness Ratio ($/Mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0-5</td>
<td>24,000</td>
<td>191,450</td>
<td>0.12</td>
<td>1034.5</td>
<td>8.675</td>
<td>78.868</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>5-10</td>
<td>72,000</td>
<td>35,500</td>
<td>0.36</td>
<td>1034.5</td>
<td>2.892</td>
<td>26.289</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>10-25</td>
<td>240,000</td>
<td>52,700</td>
<td>1.19</td>
<td>1034.5</td>
<td>496</td>
<td>7.887</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>25-50</td>
<td>420,000</td>
<td>50,800</td>
<td>2.09</td>
<td>1034.5</td>
<td>496</td>
<td>4,507</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>50-100</td>
<td>780,000</td>
<td>36,300</td>
<td>3.88</td>
<td>1034.5</td>
<td>267</td>
<td>2,427</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>100+</td>
<td>2,220,000</td>
<td>20,900</td>
<td>11.03</td>
<td>1034.5</td>
<td>94</td>
<td>853</td>
<td></td>
</tr>
</tbody>
</table>
emission reduction is in a reasonable range. As will be seen below, the smallest sources have such high costs per unit of emission reduction that they should be controlled only in the most extreme circumstances.

Based on this discussion, the third alternative is to exempt service stations with throughputs of less than 10,000 gallons per month and to allow states to determine, for each region of the state, whether service stations with throughputs of 10,000 to 25,000 gallons per month should likewise be exempted.

2.4 Cost of the Regulation

Table x.1 presents three different estimates of the annual cost to an existing gas station of installing Stage I vapor recovery equipment. Cost data for the first two estimates was received from Robert Renkes, the Executive Vice President of the Petroleum Equipment Institute (PEI), a trade association whose members are makers and distributors of equipment used in service stations, bulk plants, and other marketing facilities. Mr. Renkes conducted a survey of four members of his association who are involved in installing underground storage tanks and vapor recovery systems. EPA cost data was obtained from the preliminary draft of Gasoline Marketing Industry (Stage I) - Background Information for Proposed Standards, November 1991.

There are two types of vapor recovery equipment: coaxial and two point. A coaxial system requires only one hole in the underground storage tank, whereas the two point system requires two. The coaxial recovery system is less expensive for the service station owner, but more expensive for the truck operator than the two point system because the truck company has to purchase equipment compatible to a coaxial adaptor. The two point system is more expensive for the service station owner and less expensive for the truck operator than the coaxial system. It is expected that the proposed NESHAP for gasoline stations will be flexible and allow the use of either type of equipment as both types of equipment are effective at reducing vapors by approximately ninety-five percent. EPA cost figures given in Table x.1 are an average of coaxial and two point costs.

Total initial costs in Table x.1. were annualized for 15 years, the expected life of the equipment, using a real interest rate of ten percent. Then the annualized total initial cost was added to the annual maintenance cost to determine the annual cost of installing and maintaining Stage I vapor recovery equipment per gasoline station. PEI's estimates of annual cost are greater than EPA's estimates. Our capital costs, coaxial or two-point, are approximately one-third of EPA's capital costs. A breakdown of EPA's capital costs are not presented in preliminary draft background information document so
Table 2.1 Costs to Retrofit Service Stations With Stage I Vapor Recovery Equipment (1991 dollars) (a)

<table>
<thead>
<tr>
<th></th>
<th>Capital Cost</th>
<th>Installation Cost</th>
<th>Total Initial Cost</th>
<th>Annualized Total Initial Cost(b)</th>
<th>Annual Maintenance Cost</th>
<th>Annual Cost of Installing &amp; Maintaining Stage I per station (c)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coaxial</td>
<td>$1,233</td>
<td>$300</td>
<td>$1,533</td>
<td>$202</td>
<td>$810</td>
<td>$1,011</td>
</tr>
<tr>
<td>Two point</td>
<td>$1,587</td>
<td>$300</td>
<td>$1,887</td>
<td>$248</td>
<td>$810</td>
<td>$1,058</td>
</tr>
<tr>
<td>EPA(d)</td>
<td>$4,640</td>
<td>included in capital cost</td>
<td>$4,640</td>
<td>$607</td>
<td>$324</td>
<td>$931</td>
</tr>
</tbody>
</table>

(a) EPA values were originally in 1990 dollars. They were inflated to 1991 dollars using an inflation rate of 2.88%.
(b) A real interest rate of 10% is used over a period of 15 years, the expected lifetime of the equipment.
(c) In our calculations, we considered each gas station to have three underground storage tanks. The EPA does not define the number of storage tanks they considered each facility to have. They do state that the number of underground storage tanks do not vary considerably with throughput.
(d) The EPA figures are for an average of coaxial and two point costs.

Source for EPA data: Table 7-13 in the EPA's preliminary draft of "Gasoline Marketing Industry (Stage I) - Background Information for Proposed Standards," November, 1991.
2.3 Regulatory Alternatives

The EPA has outlined the two alternative Stage I NESHAP regulations it is considering. They are presented below as Alternative 1 and 2. A third alternative is also presented and discussed in order to examine the reasonableness of the EPA's alternatives.

2.3.1 Alternative 1. Extension of CTG Controls Nationwide

A NESHAP would require that all gasoline stations install Stage I vapor recovery equipment, utilize submerged filling of storage tanks, and assure leak free truck and vapor transfer systems. The vapor recovery system would have to have an efficiency of at least ninety-five percent.

2.3.2 Alternative 2. Extension of CTG Controls Nationwide With an Exemption for Service Stations With a Throughput of Less Than 10,000 Gallons/Month

A NESHAP would require that gasoline stations with a monthly throughput of greater than 10,000 gallons per month install Stage I vapor recovery equipment, utilize submerged filling of storage tanks, and assure leak free truck and vapor transfer systems. The vapor recovery system would have to have an efficiency of at least ninety-five percent. Approximately one-half of the states in the United States already require Stage I vapor recovery with an efficiency of at least ninety-five percent as part of their State Implementation Plans. In approximately thirty-two percent of these SIPS, gasoline stations which sell less than 10,000 gallons of gasoline per month are exempt. This exemption may be adopted by the EPA for the gasoline marketing NESHAP.

2.3.3 Alternative 3. Extension of CTG Controls Nationwide With an Exemption for Service Stations With a Throughput of Less Than 10,000 Gallons/Month and a Local Option to Exempt Stations With a Throughput of Less Than 25,000 Gallons/Month

In the following, the rationale for generating alternative approaches to setting exemption levels for Stage I is presented. Based on the discussion, a third alternative is devised.

The purpose of Title III of the 1990 Clean Air Act Amendments is to reduce the risk to the population of getting cancer or other diseases from sources in the regulated source categories. The risk generated by any source category depends not only on the quantity of toxic emissions it releases, but also on the toxicity of the emissions, the number of sources in the category contributing to local ambient...
concentrations, and the size of the population exposed to the ambient concentrations. These factors are determined locally. For the same sized plant with similar throughput, there will be a different cost per statistical life saved at each location. Statistical lives saved are computed by dividing the cost of control by the expected reduction in statistical lives lost.\(^3\)

For a given size of model plant, the highest risk associated with exempting the plant from control will be experienced in a highly populated region that also has a large number of sources in that size category. This occurs in urbanized areas. Moving progressively to regions with smaller populations, the number of service stations can be expected to decline roughly in proportion to the population. Both the concentration of emissions from service stations and the population exposed to the emissions decline simultaneously. In rural areas near interstate highways, however, service stations tend to be larger to accommodate interstate automobile and truck traffic. Very small gas stations will be located away from the highway and will be isolated from other sources. They will be small because demand for their services is low. Hence there will not likely be another service station nearby.

In numerous regions Stage 1 controls have already been mandated because of Title I issues. These regions include the most densely populated regions where toxic emissions from a service station will affect large numbers of people. Title III will only impact the other, less populated regions, where the risks associated with any particular level of emissions are lower and where there are likely to be fewer other emission sources.

These observations have three implications for setting the exemption level. First, in terms of comparing the cost per statistical life of the control measure, because the risks are lower in the less populated areas, the cost per statistical life saved there will be higher than for more populated areas for any given control strategy. As less densely concentrated areas are considered, the appropriate size cutoff for an exemption will tend to increase. Second, the service stations most likely to benefit from a size exemption will be in rural areas. And third, local considerations should be given some weight in setting the exemption level.

Stations with sufficient emissions to cause, by themselves, significant risk under normally occurring meteorological conditions should be controlled. Stations with smaller emissions should be controlled if they, in conjunction with nearby sources, contribute to significant risk and their cost per unit of

\(^3\)A statistical life saved or lost is based on epidemiological studies in which the probability that a person exposed to a toxic substance will suffer a health effect due to exposure is determined.
An area source is defined as a source of hazardous air pollutants that is not a major source. Major sources and area sources, at the discretion of the EPA administrator, may be regulated differently. Area sources may be regulated less stringently, with emissions standards commonly known as generally available control technologies (GACTs). Emissions standards for major sources are commonly called maximum available control technology (MACT).

Sources may also be regulated differently, at the discretion of the EPA administrator, based on whether they are new or existing sources. New sources face the maximum degree of reduction in emissions that is deemed achievable. Achievability is based on the emission control achieved in practice by the best controlled source similar to the new source. Emission standards for existing sources in a category may be less stringent than standards for new sources although they cannot be less stringent than the average emission limitation achieved by the best performing twelve percent of the existing sources.

Gasoline stations are area sources. They may then, at the discretion of the EPA administrator, be regulated with "generally available control technologies or management practices." Additionally, existing gasoline stations may, at the discretion of the EPA administrator, be regulated less stringently than new gasoline stations. There are special circumstances in the case of the NESHAP for Stage I gasoline stations, however, that make these distinctions partially immaterial.

One special circumstance is that equipment is necessary to control vapor emissions from Stage I sources, and vapor recovery equipment does not come in varying degrees of efficiency. All vapor recovery equipment is efficient at reducing emissions by approximately ninety-five percent. In order to control Stage I vapor emissions, an equipment standard, whether it is called a MACT or a GACT standard, would require exactly the same vapor recovery equipment. Additionally, existing sources cannot be regulated less stringently than new sources by requiring less expensive or less efficient equipment. The only way a GACT standard can be less rigorous than a MACT standard or a standard for existing sources can be less rigorous than a standard for new sources, then, is through exemptions.

Since a draft of the proposed regulation is not yet released and the proposed regulation is not scheduled to be released until November of 1993, the form of the Stage I NESHAP for gasoline

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1This applies to source categories with 30 or more sources and thus applies to gasoline marketers. Categories or subcategories of sources with less than 30 sources are regulated differently.
stations is not known with certainty. However, the preliminary draft of the background information document (November, 1991) for the regulation, titled *Gasoline Marketing Industry (Stage I) -- Background Information for Proposed Standards*, can be used to infer what the policy will look like. According to the preliminary draft, the NESHAP will take the form of an equipment standard like that espoused in the CTG document. Recommended controls in the CTG document are submerged fill of storage tanks, vapor balance between truck and tank, and a leak free truck and vapor transfer system.

In addition, the preliminary draft defines the average emission limitation achieved by the best performing twelve percent of the existing sources (the floor for differentiating between new and existing sources). According to the draft, in states with ozone nonattainment areas where the CTG documents apply, the states either require all stations to install Stage I vapor recovery equipment or require all stations except those with a throughput of less than 10,000 gallons/month (38,000 liters/month) to install Stage I vapor recovery equipment. Furthermore, according to the draft thirty-five percent of the throughput of gasoline in the U.S. and forty-two percent of the gasoline stations in the U.S. are required to have Stage I vapor recovery in a regulatory atmosphere where there are no exemptions for size. The EPA maintains then that over twelve percent of the gasoline stations in the U.S. are achieving Stage I vapor recovery at a ninety-five percent efficiency with no exemptions based on throughput/month. Since over twelve percent of existing sources are achieving what is currently the maximum achievable reduction in Stage I vapor emissions, it can be inferred that new and existing sources will not be treated differently by this regulation.

Furthermore, the draft document outlines two forms the Stage I vapor recovery regulation for service stations may take. Regulatory Alternative 1 would spread the controls in the CTG document nationwide. Regulatory Alternative 2 is less stringent. Since service stations are area sources they can be regulated less stringently. Regulatory Alternative 2 would spread the controls in the CTG nationwide but exempt service stations with a throughput of 10,000 gallons/month (38,000 liters/month) from the regulation. The 10,000 gallons/month exemption criteria is based on the relatively higher costs of control for small facilities and existing size cutoffs under State and local regulations. The two alternatives discussed by the EPA are presented below.

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2There are several other types of exemptions in some states. Some states exempt facilities based on storage tank size which exempts most agricultural accounts. Other regulations specifically exempt agricultural dispensing facilities.
Title III of the Clean Air Act, as amended in 1990, lists 189 hazardous air pollutants to be regulated by the EPA. According to the Act, "... the Administrator [of the EPA] shall promulgate regulations establishing emission standards for each category or subcategory of major sources and area sources of hazardous air pollutants listed for regulation... Emissions standards promulgated under this subsection and applicable to new or existing sources of hazardous air pollutants shall require the maximum degree of reduction in emissions of the hazardous air pollutants subject to this section (including a prohibition on such emissions, where achievable) that the Administrator, taking into consideration the cost of achieving such emission reduction, and any non-air quality health and environmental impacts and energy requirements, determines is achievable for new or existing sources..." The EPA is planning to regulate the Stage I operations of gasoline stations -- the filling of underground storage tanks, as a category of sources under this Title III regulation. Five to ten percent of the vapors released during the filling of underground storage tanks are composed of at least one of the following twelve of the 189 hazardous air pollutants listed in Title III: methyl tert butyl ether, naphthalene, hexane, toluene, benzene, isocatane, ethylbenzene, naphthalene, cumene, o-xylene, m-xylene, and p-xylene.

The Stage I operations at a gasoline station consist of gasoline being loaded by gravity into underground storage tanks via a flexible hose. The liquid gasoline displaces a nearly equal volume of partially saturated gasoline vapors which, without recovery, are vented to the atmosphere. The contemplated Title III regulation will decrease the emissions that result from the filling of underground storage tanks at service stations through the use of a vapor recovery system. Instead of being vented to the atmosphere, the gasoline vapors are transferred into the tank truck unloading at the service station, and ultimately to a bulk terminal vapor processor for recovery or destruction. The transfer of the liquid gasoline creates a slight pressure in the storage tanks and a slight vacuum in the truck compartment. These pressure differences effectively cause the transfer of displaced vapor to the transport truck.

This chapter discusses the proposed Stage I regulation of gasoline stations under Title III, presents the two regulatory alternatives being considered by EPA, proposes an additional alternative, and examines the emission reductions, costs, cost-effectiveness, and small gasoline station impacts of these
alternative Stage I regulations. The chapter concludes that gasoline stations with a throughput of less than 10,000 gallons of gasoline a month should be exempt from Stage I NESHAP regulation and that some gasoline stations in the 10,000 to 25,000 gallon/month range also should be exempted at the discretion of local authorities. Although no specific cut-off for cost-effectiveness ratios identifies which gasoline stations should be exempted, the recommended alternative would bring the cost-effectiveness of the overall regulation in line with the cost-effectiveness ratios of a fairly large service station. It will also be argued that these additional exemptions do not affect ambient air quality in areas where there are either substantial quantities of other pollutants or large populations. Hence, the risk to the overall population or to individuals is not significantly increased by choosing this alternative.

2.2 Background

2.2.1 Current Regulation

The Stage I operations of some gasoline stations are currently regulated under Title I of the Clean Air Act. Control techniques guideline (CTG) documents were prepared for service station Stage I operations in 1975. The CTG documents outline what EPA defines as reasonably available control technology (RACT) for existing sources. States with nonattainment areas for ozone are required to adopt regulations consistent with the CTG recommendations to provide for attainment of the ambient standards. It is not required that the regulation apply statewide. It is only required that the regulation apply to the ozone nonattainment area. Still, some states have adopted the regulations statewide. Currently, approximately forty-nine percent of the total throughput of gasoline at service stations in the United States comes under this control.

2.2.2 Proposed Regulation

A National Emission Standard for Hazardous Air Pollutants (NESHAP), prepared under Title III of the Clean Air Act for Stage I sources of hazardous air pollutants, will extend regulation to gasoline stations not affected by Title I. Under Title III, emission standards for sources differ based on two criteria: the amount of hazardous pollutants emitted by the source and the age of the source. To differentiate sources by the amount of hazardous pollutants they emit, the EPA distinguishes a source as either a major source or an area source. A major source is defined as a "stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any hazardous
Table 1.7 Total cost of regulation for commercial dry cleaners.

<table>
<thead>
<tr>
<th>Type of Equipment</th>
<th>Less than cutoff</th>
<th>In between</th>
<th>Greater than break even</th>
<th>Total for Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer</td>
<td>$0</td>
<td>$7,155</td>
<td>($1,828,346)</td>
<td>($1,821,191)</td>
</tr>
<tr>
<td>Dry-to-dry</td>
<td>$0</td>
<td>$23,040</td>
<td>($3,997,453)</td>
<td>($3,974,413)</td>
</tr>
<tr>
<td>Total for Size</td>
<td>$0</td>
<td>$30,195</td>
<td>($5,825,798)</td>
<td>Grand Total</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>($5,795,604)</td>
</tr>
</tbody>
</table>
assumed to be $50. For the dry cleaning firms over the breakeven points, the cost used was the annual savings estimated to accrue to firms switching from uncontrolled equipment to controlled equipment and washing 93,750 pounds of clothes annually in Table 1.3, the first points on the graphs after the breakeven points. Costs and savings accruing to dry cleaners switching from uncontrolled to controlled equipment were used, because they are the most cost-effective control options.

The typical costs for each category were then multiplied by the number of firms, categorized by equipment and type. These results were then multiplied by the fraction of firms not in compliance (40 percent) shown in Table 1.5 to determine the total costs to industry, by category, of complying with the proposed regulation. This analysis is shown in Table 1.7. For firms operating above the breakeven point, the numbers of firms were multiplied by the typical savings for firms operating with transfer and firms operating with dry-to-dry equipment. Again, this result was multiplied by the fraction of firms not in compliance. Savings and costs were then added across categories to determine the total cost for industries by equipment type. For commercial dry cleaners with either transfer or dry-to-dry equipment, the proposed regulation results in a net savings to the industry. Finally, a grand total cost of the proposed regulation of commercial dry cleaners was given by adding the costs (savings) to the commercial dry cleaners by equipment type. The table shows a grand total savings to commercial dry cleaners of almost $6 million per year resulting from the proposed regulation.

1.5 Conclusion

Due to the reduction in fluid usage attributable to compliance with EPA equipment standards, and the size standards for exemptions, this regulation will have very little financial impact on dry cleaners. Dry cleaning firms with small output would have experienced high compliance costs on a per load basis were they not exempted. Firms with high output will experience savings. Only firms with outputs between the exemption level and the breakeven level will have increased costs of business due to the regulation. The highest of these costs will be $0.25 per load, as can be seen in Figures 1.1 and 1.2. It can be asked why, given that so many dry cleaners would benefit from controlling emissions and thereby saving fluid, do they not establish controls in the absence of regulation. The major reasons are three. First, it takes a few years for the savings on fluid to equal the cost of installing the new equipment. A dry cleaner might not realized that these savings exist. Second, banks might not be willing to finance the controls for some of the dry cleaners, or the dry cleaner may be reluctant to take out financing. And finally, inertia is a major aspect of human nature. There are many examples of environmentally protective actions that also save money but are not immediately adopted by the public.
Table 1.5 Percent of commercial dry cleaners needing control by size and equipment type.

<table>
<thead>
<tr>
<th>Type of Equipment</th>
<th>Less than cutoff</th>
<th>In between</th>
<th>Greater than break even</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>Dry-to-dry</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
</tbody>
</table>
Table 1.6 Cost of regulation for typical commercial dry cleaners.

<table>
<thead>
<tr>
<th>Type of Equipment</th>
<th>Less than cutoff</th>
<th>In between</th>
<th>Greater than break even</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer</td>
<td>$0.00</td>
<td>$41.12</td>
<td>($1,106.85)</td>
</tr>
<tr>
<td>Dry-to-dry</td>
<td>$0.00</td>
<td>$50.00</td>
<td>($913.80)</td>
</tr>
</tbody>
</table>
proposed regulation is therefore more cost-effective than regulation mandating that all dry cleaners switch to ventless dry-to-dry equipment. It should be noted that for the average sized dry cleaner (75,000 pounds of clothes/yr.), three of the four control options have a negative cost-effectiveness indicating savings, not costs per pound of fluid saved. Only switching to ventless dry-to-dry equipment from vented dry-to-dry equipment has a positive cost per pound of fluid saved, $0.05/pound.

1.4 Costs of the Proposed Regulation

The total cost to the dry cleaning industry of the proposed regulation can be determined although many small firms will be exempt from the regulation and many large firms will experience savings by changing their dry cleaning equipment. These two factors do, however, make it impossible to determine the total cost to the dry cleaning industry by multiplying the cost of the regulation to a typical firm by the number of firms. Such a calculation would lead to a very much larger total than would in fact be true. An appropriate calculation of the cost of the regulation to commercial dry cleaners is shown in Table 1.7 and is developed in Tables 1.4-1.6.

The number of dry cleaners by equipment size and type was first determined. The estimated figures, shown in Table 1.4, were compiled from an EPA report using a $100,000 annual sales exemption cutoff and the breakeven points of Figures 1.1 and 1.2. The table shows that 40% of all categories of commercial dry cleaners will need to change their dry cleaning equipment. Again, this information was determined using the EPA report. Finally, the cost to a typical firm by size and type was determined so that it could be aggregated. A cost of zero was assigned to all firms which fell under the exemption. For the dry cleaning firms over the size standard and under the breakeven point that operate with transfer equipment, the cost of $41.12 was determined by the annual cost of switching from uncontrolled transfer equipment to controlled transfer equipment for a dry cleaner which washes approximately 33,333 pounds of clothes a year, or has annual sales of $999,999. This number was found by interpolating between the costs/savings of switching from uncontrolled to controlled transfer equipment given in Table 1.3 for dry cleaners who wash 18,750 and 37,500 pounds of clothes per year. For the dry cleaning firms over the size standard and under the breakeven point that operate with dry-to-dry equipment, the cost was

Table 1.4: Number of commercial dry cleaners by equipment type and size.

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Less than cutoff</th>
<th>In between</th>
<th>Greater than break even</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer</td>
<td>2685</td>
<td>435</td>
<td>4130</td>
<td>7250</td>
</tr>
<tr>
<td>Dry-to-dry</td>
<td>7112</td>
<td>1152</td>
<td>10936</td>
<td>19200</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9797</strong></td>
<td><strong>1587</strong></td>
<td><strong>15066</strong></td>
<td><strong>26450</strong></td>
</tr>
</tbody>
</table>
exemption. Indeed, he would have either reduced his costs or nearly broken even in any case. Setting the size standard for an exemption a little below 70,000 pounds of clothes cleaned annually would serve well if a single exemption standard were desired. However, firms using transfer equipment would not need such a large size standard for their exemption. If they operate a low volume facility, they would reduce their annualized costs with a size standard set anywhere over 40,000 pounds or $120,000 of annual business by adding an adsorber and anywhere over 70,000 pounds or $210,000 switching to dry-to-dry. If their annual cleaning amounted to over 100,000 pounds or $300,000 revenue, they would be better off with ventless dry-to-dry than adding a carbon adsorber.

A second alternative is to delay the regulation of area sources for five years. This can be done if there is a finding that area sources cause no adverse impact on health and the environment. Since approximately 99% of dry cleaners are area sources, however, it is unlikely that a finding of no adverse impact on health and the environment is supportable.

A third alternative, requiring a uniform equipment standard for all commercial dry cleaners regardless of what equipment they currently operate, is consistent with including all dry cleaners in a single category. Such an approach has the potential to negatively impact sources operating older equipment that is still able to provide good service. But if this alternative were combined with a high size standard for an exemption, the cost per pound of dry cleaning would be sufficiently low to make this a viable alternative. Without such an exemption, this alternative would have severe impact on many small dry cleaners. Figures 1.1 and 1.2 show that if a single equipment standard were desired, the size standard that would protect smaller sources is about 75,000 pounds or $225,000.

1.3 Cost-Effectiveness of the Proposed Regulation

Cost-effectiveness is a measure of the efficiency of a regulation. The cost-effectiveness of the proposed NESHAP for dry cleaners, which in this case is a measure of the cost per pound of fluid saved, is developed in Table 1.3. Information on the annual costs of control options was compiled from Table 1.2, and reductions in fluid used were determined using EPA’s estimations of expected fluid loss for each type of equipment configuration. For dry cleaners with transfer equipment, the most cost-effective option is to add a carbon adsorber to the transfer equipment they already own. Consequently, the proposed regulation is more cost-effective than regulation mandating that dry cleaners with uncontrolled transfer equipment switch to ventless dry-to-dry equipment. Similarly, for dry cleaners with dry-to-dry equipment, the most cost-effective option is to control the dry-to-dry equipment they already own rather than switching to ventless dry-to-dry equipment. The
Table 1.3 Cost-Effectiveness ratios for various configurations and activity levels, per 40 pound load.

<table>
<thead>
<tr>
<th>Pounds of Clothes/yr</th>
<th>Annual Costs of Control Options</th>
<th>Reductions in Fluid Use in pounds</th>
<th>Cost per pound of fluid saved</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(2)-(1) (5)-(1) (4)-(3) (5)-(3)</td>
<td>(2)-(1) (5)-(1) (4)-(3) (5)-(3)</td>
<td>(2)-(1) (5)-(1) (4)-(3) (5)-(3)</td>
</tr>
<tr>
<td>131,250</td>
<td>($1,819.35) ($2,022.33) ($1,465.99) ($597.95)</td>
<td>$987.5 $826.8 $386.5 3 $380.6 3</td>
<td>($0.16) ($0.34) ($0.08) ($0.18)</td>
</tr>
<tr>
<td>112,500</td>
<td>($1,463.10) ($1,431.71) ($1,189.90) ($426.08)</td>
<td>$275.0 $987.5 $331.3 $326.5</td>
<td>($0.14) ($0.20) ($0.13)</td>
</tr>
<tr>
<td>93,750</td>
<td>($1,106.85) ($841.08) ($913.80) ($154.20)</td>
<td>$356.2 $590.6 $276.9 $271.8</td>
<td>($0.31) ($0.14) ($0.33) ($0.06)</td>
</tr>
<tr>
<td>75,000</td>
<td>($750.60) ($250.46) ($637.71) $117.67</td>
<td>$285.0 $472.5 $220.8 $217.0</td>
<td>($0.26) ($0.05) ($0.29) ($0.05)</td>
</tr>
<tr>
<td>56,250</td>
<td>($394.35) $340.17 ($361.61) $289.55</td>
<td>$213.5 $543.8 $165.6 $161.3</td>
<td>($0.18) ($0.10) ($0.22) ($0.24)</td>
</tr>
<tr>
<td>37,500</td>
<td>($38.10) $930.79 ($85.52) $661.42</td>
<td>$142.5 $236.2 $110.4 $108.7</td>
<td>($0.02) ($0.39) ($0.08) ($0.61)</td>
</tr>
<tr>
<td>18,750</td>
<td>$318.15 $1,521.42 $190.57 $933.30</td>
<td>$712.5 $181.3 $552.2 $563.8</td>
<td>($0.45) ($1.29) ($0.35) ($1.72)</td>
</tr>
</tbody>
</table>
Fig. 1.1 Cost Differences in Options for Controlling Transfer Units

Additional Cost per 40 lb. Load

Breakeven point for dry-to-dry

Breakeven point for adsorber

Pounds of Clothes Cleaned Annually (Thousands)

Add Adsorber

Go to Dry-to-dry
Fig. 1.2 Cost Differences in Options for Controlling Vented Dry-to-dry Units

Additional Cost per 40 lb. Load

Breakeven point for ventless

Breakeven point for control

Pounds of Clothes Cleaned Annually (Thousands)

Add Control

Switch to Ventless
Environmental Concerns for Small Business

Contract No. SBA 5653-OA-90

Final Report

January 1993

Submitted to:
U.S. Small Business Administration
Office of Advocacy
409 3rd Street, SW, 7th Floor
Washington, D.C. 20416
EXECUTIVE SUMMARY

This report consists of three parts. The first part, labeled Part I, describes the process by which the other two parts were developed. The second part, labeled Part II, consists of four case studies. The third part, labeled Appendix, is a memorandum prepared for SBA discussing details of the regulations developed by EPA to implement Title V of the Clean Air Act Amendments which dealt with permits for sources of air pollution emissions. The four case studies of Part II are summarized here.

1. Dry Cleaning Industry NESHAP for PCE and 1,1,1-TCA

The dry cleaning industry is composed of industrial dry cleaners, commercial dry cleaners, and coin-operated dry cleaners. This study focuses predominately on commercial dry cleaners.

The commercial dry cleaning industry takes in dirty clothes and cleans them using as a solvent either perchlorethylene (PCE) or 1,1,1-trichloroethane. Equipment used in the industry is of two types. Transfer equipment consists of a separate washer and dryer. Laundry is transferred from the washer to the dryer while it is damp with solvent. Dry-to-dry equipment consists of a single drum in which both washing and drying takes place. Vented dry-to-dry equipment releases some solvent through a vent. Unvented dry-to-dry equipment releases no solvent, except as fugitive emissions when the door is first opened.

The 29,300 dry cleaners (including all three categories) are comprised mostly of area sources (29,000) with approximately one percent (300) considered as major sources (sources emitting over 10 tons of any hazardous air pollutant or 25 tons of any combination of hazardous air pollutants). The industrial sector (0.5 percent) is comprised of only major sources while the coin-operated facilities (11.5 percent) are all area sources (sources emitting less hazardous air pollutants than major sources).

The basic recommendation for a National Emission Standard for Hazardous Air Pollutants (NESHAP) for dry cleaners expected from the U.S. Environmental Protection Agency (EPA) is an equipment standard. Maximum Available Control Technology (MACT) will be required on all dry cleaning establishments classified as major sources. MACT for transfer equipment, used by 33 percent of the industry, will be installation of a carbon adsorber which will reduce the release of vapors by 95 percent, or replacement of the transfer equipment with unvented dry-to-dry equipment. MACT for vented dry-to-dry equipment, used by 67 percent of the industry, will be installation of a carbon adsorber or of a refrigerated condenser. Either of these controls will reduce vapor release by 95
percent. Owners of vented dry-to-dry equipment may also comply with the NESHAP by replacing their equipment with unvented dry-to-dry equipment.

With respect to area sources EPA may require all area sources to install MACT or, at the administrator's discretion, impose a more lenient standard known as Generally Available Control Technology (GACT). For area sources subject to GACT that use transfer equipment, the allowable control is expected to be carbon adsorbers. If the source has already installed a refrigerated condenser, which removes 85 percent of vapors from transfer equipment, EPA will consider the source to be in compliance. For users of vented dry-to-dry equipment, GACT will consist of either a carbon adsorber or a refrigerated condenser. EPA may also choose to exempt some area sources from compliance with MACT or GACT. EPA is considering exempting sources with less than $100,000 in annual sales or 300 gallons per year in solvent consumption if a facility uses transfer equipment and 220 gallons per year in solvent consumption if a facility uses dry-to-dry equipment.

The cost of the controls vary with the amount of clothes cleaned annually. Because solvent recovered with the controls can be reused, the cost of solvent is reduced. For sufficiently large quantities of clothes cleaned, the savings can be larger than the annualized costs of the control equipment. For transfer equipment, the break even point is 37,500 pounds of clothes ($112,500 gross receipts if consumers are charged $3.00 a pound) when an adsorber is installed or 75,000 pounds of clothes annually ($225,000 gross receipts) when the firm switches to unvented dry-to-dry equipment. For vented dry-to-dry equipment the break even point is again 37,500 pounds ($112,500 gross receipts) when a control is added or 93,750 pounds ($281,250 gross receipts). Savings for the largest quantities of clothes cleaned included in the study vary from $0.21 per 40 pound load to $0.62 per 40 pound load.

In assessing the costs of the regulation to the dry cleaning industry three categories were considered. The first is exempted firms. They will incur no costs due to the regulation. The next category consists of firms large enough they would have to add controls and small enough that they do not experience savings. Firms in this category using transfer equipment average $41.12 in annual net costs, although some will clearly experience higher costs and some lower costs. Those using dry-to-dry will experience $50.00 in annual net costs. Firms above the break even point will save money. Firms in this category using transfer equipment will average $1,106.85 in annual net savings due to compliance with the regulation. Those using dry-to-dry will save an average of $913.80. For commercial dry cleaners as a whole, the savings will be $3.8 million.
Stage I for gasoline marketers consists of recovering the gasoline vapors into the delivery truck that would otherwise have been vented into the atmosphere when a service station gasoline storage tank is being filled. The EPA has identified two technologies for doing this: the coaxial system in which there is only one hole and the two point system in which there are two holes. The coaxial system is less expensive for the service station owner than the two point system, but more expensive for the truck company that has to purchase equipment compatible with a coaxial system. However, total annualized costs for the two systems are nearly identical. EPA's rules will allow either system to be used as they both reduce vapor releases from filling gasoline station storage tanks by ninety-five percent. Costs used in this study are the average of the costs for the coaxial system and the two point system.

The major alternative considered by EPA is whether to exempt some service stations from installing stage I controls. Costs of controls vary by the size of the throughput. The cost of gasoline is increased by $0.04 per gallon for stations with 0 to 5,000 gallons per month throughput and decreases, as throughput increases, to $0.0005 per gallon for throughputs of over 100,000 gallons per month. EPA is considering two alternatives. The first is to allow no exemptions. It would cost $206 million per year and affect 199,000 sources and reduce volatile organic compounds (VOCs) by 196,000 Mg per year and hazardous air pollutants (HAPs), a subset of VOCs, by 28,000 Mg per year. The cost-effectiveness ratio for VOCs is $1,050 per Mg and for HAPs is $9,550 per Mg. The second alternative is to exempt all service stations with a throughput of less than 10,000 gallons per month. It will cost $53 million per year and affect 51,000 sources, reducing HAP emissions by 19,000 Mg per year and VOC emissions by 173,000 Mg per year. The cost-effectiveness ratio for HAPs is $2,798 per Mg and for VOCs is $308 per Mg. These values are much better than those for alternative 1.

A third alternative discussed in the study, but not considered by EPA, is to allow states to exempt stations with throughputs between 10,000 and 25,000 gallons per month. It was assumed that half of these stations would be exempted. Alternative 3 would cost $44 million and affect 43,000 stations. The cost-effectiveness ratios for HAPs would be $2,484 per Mg and for VOCs would be $273 per Mg. These ratios are slightly better than for alternative 2. It was concluded that alternative 2 was very much better than alternative 1 and that EPA might give thought to including more stations in the exemption. It was assumed that, under alternative 3, states would exercise their option by exempting rural gasoline stations. Many of these stations are not in non-attainment areas and not close to other sources of HAPs. The states would not have to exempt any station that contributed to any type of air pollution.
Irvine, California's Ordinance Governing the Manufacture, Distribution, Sale, and Recycling of Products Which Utilize Ozone-Depleting Compounds

This study considered what features of Irvine's ban on Ozone-Depleting Compounds (ODCs) contributed to its cost-effectiveness, what is the best form for a local ODC ordinance, and whether localities should adopt measures to reduce the release of ODCs. It also presents data on the cost of meeting the ban.

Irvine's ban was considered to be cost-effective because it is a performance based standard and it allows exemptions and extensions when warranted. The City worked closely with firms granted extensions to help them determine an approach to eliminating ODCs. Thus firms that had identified a cost-effective means of eliminating ODCs but needed an extra year or two were given the extra time. The performance standard means that no specific method for eliminating ODCs is imposed on the firm. Each firm may use the most cost-effective method given its own circumstances.

Irvine's approach was judged to be superior to alternative approaches. Compared to an inflexible requirement that specifies specific technologies and allows no exemptions, the performance standard and exemptions granted by Irvine result in a much more cost-effective approach. Compared to a product labeling requirement such as passed in Cambridge, Massachusetts, Irvine's approach again is superior. One reason is that because labeling requires that industry keep track of any input to the product, it is as costly to comply with a local labelling requirement as a national one. Because start-up costs are large, for both the firm and the government, a labeling program is best done at the national level, so that the costs can be spread over a larger number of units sold and a single approach to labeling followed.

A final option is to have no local ordinance, but to rely on federal and international laws to deal with ODCs. Even though Irvine's ordinance constitutes, perhaps, the best form for a local ordinance, it was considered that it could be very difficult for a firm to deal separately with numerous jurisdictions in which they may have activities.

Regarding the costs of meeting the ban, different firms had very different experiences. The firms contacted in the study made electronic components. Some approaches they used for complying with the ban had positive effects on the product and some had negative effects. For several firms, the ban
increased their costs of production, but in one case the firm experienced a cost reduction by implementing a new process that did not release ODCs.

4 Ozone Depleting Substances: Non-Essentials

EPA was required by the Clean Air Act Amendments of 1990 to identify and ban non-essential products that released ozone depleting substances. One product EPA identified was halon fire extinguishers. Most of the producers of halon fire extinguishers are small businesses, and all would likely go out of business unless an additional year or two were provided for them to develop a good substitute for halon in their products. This study demonstrates that halon fire extinguishers are not currently non-essential in some categories of use.

Halon is currently the only fire extinguishant that does not require significant clean up after use in order to prevent corrosion of electronic equipment. Other extinguishants may cause damage to electronic equipment in rooms well away from the fire. Until new halon substitutes are developed, halon will be the choice of persons seeking to protect extensive investments in electronic gear.

The economic analysis of halon fire extinguishers shows that the price persons would pay for a halon fire extinguisher equals the expected cost of purchasing an alternative extinguisher plus the expected cost of clean-up. The expected cost of clean-up equals the probability of a fire times the probable cost of cleaning up from the use of the extinguisher and replacing damaged equipment. An increase in either factor will increase the premium persons will pay for halon. Price data shows that the price of a halon unit with a 5BC rating and 2.5 pounds of extinguishant is $33.25 while the same size of multipurpose dry chemical fire extinguisher with a 1A10BC rating is $15.25. This shows that a premium is currently paid by those who purchase halon fire extinguishers. Taxing the halon would reduce the number of persons who would benefit from using it, but would not eliminate them entirely unless the tax were very high.

The alternatives to the ban are no regulation, postponed regulation, and a modified regulation. No ban on halon fire extinguishers is legally possible because the Congress did not specify that halon fire extinguishers must be banned. They are already taxed under another measure and will be phased out by the turn of the century, along with all other ozone depleting substances. Postponing the ban will allow firms to complete research needed to bring alternatives with properties similar to halon fire extinguishers to market.
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Part I

Introduction and Summary
1 Background

This report explores the varied economic effects on small businesses of federal, state and local regulations governing atmospheric emissions. The three elements of this report reflect three stages of work completed in cooperation with SBA.

The first stage, discussed in this introduction, consists of the identification of "industry-regulatory" pairs. This stage includes the identification of a particular regulation, what industries it affects, whether small businesses are likely to be significantly impacted, and whether there is a potential option to alleviate such an impact. Based on these judgements, the regulation was either dropped from the study or subjected to further consideration. The first stage was ongoing as the study team's assessment of these factors continued to change as more information was uncovered.

The second stage of the work was an intensive review of Title V of the U.S. Clean Air Act Amendments of 1990 (CAAA) which detailed the permitting process. Title V will affect every firm in the United States that releases emissions into the atmosphere. Title V and associated topics are discussed briefly in this introduction and the entire memorandum and attachments delivered to SBA are included as an appendix.

The third stage of the work was to focus on specific industry-regulatory pairs. As a result of stages 1 and 2, much information had been collected regarding the potential of regulations to impact industries. Those with the greatest potential to impact small businesses were selected. Part II of this report, "Specific Evidence of the Varied Impacts of Air Emission Regulations on Small Business," consists of individual case studies of industry-regulatory pairs.

2 Stages of Work

2.1 Identification of Industry Regulatory Pairs

Regulations initially considered had one thing in common; they concerned regulatory requirements to reduce atmospheric emissions. They included measures to reduce the emissions contributing to the depletion of the ozone layer growing out of the Montreal Protocol, the possibility of regulations targeting the greenhouse effect, state and local ordinances -- especially from California where regulations concerning atmospheric emissions are more stringent than elsewhere, and regulations from Titles I (criteria air pollutants), II (mobile source emissions), III (hazardous air pollutants), and V
(permits) of the CAAA. While a great many regulations were initially considered, the list was quickly reduced to ten. Industries were then identified that were likely to be affected by each regulation. The industry list was further narrowed by choosing those with significant participation of small businesses (based on the percentage of small businesses in the industry) and those in which small businesses would likely be disadvantaged by the regulation. Further manipulations of the list were based on judgement as to the impact of the regulation on small businesses. Those considered to have only minor impacts were dropped. One version of the list is shown in Table 1.

2.2 Title V: Permits

One aspect of the CAAA that potentially affects all small businesses is Title V. Title V deals with the programs states must develop for providing emission permits to all point sources of air emissions. Although a well designed permit program has the potential to streamline the permit process and ease the implementation of other programs such as emission trading, several aspects of the CAAA led to the possibility that the permit program would instead complicate matters. Potential outcomes harmful to small businesses included the separation of permit programs from State Implementation Plan development leading to duplication of effort by small businesses and possibly more than one set of regulatory requirements, the potential divergence of state and federal permit requirements accompanied by separate state and federal permit programs, onerous requirements for submitting permit applications, and long waits (up to one and a half years) for permit approvals that could stifle industrial flexibility and drain the resources of small business subjected to them.

For these reasons, SBA wished to scrutinize the development of the Title V regulation to be sure that its final form did not unduly harm small businesses. Analysis of Title V indicated that six elements of the rules had the greatest potential to affect small businesses. These are discussed in the Appendix, a memorandum to the SBA. One measure in particular was identified as being especially important to small businesses. The CAAA states that states may develop a general permit for sources that have simple or uniform characteristics and standard procedures for meeting air pollution limits. SBA urged EPA to develop a model general permit program and to vigorously promote it among the states. At the end of the appendix are two examples of what a general permit could look like. The general permit program will greatly reduce the cost and time required to obtain a permit and insulate firms from many of the more contentious issues raised in Title V.
TABLE 1.
Proposed Regulatory-Industry Pairings

<table>
<thead>
<tr>
<th>Item</th>
<th>Regulatory Description (ID #)</th>
<th>Industry (SIC)</th>
</tr>
</thead>
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<td>1.</td>
<td>MACT: Chromium Electroplating (2841)</td>
<td>Electroplating (3471)</td>
</tr>
<tr>
<td>2.</td>
<td>MACT: Dry Cleaning Industry (2360)</td>
<td>Dry Cleaners (7215 &amp; 7216)</td>
</tr>
<tr>
<td>3.</td>
<td>MACT: Stage 1 Gas Marketing (2926)</td>
<td>Gasoline Stations (5541)</td>
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<td>5.</td>
<td>OZONE DEPLETING: Non-Essential (2907)</td>
<td>Specialty Cleaning, Publishing, and Sanitation Preparations (2842)</td>
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<td>6.</td>
<td>OZONE DEPLETING: Product Labels (2906)</td>
<td>Industrial Organic Chemicals NEC (2869)</td>
</tr>
<tr>
<td>7.</td>
<td>OZONE DEPLETING: Auto AC Service (2901)</td>
<td>Auto Repair Shops (7538 &amp; 7539)</td>
</tr>
<tr>
<td>8.</td>
<td>OZONE DEPLETING: Irvine, CA Ban Exemptions</td>
<td>Electronics ()</td>
</tr>
<tr>
<td>9.</td>
<td>SCAQMD Rule 1113</td>
<td>Furniture MFG</td>
</tr>
<tr>
<td>10.</td>
<td>TITLE II: Alternative Fuels</td>
<td>Plumbers, Wholesalers or other fleet operators</td>
</tr>
</tbody>
</table>
2.3 Case Studies

The third element of the project was to examine specific regulatory–industry pairs. It consists of the chapters in Part II. The pairings selected for case studies were those judged to provide information that would provide the greatest impact toward protecting small businesses. For each pairing, a different aspect of regulatory costs is observed.

The discussion in Chapter 1, "Dry Cleaning Industry NESHAPS for PCE and 1,1,1-TCA" considers the selection of the cutoff point for exempting small firms from the regulation. When regulations such as the one considered in Chapter 1 result in reduced use of inputs, there will be a savings for firms with large throughputs.

For Chapter 2, "National Emission Standard for Hazardous Air Pollutants (NESHAP) for Stage 1 Gas Marketing", the issue is again to set limits on exemptions granted to firms. How large a throughput should be exempt and how much additional emissions can be allowed? How can the regulation be targeted on areas with the greatest need for reduced hazardous emissions? In this case, unlike Chapter 1, the recovery of vapors does not lead to a "break-even point".

For Chapter 3, "Irvine, California's Ordinance Governing the manufacture, Distribution, Sale, and Recycling of Products which Utilize Ozone-Depleting Compounds," the issues are whether a municipality is the best level of government for implementation of a measure targeted at a global phenomenon, how exemptions and cooperation between the city and industry can help to alleviate the costs of the measure, and the diversity of costs experienced by individual firms for eliminating the emissions of ozone depleting substances. The range is from an actual savings from the new production system developed at one plant to costs high enough to cause one firm to consider relocation.

The most clearcut case of severe damage done to an industry by a regulation is the ban on halon fire extinguishers as being nonessential discussed in chapter 4, "Ozone Depleting Substances: Nonessentials." Under some versions of the regulation during its development, the regulation would have forced all of the small firms out of the industry (the industry was nearly all small businesses) about a year before their research and development efforts would have produced a substitute. Other substitutes to halon fire extinguishers failed to meet the needs of some users of halon fire extinguishers. The study shows that some of these consumers would be willing to pay a very high price to have the properties that, to date, only halon fire extinguishers offer.
The issues studied point to three broad conclusions. First, there are numerous cases in which regulators will concoct a regulation that damages some small businesses. Usually they will change it once the problems are pointed out. This happened with regard to Title V general permits, and halon fire extinguishers, two regulations in which regulators modified their position when the issues were presented to them. Second, because production requirements differ so greatly from firm to firm, it is difficult to state that regulations governing air quality emissions will necessarily cost industry substantial amounts. There are examples where this is true and where it is not true. A well crafted regulation can bring about substantial emission reductions without unduly harming small businesses. Finally, an attentive watch over the regulators makes a vital difference to small businesses. To the extent that general permits are available to small businesses, SBA’s efforts are to be credited.
Part II

Case Studies
Dry Cleaning Industry NESHAP for PCE and 1,1,1-TCA

1.1 Introduction

Title III of the Clean Air Act, as amended in 1990, lists 189 hazardous air pollutants to be regulated by the EPA. According to the Act, "... the Administrator shall promulgate regulations establishing emission standards for each category or subcategory of major sources and area sources of hazardous air pollutants listed for regulation... Emissions standards promulgated under this subsection and applicable to new or existing sources of hazardous air pollutants shall require the maximum degree of reduction in emissions of the hazardous air pollutants subject to this section (including a prohibition on such emissions, where achievable) that the Administrator, taking into consideration the cost of achieving such emission reduction, and any non-air quality health and environmental impacts and energy requirements, determines is achievable for new or existing sources..." Two of the 189 pollutants listed as hazardous air pollutants in Title III of the Clean Air Act are perchloroethylene (PCE) and 1,1,1-trichloroethane (1,1,1-TCA), two basic solvents used by the dry cleaning industry in the United States. According to the mandate of the Act, the EPA is proposing a NESHAP for the dry cleaning industry to regulate PCE and 1,1,1-TCA. The NESHAP to regulate PCE and 1,1,1-TCA is the subject of this chapter. Following the introduction which provides an overview of the legislation requiring a NESHAP, there is a discussion of alternatives to the proposed regulation, the cost-effectiveness of the proposed regulation, and the cost of the proposed regulation.

Under the Clean Air Act, emission standards for major sources take the form of what is commonly referred to as maximum available control technology (MACT). A major source is defined as a "stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants." Within the category of major sources, MACT standards can differ for new and existing sources. According to the Clean Air Act, as amended in 1990, "The maximum degree of reduction in emissions that is deemed achievable for new sources in a category or subcategory shall not be less stringent than the emission control that is achieved in practice by the best controlled similar source, as determined by the Administrator. Emission standards promulgated under this subsection for existing sources in a category or subcategory may be less stringent than standards for new sources in the same category or subcategory but shall not be less stringent, and may be more stringent than - (A) the average emission limitation achieved by the best performing 12 percent of the existing sources...(B) the average emission limitation achieved by the best performing 5 sources..."
in the category or subcategory of categories or subcategories with fewer than 30 sources." The EPA Administrator is defining "similar source" for major sources based on the type of machine used by a dry cleaning facility.

Under the Clean Air Act, area sources, which are stationary sources of hazardous air pollutants that are not major sources, may be subject to a different emission standard, commonly known as generally available control technology (GACT). With respect to area sources the EPA Administrator "may...elect to promulgate standards or requirements applicable to sources in such categories or subcategories which provide for the use of generally available control technologies or management practices by such sources to reduce emissions of hazardous air pollutants." The decision of whether or not to regulate a particular category or subcategory of area sources depends upon an EPA finding of an adverse impact on health and the environment from the particular category or subcategory of impacts in question. In the case of emissions of hazardous air pollutants from dry cleaners that are area sources, the EPA has determined a finding of adverse impact on health and the environment, and regulation will be proposed for area sources.

The MACT and GACT standards for PCE and 1,1,1-TCA will affect some 29,300 dry cleaning facilities in the United States, 29,000 of which are area sources and 300 of which are major sources. Within the dry cleaning industry, the industrial sector (0.5%) is comprised of only major sources and the coin-operated sector (11.5%) is comprised of only area sources. The commercial sector is comprised of mostly area sources, with approximately one percent of commercial dry cleaners being considered major sources. It has been estimated that the 300 major sources emit 7,400 tons of hazardous air pollutants per year, while the 29,000 area sources emit 86,200 tons of hazardous air pollutants per year.

The basic recommendation for the content of the NESHAP expected from EPA is an equipment standard, because the most easily controlled emissions of PCE and 1,1,1-TCA come from vents on dry cleaning equipment that can be restricted with the proper control equipment. Two basic types of dry cleaning equipment are utilized by the dry cleaning industry: transfer (33% of industry) and dry-to-dry (67% of industry). Transfer equipment includes a separate washer and dryer, while dry-to-dry equipment combines the washer and dryer into one piece of machinery. In addition, there are two types of dry-to-dry machines. The first, vented dry-to-dry machines, vent residual vapors to the air after completing a drying cycle. The second, ventless dry-to-dry machines, vent vapors into the air only when the door is opened for loading and unloading.
The MACT for major sources will require that both new and existing sources are controlled at the 95% level. For vented emissions from transfer units, this would require installation of a carbon adsorber. Carbon adsorbers trap vapors onto activated carbon. The carbon has to be stripped regularly to remove the built up pollutants. It is estimated that such adsorbers can reduce hazardous air pollutant vapors in dryer exhaust by 95%. For vented dry-to-dry units a carbon adsorber or a refrigerated condenser may be installed. A refrigerated condenser chills vapors until they condense and reduces emissions by approximately 95% on dry-to-dry equipment. Major sources can also come into compliance by replacing their equipment with ventless dry-to-dry units.

The GACT for area sources differs depending on the type of dry cleaning equipment. Identical to the MACT for major sources, area sources which use dry-to-dry equipment must control emissions at the 95% level. Accordingly, a carbon adsorber or a refrigerated condenser is required for dry-to-dry equipment. If an area source has transfer equipment that has never been controlled before, the source is required to install a carbon adsorber which will control emissions at the 95% control level. If the area source has transfer equipment that has been controlled with a refrigerated condenser (which only controls emissions at the 85% level), the source is not required to install a carbon adsorber. If an existing area source purchases a reconditioned piece of transfer equipment, that equipment is regulated based on how it was controlled when purchased. If emissions from the reconditioned machinery were captured with a refrigerated condenser, the source is not required to install a carbon adsorber. If a major source purchases a reconditioned piece of transfer equipment that has previously controlled emissions with a refrigerated condenser, the refrigerated condenser must be replaced with a carbon adsorber in order to reach a 95% emission control level.

Additional emissions of PCE and 1,1,1 - TCA by the dry cleaning industry come from fugitive emissions from evaporation during clothing transfer and handling, equipment leaks, solvent transfer, and evaporation of solvent from stored solid wastes. The EPA regulation of these sources of emissions is expected to take the form of a work practice standard. Dry cleaning facilities, major and area sources, will be required to complete weekly inspections of the sources of fugitive emissions that are expected to take approximately 40 to 45 minutes.

In addition to the equipment standard and the fugitive emissions work practice, EPA is considering exempting smaller firms from complying with the standard. The cut-off for the exemption is $100,000 in annual sales or 300 gallons/year in solvent consumption if a facility uses transfer equipment and 220 gallons/year in solvent consumption if a facility uses dry-to-dry equipment.
1.2 Alternatives to the Proposed Regulation

This regulation has been developed with good cooperation between EPA and the dry cleaning industry. The requirements of Title III of the 1990 Clean Air Act Amendments have been achieved with no cost to 60% of dry cleaners because they already use the required equipment, no cost to those with revenue below $100,000 because of their exemption, and as will be shown, savings for those whose reduction in fluid consumption results in savings greater than their equipment cost. For those wishing to keep older equipment in use, the required adsorbers or condensers are much less costly in terms of capital expenditure than purchasing a new un-vented dry-to-dry unit.

1.2.1 Definition of the Alternatives

Title III of the 1990 Clean Air Act requires EPA to establish "...emission standards for each category or subcategory of major sources and area sources of hazardous air pollutants listed for regulation..." The EPA has answered this legislative mandate with the proposed MACT and GACT standards outlined in previous sections of this chapter. A discussion of regulatory alternatives to those which EPA has proposed follows. It is important to note that while the EPA has chosen an equipment standard to define the NESHAP for PCE and 1,1,1 - TCA, any source with alternative controls that meets the emission levels implied by the standard are also in compliance.

1.2.1.1 Alternative A: No Regulation or a 5 year Exemption

The MACT was mandatory for major sources and EPA has made a finding of adverse impact on health and the environment for area sources. There could, however, have been a 5 year exemption for the area sources.

1.2.1.2 Alternative B: Exemptions to Compliance Based on the Size of the Firm

EPA has proposed exemption of sources based on their sales. Smaller sources that have low sales revenues and would therefore be likely to experience financial difficulty in complying with the standard would be exempt. Alternative size standards for sources eligible for the exemption are considered.
1.2.1.3 Alternative C: Require all Dry Cleaners to Install No-vent Dry-to-dry Units with Refrigerated Condensers.

The EPA proposal allows different source types among dry cleaners different ways of meeting the equipment standard. An alternative to that is a uniform requirement that every dry cleaner have the same no-vent dry-to-dry units with refrigerated condensers or meet the emission limit equivalent to that of the ventless dry-to-dry units with refrigerated condensers.

1.2.2 Discussion of the Alternatives

Exemption of small sources is a standard regulatory remedy endorsed by the Regulatory Flexibility Act. Given that smaller dry cleaners are unlikely to operate at an efficient scale and are on the edge of financial solvency, the requirement to install and operate control equipment may put them out of business. The proper size for the exemption is best determined in light of cost data on various sizes of equipment and operating parameters such as number of pounds cleaned per day, and the requirements of the Clean Air Act.

Information provided by the International Fabricare Institute (IFI) and the EPA allows development of a simple version of the costs of controlling emissions from dry cleaning establishments. EPA has prepared a more elaborate cost study, but it is not currently available. The first step in determining the costs of controlling emissions from dry cleaning establishments is to determine the cost factors for dry cleaning equipment and fluid. This is done in Table 1.1, in which the total cost of capital equipment and fluid required to clean 75,000 pounds of clothes is presented for each configuration of dry cleaning equipment. The typical dry cleaner cleans 75,000 pounds of clothes annually, in 40 pound loads. The cost of each type of equipment, and its longevity, were provided by IFI. Ventless dry-to-dry units cost $30,000 and are expected to last 15 years. Standard dry-to-dry units cost $21,000 and last 20 years. The cleaning unit of transfer equipment costs $4,000 and has an estimated longevity of 30 years while the tumbler costs $4,000 and lasts 10 years. A carbon adsorption vent costs $7,000 and is expected to last 15 years. Annualized costs were computed for each of these items using a real cost of the loan of 5 percent for the expected life of the equipment. The capital costs used here are consistent with EPA's January 1991 report on NESHAPs for dry cleaners. The EPA report did not provide information on the longevity of the units or the interest rates used in their studies.
Table 1.1. Cost Factors for Dry Cleaning Equipment and Fluid

<table>
<thead>
<tr>
<th>Equipment Configuration</th>
<th>Annualized Capital Cost</th>
<th>Cost of Fluid/Year</th>
<th>Total Annual Cost</th>
<th>Pounds of Clothes/Year</th>
<th>Use of Fluid per 100 lb of Clothes</th>
<th>Gallons of Fluid per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer Equipment</td>
<td>$778.22</td>
<td>$4,312.50</td>
<td>$5,090.72</td>
<td>75000</td>
<td>11.5</td>
<td>1078</td>
</tr>
<tr>
<td>Transfer + Adsorber</td>
<td>$1,452.62</td>
<td>$2,887.50</td>
<td>$4,340.12</td>
<td>75000</td>
<td>7.7</td>
<td>722</td>
</tr>
<tr>
<td>Vented Dry-to-dry</td>
<td>$1,685.09</td>
<td>$3,037.50</td>
<td>$4,722.59</td>
<td>75000</td>
<td>8.1</td>
<td>759</td>
</tr>
<tr>
<td>Vent. D-D + Adsorber</td>
<td>$2,151.76</td>
<td>$1,933.12</td>
<td>$4,084.89</td>
<td>75000</td>
<td>5.2</td>
<td>483</td>
</tr>
<tr>
<td>Unvented Dry-to-dry</td>
<td>$2,890.27</td>
<td>$1,950.00</td>
<td>$4,840.27</td>
<td>75000</td>
<td>5.2</td>
<td>488</td>
</tr>
</tbody>
</table>
The EPA gives expected reductions in loss of dry cleaning fluid, which according to IFI costs $4.00 per gallon. Including quantities that become solid waste, about 2.5 pounds of fluid per 100 pounds of clothes cleaned, uncontrolled transfer equipment loses 11.5 pounds of fluid per 100 pounds of clothes cleaned. With an adsorber added, the fluid use drops to 7.7 pounds. Vented dry-to-dry machines use 8.1 pounds per 100 pounds of clothes, and vented dry-to-dry machines with an adsorber use 5.2 pounds per 100 pounds of clothes. Switching to a ventless dry-to-dry machine, the total fluid loss is also 5.2 pounds per 100 pounds of clothes.

Table 1.2 develops the average cost per 40 pound load for various levels of activity for the five configurations of dry cleaning equipment shown in Table 1.1: (1) transfer equipment, (2) transfer equipment with a carbon adsorber, (3) vented dry-to-dry, (4) vented dry-to-dry with carbon adsorber or refrigerated condenser and (5) ventless dry-to-dry. According to the draft regulation, configurations (1) and (3) must be upgraded. Configuration (2) is considered a fix for configuration (1), and configuration (4) is a fix for configuration (3). Configuration (5) and is a fix for either (1) or (3). Table 1.2 also shows the difference in cost per 40 pound load between configurations (1) and (2), (1) and (5), (3) and (4), and (3) and (5).

Table 1.2 is illustrated by Figure 1.1. For either remedy, the fix for uncontrolled transfer equipment reduces costs for average sized (75,000 pounds annually) and larger dry cleaners. For configuration 2 in which emissions are vented through a carbon adsorber and partially recovered, the breakeven point, the point at which it becomes more expensive to install control equipment in $ per 40 pound load, is at around 40,000 pounds of clothes cleaned annually. At the $3.00 per pound charge to customers estimated by IFI, this would be equal to an annual revenue of $120,000. If an operator of transfer equipment were to replace his equipment with ventless dry-to-dry units, he would breakeven if he cleaned an average amount of clothes, around 75,000 pounds, annually. The revenue for this level of activity is $225,000 per year. Figure 1.2 also illustrates Table 1.2. Here the average cost per load for a vented dry-to-dry machine is compared to the average cost per load of a vented dry-to-dry machine with control and to the average cost per load of a ventless dry-to-dry machine. The breakeven point between the vented dry-to-dry machine and the vented dry-to-dry machine with control is at 37,500 pounds of clothes per year, which corresponds to a revenue of $112,500. The breakeven point when comparing the vented dry-to-dry machine configuration to the ventless dry-to-dry configuration occurs at about 85,000 pounds of clothes cleaned per year, or $255,000.

Figures 1.1 and 1.2 show how exemptions can be set. Given the data and assumptions on which these figures were based, a dry cleaner cleaning 75,000 pounds of clothes annually would need no
Table 1.2. Cost per 40 pound load for various configurations of dry cleaning equipment.

<table>
<thead>
<tr>
<th>Pounds of Equipment Clothes/yr</th>
<th>Transfer (1)</th>
<th>T. E. w/ Adsorber (2)</th>
<th>Vented Dry-to-dry (3)</th>
<th>Vent. D-D w/ control (4)</th>
<th>Unvented Dry-to-dry (5)</th>
<th>Control Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>131,250</td>
<td>$2.54</td>
<td>$1.98</td>
<td>$2.13</td>
<td>$1.69</td>
<td>$1.92</td>
<td>($0.55)</td>
</tr>
<tr>
<td>112,500</td>
<td>$2.58</td>
<td>$2.06</td>
<td>$2.22</td>
<td>$1.80</td>
<td>$2.07</td>
<td>($0.52)</td>
</tr>
<tr>
<td>93,750</td>
<td>$2.63</td>
<td>$2.16</td>
<td>$2.34</td>
<td>$1.95</td>
<td>$2.27</td>
<td>($0.47)</td>
</tr>
<tr>
<td>75,000</td>
<td>$2.72</td>
<td>$2.31</td>
<td>$2.52</td>
<td>$2.18</td>
<td>$2.58</td>
<td>($0.40)</td>
</tr>
<tr>
<td>56,250</td>
<td>$2.85</td>
<td>$2.57</td>
<td>$2.82</td>
<td>$2.56</td>
<td>$3.10</td>
<td>($0.28)</td>
</tr>
<tr>
<td>37,500</td>
<td>$3.13</td>
<td>$3.09</td>
<td>$3.42</td>
<td>$3.33</td>
<td>$4.12</td>
<td>($0.04)</td>
</tr>
<tr>
<td>18,750</td>
<td>$3.96</td>
<td>$4.64</td>
<td>$5.21</td>
<td>$5.62</td>
<td>$7.21</td>
<td>$0.68</td>
</tr>
</tbody>
</table>

Note: The control options are in parentheses.
Fig. 1.1 Cost Differences in Options for Controlling Transfer Units

Additional Cost per 40 lb. Load

Pounds of Clothes Cleaned Annually (Thousands)

- Add Adsorber
- Go to Dry-to-dry

Breakeven point for adsorber
Breakeven point for dry-to-dry
Fig. 1.2 Cost Differences in Options for Controlling Vented Dry-to-dry Units

- Breakeven point for ventless
- Breakeven point for control

Pounds of Clothes Cleaned Annually (Thousands)

Additional Cost per 40 lb. Load

- Add Control
- Switch to Ventless
exemption. Indeed, he would have either reduced his costs or nearly broken even in any case. Setting the size standard for an exemption a little below 70,000 pounds of clothes cleaned annually would serve well if a single exemption standard were desired. However, firms using transfer equipment would not need such a large size standard for their exemption. If they operate a low volume facility, they would reduce their annualized costs with a size standard set anywhere over 40,000 pounds or $120,000 of annual business by adding an adsorber and anywhere over 70,000 pounds or $210,000 switching to dry-to-dry. If their annual cleaning amounted to over 100,000 pounds or $300,000 revenue, they would be better off with ventless dry-to-dry than adding a carbon adsorber.

A second alternative is to delay the regulation of area sources for five years. This can be done if there is a finding that area sources cause no adverse impact on health and the environment. Since approximately 99% of dry cleaners are area sources, however, it is unlikely that a finding of no adverse impact on health and the environment is supportable.

A third alternative, requiring a uniform equipment standard for all commercial dry cleaners regardless of what equipment they currently operate, is consistent with including all dry cleaners in a single category. Such an approach has the potential to negatively impact sources operating older equipment that is still able to provide good service. But if this alternative were combined with a high size standard for an exemption, the cost per pound of dry cleaning would be sufficiently low to make this a viable alternative. Without such an exemption, this alternative would have severe impact on many small dry cleaners. Figures 1.1 and 1.2 show that if a single equipment standard were desired, the size standard that would protect smaller sources is about 75,000 pounds or $225,000.

1.3 Cost-Effectiveness of the Proposed Regulation

Cost-effectiveness is a measure of the efficiency of a regulation. The cost-effectiveness of the proposed NESHAP for dry cleaners, which in this case is a measure of the cost per pound of fluid saved, is developed in Table 1.3. Information on the annual costs of control options was compiled from Table 1.2, and reductions in fluid used were determined using EPA's estimations of expected fluid loss for each type of equipment configuration. For dry cleaners with transfer equipment, the most cost-effective option is to add a carbon adsorber to the transfer equipment they already own. Consequently, the proposed regulation is more cost-effective than regulation mandating that dry cleaners with uncontrolled transfer equipment switch to ventless dry-to-dry equipment. Similarly, for dry cleaners with dry-to-dry equipment, the most cost-effective option is to control the dry-to-dry equipment they already own rather than switching to ventless dry-to-dry equipment. The
Table 1.3 Cost-Effectiveness ratios for various configurations and activity levels, per 40 pound load.

<table>
<thead>
<tr>
<th>Pounds of Clothes/yr</th>
<th>Annual Costs of Control Options</th>
<th>Reductions in Fluid Use in pounds</th>
<th>Cost per pound of fluid saved</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(2)-(1)</td>
<td>(5)-(1)</td>
<td>(4)-(3)</td>
</tr>
<tr>
<td>121,250</td>
<td>($1,819.35)</td>
<td>($2,022.33)</td>
<td>($1,465.99)</td>
</tr>
<tr>
<td>117,500</td>
<td>($1,481.10)</td>
<td>($1,431.71)</td>
<td>($1,189.90)</td>
</tr>
<tr>
<td>137,750</td>
<td>($1,196.85)</td>
<td>($841.98)</td>
<td>($913.80)</td>
</tr>
<tr>
<td>135,000</td>
<td>($750.60)</td>
<td>($250.46)</td>
<td>($653.71)</td>
</tr>
<tr>
<td>56,250</td>
<td>($394.35)</td>
<td>($340.17)</td>
<td>($301.61)</td>
</tr>
<tr>
<td>37,500</td>
<td>($281.10)</td>
<td>($930.76)</td>
<td>($85.52)</td>
</tr>
<tr>
<td>18,750</td>
<td>($318.15)</td>
<td>($1,521.42)</td>
<td>($190.57)</td>
</tr>
</tbody>
</table>
proposed regulation is therefore more cost-effective than regulation mandating that all dry cleaners switch to ventless dry-to-dry equipment. It should be noted that for the average sized dry cleaner (75,000 pounds of clothes/yr.), three of the four control options have a negative cost-effectiveness indicating savings, not costs per pound of fluid saved. Only switching to ventless dry-to-dry equipment from vented dry-to-dry equipment has a positive cost per pound of fluid saved, $0.05/pound.

1.4 Costs of the Proposed Regulation

The total cost to the dry cleaning industry of the proposed regulation can be determined although many small firms will be exempt from the regulation and many large firms will experience savings by changing their dry cleaning equipment. These two factors do, however, make it impossible to determine the total cost to the dry cleaning industry by multiplying the cost of the regulation to a typical firm by the number of firms. Such a calculation would lead to a very much larger total than would in fact be true. An appropriate calculation of the cost of the regulation to commercial dry cleaners is shown in Table 1.7 and is developed in Tables 1.4-1.6.

The number of dry cleaners by equipment size and type was first determined. The estimated figures, shown in Table 1.4, were compiled from an EPA report using a $100,000 annual sales exemption cutoff and the breakeven points of Figures 1.1 and 1.2. Table 1.5 presents the percentage of the dry cleaners, categorized by equipment and type, which need to change their dry cleaning equipment. The table shows that 40% of all categories of commercial dry cleaners will need to change their equipment or add control equipment. Again, this information, was determined using the EPA report. Finally, the cost to a typical firm by size and type was determined so that it could be aggregated. A cost of zero was assigned to all firms which fell under the exemption. For the dry cleaning firms over the size standard and under the breakeven point that operate with transfer equipment, the cost of $41.12 was determined by the annual cost of switching from uncontrolled transfer equipment to controlled transfer equipment for a dry cleaner which washes approximately 33,333 pounds of clothes a year, or has annual sales of $999,999. This number was found by interpolating between the costs/savings of switching from uncontrolled to controlled transfer equipment given in Table I.3 for dry cleaners who wash 18,750 and 37,500 pounds of clothes per year. For the dry cleaning firms over the size standard and under the breakeven point that operate with dry-to-dry equipment, the cost was

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Table 1.4: Number of commercial dry cleaners by equipment type and size.

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Less than cutoff</th>
<th>In between</th>
<th>Greater than break even</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer</td>
<td>2685</td>
<td>435</td>
<td>4130</td>
<td>7250</td>
</tr>
<tr>
<td>Dry-to-dry</td>
<td>7112</td>
<td>1152</td>
<td>10936</td>
<td>19200</td>
</tr>
<tr>
<td>Total</td>
<td>9797</td>
<td>1587</td>
<td>15066</td>
<td>26450</td>
</tr>
</tbody>
</table>
Table 1.5 Percent of commercial dry cleaners needing control by size and equipment type.

<table>
<thead>
<tr>
<th>Type of Equipment</th>
<th>Less than cutoff</th>
<th>In between</th>
<th>Greater than break even</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>Dry-to-dry</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
</tbody>
</table>
Table 1.6 Cost of regulation for typical commercial dry cleaners.

<table>
<thead>
<tr>
<th>Type of Equipment</th>
<th>Less than cutoff</th>
<th>In between</th>
<th>Greater than break even</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer</td>
<td>$0.00</td>
<td>$41.12</td>
<td>($1,106.85)</td>
</tr>
<tr>
<td>Dry-to-dry</td>
<td>$0.00</td>
<td>$50.00</td>
<td>($913.80)</td>
</tr>
</tbody>
</table>
Table 1.7 Total cost of regulation for commercial dry cleaners.

<table>
<thead>
<tr>
<th>Type ofEquipment</th>
<th>Less than cutoff</th>
<th>In between</th>
<th>Greater than break even</th>
<th>Total for Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer</td>
<td>$0</td>
<td>$7,155</td>
<td>($1,828,346)</td>
<td>($1,821,191)</td>
</tr>
<tr>
<td>Dry-to-dry</td>
<td>$0</td>
<td>$23,040</td>
<td>($3,997,453)</td>
<td>($3,974,413)</td>
</tr>
<tr>
<td>Total for Size</td>
<td>$0</td>
<td>$30,195</td>
<td>($5,825,798)</td>
<td>Grand Total</td>
</tr>
</tbody>
</table>
<pre><code>                                                      |             |             |                          | ($5,795,604)   |
</code></pre>
assumed to be $50. For the dry cleaning firms over the breakeven points, the cost used was the annual savings estimated to accrue to firms switching from uncontrolled equipment to controlled equipment and washing 93,750 pounds of clothes annually in Table 1.3, the first points on the graphs after the breakeven points. Costs and savings accruing to dry cleaners switching from uncontrolled to controlled equipment were used, because they are the most cost-effective control options.

The typical costs for each category were then multiplied by the number of firms, categorized by equipment and type. These results were then multiplied by the fraction of firms not in compliance (40 percent) shown in Table 1.5 to determine the total costs to industry, by category, of complying with the proposed regulation. This analysis is shown in Table 1.7. For firms operating above the breakeven point, the numbers of firms were multiplied by the typical savings for firms operating with transfer and firms operating with dry-to-dry equipment. Again, this result was multiplied by the fraction of firms not in compliance. Savings and costs were then added across categories to determine the total cost for industries by equipment type. For commercial dry cleaners with either transfer or dry-to-dry equipment, the proposed regulation results in a net savings to the industry. Finally, a grand total cost of the proposed regulation of commercial dry cleaners was given by adding the costs (savings) to the commercial dry cleaners by equipment type. The table shows a grand total savings to commercial dry cleaners of almost $6 million per year resulting from the proposed regulation.

1.5 Concluding Remarks

Due to the reduction in fluid usage attributable to compliance with EPA equipment standards, and the size standards for exemptions, this regulation will have very little financial impact on dry cleaners. Dry cleaning firms with small output would have experienced high compliance costs on a per load basis were they not exempted. Firms with high output will experience savings. Only firms with outputs between the exemption level and the breakeven level will have increased costs of business due to the regulation. The highest of these costs will be $0.25 per load, as can be seen in Figures 1.1 and 1.2. It can be asked why, given that so many dry cleaners would benefit from controlling emissions and thereby saving fluid, do they not establish controls in the absence of regulation. The major reasons are three. First, it takes a few years for the savings on fluid to equal the cost of installing the new equipment. A dry cleaner might not realized that these savings exist. Second, banks might not be willing to finance the controls for some of the dry cleaners, or the dry cleaner may be reluctant to take out financing. And finally, inertia is a major aspect of human nature. There are many examples of environmentally protective actions that also save money but are not immediately adopted by the public.
Title III of the Clean Air Act, as amended in 1990, lists 189 hazardous air pollutants to be regulated by the EPA. According to the Act, "... the Administrator [of the EPA] shall promulgate regulations establishing emission standards for each category or subcategory of major sources and area sources of hazardous air pollutants listed for regulation... Emissions standards promulgated under this subsection and applicable to new or existing sources of hazardous air pollutants shall require the maximum degree of reduction in emissions of the hazardous air pollutants subject to this section (including a prohibition on such emissions, where achievable) that the Administrator, taking into consideration the cost of achieving such emission reduction, and any non-air quality health and environmental impacts and energy requirements, determines is achievable for new or existing sources..." The EPA is planning to regulate the Stage I operations of gasoline stations -- the filling of underground storage tanks, as a category of sources under this Title III regulation. Five to ten percent of the vapors released during the filling of underground storage tanks are composed of at least one of the following twelve of the 189 hazardous air pollutants listed in Title III: methyl tert butyl ether, naphthalene, hexane, toluene, benzene, isocatane, ethylbenzene, naphthalene, cumene, o-xylene, m-xylene, and p-xylene.

The Stage I operations at a gasoline station consist of gasoline being loaded by gravity into underground storage tanks via a flexible hose. The liquid gasoline displaces a nearly equal volume of partially saturated gasoline vapors which, without recovery, are vented to the atmosphere. The contemplated Title III regulation will decrease the emissions that result from the filling of underground storage tanks at service stations through the use of a vapor recovery system. Instead of being vented to the atmosphere, the gasoline vapors are transferred into the tank truck unloading at the service station, and ultimately to a bulk terminal vapor processor for recovery or destruction. The transfer of the liquid gasoline creates a slight pressure in the storage tanks and a slight vacuum in the truck compartment. These pressure differences effectively cause the transfer of displaced vapor to the transport truck.

This chapter discusses the proposed Stage I regulation of gasoline stations under Title III, presents the two regulatory alternatives being considered by EPA, proposes an additional alternative, and examines the emission reductions, costs, cost-effectiveness, and small gasoline station impacts of these
alternative Stage I regulations. The chapter concludes that gasoline stations with a throughput of less than 10,000 gallons of gasoline a month should be exempt from Stage I NESHAP regulation and that some gasoline stations in the 10,000 to 25,000 gallon/month range also should be exempted at the discretion of local authorities. Although no specific cut-off for cost-effectiveness ratios identifies which gasoline stations should be exempted, the recommended alternative would bring the cost-effectiveness of the overall regulation in line with the cost-effectiveness ratios of a fairly large service station. It will also be argued that these additional exemptions do not affect ambient air quality in areas where there are either substantial quantities of other pollutants or large populations. Hence, the risk to the overall population or to individuals is not significantly increased by choosing this alternative.

2.2 Background

2.2.1 Current Regulation

The Stage I operations of some gasoline stations are currently regulated under Title I of the Clean Air Act. Control techniques guideline (CTG) documents were prepared for service station Stage I operations in 1975. The CTG documents outline what EPA defines as reasonably available control technology (RACT) for existing sources. States with nonattainment areas for ozone are required to adopt regulations consistent with the CTG recommendations to provide for attainment of the ambient standards. It is not required that the regulation apply statewide. It is only required that the regulation apply to the ozone nonattainment area. Still, some states have adopted the regulations statewide. Currently, approximately forty-nine percent of the total throughput of gasoline at service stations in the United States comes under this control.

2.2.2 Proposed Regulation

A National Emission Standard for Hazardous Air Pollutants (NESHAP), prepared under Title III of the Clean Air Act for Stage I sources of hazardous air pollutants, will extend regulation to gasoline stations not affected by Title I. Under Title III, emission standards for sources differ based on two criteria: the amount of hazardous pollutants emitted by the source and the age of the source. To differentiate sources by the amount of hazardous pollutants they emit, the EPA distinguishes a source as either a major source or an area source. A major source is defined as a "stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year of or more of any hazardous
air pollutant or 25 tons per year or more of any combination of hazardous air pollutants." An area source is defined as a source of hazardous air pollutants that is not a major source. Major sources and area sources, at the discretion of the EPA administrator, may be regulated differently. Area sources may be regulated less stringently, with emissions standards commonly known as generally available control technologies (GACTs). Emissions standards for major sources are commonly called maximum available control technology (MACT).

Sources may also be regulated differently, at the discretion of the EPA administrator, based on whether they are new or existing sources. New sources face the maximum degree of reduction in emissions that is deemed achievable. Achievability is based on the emission control achieved in practice by the best controlled source similar to the new source. Emission standards for existing sources in a category may be less stringent than standards for new sources although they cannot be less stringent than the average emission limitation achieved by the best performing twelve percent of the existing sources.¹

Gasoline stations are area sources. They may then, at the discretion of the EPA administrator, be regulated with "generally available control technologies or management practices." Additionally, existing gasoline stations may, at the discretion of the EPA administrator, be regulated less stringently than new gasoline stations. There are special circumstances in the case of the NESHAP for Stage I gasoline stations, however, that make these distinctions partially immaterial.

One special circumstance is that equipment is necessary to control vapor emissions from Stage I sources, and vapor recovery equipment does not come in varying degrees of efficiency. All vapor recovery equipment is efficient at reducing emissions by approximately ninety-five percent. In order to control Stage I vapor emissions, an equipment standard, whether it is called a MACT or a GACT standard, would require exactly the same vapor recovery equipment. Additionally, existing sources cannot be regulated less stringently than new sources by requiring less expensive or less efficient equipment. The only way a GACT standard can be less rigorous than a MACT standard or a standard for existing sources can be less rigorous than a standard for new sources, then, is through exemptions.

Since a draft of the proposed regulation is not yet released and the proposed regulation is not scheduled to be released until November of 1993, the form of the Stage I NESHAP for gasoline

¹This applies to source categories with 30 or more sources and thus applies to gasoline marketers. Categories or subcategories of sources with less than 30 sources are regulated differently.
stations is not known with certainty. However, the preliminary draft of the background information document (November, 1991) for the regulation, titled *Gasoline Marketing Industry (Stage I) - Background Information for Proposed Standards*, can be used to infer what the policy will look like. According to the preliminary draft, the NESHAP will take the form of an equipment standard like that espoused in the CTG document. Recommended controls in the CTG document are submerged fill of storage tanks, vapor balance between truck and tank, and a leak free truck and vapor transfer system.

In addition, the preliminary draft defines the average emission limitation achieved by the best performing twelve percent of the existing sources (the floor for differentiating between new and existing sources). According to the draft, in states with ozone nonattainment areas where the CTG documents apply, the states either require all stations to install Stage I vapor recovery equipment or require all stations except those with a throughput of less than 10,000 gallons/month (38,000 liters/month) to install Stage I vapor recovery equipment. Furthermore, according to the draft thirty-five percent of the throughput of gasoline in the U.S. and forty-two percent of the gasoline stations in the U.S. are required to have Stage I vapor recovery in a regulatory atmosphere where there are no exemptions for size. The EPA maintains then that over twelve percent of the gasoline stations in the U.S. are achieving Stage I vapor recovery at a ninety-five percent efficiency with no exemptions based on throughput/month. Since over twelve percent of existing sources are achieving what is currently the maximum achievable reduction in Stage I vapor emissions, it can be inferred that new and existing sources will not be treated differently by this regulation.

Furthermore, the draft document outlines two forms the Stage I vapor recovery regulation for service stations may take. Regulatory Alternative 1 would spread the controls in the CTG document nationwide. Regulatory Alternative 2 is less stringent. Since service stations are area sources they can be regulated less stringently. Regulatory Alternative 2 would spread the controls in the CTG nationwide but exempt service stations with a throughput of 10,000 gallons/month (38,000 liters/month) from the regulation. The 10,000 gallons/month exemption criteria is based on the relatively higher costs of control for small facilities and existing size cutoffs under State and local regulations. The two alternatives discussed by the EPA are presented below.

---

2 There are several other types of exemptions in some states. Some states exempt facilities based on storage tank size which exempts most agricultural accounts. Other regulations specifically exempt agricultural dispensing facilities.
2.3 Regulatory Alternatives

The EPA has outlined the two alternative Stage I NESHAP regulations it is considering. They are presented below as Alternative 1 and 2. A third alternative is also presented and discussed in order to examine the reasonableness of the EPA's alternatives.

2.3.1 Alternative 1. Extension of CTG Controls Nationwide

A NESHAP would require that all gasoline stations install Stage I vapor recovery equipment, utilize submerged filling of storage tanks, and assure leak free truck and vapor transfer systems. The vapor recovery system would have to have an efficiency of at least ninety-five percent.

2.3.2 Alternative 2. Extension of CTG Controls Nationwide With an Exemption for Service Stations With a Throughput of Less Than 10,000 Gallons/Month

A NESHAP would require that gasoline stations with a monthly throughput of greater than 10,000 gallons per month install Stage I vapor recovery equipment, utilize submerged filling of storage tanks, and assure leak free truck and vapor transfer systems. The vapor recovery system would have to have an efficiency of at least ninety-five percent. Approximately one-half of the states in the United States already require Stage I vapor recovery with an efficiency of at least ninety-five percent as part of their State Implementation Plans. In approximately thirty-two percent of these SIPS, gasoline stations which sell less than 10,000 gallons of gasoline per month are exempt. This exemption may be adopted by the EPA for the gasoline marketing NESHAP.

2.3.3 Alternative 3. Extension of CTG Controls Nationwide With an Exemption for Service Stations With a Throughput of Less Than 10,000 Gallons/Month and a Local Option to Exempt Stations With a Throughput of Less Than 25,000 Gallons/Month

In the following, the rationale for generating alternative approaches to setting exemption levels for Stage I is presented. Based on the discussion, a third alternative is devised.

The purpose of Title III of the 1990 Clean Air Act Amendments is to reduce the risk to the population of getting cancer or other diseases from sources in the regulated source categories. The risk generated by any source category depends not only on the quantity of toxic emissions it releases, but also on the toxicity of the emissions, the number of sources in the category contributing to local ambient...
concentrations, and the size of the population exposed to the ambient concentrations. These factors are determined locally. For the same sized plant with similar throughput, there will be a different cost per statistical life saved at each location. Statistical lives saved are computed by dividing the cost of control by the expected reduction in statistical lives lost.3

For a given size of model plant, the highest risk associated with exempting the plant from control will be experienced in a highly populated region that also has a large number of sources in that size category. This occurs in urbanized areas. Moving progressively to regions with smaller populations, the number of service stations can be expected to decline roughly in proportion to the population. Both the concentration of emissions from service stations and the population exposed to the emissions decline simultaneously. In rural areas near interstate highways, however, service stations tend to be larger to accommodate interstate automobile and truck traffic. Very small gas stations will be located away from the highway and will be isolated from other sources. They will be small because demand for their services is low. Hence there will not likely be another service station nearby.

In numerous regions Stage I controls have already been mandated because of Title I issues. These regions include the most densely populated regions where toxic emissions from a service station will affect large numbers of people. Title III will only impact the other, less populated regions, where the risks associated with any particular level of emissions are lower and where there are likely to be fewer other emission sources.

These observations have three implications for setting the exemption level. First, in terms of comparing the cost per statistical life of the control measure, because the risks are lower in the less populated areas, the cost per statistical life saved there will be higher than for more populated areas for any given control strategy. As less densely concentrated areas are considered, the appropriate size cutoff for an exemption will tend to increase. Second, the service stations most likely to benefit from a size exemption will be in rural areas. And third, local considerations should be given some weight in setting the exemption level.

Stations with sufficient emissions to cause, by themselves, significant risk under normally occurring meteorological conditions should be controlled. Stations with smaller emissions should be controlled if they, in conjunction with nearby sources, contribute to significant risk and their cost per unit of

3A statistical life saved or lost is based on epidemiological studies in which the probability that a person exposed to a toxic substance will suffer a health effect due to exposure is determined.
emission reduction is in a reasonable range. As will be seen below, the smallest sources have such high costs per unit of emission reduction that they should be controlled only in the most extreme circumstances.

Based on this discussion, the third alternative is to exempt service stations with throughputs of less than 10,000 gallons per month and to allow states to determine, for each region of the state, whether service stations with throughputs of 10,000 to 25,000 gallons per month should likewise be exempted.

2.4 Cost of the Regulation

Table x.1 presents three different estimates of the annual cost to an existing gas station of installing Stage I vapor recovery equipment. Cost data for the first two estimates was received from Robert Renkes, the Executive Vice President of the Petroleum Equipment Institute (PEI), a trade association whose members are makers and distributors of equipment used in service stations, bulk plants, and other marketing facilities. Mr. Renkes conducted a survey of four members of his association who are involved in installing underground storage tanks and vapor recovery systems. EPA cost data was obtained from the preliminary draft of *Gasoline Marketing Industry (Stage I) - Background Information for Proposed Standards*, November 1991.

There are two types of vapor recovery equipment: coaxial and two point. A coaxial system requires only one hole in the underground storage tank, whereas the two point system requires two. The coaxial recovery system is less expensive for the service station owner, but more expensive for the truck operator than the two point system because the truck company has to purchase equipment compatible to a coaxial adaptor. The two point system is more expensive for the service station owner and less expensive for the truck operator than the coaxial system. It is expected that the proposed NESHAP for gasoline stations will be flexible and allow the use of either type of equipment as both types of equipment are effective at reducing vapors by approximately ninety-five percent. EPA cost figures given in Table x.1 are an average of coaxial and two point costs.

Total initial costs in Table x.1 were annualized for 15 years, the expected life of the equipment, using a real interest rate of ten percent. Then the annualized total initial cost was added to the annual maintenance cost to determine the annual cost of installing and maintaining Stage I vapor recovery equipment per gasoline station. PEI's estimates of annual cost are greater than EPA's estimates. Our capital costs, coaxial or two-point, are approximately one-third of EPA's capital costs.- A breakdown of EPA's capital costs are not presented in preliminary draft background information document so
Table 2.1 Costs to Retrofit Service Stations With Stage I Vapor Recovery Equipment (1991 dollars) (a)

<table>
<thead>
<tr>
<th></th>
<th>Capital Cost</th>
<th>Installation Cost</th>
<th>Total Initial Cost</th>
<th>Annualized Total Initial Cost (b)</th>
<th>Annual Maintenance Cost</th>
<th>Annual Cost of Installing &amp; Maintaining Stage I per station (c)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coaxial</td>
<td>$1,233</td>
<td>$300</td>
<td>$1,533</td>
<td>$202</td>
<td>$810</td>
<td>$1,011</td>
</tr>
<tr>
<td>Two point</td>
<td>$1,587</td>
<td>$300</td>
<td>$1,887</td>
<td>$248</td>
<td>$810</td>
<td>$1,058</td>
</tr>
<tr>
<td>EPA (d)</td>
<td>$4,640</td>
<td>included in capital cost</td>
<td>$4,640</td>
<td>$607</td>
<td>$324</td>
<td>$931</td>
</tr>
</tbody>
</table>

(a) EPA values were originally in 1990 dollars. They were inflated to 1991 dollars using an inflation rate of 2.88%.
(b) A real interest rate of 10% is used over a period of 15 years, the expected lifetime of the equipment.
(c) In our calculations, we considered each gas station to have three underground storage tanks. The EPA does not define the number of storage tanks they considered each facility to have. They do state that the number of underground storage tanks do not vary considerably with throughput.
(d) The EPA figures are for an average of coaxial and two point costs.

Source for EPA data: Table 7-13 in the EPA's preliminary draft of "Gasoline Marketing Industry (Stage I) - Background Information for Proposed Standards," November, 1991.
it is not possible to examine where the capital costs differ. PEI's maintenance costs are a little more than one-third of EPA's maintenance cost. Again, a breakdown of EPA's maintenance costs are not provided in the preliminary draft background information document so it is not possible to examine where PEI and EPA maintenance costs differ. When final annual costs to a gas station of installing Stage I vapor recovery equipment are determined, PEI and EPA figures do not differ greatly. The largest difference is approximately $127.

To calculate the costs, VOC removals, and HAP removals for alternative scenarios, the costs and the emission reductions of VOC and HAP emissions must be broken down by service station size. It is standard practice for EPA to define distinct size models within an industry facing regulation so that the differential impacts of the regulation on facilities of various sizes can be measured. The models used here are those determined by EPA in the preliminary draft of Gasoline Marketing Industry (Stage I) - Background Information for Proposed Standards, November, 1991.

There are six sizes of model plants based on throughput measured in gallons per month. Model plant 1 is defined as a service station with throughput ranging from zero to five thousand gallons per month. For model plant 2 the range is from five thousand to ten thousand gallons per month. Model plant 3 ranges from ten thousand to twenty-five thousand gallons per month; model plant 4, from twenty-five thousand to fifty thousand; model plant 5, from fifty thousand to one hundred thousand; and model plant 6 has throughput of over one hundred thousand gallons per month.

In Table x.2 annual measures of cost of vapor recovery and average gasoline throughput are presented for each model plant size. With vapor recovery, the reductions of both HAPs and VOCs are calculated for individual model plants. Although there is some variation in the HAP and VOC emissions from a gallon of throughput from various gasoline blends, and local environments, a single factor is used in each calculation. The factors used are the same as those used by EPA. Table x.2 shows emission removals for each model plant given 95 per cent removal efficiency. The annualized costs for the six model plants are an identical $1,034.50, based on the PEI survey and reflecting the assumption that nearly all gasoline stations have three tanks, one for each blend of gasoline marketed. Finally the cost-effectiveness ratio for each model plant is shown. As can be seen, the cost per unit of HAP emissions removed from the smaller model plant ($78,868 $/Mg) is very much higher than the cost of removing a unit of HAP from the largest model plant ($853 $/Mg).

Table x.3 presents information on the cost-effectiveness of the three alternative Stage I regulations described above. The number of facilities needing control are computed using data from the
Table 2.2 Emission Reductions, Costs and Cost-Effectiveness Ratios for Six Model Plants

<table>
<thead>
<tr>
<th>Model Plant #</th>
<th>Monthly Throughput Range (gal/mo)</th>
<th>Average Annual Throughput (gal/yr)</th>
<th>Total Number of Sources</th>
<th>95% REMOVAL</th>
<th>Plant Annual Cost ($/yr)</th>
<th>VOCs</th>
<th>HAPs</th>
<th>Cost-Effectiveness Ratio ($/Mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0-5</td>
<td>24,000</td>
<td>191,450</td>
<td>0.12</td>
<td>1034.5</td>
<td>8.675</td>
<td>78,868</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>5-10</td>
<td>72,000</td>
<td>35,500</td>
<td>0.36</td>
<td>1034.5</td>
<td>2.892</td>
<td>26,289</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>10-25</td>
<td>240,000</td>
<td>52,700</td>
<td>1.19</td>
<td>1034.5</td>
<td>868</td>
<td>7,887</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>25-50</td>
<td>420,000</td>
<td>50,800</td>
<td>2.09</td>
<td>1034.5</td>
<td>496</td>
<td>4,507</td>
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<tr>
<td>5</td>
<td>50-100</td>
<td>780,000</td>
<td>36,300</td>
<td>3.88</td>
<td>1034.5</td>
<td>267</td>
<td>2,427</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>100+</td>
<td>2,220,000</td>
<td>20,900</td>
<td>11.03</td>
<td>1034.5</td>
<td>94</td>
<td>853</td>
<td></td>
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</table>
### Table 2.3 Cost-Effectiveness Ratios for Three Alternative Regulations

<table>
<thead>
<tr>
<th>ALTERNATIVE 1</th>
<th>Number of Sources Affected by Alternative 1</th>
<th>Annual Aggregate Cost ($/yr)</th>
<th>AGGREGATE REDUCTIONS (Mg/yr)</th>
<th>COST-EFFECTIVENESS RATIO ($/Mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Plant #</td>
<td></td>
<td></td>
<td>HAPs</td>
<td>VOCs</td>
</tr>
<tr>
<td>1</td>
<td>124,443</td>
<td>128,735,766</td>
<td>1,632</td>
<td>14,839</td>
</tr>
<tr>
<td>2</td>
<td>23,075</td>
<td>23,871,088</td>
<td>908</td>
<td>8,255</td>
</tr>
<tr>
<td>3</td>
<td>16,864</td>
<td>17,445,808</td>
<td>2,212</td>
<td>20,109</td>
</tr>
<tr>
<td>4</td>
<td>16,256</td>
<td>16,816,832</td>
<td>3,731</td>
<td>33,923</td>
</tr>
<tr>
<td>5</td>
<td>11,616</td>
<td>12,016,752</td>
<td>4,952</td>
<td>45,017</td>
</tr>
<tr>
<td>6</td>
<td>6,688</td>
<td>6,918,736</td>
<td>8,115</td>
<td>73,769</td>
</tr>
<tr>
<td>Total</td>
<td>198,942</td>
<td>205,804,982</td>
<td>21,550</td>
<td>195,912</td>
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<table>
<thead>
<tr>
<th>ALTERNATIVE 2</th>
<th>Number of Sources Affected by Alternative 1</th>
<th>Annual Aggregate Cost ($/yr)</th>
<th>AGGREGATE REDUCTIONS (Mg/yr)</th>
<th>COST-EFFECTIVENESS RATIO ($/Mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Plant #</td>
<td></td>
<td></td>
<td>HAPs</td>
<td>VOCs</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>3</td>
<td>16,864</td>
<td>17,445,808</td>
<td>2,212</td>
<td>20,109</td>
</tr>
<tr>
<td>4</td>
<td>16,816,832</td>
<td>3,731</td>
<td>45,017</td>
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<tr>
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<td>12,016,752</td>
<td>4,952</td>
<td>73,769</td>
</tr>
<tr>
<td>6</td>
<td>6,688</td>
<td>6,918,736</td>
<td>8,115</td>
<td>73,769</td>
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<tr>
<td>Total</td>
<td>51,424</td>
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<table>
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<tr>
<th>ALTERNATIVE 3</th>
<th>Number of Sources Affected by Alternative 1</th>
<th>Annual Aggregate Cost ($/yr)</th>
<th>AGGREGATE REDUCTIONS (Mg/yr)</th>
<th>COST-EFFECTIVENESS RATIO ($/Mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Plant #</td>
<td></td>
<td></td>
<td>HAPs</td>
<td>VOCs</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>8,432</td>
<td>8,722,904</td>
<td>1,106</td>
<td>10,055</td>
</tr>
<tr>
<td>4</td>
<td>16,256</td>
<td>16,816,832</td>
<td>3,731</td>
<td>33,923</td>
</tr>
<tr>
<td>5</td>
<td>11,616</td>
<td>12,016,752</td>
<td>4,952</td>
<td>45,017</td>
</tr>
<tr>
<td>6</td>
<td>6,688</td>
<td>6,918,736</td>
<td>8,115</td>
<td>73,769</td>
</tr>
<tr>
<td>Total</td>
<td>42,992</td>
<td>44,475,224</td>
<td>17,904</td>
<td>162,763</td>
</tr>
</tbody>
</table>
preliminary draft of Gasoline Marketing Industry (Stage I) - Background Information for Proposed Standards, November, 1991, as are the hazardous air pollutant and volatile organic compound emissions reductions. Only PEI cost values are used. Cost-effectiveness figures in dollars per metric ton of VOC and HAP reduced were determined for each model plant by dividing the aggregate annual Cost of Stage I vapor recovery capital and maintenance by the aggregate annual HAP or VOC emission reduction. Total cost-effectiveness was computed by dividing the aggregate cost summed over all model plants by the aggregate emission reductions summed over all model plants. The aggregates were computed by multiplying the corresponding values in Table x.2 by the number of sources affected by each alternative for each model plant. The number of sources affected was determined in light of the amount of throughput in states with no Stage I requirements and with Stage I requirements that exempt model plants numbers 1 and 2. Alternative 1 requires that all source in states with no regulations be controlled along with the exempted sources in the other states. Alternative 2 requires that states with no Stage I requirement mandate controls on model plants 3 through 6. Alternative 3 is like alternative 2 except that it is assumed that states opt to exempt controls on half of the sources in the model plant 3 category.

Under regulatory Alternative 1 the cost per Mg of reducing HAP emissions is 3.4 times greater than the cost of removing HAP emissions under regulatory Alternative 2 and 3.9 times as much as for Alternative 3. The cost-effectiveness ratio in the case of Stage I is inversely related to the size of the throughput due to the fact that cost of installing Stage I controls is not related to throughput. Hence, cost-effectiveness is a continuous function with a range from near zero for very large throughputs and approaching infinity for very small throughputs. There is no rule for selecting the optimum level of exemption based on cost-effectiveness alone. To select an appropriate exemption point depends on an outside consideration, such as perhaps the value of the benefit stream of the control. Environmental benefits will depend on the specific gasoline stations exempted.

Cost-effectiveness measures for VOC removal can also be compared for Alternatives 1, 2, and 3. Cost-effectiveness measures in terms of dollars per megagram of VOC are relevant even though the purpose of the Title III Stage I regulation is to regulate HAPs. This is because VOCs and HAPs are correlated to each other and measures of the cost-effectiveness of reducing VOC emissions under regulatory Alternatives 1, 2, and 3 can be compared to the cost-effectiveness of reducing VOC emissions with other federal rulemakings. Table x.4 shows the highest and lowest cost-effectiveness ratios for model plants defined in EPA analyses of federal rulemakings which affect VOC emissions. Stage I vapor recovery cost-effectiveness for VOC are among the highest cost-effectiveness ratios on the table, whether Alternative 1 (no exemptions) or alternative 2 (exemption for gasoline stations with
Table 2.4 Cost-Effectiveness Values for Federal Control Technology Guidelines (CTG) That Reduce VOC Emissions Compared to Stage I Cost-Effectiveness Values (1991 Dollars)

<table>
<thead>
<tr>
<th>CTG</th>
<th>Smallest Model Plant</th>
<th>Largest Model Plant</th>
<th>Ratio of Largest Model Plant to $2,000/Mg of VOC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cost-effectiveness ($/Mg of VOC)</td>
<td>Cost-effectiveness ($/Mg of VOC)</td>
<td>Cost-effectiveness to $2,000/Mg of VOC</td>
</tr>
<tr>
<td>Large Appliances</td>
<td>$0</td>
<td>$0</td>
<td>0.0</td>
</tr>
<tr>
<td>Fixed Roof Petrol Tanks</td>
<td>$0</td>
<td>$0</td>
<td>0.0</td>
</tr>
<tr>
<td>Miscellaneous Refinery Sources</td>
<td>$0</td>
<td>$0</td>
<td>0.0</td>
</tr>
<tr>
<td>Dry Cleaning: petroleum</td>
<td>$0</td>
<td>$0</td>
<td>0.0</td>
</tr>
<tr>
<td>SOCMI Equipment Leaks</td>
<td>$0</td>
<td>$0</td>
<td>0.0</td>
</tr>
<tr>
<td>Natural Gas Process Equipment Leaks</td>
<td>ERR $0</td>
<td>$0</td>
<td>0.0</td>
</tr>
<tr>
<td>Cutback Asphalt</td>
<td>$0</td>
<td>$0</td>
<td>0.0</td>
</tr>
<tr>
<td>Fabric Coating</td>
<td>$0</td>
<td>$34</td>
<td>0.0</td>
</tr>
<tr>
<td>Paper Coating</td>
<td>$0</td>
<td>$34</td>
<td>0.0</td>
</tr>
<tr>
<td>Gasoline Bulk Plants</td>
<td>$0</td>
<td>$34</td>
<td>0.0</td>
</tr>
<tr>
<td>Metal Coils</td>
<td>$0</td>
<td>$196</td>
<td>0.1</td>
</tr>
<tr>
<td>Gasoline Loading Terminals</td>
<td>$140</td>
<td>$247</td>
<td>0.1</td>
</tr>
<tr>
<td>Solvent Metal Cleaning</td>
<td>$0</td>
<td>$280</td>
<td>0.1</td>
</tr>
<tr>
<td>Polymers Production</td>
<td>$34</td>
<td>$460</td>
<td>0.2</td>
</tr>
<tr>
<td>Service Stations Stage I</td>
<td>$39</td>
<td>$460</td>
<td>0.2</td>
</tr>
<tr>
<td>Magnet Wire</td>
<td>$196</td>
<td>$471</td>
<td>0.2</td>
</tr>
<tr>
<td>Dry Cleaning: perchloroethylene</td>
<td>$0</td>
<td>$516</td>
<td>0.3</td>
</tr>
<tr>
<td>Flat Wood Fencing</td>
<td>$337</td>
<td>$651</td>
<td>0.3</td>
</tr>
<tr>
<td>STAGE I VAPOR RECOVERY (II)</td>
<td>$94</td>
<td>$868</td>
<td>0.4</td>
</tr>
<tr>
<td>STAGE I VAPOR RECOVERY (III)</td>
<td>$94</td>
<td>$868</td>
<td>0.4</td>
</tr>
<tr>
<td>Metal Furniture</td>
<td>$314</td>
<td>$875</td>
<td>0.4</td>
</tr>
<tr>
<td>Volatile Liquid Storage</td>
<td>$0</td>
<td>$1,459</td>
<td>0.7</td>
</tr>
<tr>
<td>Petroleum Refinery Equipment Leaks</td>
<td>$0</td>
<td>$1,683</td>
<td>0.8</td>
</tr>
<tr>
<td>Float Roof Petrol Tanks</td>
<td>$247</td>
<td>$1,683</td>
<td>0.8</td>
</tr>
<tr>
<td>Auto &amp; Light Duty Trucks</td>
<td>$123</td>
<td>$2,513</td>
<td>1.3</td>
</tr>
<tr>
<td>SOCMI Air Oxidation</td>
<td>$112</td>
<td>$2,917</td>
<td>1.5</td>
</tr>
<tr>
<td>Miscellaneous Metal Parts</td>
<td>$0</td>
<td>$5,318</td>
<td>2.7</td>
</tr>
<tr>
<td>STAGE I VAPOR RECOVERY (I)</td>
<td>$94</td>
<td>$8,675</td>
<td>4.3</td>
</tr>
<tr>
<td>Rubber Tires</td>
<td>$280</td>
<td>$12,230</td>
<td>6.1</td>
</tr>
<tr>
<td>Publication Rotogravure</td>
<td>$0</td>
<td>$12,903</td>
<td>6.5</td>
</tr>
</tbody>
</table>

STAGE I VAPOR RECOVERY (I) - No exemptions
STAGE I VAPOR RECOVERY (II) - Exemption for throughput less than 10,000 gallons a month
STAGE I VAPOR RECOVERY (III) - Exemption for throughput less than 10,000 gallons a month and a local option for exempting sources with a throughput of 10,000-25,000 gallons a month

(a) All values except for STAGE I values were originally in 1988 dollars. They were inflated to 1991 dollars using an inflation rate of 12.2%.

Source: Information from Kevin Bromberg, U.S. Small Business Administration
a throughput of less than 10,000 gallons a month) cost-effectiveness ratios are used. The cost-effectiveness ratio for alternative 1 (no exemptions), however, is much higher than that for alternative 2. Additionally, alternative 1 is one of only three of the twenty-nine rulemakings with a cost-effectiveness of over $8,000/Mg of VOC emissions reduced for the smallest model plant. The highest comparable cost-effectiveness for the other regulations is $5,318. This indicates that alternatives 1 and 2 are not very cost-effective relative to most other regulations with regard to VOC reductions. Because HAP reductions are highly correlated to VOC reductions for Stage I, this result indicates that alternatives 1 and 2 are not very cost-effective for HAPs reductions either.

Alternative 3 brings the cost-effectiveness ratio for the total regulation down to 2,484 $/Mg. This is close to the cost-effectiveness ratio for model plant 5. But more importantly, alternative 3 allows exemptions to be targeted to gasoline stations in areas where the additional risk imposed by the exemption is minimized due to the isolated nature of the emission and the low density of the local population.

Table x.5 and Figure x.1 evaluate the effect of Stage I regulation on the gasoline prices of various sized service stations. It is assumed that the entire cost of installing Stage I vapor recovery equipment is passed to the consumer through increased gasoline prices. The fuel throughput per month and average fuel throughput per year categories were again obtained from EPA's preliminary draft of Gasoline Marketing Industry (Stage I) - Background Information for Proposed Standards, November, 1991. For service stations with a fuel throughput of 0 to 5,000 gallons, the price of gasoline per gallon would increase by approximately 4.4 cents per gallon. For service stations with a throughput of 5,000 to 10,000 gallons, the price of gasoline per gallon would increase by approximately 1.5 cents per gallon. For larger stations, the largest increase seen is .05 cents per gallon. If small gasoline stations (those with a throughput per month of 0-10,000 gallons/month) are not exempted from this regulation and the whole price of Stage I vapor recovery is passed on to the consumer, gasoline prices at the small stations could be 3.3 cents a gallon higher than those at larger stations. This is a price difference large enough to affect a gasoline station's business. Small stations could lose business because their prices are higher than others' prices. Figure x.1 illustrates Table x.5. The graph shows that the curve is very steep for gasoline stations which have monthly throughput of 0-25,000 gallons. Without an exemption for smaller gasoline stations, such stations are likely to be negatively impacted by the regulation.
Table 2.5 The Effect of Stage I Regulation on the Gasoline Prices of Various Sized Gas Marketers (1991 Dollars)

<table>
<thead>
<tr>
<th>Fuel Throughput per month (a) (gallons)</th>
<th>Average Fuel Throughput per year (gallons)</th>
<th>Annualized Coaxial Cost</th>
<th>Annualized Two Point Cost</th>
<th>Increased Cost per gallon coaxial</th>
<th>Increased Cost per gallon two point</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5,000</td>
<td>24,000</td>
<td>$1,011.00</td>
<td>$1,058.00</td>
<td>$0.04213</td>
<td>$0.04408</td>
</tr>
<tr>
<td>5,000-10,000</td>
<td>72,000</td>
<td>$1,011.00</td>
<td>$1,058.00</td>
<td>$0.01404</td>
<td>$0.01469</td>
</tr>
<tr>
<td>10,000-25,000</td>
<td>240,000</td>
<td>$1,011.00</td>
<td>$1,058.00</td>
<td>$0.00421</td>
<td>$0.00441</td>
</tr>
<tr>
<td>25,000-50,000</td>
<td>420,000</td>
<td>$1,011.00</td>
<td>$1,058.00</td>
<td>$0.00241</td>
<td>$0.00252</td>
</tr>
<tr>
<td>50,000-100,000</td>
<td>780,000</td>
<td>$1,011.00</td>
<td>$1,058.00</td>
<td>$0.00130</td>
<td>$0.00136</td>
</tr>
<tr>
<td>&gt;100,000</td>
<td>2,220,000</td>
<td>$1,011.00</td>
<td>$1,058.00</td>
<td>$0.00046</td>
<td>$0.00048</td>
</tr>
</tbody>
</table>

(a) Plant fuel throughput per month and average fuel throughput per year information was obtained from the EPA's preliminary draft of "Gasoline Marketing Industry (Stage I) - Background Information for Proposed Standards" November, 1991.
Figure 2.1 Increased Gasoline Cost Per Gallon for Various Sized Gas Marketers
2.5 Conclusion

Two alternatives are being examined by EPA, alternative 1 and alternative 2. Alternative 2, a NESHAP for all gasoline stations except for those with a throughput of less than 10,000 gallons a month, is clearly the better regulation. Alternative 1 (no exemptions) is more costly than alternative 2. Additionally, alternative 1 is less cost-effective for both VOC and HAP than alternative 2. Furthermore, the cost-effectiveness ratios of alternative 2 are more in line with the cost-effectiveness values of other federal regulations regulating VOC emissions than are those of alternative 1. Finally, alternative 1 has the potential to negatively impact small businesses more than alternative 2.

Alternative 3, which is not one of the alternatives advanced by EPA, allows additional exemptions by states for gasoline stations with throughputs of 10,000 to 25,000 gallons per month so long as the stations are not in populated areas and do not contribute in conjunction with other sources to high ambient levels of HAPs. This alternative allows an element of risk-benefit analysis to inform the final decision on exemptions.

The only advantage the adoption of alternative 1 has over the other alternatives is that it achieves a 13 percent greater HAP emissions reduction than alternative 2 and a 20 percent greater reduction than alternative 3. But eighty-four percent of the stations exempted under alternative 2 are small "private" gasoline stations with low emissions because they have a throughput range of 0-5,000 gallons a month. "Private" stations are stations maintained by governmental, commercial, and industrial consumers for their own fleet operations as well as stations owned by utility companies, taxi fleets, rental car fleets, school buses and corporate fleets. Sixteen percent of the stations exempted under alternative 2 are public gas stations. According to Dave Haddad Sr., President of the Service Station Dealers of America, a trade association representing independent gasoline dealers who sell gasoline under the brand name of their supplier, public stations with a throughput of 0-5,000 gallons of gasoline a month, if they are pure gas stations (i.e. not convenience stores with a gas pump), are very, very rural. With such a low throughput, he believes it would be impossible for such a gas station to survive in an urban or suburban area. Very, very rural gas stations would likely be the gas stations most unable to obtain the financing necessary for Stage I vapor recovery installation and maintenance expenditures. Thus alternatives 2 and 3 are superior to alternative 1 in their treatment of small businesses.
Irvine, California's Ordinance Governing the Manufacture, Distribution, Sale, and Recycling of Products Which Utilize Ozone-Depleting Compounds

3.1 Introduction

This chapter discusses an existing municipal ordinance, enacted by Irvine, California, in 1989, that bans emissions of ozone depleting compounds (ODCs). The ban is all encompassing, but it is moderated by exemption clauses that greatly reduce the cost to industry by allowing time, in cases where it is needed, for the firm to find the most cost-effective approach to control of ozone depleting compounds in its operations. In discussing the ordinance, the following issues are considered:

- What features of a ban contribute to cost-effectiveness,
- What is the best form for a local ODC ordinance -- i.e., is a product labeling ordinance superior to a local ban, and
- Whether localities should adopt measures to reduce the release of ozone depleting substances.

New regulations to control emissions from ozone-depleting compounds are emerging in localities all across the United States. The town of Nashua, New Hampshire passed an ordinance "Regulating The Manufacture, Distribution, Sale And Recycling Of Products Which Utilize Ozone-Depleting Compounds" in 1990. The city of Cambridge, Massachusetts recently passed a law requiring that products made with or emitting ozone-depleting compounds be labelled. In light of this growth in regulation, Irvine is an example that shows why regulatory flexibility is necessary. Irvine's exemption clause as well as several other aspects of Irvine's regulation have substantially reduced the cost of this ban on the release of ozone depleting compounds without causing a major slippage in the goals of the regulation. Irvine's ordinance is also a good focus for a discussion of alternative local approaches to reducing releases of ozone depleting compounds including the option of not regulating ODCs -- a global, not a local, pollutant -- at the local level.
This discussion focuses on electronics firms\(^1\) in Irvine and is based in part on an informal phone survey conducted of several such firms. The firms were questioned about the impact of the Ordinance on their establishment. The information received from the firms is more accurate than information from firms that face a future regulation. Since the regulation has been in place for two years, information received is the result of research on various technical options.

The following analysis describes the regulation, presents the information provided by firms, presents alternatives to Irvine's regulation, and discusses the alternatives in terms of their cost-effectiveness. The chapter closes with presentation of conclusions.

### 3.2 Background

In 1989, the City of Irvine, one of the 200 largest cities in the United States, passed an ordinance regulating the use of ozone depleting chemicals within city limits. The City Council of Irvine advanced several reasons for doing so. Primarily, the City Council was aware of scientific evidence that the release of chlorofluorocarbons and halons into the atmosphere depleted the earth's ozone layer and that such depletion allows increased ultraviolet radiation to enter the earth's atmosphere. This radiation poses danger to human health and the environment by increasing harms such as skin cancers, cataracts, suppression of the immune system, damage to crops and aquatic life, and related effects. The City Council was also concerned about the widespread use of halons in testing fire extinguishing systems, chlorofluorocarbons in refrigeration and air conditioning systems, and the lack of alternatives for most of these uses. The Council saw potential benefits in recycling halons and chlorofluorocarbons used for such purposes.

Passage of the legislation was also driven by the United States ratification of the Montreal Protocol on Substances that Deplete the Ozone Layer on April 21, 1988. The Protocol calls for reductions in the production, importation, and exportation of CFCs and halons. The City Council of Irvine believed that in light of the current and future limitations on the production of CFCs both nationally and internationally, the early development and utilization of environmentally safe alternatives to CFCs would create a competitive advantage to those businesses electing to utilize such alternatives

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\(^{1}\) The electronics industry in the United States used an estimated 80 million kilograms of CFC-113 to remove flux from printed circuit boards in 1986, representing 45 percent of worldwide CFC-113 consumption at that time. (Information obtained from a FAX from Robin Sellers of the Naval Avionics Center, October, 1, 1991)
prior to the effective date of any comprehensive international, federal, state, or local regulation banning the use of CFCs and halons. Furthermore, the City Council of Irvine believed that the reductions set forth in the Montreal Protocol may not have been sufficient to remedy the "global health and safety risk" created by halons and CFCs.

According to Dr. Frances E. Winslow of the City Manager's Office of Irvine, the drive to pass much of the regulation was based on Irvine's belief that effective implementation of international and national standards for the reduction of ozone depletion requires active local cooperation. In a brief paper on Irvine's Ordinance Governing the Manufacture, Distribution, Sale, and Recycling of Products which Utilize Ozone-Depleting Compounds, Dr. Winslow writes:

> Each point source of CFC emissions lies within the jurisdiction of a local or county government. Developing an implementation plan that is suitable for the entire world, or even for the whole United States, will be a lengthy process. During the development, CFCs will continue to be released into the atmosphere. Local governments can work with the local community to effectively create local regulations that reduce CFC emissions quickly. While each municipality may release only a small portion of the world-wide total of ozone depleting compound emissions, each molecule of CFC that is recycled or destroyed is a contribution to the health of the stratospheric ozone layer. Two

3.3 The Ordinance

For this discussion we are dividing the ordinance in two parts. The first describes the prohibitions and the second describes the exemptions.

3.3.1 The Ban on Ozone-Depleting Compounds

The ordinance "Governing the Manufacture, Distribution, Sale, and Recycling of Products which Utilize Ozone-Depleting Compounds" (No. 89-21) was passed by the City Council of Irvine on August 22, 1989. Following the first section on definitions, there are twelve sections. The second section outlines the specifics of the prohibition of manufacturing, selling, or distributing products utilizing ozone-depleting compounds. It reads that within the City of Irvine,

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2 Dr. Frances E. Winslow, City Manager's Office, City of Irvine, California, "CFC Pollution: Repairing the Ozone Hole Through Municipal Legislation."
(a) no establishment shall use any ozone-depleting compound in any process or activity involving the manufacture, production, cleansing, degreasing, or sterilization of any substance or product, except as otherwise provided in this section

(b) no establishment shall package any product with rigid or flexible foam containing or utilizing an ozone-depleting compound, except as otherwise provided in this section

(c) no establishment shall purchase, obtain, store, sell, distribute or otherwise provide to any person any CFC food packaging material, except as otherwise provided in this section.

The next two sections prohibit the use of ozone-depleting compounds in new and replacement building insulation and establish mandatory recovery and disposal of ozone-depleting compounds contained in discarded building insulation. The following three sections address ozone-depleting compounds found in cooling systems. They include requirements to recycle ozone-depleting compounds used as coolants in refrigeration and/or air conditioning units, restrictions on the sale of ozone-depleting compounds used as coolants, and restrictions on the disposal of refrigeration or air conditioning units or systems. The next sections discuss halon used as a fire extinguishant and require a permit to release halon to test fire extinguishing equipment and require the reclamation of halons from portable fire extinguishers during servicing. Additional sections create the position of Environmental Program Coordinator, create a Science Advisory Committee, address exemption criteria, and create enforcement guidelines.

3.3.2 Exemptions from the Regulation

Section IV.Q-201 of Ordinance 89-21 exempts the prohibition of manufacture, sale, and distribution of products using halons and chlorofluorocarbons for the following uses:

- Use in the study and/or research of the effect of the release of ozone-depleting compounds into the environment and/or the development of alternative technologies

- Use of any compound used as a coolant in refrigeration or air conditioning unit or system
Use by any licensed health care facility including any medical research conducted at such facilities (The exemption is only valid until safe and effective alternatives are found.)

Use by manufacturers of any drug or medical device (The exemption is only valid until safe and effective alternatives are found. In addition, manufacturers are responsible for developing recycling systems for ozone-depleting compounds used by their facility.)

Use by any person manufacturing a product or component product under contract with any branch of the United States Armed Forces or with any establishment under contract with such branch where applicable military specifications require the use of an ozone-depleting compound. (Manufacturers are responsible for developing recycling systems for ozone-depleting compounds used by their facility.)

If a manufacturer, distributor, or retailer of a product containing or made with an ozone-depleting substance or a use of a such a product does not qualify for an exemption under Section IV.Q-201, such person may still apply for an exemption if there are no currently available technically or economically feasible alternatives for such person's use or if such person's use of an ozone-depleting compound is de minimis. Section IV.Q-601 lists the criteria for other exemptions. The criteria used by the City Council to evaluate these applications include:

1. the technical, practical, and economic viability of the alternative

2. the health, safety and environmental impact of the alternative

3. the length of time for which the exemption is sought and the length of time needed before a technically and economically feasible non-ozone depleting alternative can be implemented

4. the measures already taken or to be taken by the applicant to minimize and/or eliminate the release of an ozone-depleting compound, including whether and when a reclamation and/or recycling system has been or is to be implemented, as well as the effectiveness of any such system

5. the hardship that will result to the applicant in the event the exemption is not granted
whether the applicant's actions are consistent with the spirit and intent of the Ordinance.

As of June 11, 1991 there had been 130 exemptions granted in Irvine. Fifty-seven percent were granted as de minimis exemptions, and twenty-seven percent were granted as general exemptions. General exemptions and De Minimis exemptions are granted under Section IV.Q-601 of Ordinance 89-21. General exemptions are the exemption given when it is determined that no feasible alternative to the use of an ozone-depleting compound exists. De minimis exemptions, while not explicitly mentioned in Section IV.Q-601, are a standard operating procedure within Ordinance 89-21. De minimis exemptions can be granted to those establishments in Irvine who use less than 55 gallons or 450 pounds of the ozone depleting substances covered in Irvine's regulation. Eleven percent of the exemptions were granted to licensed health care facilities or manufacturers of drugs or medical devices. Such exemptions are categorized as "health exemptions." Six percent of the exemptions were granted to companies manufacturing products or components under contract to the U.S. Armed Forces. Such exemptions are categorized as "military exemptions." To collect information on the type of electronics companies applying for exemptions and the processes they use that require ozone-depleting compounds, we conducted an informal phone survey of several Irvine electronic facilities that applied for exemptions from Irvine's regulation. The information we collected is described below.

3.4 Examples of Electronics Firms that Utilized the Exemptions

Firms discussed below received exemptions of the following types: (1) De Minimis Exemptions, (2) General Exemptions, (3) Health Exemptions, and (4) Military Exemptions. Nine firms responded to our telephoned request for information and we obtained some data on two others. The firms applying for exemptions were those that had problems meeting the requirements on the original schedule.

3.4.1 De Minimis Exemptions

Circuit Assembly Corporation is a small business that manufactures connectors and cable assemblies. Circuit Assembly applied and was granted an exemption for their use of 1,1,1 - TCE in cleaning printed circuit boards. In 1989 they used 80 gallons of 1,1,1 - TCE as a defluxing agent and emitted 80 gallons. The company recently complied with the Irvine regulation by changing from their
previous soldering process to a low flux soldering process, thereby reducing/eliminating the need for degreasing. It was estimated that this modification occurred at little cost to the company.\(^3\)

**Sharp Microelectronics** is a research and development center for Sharp Corporation that was granted a de minimis exemption from Irvine's regulation. They use less than 10 gallons of 1,1,1 - TCE annually for degreasing printed circuit boards. To reduce use of 1,1,1 - TCE at Sharp, the company is partially substituting a rosin flux remover, composed of 75-69-4 trichlorooneffluoremethane and 75-71-8 dichlorodifluoromethane. The rosin flux remover is not as effective as 1,1,1 - TCE and costs more than 1,1,1 - TCE. It was estimated that 1,1,1 - TCE costs $3 a gallon, whereas the rosin flux remover costs $18 a gallon. The only alternative for Sharp which would completely eliminate the use of ozone-depleting compounds is a hot water bath (approximately $2,000) for degreasing printed circuit boards. With such a minimal use of ozone-depleting compounds, the company believes this investment is unwarranted.\(^4\)

3.4.2 General Exemptions

**Ricoh Electronics**, Inc. manufactures photocopy drums for copiers. In 1989 they used 2,032 gallons of CFC-113 and emitted 1,338 gallons of CFC-113. The company has continued to use chlorofluorocarbons by obtaining two one-year exemptions from Irvine's regulation since it was passed in 1989. Ricoh uses CFC-113 for degreasing. In order to come into compliance with the regulation, Ricoh is modifying its manufacturing process to delete the degreasing step requiring CFC-113. This modification will cost Ricoh Electronics, Inc., a large outfit with 8 manufacturing facilities approximately $750,000. The modification will improve the quality of Ricoh's product in addition to bringing Ricoh into compliance with Irvine's regulation.\(^5\)

**Ball Corporation** makes rubidium oscillators, better known as atomic clocks. In 1989, they used ozone depleting compounds in three ways. Ball used 18 gallons of CFC-11 to cool circuits in 1989. For this process, CFC-11 has been replaced with a non-ozone depleting substitute, MS 242. In 1989 Ball Corporation used 96 gallons of CFC-12 as an aerosol propellant for an acrylic based coating for printed circuit boards. Carbon dioxide has replaced CFC-12 as the propellant at little or no cost to

\(^3\) Conversation with John McCallister of Circuit Assembly Corporation on September 17, 1991.


\(^5\) Conversation with Lee Gjetley of Ricoh Electronics on September 16, 1991.
Ball Corporation. In 1989 Ball also used 410 gallons of CFC-113 (emitted 300 gallons) and 50 gallons of TCA for degreasing and defluxing respectively. Ball has an exemption for this use of CFC-113. They are currently looking at different brands of equipment that provide alternative cleaning processes. It was estimated that the capital cost of the equipment for the alternative cleaning process is $10,000 more than the capital cost of the equipment currently in use.6

Preece Incorporated is a small business that manufactures hydraulic hose for the military. In 1989 the company used 25 gallons of freon (CFC-111) for degreasing the quick disconnect assembly at the end of their hydraulic hoses and 220 gallons of 1,1,1-TCE for thinning the glue that attaches braids to hoses. With an exemption from Irvine's regulation, Preece continues to use CFC-111 and 1,1,1-TCE in both of these processes. Preece has an ongoing study in place to search for alternative substances for both processes. In place of 1,1,1 - TCE, Preece tested VMNPNAPTHA, but it was not an effective substitute. Dupont is continuing to look into alternatives to 1,1,1-TCE for Preece. Freon MCA was tested as a replacement for freon. It was determined unacceptable, however, because it has the potential to dissolve o-rings. Another alternative tested, Vertrel 245, a non-ozone depleting substance, was rejected because of its cost. Preece currently spends $126 for a 5 gallon container of freon. Vertrel 245 is $1600 per 5 gallon container.7

Rosemont Analytical is a subsidiary of Emerson Corporation. They manufacture analytical instrumentation. Rosemont obtained an exemption from Irvine's regulation in order to evaluate alternatives to their vapor degreasing process which used trichlorfluorethylene. Rosemont decided to comply with Irvine's regulation by changing their manufacturing process to eliminate their need for vapor degreasers. As a replacement, the company switched to a water soluble flux. This change did not negatively impact Rosemont's product and saved the company money. Expenses were reduced because expenditures were no longer necessary for the labor and solvent necessary to operate the company's two vapor degreasers.8

3.4.3 Health Exemptions

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6 Conversation with Pat Kailey of Ball Corporation 9/16/91.

7 Conversation with Mary Neil of Preece, Inc. on September 20, 1991.

8 Conversation with Dave Parrish of Rosemont Analytical on September 23, 1991.
Representatives of the electronics industry who had been granted health exemptions were not available for comment. In general, of the 130 exemptions granted in Irvine as of June 11, 1991, fourteen were granted as health exemptions. The authors are aware of one electronics company, Pfizer Laser Systems, who obtained a health exemption from Irvine's Ordinance. Pfizer uses CFC-113 to degrease the electronic components in laser medical devices. They expect to use HCFC, a less-ozone depleting alternative, when it is available. Other health care exemptions of which the authors are aware were granted to facilities who used ozone-depleting compounds to degrease medical device implants or medical instruments. In most cases, FDA approved non-ozone depleting alternatives to the ozone-depleting compound were not available.

3.4.4 Military Exemptions

Kaiser Electroprecision manufactures rocket motor missile cases and aircraft parts. In 1989 they used 564 gallons of CFC-113 and emitted 554 gallons to degrease printed circuit boards. Kaiser also uses 1,1,1-TCE for vapor degreasing. The company has continued to use chlorofluorocarbons by obtaining two one-year exemptions from Irvine's regulation since it was passed in 1989. Primarily for other reasons but also in order to comply with the Irvine regulation, Kaiser Electroprecision is relocating their degreasing of printed circuit boards process out of the Irvine area. They are pursuing alternate solutions for the vapor degreasing process. At the current time, they have estimates for alternative vapor degreasing equipment ranging from $137,000 to $450,000. Any alternatives they adopt which affect their military contracts will require military approval.9

Raytheon Service Co. is a subsidiary of Raytheon Corporation, which manufactures Sea-Sparrow guided missile systems and ground approach radar systems for the U.S. military. Raytheon Service Co. overhauls and repairs such systems. In 1989 Raytheon Service Co. used 1,000 pounds of CFC-11 in foam packaging and 220 pounds of 1,1,1-TCE primarily for the degreasing of printed circuit boards. They obtained an exemption from Irvine's regulation because no alternatives were available which met military specifications. Not only Raytheon Service Co., Raytheon's subsidiary in Irvine, but also Raytheon Corporation, are looking for alternative packaging and decreasing their use of 1,1,1-TCE by substituting terpenes. Terpenes are effective at degreasing printed circuit boards, but have a noxious odor.10

10Conversation with Raytheon Service Co. on September 20, 1991.
**Product Technology Incorporated** is a small business that is a subcontractor for large manufacturers. They manufacture electronic circuit assemblies. In 1989 they used 165 gallons of 1,1,1-TCE to deflux printed circuit boards. Product Technology was granted an exemption from Irvine's regulation because military specifications call for their use of 1,1,1-TCE. When Irvine's regulation was first passed, the company hired a consultant for advice on complying with the law. They were told that an aqueous cleaning system would be effective and non-ozone-depleting. The costs to Product Technology of switching to an aqueous system were prohibitive, however, and the company did not switch although they are still evaluating whether or not to switch. They would have had to purchase an industrial dishwasher and have their building replumbed to accommodate such a dishwasher. Additionally, Product Technology would have had to hire an outside consultant to do resistive testing. Resistive testing measures between one circuit and another to see if there is any flux remaining. If flux remains, it can cause a circuit to short out. Resistive testing is not necessary when 1,1,1-TCE is used.\(^1\)

### 3.4.5 Summary

Table x.1 summarizes the information collected from companies in Irvine. It briefly describes the industry by presenting the name of the business, the size of the business, and the product made by the business. At least three of the businesses we surveyed were small businesses. Information is also presented on the type of ozone-depleting substance used by the business, the cost of the ozone-depleting substance or process using the substance, the substitute considered by the business, and the cost of the substitute. In most cases, the cost of the current ozone-depleting product or process of the businesses was unknown, but the cost of researched substitutes was often known. Where possible, the additional cost of the substitute over the product in current use is determined. Additionally, the table describes whether the substitute will have a negative, positive, or neutral effect on the business's product. The best substitute would of course have a positive or neutral effect on the product of the business. Three of the businesses we talked to had tested products that would have a negative effect on their product.

Table x.1 demonstrates that among electronics firms in Irvine a variety of ODCs are used and a wider variety of substitute inputs and processes that have been considered. The substitutes are sometimes more costly than the ODC and sometimes less costly. The product produced using the substitutes is

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\(^1\)Conversation with Shirley Turturro, Quality Manager, at Product Technology, Inc. on September 20, 1991.
<table>
<thead>
<tr>
<th>Firm</th>
<th>Small Business</th>
<th>Type of Product</th>
<th>Ozone-Depleting Substance Used</th>
<th>Cost of Substitute Considered</th>
<th>Substitute Considered</th>
<th>Cost of Substitute</th>
<th>Increment of cost of Substitute to Ozone-depleting Substance or Process</th>
<th>Effect on Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit Assembly Corp.</td>
<td>Yes</td>
<td>Connectors</td>
<td>1,1,1 - TCE</td>
<td>Unknown</td>
<td>Change in Manufacturing Process</td>
<td>$0</td>
<td>Unknown</td>
<td>Neutral</td>
</tr>
<tr>
<td>Sharp Microelectronics</td>
<td>No</td>
<td>None - Research Facility</td>
<td>1,1,1 - TCE</td>
<td>$30</td>
<td>Rosin Flux Remover</td>
<td>$180</td>
<td>$150</td>
<td>Negative</td>
</tr>
<tr>
<td>Ricoh Electronics</td>
<td>No</td>
<td>Photocopy Drums</td>
<td>CFC-113</td>
<td>Unknown</td>
<td>Change in Manufacturing Process</td>
<td>$750,000</td>
<td>Unknown</td>
<td>Positive</td>
</tr>
<tr>
<td>Bell Corporation</td>
<td>Unknown</td>
<td>Rubidium Oscillators</td>
<td>CFC-11, CFC-12</td>
<td>MS 242</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CFC-113 and 1,1,1 - TCE</td>
<td>Unknown</td>
<td>Carbon Dioxide</td>
<td>$0</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CFC-113 and 1,1,1 - TCE</td>
<td>Unknown</td>
<td>Miller-Stephenson System</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unknown</td>
<td>Allied Signal System</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Preece Incorporated</td>
<td>Yes</td>
<td>Hydraulic Hoses</td>
<td>CFC-111, 1,1,1 - TCE</td>
<td>$630</td>
<td>Freon MCA</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CFC-111</td>
<td>Unknown</td>
<td>VMNPNAIPTHA</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unknown</td>
<td>Vertrel 245</td>
<td>Unknown</td>
<td>Unknown</td>
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</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>$530</td>
<td>$8,000</td>
<td>$0</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Rosemont Analytical</td>
<td>No</td>
<td>Analytical Instrumentation</td>
<td>1,1,1 - TCE</td>
<td>Unknown</td>
<td>Change in Manufacturing Process</td>
<td>Unknown</td>
<td>Savings</td>
<td>Neutral</td>
</tr>
<tr>
<td>Kaiser Electroprecision</td>
<td>No</td>
<td>Motor Missile Cases</td>
<td>CFC-113</td>
<td>Unknown</td>
<td>Relocation</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Neutral</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aircraft Parts</td>
<td>1,1,1 - TCE</td>
<td>Unknown</td>
<td>Substitute Vapor</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unknown</td>
<td>Degreasing Equipment</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$137,000 - $450,000</td>
<td>Change in Manufacturing Process</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Raytheon Service Co.</td>
<td>No</td>
<td>None - Repair Facility</td>
<td>CFC-11, 1,1,1 - TCE</td>
<td>Unknown</td>
<td>None</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unknown</td>
<td>Terpenes</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Product Technology</td>
<td>Yes</td>
<td>Electronic Circuit Assemblies</td>
<td>1,1,1 - TCE</td>
<td>Unknown</td>
<td>Aqueous System</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Negative</td>
</tr>
</tbody>
</table>
sometimes inferior to the original product and sometimes superior. There is no set pattern beyond the uniqueness of each situation encountered.

3.5 Alternatives to Irvine's Ordinance

Although Irvine has already passed its ordinance and is not, so far as we know, considering alternatives to it, consideration of alternative forms the Irvine regulation could have taken provides insight concerning the merits of various aspects of Irvine's regulation. This will be of use in assessing ordinances proposed by other localities.

3.5.1 Alternative 1: An Inflexible Regulation

The Alliance for Responsible CFC Policy is a coalition of the industries which produce CFCs and the industries which manufacture products which use CFCs. Michael Stripe of the Alliance believes the dangerous alternative to ozone governing regulations like Irvine's are regulations which do not provide flexibility, education, or assistance to industry in complying with the regulation. He notes that Irvine's regulation has been handled well. There are exemption clauses for facilities which must use ozone-depleting compounds for military or health applications, and there are exemptions for facilities which can find no alternative or cannot afford an alternative. Additionally, Michael Brown, Irvine's Environmental Program Administrator, has visited industries, discussed alternatives with them, and advised them on alternative technologies. For the first alternative, we will consider an ordinance like Irvine's ordinance but absent its flexibility (exemption clauses) and absent its education and assistance efforts.

3.5.2 Alternative 2: An Equipment Standard Instead of a Performance Standard

An equipment standard specifies the type of control equipment required in a certain industrial process. It is the most inflexible and hence the most costly version of environmental control. The Irvine ordinance is in the form of a performance standard in that it specifies an outcome -- no release of ODCs -- that the City wishes the firm to achieve, but does not specify that the goal must be achieved by a specific means. An equipment standard is examined as the second alternative.

3.5.3 Alternative 3: A Labeling/Public Awareness Program
As mentioned earlier, the city of Cambridge, Massachusetts recently passed a law requiring that all products containing or manufactured with ozone-depleting compounds be labelled as such. A labeling program depends on public awareness of the danger of ozone depletion. The public is expected to use their purchasing power to compel industry to move away from products that directly or indirectly cause ozone-depletion. Having a labeling/public awareness program is the third option.

3.5.4 Alternative 4: No Ordinance at the Local Level

Having a different environmental regulation in each town and village may be unnecessarily burdensome, especially if the pollutant is effectively regulated at the national level. Since ODCs have a global and not a local effect, it may be better that localities not regulate them. Having no ordinance at the local level is the fourth alternative.

3.6 Cost-Effectiveness of the Ordinance

The Irvine ordinance is inherently cost-effective in that it meets its goal in the least cost manner. There are two features of the ordinance that contribute to this conclusion. The first is the fact that the ordinance is a performance standard. It places no constraints on complying firms that would require them to use any other than the firm’s preferred method for achieving the goal. The second feature is that the ordinance allows a number of exemptions. The most important aspect of the exemption is that it allows extra time for those firms which have not identified a satisfactory method for eliminating ODC to do so. In the following we contrast Irvine’s ordinance with the alternatives to it.

3.6.1 Alternative 1: An Inflexible Regulation

If Irvine’s ordinance lacked its exemptions, Table x.1 indicates some of the costs that firms would have borne. These costs consist of a degradation in the product or a more expensive manufacturing process. For example, Sharp Microelectronic identified a Rosin Flux Remover as the best way of meeting the goal at an additional cost of $15/gallon over their original flux remover. The change had a negative effect on product quality. Absent an exemption, these costs -- the slight increase due to the more expensive input and the degradation of the product -- would have had to be borne, or the facility would have had to have moved its operation out of the city, by the initial deadline set by the ordinance. In other cases, Table x.1 shows that some of the firms eventually found methods that
reduced their costs or improved the quality of their product. Rosemont Analytical achieved savings with no effect on product quality. Ricoh Electronics improved product quality after a $750,000 capital expenditure. These opportunities would have not been realized without the exemption.

3.6.2 Alternative 2: An Equipment Standard Instead of a Performance Standard

An even worse outcome would have occurred had Irvine imposed specific control technologies. Table x.1 illustrates that in cases where 1,1,1 - TCE is controlled the best control options identified for any facility are not duplicated elsewhere. Each facility has its own special problems so even if an equipment standard attempted to isolate specific applications, the only way it could match the preferred outcome obtained by the ordinance is to develop a unique equipment standard for each facility. The less the equipment standard tries to do this and thus save cost of regulatory development, the more costs it imposes on the firms. An equipment standard would also retard development of new ways of controlling ODCs.

3.6.3 Alternative 3: A Labeling/Public Awareness Program

A labeling program has several advantages and disadvantages. One disadvantage is that labeling programs are difficult to implement. Many products, somewhere in their production, contact an ozone-depleting substance or process. Are all of these products to be labelled? If so, determining which products to label, whether labels should differ based on the amount of ozone-depletion the product causes, and how to quantify differences in ozone-depleting potential all become issues. Because labeling requires that industry keep track of any input to the product, it is as much work to comply with a local labeling ordinance as with a national one. Because start-up costs are large, for both the firm and the government, a labeling program is best done at the national level, so that the costs can be spread over a larger number of units sold and a single approach to labeling followed. Furthermore, reductions in ODCs cannot be traced directly to the labels. There is an intermediate step in which individuals decide whether they want to reduce their consumption of the product if it contains ODCs. Then there is the problem of demonstrating that any decline in the use of labeled products was due to the labeling as opposed to other factors such as the recession, changes in taste, or new substitute products. A firm will have the choice of doing all the work to label its products or not selling them in the town that requires the labeling. Finally, many regulators see labeling programs as less burdensome on manufacturers than ozone depleting chemical bans or equipment/performance standards to reduce ozone-depleting chemical emissions; since the labeling programs are
often seen as less burdensome, a labeling regulation might be applied to a greater number (wider range) of sources than a ban or equipment standard regulation.

In addition, in instances where a set of similar products are made by the same process (a process using ozone depleting chemicals) or with the same substances (an ozone-depleting substance) and all of the products are labeled, the consumer is left with no choice. In the short run, he must by the ozone-depleting product or not buy the product at all.

An advantage of a labeling program is that companies are not required to purchase new, possibly expensive technology, that may be outdated by the time it is put into practice. On balance product labeling is a poor choice for local governments.

3.6.4 Alternative 4: No Ordinance at the Local Level

Irvine's Ordinance has compelled numerous local firms to reduce or eliminate their release of ODCs while garnering the praise of many who would normally oppose regulation, but what if many cities adopted a similar ordinance? If there were any form of equipment standard or if the exemptions incorporated in the urban ordinances were not as flexible as Irvine's it could lead to the situation large national corporations fear: having a large number of different local requirements to deal with, each in a different way. Even if Irvine's ordinance were adopted by each city without change, there would still be a large number of persons the firms must deal with to verify their compliance with each local rule. Because the effects of ODCs are global, not local, the rule would work better if administered by a few larger entities like states or the federal government, rather than by hundreds of individual cities. That way a firm with facilities in several cities could ascertain the compliance for all of them by talking with the same group of people.

3.7 Conclusions

Irvine's Ordinance Governing the Manufacture, Distribution, Sale, and Recycling of Products which Utilize Ozone-Depleting Compounds is a well conceived regulation that achieves its basic goals in a cost-effective way. However, a proliferation of such ordinances would lead to excessive cost to industry relative to the benefits conferred on the global environment. Three significant conclusions can be drawn from this analysis of Irvine's Ordinance.
First, flexible regulation is good regulation. The exemption categories provided by Irvine's Ordinance were broad enough to flush out those companies that were having trouble complying with the law because of a lack of alternatives or a lack of resources. By not mandating that such firms discontinue the use of ozone-depleting compounds, regardless of cost or availability of substitute factors, Irvine's ordinance allowed the companies that were having difficulty determining effective alternatives the time to research the best compliance program for their company. The ordinance is also flexible in that it does not dictate any particular approach to compliance -- i.e., it does not impose an equipment standard -- and thus allows any approach that eliminates ODCs.

Second, the worst form of a regulation of ODCs at the local level is product labeling. It imposes costs on industries wishing to operate in a community that are nearly equal to the costs they would bear if the labeling requirement were national. Furthermore, a national labeling requirement is being promulgated, making the local efforts truly superfluous.

Third, the regulation of emissions of ODCs is best left to higher levels of government. If the emissions had a local effect, this would not necessarily be true. But for emissions whose only effects are global, having a similar rule in a number of cities would rapidly and unnecessarily increase regulatory burdens.

Irvine has framed its ODC regulation correctly, and has implemented it well. But there is still the question of whether Irvine should have implemented such an ordinance at all.
4 Ozone Depleting Substances: Non-Essentials

4.1 Introduction

The stratospheric ozone layer protects the earth from harmful ultraviolet radiation. According to the EPA, "national and international consensus has developed that certain human-made halocarbons (including chlorofluorocarbons (CFCs), halons, carbon tetrachloride, and methyl chloroform) can transport chlorine and bromine to the stratosphere and there contribute to the depletion of the ozone layer." Depletion of the ozone layer, in that it allows more ultraviolet radiation to reach the earth, is harmful to human health and has the potential to lead to increased incidence of skin cancer, suppression of the immune system, and other health problems. Ozone depletion also has the potential to damage crops and aquatic organisms.

Realizing the threat that ozone depletion poses to human health and the environment, the United States has established regulations governing ozone depleting substances since the late 1970s. In 1978 the United States banned the use of CFC as aerosol propellants in all but "essential applications." In 1987, the United States was one of the twenty-two nations who signed the Montreal Protocol, an international agreement to reduce ozone depleting products in the atmosphere. By signing the Protocol, the United States pledged to freeze the production and consumption of CFC-11, -12, -113, -114, -115, and halon 1211, 1301, and 2402 at 1986 levels, and to a phased reduction of CFCs to 50 percent of 1986 levels by 1998. To institute this international pledge, the EPA created a system of tradable allowances of the controlled substances and monitored industry's compliance with the production and consumption limits with record keeping and quarterly reporting requirements. In 1989, the EPA further regulated chlorofluorocarbons by levying an excise tax on the sale of CFCs and other ozone depleting substances, with specific exemptions for exports and recycling.

Amendments to the Montreal Protocol in 1990, commonly called the London amendments, have lead to new regulations on ozone depleting substances and products. The amendments call for a complete phase-out of the regulated CFCs and halons by 2000, a phase-out of carbon tetrachloride and "other CFCs" by 2000, and a phase-out of methyl chloroform by 2005. As a result of these amendments, the Internal Revenue Service expanded the excise tax on ozone depleting substances to include methyl

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1 OMB Review Draft of the EPA’s Notice of Proposed Rulemaking for 40 CFR Part 82, 6/4/91. Note that all information on past ozone-depleter regulation, the EPA, and the EPA's intent concerning the proposed ban on nonessentials are from this source unless otherwise noted.
chloroform, carbon tetrachloride, and the "other CFCs" of the amended Montreal Protocol. In addition, Title VI of the Clean Air Act was amended in 1990 to contain the legislation necessary to comply with the amended Montreal Protocol in the United States. The amended Clean Air Act requires regulations restricting ozone depleting substances, including provisions to reduce emissions of controlled substances to the "lowest achievable level" in all use sectors, to ban nonessential products, to mandate warning labels, and to establish a safe alternatives program.

The banning of nonessential products is the focus of this chapter. Section 610(b) of the Clean Air Act requires the EPA to "identify nonessential products that release Class I substances into the environment (including any release during manufacture, use, storage, or disposal) and prohibit any person from selling or distributing any such product, or offering any such product for sale or distribution, in interstate commerce" after November 15, 1992. Section 610(b) may be applied to both consumer and commercial products. Class I substances include CFCs, halons, carbon tetrachloride, and methyl chloroform. The criteria to be used in determining non-essentiality include: "the purpose or intended use of the product, the technological availability of substitutes for such product and for such Class I substance, safety, health, and other relevant factors." The Clean Air Act explicitly banned chlorofluorocarbon propelled plastic party streamers and noise horns and chlorofluorocarbon-containing cleaning fluids for noncommercial electronic and photographic equipment as nonessential products.

In June of 1991 the EPA released a draft proposed rule on the banning of nonessential products. In the June draft proposed rule, the EPA determined three product categories to be non-essential. They included flexible and packaging foam using CFCs, aerosols and other pressurized dispensers containing CFCs, and residential fire extinguishers containing halons. In January of 1992, the EPA published the proposed rule in the Federal Register. In the January proposed rule, the EPA did not determine that halon fire extinguishers were nonessential. They remained neutral and asked for comment on the issue. The following sections of this chapter discuss issues surrounding the ban on November 15, 1992 of residential halon fire extinguishers as proposed in the June draft proposed rule, how the January proposed rule is different from the June 1991 draft proposed rule, the cost of banning the extinguishers, and alternatives to the banning of the extinguishers.

4.2 The EPA's Ban on Residential Halon Fire Extinguishers in the June Draft Proposed Rule

The EPA states that its primary reason for proposing the ban on residential halon fire extinguishers is that substitute products are "currently available and widely used." According to the EPA adequate
substitutes include multipurpose dry chemical, powders, and water. The leading alternative is the multipurpose dry chemical fire extinguisher, a type of powder fire extinguisher, with an ammonium phosphate based agent that is electrically non-conductive and non-toxic and has no ozone-depleting potential. In evaluating the decision to ban residential halon fire extinguishers using the safety and health criteria, the EPA states that they are unaware of any health dangers associated with multipurpose dry chemical fire extinguishers. They do however mention that halon can produce toxic gases when used on very hot fires. In evaluating the purpose or intended use of residential halon fire extinguishers, the EPA states that residential halon fire extinguishers serve a very important service. They conclude, however, that the huge imminent tax burden on these products as well as the downturn in the market of the products, demonstrate that the use is inessential. The imminent tax burden the EPA refers to is the scheduled increase in the tax on halons. On January 1, 1994 the excise tax on halons increases from $0.25 to $7.95 per pound for halon 1211 and $26.50 per pound for halon 1301. This will most likely increase the price of residential halon fire extinguishers.

When evaluating the proposed ban using the other relevant factors criteria, the EPA focuses on the economic impact of such a ban on small business and consumers. The EPA estimates that the impact on the manufacturers of residential halon fire extinguishers will be minimal. According to the EPA's Draft Background Document on Identification of Nonessential Products that Release Class I Substances (May 1991), the majority of residential halon fire extinguishers are made by eight factory sealed fire extinguisher manufacturers, which are considered small businesses. The average number of employees at the eight facilities is twenty-five. According to the EPA, three of the eight facilities are in financial distress and are expected to go out of business. There is then no impact on those manufacturers. Of the remaining manufacturers, the EPA quotes the Association of Factory Sealed Fire Equipment Manufacturers as saying "if a suitable chemical alternative is not identified and commercialized for use by January 1, 1994, the ... halon tax will effectively force the remaining manufacturers out of business." The EPA then "does not believe there to be a significant impact on this industry from the proposed rule because these facilities are expected to close in the near future even without the proposed rule, due primarily to the tax on halons." The EPA also states that banning the use of residential halon fire extinguishers will have little economic impact on consumers, because


3The Association of Factory Sealed Fire Equipment Manufacturers represents six of the eight manufacturers of residential halon fire extinguishers.
halon was not the least costly type of fire extinguisher available for residential use. According to the EPA, residential halon fire extinguishers were popular in the market because of their ease of use and cleanliness, not because they were inexpensive.

4.3 Discussion of the EPA’s Rationale in the June Draft Proposed Rule and the January Proposed Rule

The substitute products the EPA describes as "currently available and widely used" do not have the attributes of halon. Multipurpose dry chemical fire extinguishers and other powder extinguishers, unlike halon extinguishers, may require significant clean up after use in order to prevent corrosion of electronic equipment. This is a point that the Association of Factory Sealed Fire Extinguisher Manufacturers, Inc. believes the EPA understates. According to the Association, "statistics show more and more electrical and electronic goods are being purchased by the average U.S. citizen and the use of a halon extinguisher does not lead to damage of such equipment whether directly involved in the fire or in another room of a dwelling. Discharge of a halon or a powder extinguisher in a particular room will always lead to extinguishant being distributed all around the house, consequently, powder can cause serious corrosion damage to electrical/electronic equipment in rooms well away from the source of the fire." Multipurpose dry chemical and other powder fire extinguishers also require service checks to make sure the substances inside the extinguisher have not caked, possibly causing the extinguisher to fail to release extinguishant during an emergency situation. Such maintenance does not always occur in residential settings, where many consumers overlook the maintenance of fire extinguishers.

Until such time as a perfect substitute for halon fire extinguishers is developed, it is incorrect to classify halon fire extinguishers as non-essential. It is possible that substitute products currently being developed by the halon industry may have the same fire-fighting and clean-up properties as halon fire extinguishers. If so, these products would be perfect substitutes, and halon could be classified as nonessential once these products are on the market.

In the January 16, 1992 proposed rule published in the Federal Register, the E.P.A. softens its argument that substitute products are "currently available and widely used." They write that "EPA

4Letter from Glyn Miller of the Association of Factory Sealed Fire Extinguisher Manufacturers Inc., April 3, 1991 to Dan Blank, United States EPA. Note that all information from the Association of Factory Sealed Manufacturers was obtained from this source unless otherwise noted.

believes that halon substitutes will be available for most applications in the near future." (Emphasis added.) They request "comments on the effectiveness of halons and the substitutes on the different types of fires."

By concluding that they are unaware of any safety or health problems associated with the use of multipurpose dry chemical fire extinguishers when evaluating the decision to ban residential halon fire extinguishers using the safety and health criteria in the OMB Review Draft of the EPA's Notice of Proposed Rulemaking for 40 CFR Part 82, the EPA overlooked an earlier conclusion it drew about the safety of multipurpose dry chemical fire extinguishers. In the Draft Background Document on Identification of Nonessential Products that Release Class I Substances the EPA writes, "Dry chemical extinguishers, when used in a small unventilated area may reduce visibility for a period of up to several minutes." The EPA continues to overlook this difference in its January 16, 1992 proposed rule.

The EPA's conclusion that the downturn in the residential halon fire extinguisher market reflects that the use of such extinguishers is nonessential, when evaluating the purpose or intended use of such extinguishers, is inappropriate. The EPA infers that the downturn reflects that substitutes are available and widely used. Two points can be made about the downturn. First, stores such as K-mart that were the major outlet for many of the halon units discontinued them for reasons of store policy. Hence, demand is not directly revealed by the downturn. Secondly, even though halon fire extinguishers are more expensive than their substitutes and less widely available, a market still exists. This implies that the market that remains is very likely a loyal one, that has strong reasons for using halon units. The intended use of halon units is to put out fires in situations where the collateral damage of substitute products is unacceptable.

In the January 1992 proposed rule, the EPA states that the substantial downturn in the market for halon residential fire extinguishers combined with the large imminent tax burden on these substances "raises questions as to whether the intended use of halons in this product area is nonessential and whether a ban is necessary." (Emphasis added.)

The EPA's conclusion then that there would be no economic impact on consumers from a ban on residential halon fire extinguishers when evaluating other relevant factors is mistaken. The economic impact of a ban on consumers may not be felt in the market at the time of purchase since halon extinguishers are more expensive than their substitutes, but may be felt by those consumers of multipurpose dry chemical extinguishers or other powder extinguishers who release extinguishant in
their home and subsequently encounter large cleaning bills. Accordingly, in examining the market for halons and the economic impact of withdrawing them, consumers should be divided into groups depending on the value and nature of the property they are trying to protect. For each group, a willingness to pay for a "clean" halon fire extinguisher can be calculated, based on the expected cleaning bill using a "dirty" substitute and the probability of a fire.

This analysis, shown in Table x.1, demonstrates that there are consumers who would pay a high price for clean fire extinguishers. Various probabilities of fire are shown along the top of the table and cleanup costs due to "dirty" fire extinguishers on the side. Each segment of the consumer population can be defined with a unique pairing of these factors. For each combination of factors, the maximum price that the consumer is willing to pay for the halon unit is presented. At this price the expected cost of purchasing the halon unit, including the expected cost of cleanup given the probability of fire ($0 since halon is used), just equals the expected cost of utilizing and cleaning up after the substitute. For any combination of probability of fire and cost of cleanup for a dirty unit that results in a price shown below line A in Table x.1, the expected cost of utilizing a halon unit costing $33.25 is less than that of utilizing a multipurpose dry chemical unit costing $15.25. For any consumer facing those combinations of risk and cleanup cost, the ban on halon units would result in an economic cost. If a tax on halon is imposed the price of utilizing a halon unit increases, and the set of people for whom halon units exhibit lower expected costs than dry chemical units gets smaller (those under line B), but there are still numerous combinations. For example, if the clean-up cost is $40,000 and the probability of fire is 0.001, the consumer would be willing to pay $55.25 for the halon unit, which exceeds its $52.50 after tax price.

Additionally, in evaluating other relevant factors, the EPA's conclusion that a ban would cause "no significant impact" on the manufacturers of residential fire extinguishers is also mistaken. In the January 16, 1992 proposed rule, the EPA states that "EPA has received information from industry representatives that it would be extremely disadvantageous to the industry to require a total phaseout of halon use in residential fire extinguishers prior to January 1, 1994. The ban on residential halon fire extinguishers would take effect in November of 1992 and have a significant impact on the manufacturers of such products by prohibiting the sale of the manufacturer's principle products and possibly closing some of the manufacturers. This impact should not be minimalized just because the

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6 The $33.25 and the $15.25 price were received from Maryland Fire Equipment Corporation for a 2.5 pound halon fire extinguisher with a 5BC rating and a 2.5 pound multipurpose dry chemical fire extinguisher with a 1A10BC rating.
### Table 4.1 Consumer Willingness to Pay for Halon Fire Extinguishers

<table>
<thead>
<tr>
<th>PRICE:</th>
<th>$13.25</th>
<th>$33.25</th>
<th>$52.50</th>
</tr>
</thead>
<tbody>
<tr>
<td>of substitute</td>
<td>of halon</td>
<td>of halon with tax</td>
<td></td>
</tr>
</tbody>
</table>

#### Probability of use of fire extinguisher

<table>
<thead>
<tr>
<th>Expected clean-up cost for substitute</th>
<th>0.00001</th>
<th>0.0001</th>
<th>0.0005</th>
<th>0.001</th>
<th>0.005</th>
<th>0.01</th>
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</thead>
<tbody>
<tr>
<td>$100</td>
<td>$15.25</td>
<td>$15.26</td>
<td>$15.30</td>
<td>$15.35</td>
<td>$15.75</td>
<td>$16.25</td>
</tr>
<tr>
<td>$1,000</td>
<td>$15.26</td>
<td>$15.35</td>
<td>$15.75</td>
<td>$16.25</td>
<td>$20.25</td>
<td>$25.25</td>
</tr>
<tr>
<td>$10,000</td>
<td>$15.35</td>
<td>$16.25</td>
<td>$20.25</td>
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</tr>
<tr>
<td>$20,000</td>
<td>$15.45</td>
<td>$17.25</td>
<td>$25.25</td>
<td>$35.25</td>
<td>$115.25</td>
<td>$215.25</td>
</tr>
<tr>
<td>$40,000</td>
<td>$15.65</td>
<td>$19.25</td>
<td>$35.25</td>
<td>$55.25</td>
<td>$215.25</td>
<td>$415.25</td>
</tr>
<tr>
<td>$60,000</td>
<td>$15.85</td>
<td>$21.25</td>
<td>$45.25</td>
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<td>$315.25</td>
<td>$615.25</td>
</tr>
<tr>
<td>$80,000</td>
<td>$16.05</td>
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<td>$95.25</td>
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<tr>
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<td>$16.25</td>
<td>$25.25</td>
<td>$65.25</td>
<td>$115.25</td>
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<td>$1,015.25</td>
</tr>
<tr>
<td>$200,000</td>
<td>$17.25</td>
<td>$35.25</td>
<td>$115.25</td>
<td>$215.25</td>
<td>$1,015.25</td>
<td>$2,015.25</td>
</tr>
<tr>
<td>$400,000</td>
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<td>$55.25</td>
<td>$215.25</td>
<td>$415.25</td>
<td>$2,015.25</td>
<td>$4,015.25</td>
</tr>
<tr>
<td>$600,000</td>
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<td>$315.25</td>
<td>$615.25</td>
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<td>$515.25</td>
<td>$1,015.25</td>
<td>$5,015.25</td>
<td>$10,015.25</td>
</tr>
</tbody>
</table>

Note: For any combination of probability of use of fire extinguisher and cost of cleanup for a multipurpose dry chemical unit that results in a price shown below line A, the expected cost of utilizing a halon unit costing $33.25 is less than that of utilizing a multipurpose dry chemical unit costing $15.25. If a tax on halon is imposed, the set of conditions for which halon units exhibit lower expected costs than dry chemical units decreases to the set of people under line B.
tax to be imposed in January of 1994 may or may not have the same effect. An analysis of the impact of a ban on the halon fire extinguisher market was performed based on sales of 2.5 million units of residential halon fire extinguishers in the base year 1987 at a selling price of $33.25 per 2.5 pound unit.\(^7\) Multiplying the number of units by the sales price gives 1987 revenues of approximately $83,000,000 in 1991 dollars. 1987 is used as the base year because the EPA's Draft Notice of Proposed Rulemaking on 40 CFR Part 82 (6/4/91) maintains that sales of portable residential halon fire extinguishers has been reduced in 1991 to fifty percent of what it was in 1987. The analysis also assumes that within the residential halon manufacturing industry, the percent of business attributable to residential sales is ninety-five percent of sales. This assumption is based on the EPA’s Draft Background Document on Identification of Nonessential Products that Release Class I Substances (5/91). The analysis, shown in Tables x.2, x.3, and x.4, projects the sales of residential halon fire extinguisher manufacturers from 1991 to 1999 with and without a ban on the sale of residential halon fire extinguishers for two scenarios. Scenario I assumes that with the ban, new non-halon products, commercial and residential, are developed by the halon fire extinguisher manufacturers, whereas Scenario II assumes that with a ban, there is no new product development.

The projections without the ban, shown in Table x.2, are the same for Scenario I and Scenario II. Without the ban it is assumed that sales of the old (current) residential and commercial products decline until they reach zero during and after the year 1994, but that sales of a new residential and commercial product using a halon alternative will begin in 1994. The revenues for the old halon product declines from 1992 to 1993 due to a tax increase of $7.70 per pound of halon. The magnitude of the decline depends on three assumptions. First, there is no change in the number of units sold to "non-residential" customers. Secondly, residential customers, who accounted for the purchase of 2.5 million units in 1987, are divided into three groups with different price sensitivities and different shares of the market. Forty percent of them have a need for a very clean fire extinguisher because they have fine art works, or valuable electronic or photographic equipment that would be hard to clean and hard to replace. Their demand for halon or something else just as "clean" is highly inelastic. Fifty percent have slightly elastic demand for halon, meaning the total revenues collected from them after a price increase would decline by a relatively small amount, and ten percent have highly elastic demand for halon, meaning there would be a major decline in revenues collected from them. Thirdly,

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\(^7\)The 2.5 million quote was received from Glyn Miller of the American Association of Factory Sealed Fire Extinguishers in a phone conversation September 18, 1991. The $33.25 price was received from Maryland Fire Equipment Corporation for a 2.5 pound halon fire extinguisher with a 5BC rating.
Table 4.2 Revenue Projections for the Residential Halon Manufacturing Industry Without a Ban on Residential Halon Units

<table>
<thead>
<tr>
<th>Year</th>
<th>Old Residential Products</th>
<th>New Residential Products</th>
<th>Total Residential Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Old Residential Products</td>
<td>New Residential Products</td>
<td>Total Residential Sales</td>
</tr>
<tr>
<td></td>
<td>Revenue</td>
<td>Tax</td>
<td>Net</td>
</tr>
<tr>
<td>1987</td>
<td>$83,125,000</td>
<td>$0</td>
<td>$83,125,000</td>
</tr>
<tr>
<td>1988</td>
<td>$74,812,500</td>
<td>$0</td>
<td>$74,812,500</td>
</tr>
<tr>
<td>1989</td>
<td>$66,500,000</td>
<td>$0</td>
<td>$66,500,000</td>
</tr>
<tr>
<td>1990</td>
<td>$58,187,500</td>
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<tr>
<td>1991</td>
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</tr>
<tr>
<td>1992</td>
<td>$41,562,500</td>
<td>$0</td>
<td>$41,562,500</td>
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<td>$36,646,382</td>
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<tr>
<td>2000</td>
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<td>$0</td>
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<tr>
<td>NPV</td>
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<td>$104,421,335</td>
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</table>

NPV: Net Present Value
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<tr>
<th>Year</th>
<th>Old Non-Residential Products</th>
<th>New Non-Residential Products</th>
<th>Total Non-Residential Products</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Revenue</td>
<td>Tax</td>
<td>Net</td>
</tr>
<tr>
<td>1987</td>
<td>$4,375,000</td>
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<td>$4,375,000</td>
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<tr>
<td>1988</td>
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<tr>
<td>1989</td>
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<td>$4,375,000</td>
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<tr>
<td>1990</td>
<td>$4,375,000</td>
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<tr>
<td>1999</td>
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</tbody>
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NPV $15,325,213 $2,458,403 $12,866,810 $24,609,517 $0 $24,609,517 $39,934,730 $2,458,403 $37,476,327 $443,317,295
Table 4.3 Revenue Projections for the Residential Halon Manufacturing Industry Assuming a Ban and Assuming New Non-Halon Residential Product Development and Sales (Scenario I)

<table>
<thead>
<tr>
<th>Year</th>
<th>Old Residential Product</th>
<th>New Residential Product</th>
<th>Total Residential Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Revenue ($)</td>
<td>Tax ($)</td>
<td>Net ($)</td>
</tr>
<tr>
<td>1987</td>
<td>$83,125,000</td>
<td>$0</td>
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<tr>
<td>1988</td>
<td>$74,812,500</td>
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<td>1989</td>
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<td>1990</td>
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<tr>
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<td>$81,894,545</td>
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</table>
Table 4.3 (Continued)

<table>
<thead>
<tr>
<th>Year</th>
<th>Old Non-Residential Product</th>
<th>New Non-Residential Product</th>
<th>Total Non-Residential Sales</th>
<th>Total Net Revenues</th>
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</thead>
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<td></td>
<td>Revenue</td>
<td>Tax</td>
<td>Net</td>
<td>Revenue</td>
</tr>
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<td>$24,609,517</td>
<td>$0</td>
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NPV: $14,937,044, $2,316,074, $12,620,970, $24,609,517, $33,954,561, $2,316,074, $37,230,487, $460,544,664
Table 4.4 Revenue Projections for the Residential Halon Manufacturing Industry Assuming a Ban and Assuming No New Non-Halon Residential Product Development and Sales (Scenario II)

<table>
<thead>
<tr>
<th>year</th>
<th>old residential product revenue</th>
<th>tax</th>
<th>net</th>
<th>new residential product revenue</th>
<th>tax</th>
<th>net</th>
<th>total residential sales revenue</th>
<th>tax</th>
<th>net</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>$83,125,000</td>
<td>$0</td>
<td>$83,125,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
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Table 4.5 Assumptions Concerning the Effect of a Tax on Halon on the Purchase of Halon Fire Extinguishers by the Three Categories of Residential Consumers Defined for the Analyses of Tables 4.2, 4.3, 4.5

<table>
<thead>
<tr>
<th>Category</th>
<th>Demand classifications</th>
<th>Very elastic</th>
<th>Slightly inelastic</th>
<th>Very inelastic</th>
<th>Total</th>
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</thead>
<tbody>
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</tr>
<tr>
<td>Price elasticity of demand</td>
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<td>0.1</td>
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<tr>
<td>% of unit sales</td>
<td>10</td>
<td>50</td>
<td>40</td>
<td>100</td>
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</tr>
<tr>
<td>Initial quantity</td>
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<td>1,250,000</td>
<td>1,000,000</td>
<td>2,500,000</td>
<td></td>
</tr>
<tr>
<td>Initial revenue</td>
<td>$8,312,500</td>
<td>$41,562,500</td>
<td>$33,250,000</td>
<td>$83,125,000</td>
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</tr>
<tr>
<td>Reduction in quantity (due to tax)</td>
<td>250,000</td>
<td>796,053</td>
<td>57,895</td>
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<td>Resulting quantity</td>
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<td>942105</td>
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<td></td>
</tr>
<tr>
<td>Resulting revenue</td>
<td>$0</td>
<td>$23,832,237</td>
<td>$49,460,526</td>
<td>$73,292,763</td>
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<tr>
<td>Loss of revenue</td>
<td>$8,312,500</td>
<td>$17,730,263</td>
<td>($16,210,526)</td>
<td>$9,832,237</td>
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</table>

| Percent halon taxed | 100% |
| Amount of halon pre-extinguisher | 2.5 pounds |
| Tax per pound | $7.70 |
| Total tax | $19.25 |
| Lost revenue/initial revenue | 12% |
| Initial price | $33.25 |
| Tax | $19.25 |
| New price | $52.50 |
| % change in price | 58% |
| Tax as % of new price | 37% |
the percent of the halon not recycled and therefore subject to the tax is one-hundred percent. If half the halon is recycled the impact of the tax is only half as large. Table x.5 shows these assumptions, and how the halon tax affects residential customers' purchases. Overall, the tax increases the price by fifty-eight percent, assuming it is all passed through to consumers. Revenues from residential customers decline by twelve percent, as shown by the twelve percent decrease in revenue for the 1993 year without the ban in Scenarios I and II. Revenues net of the tax decline by forty-four percent. The associated decline in quantity purchased is twenty-seven percent. It is possible or even likely, that the industry could survive the tax increase for a year or two until alternative products are available that would not be subject to the tax, especially if recycling would reduce the proportion of the halon content of the fire extinguishers subject to the tax.

When residential and commercial sales of the old products end in 1994, sales of the new non-halon products increase at the same rate as sales of residential halon products decreased from 1987 to 1991 until they reach the 1987 level of sales in 1999. This is based on the assumption that the new non-halon product has a price similar to that of halons and offers the same easy clean-up qualities as halon fire extinguishers. It is also assumed that halon fire extinguisher manufacturers continue to sell the same quantity of fire extinguishers in the non-residential market as they do currently, about five percent of the 1987 residential level.

With the ban, the scenarios are similar in that they both assume that sales of the old residential and commercial products cease when the ban is instituted in 1992. Beginning in 1993 sales of the old commercial and residential products are zero. Scenario I and II are illustrated by Tables x.3 and x.4 respectively. The scenarios differ in that Scenario I assumes that new residential and commercial products are marketed in 1994, while Scenario II assumes the production and marketing of no residential or commercial product after the year 1992; the industry did not survive long enough to market new products. In Scenario I, new residential product revenues increase at the same rate halon revenues decreased from 1987 to 1992 until they reach the 1987 level in 1999. The new non-residential product is assumed to have the same sales as the old non-residential product.

The purpose of looking at these two scenarios with and without the ban is to consider how the ban will affect the industry. Table x.6 shows the results of the comparison in the present value of the

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8 Halon can be recycled if manufacturers or other facilities recapture the halon in fire extinguishers that have not been used to extinguish a fire and have reached the end of their lifetime. The halon recovered from these extinguishers can be used in new extinguishers or to fill extinguishers from which the extinguishant has been discharged.
costs of the ban, calculated with a discount rate of .01. Costs are revenues without the ban minus revenues with the ban. For both Scenario I and Scenario II, total net revenues without the ban are $483,317,295; total net residential revenues are $445,840,968. In Scenario I, total net revenue with the ban decreases to $460,544,664, and total net residential revenue with the ban decreases to $423,314,177. In Scenario II, total net revenue without the ban decreases to $90,515,023, and total net residential revenue decreases to $81,894,545. Total losses then for Scenario I of residential revenues over the period 1991-1999 with the ban are $23 million in 1991 dollars. In Scenario II, total losses of residential revenues for this period are $364 million in 1991 dollars. When total revenues are used, Scenario I figures change slightly. The Scenario II cost, however, increases to $393 million. The extra $29 million represents lost non-residential sales. Contrary to the EPA's conclusion, both of these analyses show a significant impact on the residential fire extinguisher manufacturing industry with a ban.

4.4 Cost-Effectiveness of a Ban on Halon Fire Extinguishers

As discussed above, the opportunity cost to business in the form of lost revenues during the period 1991-1999 is $23 million in 1991 dollars if the industry survives the ban to produce its substitute product and $393 million if it does not. Using these figures as well as the total reduction of halon 1211 projected to result from a ban, it is possible to determine the cost-effectiveness of a ban. It has been estimated that in 1991 residential halon fire extinguisher manufacturers used 400,000-500,000 pounds of halon 1211. 9 450,000 pounds, an average of this estimate, will be used as the halon reduction that would result from a ban on residential halon fire extinguishers. Assuming the industry survives to produce a substitute product (Scenario I), the cost-effectiveness of the ban is $51 per pound of halon 1211 ($111,567/Mg). Assuming the industry does not survive (Scenario II), the cost-effectiveness of the ban is $873 per pound of halon 1211 ($1,924,401/Mg).

These cost-effectiveness measures have several weaknesses. First, the use of lost revenues or opportunity cost in this analysis results in a debatable measure of cost-effectiveness. A measure of lost consumer surplus should have been used in place of lost revenues. The data required to calculate consumer surplus for halon fire extinguishers was not available, but there is reason to believe that demand will be inelastic and consumer surplus high.

Table 4.6 Costs to the Residential Halon Manufacturing Industry of a Ban on Residential Halon Fire Extinguishers for Scenarios I and II

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Residential</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>I - Non-halon alternative products developed and marketed</td>
<td>$22,526,791</td>
<td>$22,772,631</td>
</tr>
<tr>
<td>II - No non-halon alternative products developed and marketed</td>
<td>$363,946,423</td>
<td>$392,802,272</td>
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</table>
Secondly, attributing a reduction of 450,000 pounds of halon to this regulation overstates the probable halon reduction and therefore underestimates the cost-effectiveness ratios given here. By using the 450,000 pound value, we assume that the amount of halon used annually by the residential halon manufacturing industry will not decrease from its 1991 value by 1993 and that all of the halon 1211 that would have been used to make the banned fire extinguishers in 1993 would have been released to the environment. It is possible, however, that halon recycling might increase by 1993. In addition, only a percentage of fire extinguishers purchased by residential homeowners are ever used to extinguish fires. It is not possible to determine a more realistic number for the amount of halon reduction that can be expected to result from this regulation. To do so, assumptions would have to be made about halon recycling rates and the rate at which halon is released from fire extinguishers as extinguishant and from leaks. We do not possess the information necessary to make reasonable assumptions about these rates. In addition, if we do assume that some of the halon used by the residential halon fire extinguisher manufacturing industry is recycled, our cost values would change since the cost determination in Section x.3 assumed zero percent recycling. To change the cost values to incorporate recycling, it would be necessary to make assumptions about the costs to manufacturers of recycling and the costs of purchasing recycled halon. We do not possess the information to make reasonable assumptions about these costs. It is expected, however, that a recalculation of the cost-effectiveness values given above that took into account recycling and assumed that only a percentage of the halon in fire extinguishers was released as extinguishant or leaks would yield higher cost-effectiveness ratios than those determined above.

4.5 Alternatives to a Ban of Residential Halon Fire Extinguishers

4.5.1 No Regulation

A major alternative to a ban on residential halon fire extinguishers would be to maintain the status quo and not regulate residential halon manufacturers. This can be done if it is determined that residential halon fire extinguishers are not nonessential. The analysis above explains why residential halon fire extinguishers are essential. Their intended use is very important -- putting out fires. Most importantly, there are no substitutes for halon extinguishers with the same properties as halon extinguishers. There is a segment of the population of consumers of residential halon manufacturers with a very inelastic demand for the extinguishers, people who own expensive electronic equipment, computers, or other materials that would be damaged by a multipurpose dry chemical fire extinguisher, people who would face significant clean-up costs.
The major benefit of this alternative is that it allows the manufacturers of residential halon fire extinguishers time to develop, test, and market substitutes for halon extinguishers before the increased excise tax on halon in 1994 using returns from sales of halon fire extinguishers to the sector of the residential halon market with inelastic demand for halon extinguishers. Without this time, our analysis above shows that the industry may not survive. In addition, the cost of removing a Megagram of halon under this approach is very high. Perhaps it would be more cost effective to control ozone-depleting chemical emissions elsewhere or to concentrate on developing an efficient recycling program for halon.

There are two problems with this alternative. First, without a ban on the sale or manufacture of residential halon fire extinguishers, the halon used in such extinguishers would still be released into the atmosphere in the case of a fire where it would contribute to ozone depletion. But, sales of residential halon fire extinguishers are likely to decrease with the onset of January 1994 tax increase on halon. Factors affecting the magnitude of this decline were discussed above. Without recycling, a 27 percent decline in the number of units sold is expected, according to our analysis above. EPA expects a 100 percent decline. Secondly, the manufacturers of residential halon units may not proceed as quickly with substitute research and development if they receive relief from a ban of their halon products. This seems unlikely, however, due to the increasing excise tax on halon which will increase even more in the future, the fact that halon use must be discontinued by 2000, and in light of research already conducted by the industry into new product development (discussed below).

Additionally, the cost of a ban on residential halon fire extinguishers is large compared to the gain in terms of halon reduction attributable to a ban. Residential halon fire extinguishers account for only 0.16 percent of the total ozone depletion potential attributable to the Halon/CFC market in the United States. Furthermore, they account for only 1.3 percent of the total United States halon market. The cost of eliminating these emissions could very well be the domestic residential halon fire extinguisher manufacturing industry. In light of expected future reductions in halon use, it would be nearly as effective for the EPA to conduct outreach programs for the residential halon manufacturing industry on recycling and halon substitutes. All members of the Association of Factory Sealed Manufacturers, which represents six of the eight manufacturers of residential halon fire extinguishers, have already established halon recovery and reclaim systems.

4.5.2 Postponed regulation
A second alternative would be to maintain the status quo until the effects of the January 1, 1994 excise tax increase are known. At such a time if the sales of residential halon fire extinguisher do not decline or discontinue, a decision to ban the manufacture and sale of residential halon fire extinguishers could be reevaluated. This alternative is less effective than the ban in that it allows the continued sale of residential halon fire extinguishers until the effects of the January 1994 tax could be determined. The benefit of this alternative is that it allows time for the development of alternative products using returns from the manufacturer's sales of halon fire extinguishers to the sector of the market with very inelastic demand for halon fire extinguishers. The analysis shown in Tables x.2-x.4 shows that the development and marketing of new residential (and commercial) products soon after a ban is essential to the survival of the residential halon fire extinguisher manufacturing industry. The analysis shows that if the industry produces a product with similar properties at a similar price to those of the halon extinguishers they can expect to return to 1987 levels of sales and revenues. Getting through 1993 is the major obstacle to this.

According to the Association of Factory Sealed Fire Extinguisher Manufacturers, which represents six of the eight manufacturers of residential halon fire extinguishers, member companies have invested considerable sums of money and effort into the development and testing of alternatives to halon such as FM 100, FM 200, and DuPont's 232. Safety Plus, one of the manufacturers of residential halon extinguishers, has already spent over $30,000 fire testing substitute products. Tests have been carried out at Underwriters' Laboratories, and resources have been invested in the evaluation of compatible plastic and rubber components necessary for these substitutes. The long-term testing of models based on these substitutes has begun. Studies include tests for toxicity and chemical availability as well as assessments of compliance with UL and NFPA standards. The development of substitute products is a lengthy process, however.10 Banning residential halon fire extinguishers under the proposed rule might force many of the manufacturers of residential halon fire extinguishers out of business before the development of these substitutes was complete. Although the losses due to the ban in Scenario I, when compared to the revenues without a ban are relatively small (about five percent of total revenue for the period), they constitute the entire revenue for the year of 1993. Most of the industry's resources would be idle for that year or employed in another industry, making restart difficult or impossible.

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10 Letter from Glyn Miller, April 10.
Rather than determine that residential halon fire extinguishers are nonessential and ban the sale of residential halon fire extinguishers, the EPA could achieve a reduction of emissions by November 1992 from residential halon fire extinguishers and put off the ban until November of 1994. The EPA could determine industry guidelines for the manufacturers of residential halon fire extinguishers during this time. These guidelines could include leak detection tests for all units and labels on units requiring their return to a manufacturer when the product's guarantee ends or when the product has been partially used. When such units are returned to the manufacturers, the manufacturers could be required to recycle halon. Such a recycling system is likely to be put in place by the manufacturers of halon products in any case as a result of the increase in the cost of halon. The benefit of this alternative is that it allows time for the development of substitutes to residential halon fire extinguishers using the returns from halon fire extinguisher sales, so that manufacturers could make it through 1993, while decreasing the amount of halon escaping into the atmosphere to cause ozone depletion.

4.6 Conclusion

Residential halon fire extinguishers are not nonessential products. The purpose of residential halon fire extinguishers are to save lives and damages that result from fires. Substitutes with the same effectiveness and properties (lack of clean-up costs) are not yet available. Furthermore, the EPA analysis greatly underestimates the cost of the ban of halon fire extinguishers for residential users. This is because EPA failed to account for an important segment of the market -- those consumers who can avoid high clean-up costs after a fire only if a halon (or other "clean") fire extinguisher is available. This market segment will provide enough revenue to the industry to give it a good chance of surviving the tax. However, the industry's prospect of surviving the ban is not as good, given that its revenues will be reduced to zero for a year or more. The present value of lost revenue is estimated to be between $23 million and $393 million depending on which scenario occurs.
Appendix
MEMORANDUM

June 25, 1991

To: Kevin Bromberg, SBA
From: Eric VanDeVerg, JFA
Re: Comments on 40 CFR Part 70, Permitting of Sources of Air Pollution, from the perspective of small business.

INTRODUCTION

Title V of the Clean Air Act Amendments of 1990, P.L. 101-549, enacted on November 15, 1990 requires the EPA to promulgate regulations within 12 months of enactment that require and specify the minimum elements of State operating permit programs. A new Part 70 of Chapter I of Title 40 of the Code of Federal Regulations will contain the provisions to carry out Title V. The draft version of 40 CFR Part 70 published in the Federal Register May 10, 1991 has the potential to severely impede the ability of American firms to respond to developments in the market place. It also has the potential to streamline some response mechanisms and incentives to efficient application of emission control options, such as emission trading. Whether the first potential is avoided and the second realized depends on how a number of issues not completely spelled out in 40 CFR Part 70 are resolved. This discussion (testimony) makes the case for several alternatives to the current language of 40 CFR Part 70 that will streamline the regulation and protect the economic viability of both small and big business.

Examples of the potential to retard business include the possibility that even small businesses with the simplest of applications would have to wait one and a half years for permit renewals or modifications that would allow them to alter their production process, that the amount of information they must include in their permits grows extra large due to rulings on the de minimus size of emission points they must include in their permit, and the number of regulatory requirements they must cite in the permit becomes large and complex. The approach should be to reduce permit application and review time by making each permit as simple as possible within the limits defined by Title V.

Potential to streamline changes in the production process includes the statement that a source may at any time switch to any alternative production and pollution control scenario listed in its permit, that emission trading does not require permit (or SIP?) modification, and that a number of initiatives are to be undertaken to ease the permit burden on small sources, including the use of general permits, the establishment of a small business assistance program, and temporary exemptions for non-major sources. These measures will help streamline the permitting process and, in some cases, help to reduce the total cost of meeting air quality goals, but only if program elements to achieve these ends are aggressively developed. General permits should be strongly promoted to the
states by EPA, emission trading networks developed in key regions where they are most likely to be needed, and strong efforts made to ensure that the SBAP are in place and equipped to assist small business with all these programs (i.e., general permits, emission trading, and design of permits to ensure maximum flexibility).

We also state our hope that the final regulation will provide firms with a single permit that covers all state and federal emission control requirements. Requiring sources to fill out state applications separate from federal applications and wait for state permit approval, renewal, and modification as well as federal permit approval, renewal, and modification would be burdensome for sources.

In the following sections, we describe six issues stating how they affect small business, what alternatives we propose, and the pros and cons of the alternatives.

Comment I. Permits in General

A. Issue

Section 70.6(d)(3)(iv) reads, "Neither notification nor permit revision is required for changes at the source that are allowed for and regulated by the permit, or that are not regulated or prohibited by the permit."

B. Implications for Small Business

Section 70.6(d)(3)(iv) could lengthen and complicate permits. NESCAUM, the Northeast States for Coordinated Air Use Management, writes, "For the record we note that if EPA proceeds with exempting a source from all conditions not explicitly mentioned in a permit, states will be forced to greatly lengthen their permits to include all potential conditions needed to restrict source activities to those within the purview of their permit. Obviously this will impede the timely review and completion of permits and we believe was not intended by Congress or EPA in the drafting of this proposal."

If the proposed regulation does not change and NESCAUM's prediction is realized, small business would be negatively impacted by Section 70.6(d)(3)(iv). If states attempt to include every detail they believe will affect a source's emissions in the permit, drafting permits would become an extremely lengthy and demanding process for the state permitting authorities. The granting of permits would be likely to take the maximum amount of time state agencies are allowed for review. Long waiting periods for permits means less flexibility for small business. Starting a new business, expanding a business to capture a sudden increase in demand, or modifying a current business practice becomes a long, laborious process.

1See NESCAUM's comments on the proposed Part 70 regulations.
On the other hand, once the permit is in place, this measure ensures that a business has flexibility to make changes that are consistent with the permit. The permit can be developed in such a way that this clause provides a great number of options to the business.

C. Available Alternatives

Leave Section 70.6(d)(3)(iv) of the proposed regulation to read the way it does now, but encourage states to refrain from spending an excessive amount of time trying to determine every detail that might affect permits on a case by case basis. Encourage states to add a phrase or paragraph to the permit which states that all permittees are responsible for being in compliance with all state laws concerning air pollution. If necessary, include those laws in an appendix of the permit.

States should not believe that by doing this they will be underregulating sources. A source should not have to ask federal, state, or local authorities before making changes in its operations which do not violate the law. All areas and all ways in which a state wishes to regulate a source of air pollutants should be part of a regulation. States should not feel they can limit a source's actions in ways not incorporated into law or regulation.

D. Discussion

This clause implies both a cost (possibly a small one) and a (potential) benefit to business. The cost, burdening the permit with possibly copious detail, buys the firm the option of designing a permit that will cover a number of future operating scenarios. This could be a valuable tool for industries like chemical batch processors. The cost (of including extra regulatory detail) can be kept low if it is realized that the extra detail is "boiler plate," and can be put in an appendix or incorporated by reference. State air pollution officials we talked to have no problem with inclusion by reference.

Comment II. 18 Month Permit Renewal/Modification Process

A. Issue

The time between a firm's decision to alter its production process and the day it can actually begin to operate the new process may be unnecessarily lengthened. The following parts of the proposed Part 70 Chapter I of Title 40 of the Code of Federal Regulations are part of the EPA's interpretation of Title V of the Clean Air Act and are pertinent to the following discussion.

70.5 (a) "For purposes of permit renewal...a timely application is one that is submitted 18 months prior to the date of permit expiration, or such other time as may be approved by the Administrator...in no event shall a time less than 6 months before
permit expiration be approved."

70.7 (a) (2) "...the program shall provide that the permitting authority take final action on each permit application (including request for permit modification or renewal) within 18 months after receiving a complete application."

70.7 (d) (3) "Permit modifications shall be subject to the same procedural requirements, including those for public comment and Federal oversight, as original permit issuance, except that the required review shall cover only the proposed changes rather than the unchanged activities of the permittee."

A permit modification is defined as a change in its process that increases criteria pollutants above a de minimis level (Sec. 112) or a physical change or change in a method of operations that results in an increase in the source's hourly emissions rates (Sec. 111).

B. Implications for Small Business

1. 18 Month Permit Renewal Period

The principal problem to small business of the 18 month permit renewal period is its length. 18 months is too long. For a small source in which only minimal changes or modifications will be made to the permit, having to submit an application for permit renewal 18 months before the other one expires is bothersome. If permits are written for a three year period, sources would be in a process of permit renewal half of the time, even more if you count the time necessary to fill out a permit renewal application. Furthermore, if a permit renewal application is due 18 months before a permit expires, much of the information contained on the application may change during the review process. This will call for changes and additions to the permit renewal application during 18 month review process which have the potential to create burdens on both industry and regulators. Even if the state permitting authority reviews a permit renewal application the first month of the 18 month period and approves it, it cannot renew the permit for 17 months. Close to the end of the 18 month time period, the permitting authority would definitely want to review the application again to make sure there are no changes. Why should the permit sit in the state office becoming outdated just to be reviewed twice?

2. 18 Month Permit Modification Period

The predominant problem to small business of the 18 month permit

\[\text{2See the Statement of Melvin Keener, Assistant Director,}\]
\[\text{Federal Government Affairs, BP Chemicals, on behalf of the Chemical}\]
\[\text{Manufacturer's Association on EPA's Proposed Rule For the Clean Air}\]
\[\text{Act Operating Permit Program, Washington, D.C. June 4, 1991.}\]
modification period is its length. 18 months is too long. Once the permit modification application is filled out, the source has to possibly wait 18 months before it knows if it can or cannot make the change. While the implications for small industry are variable, several small industries would be particularly affected by an 18 month permit modification process. Chemical batch processors who make a variety of products for among others, the pharmaceutical industry, chemical industry, agricultural industry, plastic industry, solvent, paint, sealer, and varnish industry, and paper industry, need maximum flexibility. A study done by the Synthetic Organic Chemicals Manufacturing Association outlines the reasons why chemical batch processors need flexibility. The reasons include the need to develop a product for a specific application, the need to fill an order for a small volume of a chemical which is not normally made by one piece of dedicated equipment, the need to supply seasonal demand, the need to supply a customer when they have a shortfall in raw materials, the need to supply a customer's emergency requirement, the need to match a competitor's product, and the need to gain the confidence of prospective customers.

In general, the costs to all small business of an 18 month permit modification process are the following opportunity costs:

a) Idle resource costs - For example, suppose a chemical batch processor gets an order to make chemical abc for a pharmaceutical company that has discovered a new miracle drug. Because the batch processor did not expect this demand for chemical abc and producing the chemical necessitates operational change, the batch processor must apply for a permit modification. For up to 18 months, the equipment at the chemical batch processor sits unused.

b) Lost business opportunities - For example, suppose a chemical batch processor fails to make a product that satisfies a customer. A different batch processor is offered the opportunity to manufacture a replacement batch but cannot do so quickly because of the 18 month permit modification process. The former chemical batch processor remakes the product and the opportunity is lost.

C. Available Alternatives

1. Establish a permit modification and renewal schedule based on the complexity of the permit

a) Renewal

(1) General permits -

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Complete general permit renewal applications must be filed with the appropriate state government authority two months before the current permit expires. The State authority would have up to 2 months from the time the complete application was filed to act on the application.

(2) Regular permits -

(a) For regular permits in which substantial changes* will be made, complete permit renewal applications must be filed with the appropriate state government authority no less than 6 months before the current permit expires. The State authority would have up to 18 months from the time the complete permit application was filed to act on the application.

(b) For regular permits in which only minor changes** will be made, complete permit renewal applications must be filed with the appropriate state government authority 6 months before the current permit expires. The State authority would have 6 months from the time the complete application was filed to act on the application.

*Substantial change is defined as a change which results from both:
  a) new rules and regulations
  b) source desire to make a modification as defined in Sec. 111 or 112 of Title V.)

**Minor change is defined as a change which is not substantial.

b) Modification

(1) General permits - Complete general permit modification applications such as the purchase of a new dry-to-dry machine for which a general permit has been developed must be filed with the appropriate state government authority one month before the permittee wishes to make the modification.

(2) Regular permits - There are currently two classes of modification, minor and major. We proposed adding a third. For lack of a better term, we will call them more than minor but less than major changes*. If the permitted source wishes to make a more than minor but less than major modification, he/she must file an application for modification 6 months before he/she wishes to be able to make the modification. The state authority has six months from the time the completed application is received to act on the application.

*More than minor but less than major is defined as a potentially large modification which is not a major modification because the modification has been done before by an industry of the same SIC code.
2. Encourage the establishment of emissions trading networks by establishing comprehensive guidance to regions developing SIPs in order to increase the flexibility of the permits and decrease the number of sources who have to go through modification processes. The way the proposed regulation is written a source does not have to go through permit revision to participate in emissions trading. Part 70.6(a)(8) states that a permit must contain "A provision stating that no permit revision shall be required for increases in emissions allowed through emissions trading to the extent such trades are authorized by the applicable requirements of the Act, including any applicable implementation plan."

D. Discussion

Permit renewal is necessary for two major reasons: determining how new rules and regulations apply to a source whose permit is up for renewal and evaluating any changes the regulated source wishes to make to its permit. 18 months is not necessary for evaluating changes the regulated source would like to make to its permit, because any major modifications that the permitted entity has made since its last permit approval will have undergone a permit modification process and been incorporated into the permit already. It is possible that some industries will wait for their permit renewal time to come around before making such changes. This is doubtful, however, since most permits will have a length of three to five years, and 3 to 5 years is a long time for an industry to wait to make a change. 18 months is not necessary to determine how new rules or regulations apply to a permitted source either. If permits were written to last for more than 3 years, the permits may already have been reopened to incorporate all the new rules and regulations at the time of permit expiration. (A permit can be reopened to incorporate new rules and regulations if it has 3 or more years remaining in its life when new rules and regulations are passed that are applicable to it. Title V. Sec. 502(b)(9))

If however there are new rules and regulations that apply to the permitted source when a permit expires or the industry does wish to make significant changes during permit renewal, why is 18 months necessary? Once the affects of new rules and regulations have been determined for several representatives of one type of industry, the process for other members of that industrial grouping should not take as long. Title V. Sec. 502(b)(6) of the Clean Air Act calls for "adequate, streamlined, and reasonable procedures... and for expeditious review of permit actions including applications, renewals, or revisions..." Furthermore, much of the detailed information necessary to determine how a change in an industrial process or change in a regulation will affect a permit will already be in the permit as the minimal permit requirements are excessive.

It is possible that regulators intend to use part of the proposed 18 month renewal period to determine compliance for enforcement purposes. The permit renewal period should not be used for enforcement purposes. The State agency should monitor compliance more often than every time a permit is to be renewed. If the State
has difficulty doing so, perhaps it is not efficiently using the funds accruing to it from the permit fees, or perhaps the permit fees are too low.

It is understandable that some permit modifications may be complex and require an 18 month approval period. We believe, however, that the major category is too broad and could be narrowed by creating a "more than minor but less than major" modification category. The inclusion of a "more than minor but less than major" modification category would alleviate the burden on groups of source's who are modifying their industrial process in similar ways or who are being brought into compliance with the same regulation. For example, if all dry cleaners are switching from current equipment to a dry to dry system, why should each one have to go through a long permit modification process to explain the procedure to the state permitting authority. Similarly, once a new rule or regulation has been applied to a few dry cleaners, it should not be difficult to determine how to apply it to other dry cleaners. All dry cleaners use practically the same equipment and have similar emission profiles.

Based on the inflexibility of the permit modification process as it is proposed in the proposed Part 70 regulation, sources may decide to overestimate their emissions. They would have to pay a greater permit fee, but $25/ton is not excessive. It may be cost effective for a source to pay the larger permit fee in order to be able to take advantage of changes in the market for their products without going through a permit modification process. This would unfortunately decrease the certainty of the data upon which air quality models are based and regulations determined. Establishing extensive emissions trading networks and promoting their effectiveness, may keep sources from providing themselves with extra flexibility in their permits. A working, efficient emissions trading program would not only benefit business, but decrease the administrative burden on EPA.

Comment III. Using Actual Emissions to Determine Permit Fees

A. Issue

The Section of Title V which creates permit fees is Section 502(b) 3. This Section establishes a permit fee "sufficient to cover all reasonable (direct and indirect) costs required to develop and administer the permit program requirements of this title[V]..." In the preamble for the Part 70 proposed rule, released to the public on May 10 in the Federal Register, the EPA writes, "The program must presumptively collect a fee amount from all permitted sources equal to at least $25 per ton (1990 baseline) for the actual emissions of each regulated pollutant... The program need not collect the $25 per ton amount if it can provide a demonstration that a lesser amount will adequately support the direct and indirect costs of the program[502(b) 3 (B) (iv)]. Conversely, States are free to use different approaches or charge more than $25
per ton and must do so if additional funds are necessary to cover the costs of the program."

B. Implications for Small Business

In much of the debate on the proposed Part 70 of Chapter I of Title 40 of the Code of Federal Regulations, we believe there has been a misunderstanding on the part of some commenters of the definition of potential emissions." People have misconstrued potential emissions to be those emissions that result from a source operating at their absolute maximum potential, regardless of operational limits. For instance, the International Fabricare Institute, an association which represents dry cleaners and launderers across in the United States, explains that potential emission estimates for dry cleaners "grossly" overestimate actual emissions. They write, "Dry cleaners do not run their equipment 60 seconds a minute, 60 minutes an hour, 24 hours a day, 7 days a week, 365 days a year normally associated with emitting potential." But the proposed 40 CFR does not define potential emissions this way. Part 70.2 (y) of the proposed CFR defines "Potential to emit" to mean "the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of a source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation is federally-enforceable." Potential emissions should be thought of as allowable emissions-- the emissions from a source operating within its normal business hours and within all laws affecting its operation.

Presumably using the misunderstood definition of potential emissions, many sources have argued that permit fees should be based on actual emissions rather than potential emissions. It is true that actual emissions will always be less than the misconstrued definition of potential emissions, and that actual emissions should always be lower than or equal to the regulation's definition of potential. But, commenters are possibly burdening themselves with expensive monitoring costs when they suggest that permit fees be based on actual emissions.

Determining actual emissions from a source can be quite costly if it means installing expensive monitoring equipment. In areas where emissions monitoring is not already done or where the cost of such monitoring would be great, it is possible that the cost of determining actual emissions could be greater than the permit fee. For example, the Northeast States for Coordinated Air Use Management, the members of which are 8 Northeast air pollution control agencies, writes, "We caution that if the proposal goes as proposed state agencies may require additional continuous

"See the Testimony of the International Fabricare Institute on the Proposed Regulations for the Operating Permits Program."
monitoring at sources to monitor a source's level of actual emissions. This may end up costing a source more than if fees were based on potential emissions. It is not in the spirit of the Clean Air Act, which strives to minimize its impact on small business, to impose monitoring costs greater than the permit fee. It is already necessary for a source's "potential" emissions to be a part of its permit as it is required in Title V. It would be simpler for some sources to use this amount of emissions for determining their fee, than to go to the extra cost of determining their actual emissions.

C. Available Alternatives

1. Allow sources to choose whether to determine their permit fee based on actual or allowable emissions based on the cost effectiveness of doing so for each source.

2. Give industries the option of trying to negotiate with their state permitting authority a flat fee for their industrial category. Similar to the other fees, this fee could be corrected by the Consumer Price Index and renegotiated on a regular basis. This is supported by the preamble to the proposed part 70 regulation which states, "States are free to use different approaches" than charging $25/ton, but it should be made more explicit.

D. Discussion

A flat fee or fee based on allowable emissions could keep the costs of determining actual emissions from overwhelming small business and becoming more costly than their actual fee. While the $/ton fee in some small way acts as an incentive for the producers of pollutants to reduce emissions, it is not large enough to really act as an economic incentive. Replacing it with a flat fee for small businesses or those businesses with excessive monitoring costs (not required in another part of the Act) will not exclude a major economic incentive component of the Act.

Comment IV. Small Business Stationary Source Technical and Environmental Compliance Assistance Program

A. Issue

The Title V Sections of concern here are Sections 507(a) and (b). Section 507 of the Amendments creates a small business stationary source technical and environmental compliance assistance program. 507(a) outlines the responsibilities of the state Program, while 507(b) outlines the responsibilities of the Federal Program. In the proposed Part 70 of Chapter I of Title 40 of the Code of Federal Regulations, the requirements for EPA approval of a state

See note 1.
small business stationary source technical and environmental compliance assistance program are outlined. The program must offer:

1. Mechanisms for developing information concerning compliance methods and programs to encourage lawful cooperation among such sources.
2. Mechanisms to assist such sources with pollution preventions and accidental release detection and prevention.
3. A State ombudsman for such sources to aid in implementation of the Act.
4. A compliance assistance program to help such sources determine applicable requirements and receive permits.
5. Mechanisms to assure that such sources receive notice of their rights under the Act.
6. Mechanisms to assure that such sources are informed of their obligations under the Act, including referrals to qualified auditors.
7. Procedures to consider requests from such sources to modify work practice or technological compliance methods, or the milestones for implementing such methods.

B. Implications for Small Business

There are several problems with the regulation as it now stands. First, it is possible that a state might not adopt a program. In such a case, small business assistance and information would be provided by a federal small business stationary source technical and environmental compliance assistance program. We do not believe that a federal program could be as responsive to needs of state business as a state program could be. The federal program office would not only have to be able to assist with federal laws and regulations but also with a particular state's air pollution laws and regulations.

Also, the regulation as proposed only suggests a brief outline of what a state program should be. More detail has been provided since that time in the EPA's Guidelines for the Implementation of Section 507 of the 1990 Clean Air Act Amendments. But, small business does not know how these guidelines will be interpreted and cannot depend on quality programs being developed in the states. The program will differ from state to state, and may be ineffective. Will states disseminate information using fact sheets and hire only one small business ombudsman? Conversely, will states create a small business stationary source technical and environmental compliance assistance office with multiple resource personnel and access to the governor, attorney general, and air pollution control authority?

Without a small business stationary source technical and environmental compliance assistance program in each state, small business will spend more time and labor determining which permits apply to them, how to fill them out, and if applicable who to hire to fill them out.
C. Available Alternatives

Establish stronger guidelines on what a quality small business stationary source technical and environmental compliance assistance program is. Based on discussion with a state air quality official, we suggest that the guidance recommend that the program be autonomous from the state air quality office and any economic development office that the state may operate. An independent office, with access to the governor would have the most leeway to offer a balanced perspective to small business.

D. Discussion

The SBAP can potentially reduce permit and control costs to small businesses by providing advice and assistance. These offices should assist small business to promote general permits, emission trading, innovative approaches to permit writing, etcetera. The offices should be staffed by persons dedicated to making each element of the permitting program work smoothly for small business.

Comment V. Operational Flexibility

A. Issue

The following four things have been suggested in the Regulatory Flexibility Analysis performed for Title V. of the Clean Air Act Amendments on November 15, 1990 or in the proposed part 70 regulation as ways to minimize the impact of Title V. on small business, but they are only optional to the States.

1. Section 502 (b) 10 of Title V. establishes fast track approval for minor modifications to permits. It reads, "These are changes which go beyond the activities allowed in the original permit that increase the total emissions allowed under the permit (for any regulated pollutant from emissions units addressed by the permit), but do not rise to the level of modifications subject to Title I NSR procedures and do not violate any applicable Federal requirements. Under such a "fast track" process for minor permit amendments, States are free to adopt procedures to allow such changes to take effect automatically after a specified period of time (no less than 7 days), as long as the permitting authority does not object during this period."

2. Section 504(d) of Title V. establishes general permits. It reads, "The permitting authority may, after notice and opportunity for public hearing, issue a general permit covering numerous similar sources. Any general permit shall comply with all requirements applicable to permits under this title." On the topic of general permits, the preamble to the proposed permit regulations reads, "For those small business still required to obtain, or those opting to obtain, a permit, and for other appropriate source categories, EPA is promoting the use of general permits where possible."
3. Section 504 (f) of the Act defines the permit shield provision of Title V, which enables States and the Administrator to provide sources with greater certainty as to their legal obligations under the Act. This section establishes that "the permit shall be deemed in compliance with all other applicable provisions of this Act which relate to the permittee if-- (1) the permit includes the applicable requirements of such provision, or (2) the permitting authority in acting on the permit application makes a determination relating to the permittee that such other provisions (which shall be referred to in such determinations) are not applicable and the permit includes the determination or a concise summary thereof. In the proposed rule, the EPA writes, "The EPA encourages States to employ the "permit shield" routinely to help stabilize the permit process and give greater certainty to the regulated community."

4. The EPA has proposed to defer non-major sources for five years. They receive the authority to make this suggestion from Title V. Section 502 (a) which reads, "The Administrator may, in the Administrator's discretion and consistent with the applicable provisions of this Act, promulgate regulations to exempt one or more source categories (in whole or in part) from the requirements of this subsection if the Administrator finds that compliance with such requirements is impracticable, infeasible, or unnecessarily burdensome on such categories, except that the Administrator may not exempt any major source from such requirements." In the preamble to the proposed rule the EPA writes, "The EPA proposes to use the authority available under section 502(a) to defer initially the applicability of the Title V program to all sources that would otherwise be subject but are not major or affected sources under the Act. The EPA finds that without this deferral, compliance by all these non-major sources with the permitting requirements would be "impracticable" and "infeasible" within the meaning of Section 502 (a)."

B. Implications for Small Business

1. Without the 7 day fast track approval process for minor modifications, small business will have to spend more time on permit modification. A possible 18 month permit modification process for a minor modification which leads only to a de minimis change in emissions could keep sources from making quick changes to take advantage of changing markets or from making a new product to take advantage of an anticipated consumer demand.

2. Without general permits all industry, including small sources with similar emissions profiles, would have to go through an extensive permit application process. This is not necessary if a group of sources employ the same equipment and work practices and share similar emissions profiles. The state permitting authority does not need every single dry cleaner to explain how its equipment works and what its air pollution controls will be, because all dry cleaners basically have the same equipment. Left optional to the states, it is possible that some states will not have the time to develop general permit programs. The National Environmental
Development Association's Clean Air Regulatory Project and American Electronics Association write, "States, left by EPA rules, with the task of characterizing each small industry group in the state and devising general permit rule, but meeting only once every one to two years, often with limited sessions and constitutional mandates to deal with revenue matters and redistricting, will never consider legislation on general permits and states will not have ability to devise such rules, particularly without guidance from EPA on source categories." This would be unfortunate because both states and business benefit from general permits. State agencies have to spend less administrative time and money. Even the EPA benefits. General permits are easy to view and monitor, if the EPA wishes to check for state compliance on some issue.

3. Without strong encouragement from the EPA, the states may not adopt permit shields. Based on conversations with state air quality officials, we find that all of these officials view the permit shield as a clause that exempts sources from being regulated. Without a permit shield, permitted sources will have less faith in the completeness of their permit and worry that they may be required to comply with some regulation they have never heard of before. This rule was meant to shield permittees from unanticipated changes in regulations. It would ensure that until a permit is renewed or modified, the source would have a clear definition of its rights and duties. Permits should be viewed as a negotiated contract between states and permittees, with some benefit to both. Both sides benefit from certainty; permittees know their obligations, and states know the emissions limit for the source.

4. According to the Regulatory Impact Analysis and Regulatory Flexibility Act Screening Analysis for Proposed Title V Operating Permits Regulations dated February 12, 1991 "approximately 80% of State and local air pollution control agencies already have some kind of operating permit program in place. Of those States with programs in place, 88% permit small sources emitting 25 tons per year and 79% permit sources which emit less than 25 tons per year." It is probable that states which already have established permit programs in place and already permit some small sources will not defer non-major sources for five years. Based on the large percentage of states with such programs, the small business community cannot make a blanket assumption that all states will defer non-major sources. Furthermore, if non-major sources are not deferred for at least a few years, the small business stationary source technical and environmental compliance assistance program may not be established when small sources have to apply for permits. Non-major sources would not have an organized program to

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6See the Testimony of David A. Chittick, AT&T Corporate Environment and Safety Vice President, on behalf of The National Environmental Development Association's Clean Air Regulatory Project and the American Electronics Association, before the Environmental Protection Agency, June 4, 1991.
turn to with questions. Similarly, if non-major sources are not deferred, states may not have had time to establish general permits.

C. Available Alternatives

1. Leave the 7 day fast track approval process as optional to states but strongly encourage them to adopt it, or make the 7 day fast track approval process mandatory.

2. Leave the adoption of general permits as optional but strongly encourage states to adopt general permit programs by publishing a list of sources that would be good applicants for general permits and model permits for at least some of these industries. Or, make it mandatory that states adopt general permits for a fixed group of sources. Perhaps sources who feel they are especially qualified for a general permit could pay a one time fee to cover the initial fixed cost of writing a general permit for their industry. Whether the EPA leaves the program as it is now or mandates general permits for some sources, the agency needs to begin to determine which sources may be able to utilize a general permit. The following is a list of sources who have been suggested by various associations as particularly appropriate for general permit use.

- dry cleaners (NEDA, AEA, & IFI)
- metal fabricators (NEDA & AEA)
- small printing operations (NAM, NEDA, & AEA)
- metal finishing operations (NAM, NEDA, & AEA)
- small textile mills (NAM, NEDA, & AEA)
- small electronics facilities (NAM, NEDA, & AEA)
- electroplating (NAM, NEDA, & AEA)
- batch chemical (NEDA & AEA)
- batch food processing (NEDA & AEA)
- metal furniture (NAM, NEDA, & AEA)
- batch plastics (NAM, NEDA & AEA)
- machinery manufacturing (NAM, NEDA, & AEA)
- batch metal manufacturing (NAM)
- pharmaceutical (NAM)

3. Leave permit shields as optional to states but make a greater effort to explain to states how a permit shield would work and the economic benefits of certainty for a business.

4. Unless a non-major source wishes to be permitted:
   a) Propose deferral for non-major sources at least until model general permits have been established for certain categories.
   b) Propose deferral for non-major sources at least until states have an established small business stationary source technical and environmental compliance assistance program.
   c) For states which already have an air quality program which permits some small sources, continue with the state's permit system until a time when a) and b) have been accomplished.
D. Discussion

If certain parts of EPA's proposed rule for the Operating Permit Program which ensure operational flexibility are not adopted by states, the EPA's determination that the small business economic impact from the Title V. permitting program will be insignificant should be reevaluated.

Comment VI. Exemptions

A. Issue

The regulation of concern here is Section 502(a) It reads, "The Administrator may, in the Administrator's discretion and consistent with the applicable provisions of this Act, promulgate regulations to exempt one or more source categories (in whole or in part) from the requirements of this subsection if the Administrator finds that compliance with such requirements is impracticable, infeasible, or unnecessarily burdensome on such categories, except that the Administrator may not exempt any major source from such requirements."

B. Implications for Small Business

As of the proposed Part 70 regulations which appeared in the Federal Register on May 10, 1991 no sources had been exempted. We believe there is a possibility that asbestos demolition and removal should be considered as a possible exemption. EPA already has legislation (Requirement to Inspect and Requirement to Notify) which examines the temporary release of air pollutants from asbestos demolition and removal sites. (See the November 20, 1990 Federal Register) Developing permit programs for these temporary ventures when there is already a program in place is redundant and may be a waste of the EPA's time.

Also there are some non-major source types, such as wood stoves, that contribute to air quality problems in some regions (for example Vermont) but not others (perhaps Florida). Unless these are exempted, all such sources will have to be permitted, even if they are not part of the SIP for the region.

C. Available Alternatives

Exempt asbestos demolition and removal from needing a permit and continue to implement EPA's Requirement to Inspect and Requirement to Notify.

Exempt source types that are typically non-major and contribute to pollution concerns in only some regions. State in the regulations that exempted sources would have to have permits in a region if that region included them in their SIP.

Go the next step -- State that non-major sources are not required
by 40 CFR Part 70 to be permitted unless they are part of a SIP.

D. Discussion

The key issue under exemptions is to find language that would define the minimum set of sources that all states must permit. This set should not include sources that do not present problems except in a few locations. The language should also clarify the circumstance in which the generally exempted source should be permitted.
Model General Permit Application for Dry Cleaners

1. General Information

Company Name: ________________________________

Location: ____________________________________

(Street) (City) (State) (Zip)

Owner's Name: ________________________________

(Last) (First) (M.I.)

Owner's Address: ______________________________

(Street) (City) (State)

Designated Representative: ______________________

(Last) (First) (M.I.)

Designated Representative's Address: _______________

(Street) (City) (State)
II. Equipment

Please check the box which corresponds to the model of your facility's dry cle equipment and the number of these models your facility operates.

Model ABC  
My Facility operates □ 1 □ 2 □ 3 other (Please specify.)

Model XYZ  
My Facility operates □ 1 □ 2 □ 3 other (Please specify.)

Model 123  
My Facility operates □ 1 □ 2 □ 3 other (Please specify.)

Model 456  
My Facility operates □ 1 □ 2 □ 3 other (Please specify.)

Model DEF  
My Facility operates □ 1 □ 2 □ 3 other (Please specify.)

Model 456  
My Facility operates □ 1 □ 2 □ 3 other (Please specify.)

Other: If the type of equipment your facility operates is not listed above, please give a detailed description of your equipment.

____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
II. Equipment and Fuel Use Information

A. For the equipment listed in Part II. of this permit application, please estimate what capacity (0-100%) this piece of machinery is operated. (0% = Equipment is used at facility but is not operated. 100% = Equipment is used at maximum capacity).

<table>
<thead>
<tr>
<th>Model #</th>
<th>% of capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

70.5(b)(3)(iv)

B. Please check the box next to the following fuels and raw materials associated with your dry cleaning equipment which are sources of regulated pollutants.

<table>
<thead>
<tr>
<th>Material</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perchloroethylene</td>
<td></td>
</tr>
<tr>
<td>abc solution</td>
<td></td>
</tr>
<tr>
<td>cdf solution</td>
<td></td>
</tr>
</tbody>
</table>

70.5(b)(3)(vi)

C.
1. Please check the box beside the maximum number of hours your facility operates during a normal week.

   - [ ] <10
   - [ ] 10-15
   - [ ] 16-20
   - [ ] 21-25
   - [ ] 26-30
   - [ ] 31-35
   - [ ] 35-40
   - [ ] 41-45
   - [ ] 46-50
   - [ ] 50-55
   - [ ] 56-60
   - [ ] > than 60; Please specify.____________

2. How many times a year does your facility exceed this maximum weekly average and by how much each time? ____________________________
IV. Information on other pollutants

A. To determine what other regulated pollutants exist at your facility, please check the boxes next to any of the following sources of regulated pollutants operate on the premises of your facility.

- [ ] gas stove
- [ ] gas operated refrigeration unit
- [ ] gas heat
- [ ] gas powered electric generator
- [ ] lawnmower

Are you aware of any other sources of regulated pollutants operated at your dry cleaning facility. If so, please list. ____________________________________________

B. To determine what other regulated pollutants exist at your dry cleaning facility, please check the boxes next to the following raw materials which exist at your facility.

- [ ] gasoline
- [ ] bleach
- [ ] paint
- [ ] varnish
- [ ] motor oil
- [ ] cleaning solvent A
- [ ] natural gas
- [ ] other—Please specify material and quantity. ____________________________

______________________________
______________________________
Model General Permit for Dry Cleaners

I. General Information
Dry Cleaner Name: [70.5(b)(1)]
Location of Dry Cleaner: [70.5(b)(1)]
Dry Cleaner Owner: [70.5(b)(1)]
Dry Cleaner Owner’s Address: [70.5(b)(1)]
Designated Representative: [70.5(b)(1)]
Designated Representative’s Address: [70.5(b)(1)]
SIC code: [70.5(b)(1)]

II. Legislation Information
Citation and description of applicable State and Federal air pollution control requirements [70.5(b)(4)(i)]

III. Emissions Information
A. Brand and model of dry cleaning equipment [70.5(b)(2)]
B. A determination of emissions from the dry cleaner based on inputs from the brand and model of the dry cleaner’s equipment (which explain pollution control equipment and the emissions outputs of the equipment) and from the application (limitations on operation and fuel and raw material use) [70.5(b)(2)(i)(ii)(iii)(v)(vi)(vii)]
C. Calculations on which the dry cleaner information was based [70.5(b)(2)(viii)]
D. Other pollutant information
   1. Raw Materials: List of raw materials which exists at the dry cleaning facility. [70.5(b)(2)(iv)]
   2. Pollution Emitting Equipment: List of pollution emitting equipment which exists at the dry cleaning facility. [70.5(b)(2)(i)]

IV. Compliance Information
A. Applicant

In signing this permit, I agree to all of the following:
- I agree that all of the information I provided in the permit application is true. [70.5(a)]
- I agree to operate my dry cleaning equipment within the operation hours I listed and at the capacity that I stated, understanding that the failure to do so would lead to changes in the emission of pollutants from my facility and invalidate this permit. [70.5(b)(8)]
- I agree to have my dry cleaning equipment maintained by a reputable maintenance company x times per time period and to keep records of such maintenance. [70.5(b)(8)]
- I agree to send in the attached postcards to the permitting authority x times per time period saying that my dry cleaning equipment has been checked by a reputable maintenance company and is operating in good condition. [70.5(b)(8)]

Signature of Dry Cleaner
Owner:__________________________________________ Signature of
Designated Representative: ______________________________
Date:______________________________

B. Responsible Official[70.5(b)(8)(i)]

To the best of my knowledge, information, and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete.

Signature of Responsible
Official:__________________________________________
Date:______________________________
Dry Cleaner General Permit Notes

Notes:

- Part III D. of the permit and part IV. of the permit application would change based on the definition of de minimis for criteria and toxic air pollutants. If the de minimis level is very low, the lists will be long and included things like lawnmowers and varnish. If the de minimis level is high, this section could be simplified.

Regulations we determined were not applicable to general permits for dry cleaners:

- Description of any applicable test method for determining compliance with each requirement. [Part 70.5(b)(4)(ii)]
- A compliance plan for sources that are not in compliance with all applicable requirements [Part 70.5(b)(7)]
- The use of nationally standardized forms for acid rain portions of permit applications and compliance plans, as required by Part 72 of this chapter. [Part 70.5(b)(9)]
Title V Model General Permit Application for Woodstoves

I. General Information

A. 70.5(b)1

Owner's Name

<table>
<thead>
<tr>
<th>(Last)</th>
<th>(First)</th>
<th>(M.I.)</th>
</tr>
</thead>
</table>

Owner's Address

<table>
<thead>
<tr>
<th>(Street)</th>
<th>(City)</th>
<th>(State)</th>
</tr>
</thead>
</table>

B. Location of Woodstove 70.5(b)2

(This permit application is directed towards the multiple woodstove owner. If disregard any questions that do not apply to you.)

1. Is the location of the woodstove(s) a business or residence?

Woodstove(s)  □ residence  □ business

*(Standard Industrial Classification # ___)

2. What is the address of woodstove(s) location?

Woodstove

<table>
<thead>
<tr>
<th>(Street)</th>
<th>(City)</th>
<th>(State)</th>
<th>(Zip)</th>
</tr>
</thead>
</table>

C. Please check the box which corresponds to the model of your woodstove

Woodstove 1

- 70.5(b)2

- Model ABC 1991
- Model ABC 1989
- Model XYZ 1990
- Other-- Please specify ______

Woodstove 2

- Model ABC 1991
- Model ABC 1989
- Model XYZ 1990
- Other-- Please specify ______
II. Please answer the following questions about the building in which the woodstove is located. If you own woodstoves which are located in more than one building, please photocopy this page and fill it out for each building and designate here which woodstove (by brand, model, and Year) is in that building. (Woodstove model____________________)

a) The building in which the woodstove is located is approximately ___ square

b) The building in which the woodstove is located has:

☐ 1 floor
☐ 2 floors
☐ 3 floors
☐ Other, Please explain. ____________________________________________

__________________________________________

__________________________________________

c) The building in which the woodstove is located has:

☐ 1 chimney ☐ 2 chimneys ☐ Other-- Please explain. ________________

__________________________________________

d) Please describe the approximate height above the ground of each chimney in question c) ____________________________

__________________________________________
III. Stove and Fuel Use Information

A. Please check the box which completes the following sentence. As part of compliance with the State and Federal laws necessitating this permit, I only use my woodstove: 

Woodstove 1

- [ ] 0-45 days a year
- [ ] 46-90 days a year
- [ ] 91-135 days a year
- [ ] 136-180 days a year
- [ ] 181-226 days a year
- [ ] 226-270 days a year
- [ ] 271-316 days a year
- [ ] 316-365 days a year

Woodstove 2

- [ ] 0-45 days a year
- [ ] 46-90 days a year
- [ ] 91-135 days a year
- [ ] 136-180 days a year
- [ ] 181-226 days a year
- [ ] 226-270 days a year
- [ ] 271-316 days a year
- [ ] 316-365 days a year

B. Please check the box next to the following fuels you will use in your wood or woodstoves and estimate the quantities of each fuel you will use annually.

<table>
<thead>
<tr>
<th>Fuel</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood (as fuel)</td>
<td></td>
</tr>
<tr>
<td>a) hardwood</td>
<td></td>
</tr>
<tr>
<td>- dry</td>
<td></td>
</tr>
<tr>
<td>- green</td>
<td></td>
</tr>
<tr>
<td>b) softwood</td>
<td></td>
</tr>
<tr>
<td>- dry</td>
<td></td>
</tr>
<tr>
<td>- green</td>
<td></td>
</tr>
<tr>
<td>c) synthetic wood</td>
<td></td>
</tr>
<tr>
<td>- presto logs</td>
<td></td>
</tr>
<tr>
<td>- hot logs</td>
<td></td>
</tr>
<tr>
<td>d) newspaper</td>
<td></td>
</tr>
<tr>
<td>e) lighter fluid</td>
<td></td>
</tr>
<tr>
<td>f) Other -- Please specify material and quantity used annually.</td>
<td></td>
</tr>
</tbody>
</table>
IV. Information on other pollutants

A. To determine what other regulated pollutants exist at your facility, please check the boxes next to any of the following sources of regulated pollutants operate on the premises of your facility.

- [ ] gas stove
- [ ] gas operated refrigeration unit
- [ ] gas heat
- [ ] gas powered electric generator
- [ ] lawnmower

Are you aware of any other sources of regulated pollutants operated at the location of the woodstove. If so, please list. ____________________________

B. To determine what other regulated pollutants exist at your dry cleaning facility, please check the boxes next to the following raw materials which exist at your facility.

- [ ] gasoline
- [ ] bleach
- [ ] paint
- [ ] varnish
- [ ] motor oil
- [ ] cleaning solvent A
- [ ] natural gas
- [ ] other--Please specify material and quantity. ____________________________
Model General Permit for Woodstoves

I. General Information
Woodstove Owner: [70.5(b)(1)]
Woodstove Owner’s Address: [70.5(b)(1)]
Location of Woodstove/s: [70.5(b)(1)]
SIC code: [70.5(b)(1)]

II. Legislation Information
Citation and description of applicable State and Federal air pollution control requirements [[70.5(b)(4)(i)]]

III. Emissions Information
A. Woodstove Information

Woodstove 1

   a) Brand and model of woodstove [70.5(b)(2)]
   b) A determination of emissions from the woodstove based on inputs from the brand and model of woodstove (which determines pollution control equipment and emissions outputs of the stove) and application (i.e. days of use, area of house, limitations on operation) [70.5(b)(2)(i)(ii)(iii)(v)(vi)(vii)]

Woodstove 2

   a) Brand and model of woodstove [70.5(b)(2)]
   b) A determination of emissions from the woodstove based on inputs from the brand and model of woodstove (which determines pollution control equipment and emissions outputs of the stove) and application (i.e. days of use, area of house, limitations on operation) [70.5(b)(2)(i)(ii)(iii)(v)(vi)(vii)]

B. Calculations on which the woodstove information was based [70.5(b)(2)(viii)]

C. Other pollutant information

   1. Raw Materials: List of raw materials and the quantity of each which exists at the location of the woodstove. [70.5(b)(2)(iv)]
2. Pollution Emitting Equipment: List of pollution emitting equipment which exists at the location of the woodstove. 
[70.5(b)(2)(i)]

IV. Compliance Information
A. Applicant

In signing this permit, I agree to all of the following:

- I agree that all of the information I provided in the permit application is true. [70.5(a)]
- I agree to operate my woodstove(s) according to the manual(s) provided with the woodstove(s), understanding that the failure to do so would lead to changes in the emission of pollutants from my woodstove(s) and invalidate this permit. [70.5(b)(8)]
- I agree to have my woodstove maintenance by a reputable woodstove maintenance person once a year and to keep records of such maintenance. [70.5(b)(8)]
- I agree to send in the attached postcards to the permitting authority once a year saying that my woodstove or woodstoves have been checked by a woodstove maintenance person and are operating in good condition. [70.5(b)(8)]
- I agree not to sell or move my woodstove/s without contacting the permitting authority and changing the permit.[70.5(a)]
- I agree to promptly submit any relevant facts or new information on my woodstove(s) that becomes available to me.

Signature of Woodstove
Owner:__________________________________________
Date:________________________

B. Responsible Official[70.5(b)(8)(i)]

To the best of my knowledge, information, and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete.

Signature of Responsible Official:________________________
Date:________________________
Woodstove General Permit Notes

Notes:

- Permits are written one permit per location of a woodstove or woodstoves. A single permit is sufficient where there are woodstoves in different buildings at the same location.
- If certain fuels (such as green wood) are not allowed for proper use of a woodstove, they should be left on list III B. on the general permit application with a zero* under quantity. At the bottom of the page, an asterisk paragraph should explain that this type of fuel is illegal.
- Part III. C. of the permit and part IV. of the permit application would change based on the definition of de minimis for criteria and toxic air pollutants. If the de minimis level is very low, the lists will be long and could include things like lawnmowers and varnish. If the de minimis level is high, this section could be simplified for businesses or deleted for residences.

Regulations we determined were not applicable to woodstove general permits.

- Description of any applicable test method for determining compliance with each requirement. [Part 70.5(b)(4)(ii)]
- Additional information as necessary to define reasonably anticipated alternative operating scenarios [Part 70.5(b)(6)]
- A compliance plan for sources that are not in compliance with all applicable requirements [Part 70.5(b)(7)]
- The use of nationally standardized forms for acid rain portions of permit applications and compliance plans, as required by Part 72 of this chapter. [Part 70.5(b)(9)]