

Originally Processed With FOIA(s):
2001-1865-F; 2001-1978-F

FOIA Number:
2001-1978-F

FOIA MARKER

**This is not a textual record. This is used as an
administrative marker by the George Bush Presidential
Library Staff.**

Record Group/Collection: George H.W. Bush Presidential Records
Collection/Office of Origin: Counsels Office, White House
Series: Holmstead, Jeffrey, Files
Subseries: Environmental Subject Files

OA/ID Number: 45125
Folder ID Number: 45125-008

Folder Title:
Clean Air Act - Air Toxins

Stack:	Row:	Section:	Shelf:	Position:
G	12	7	7	3

THE WHITE HOUSE
WASHINGTON

4/15/91

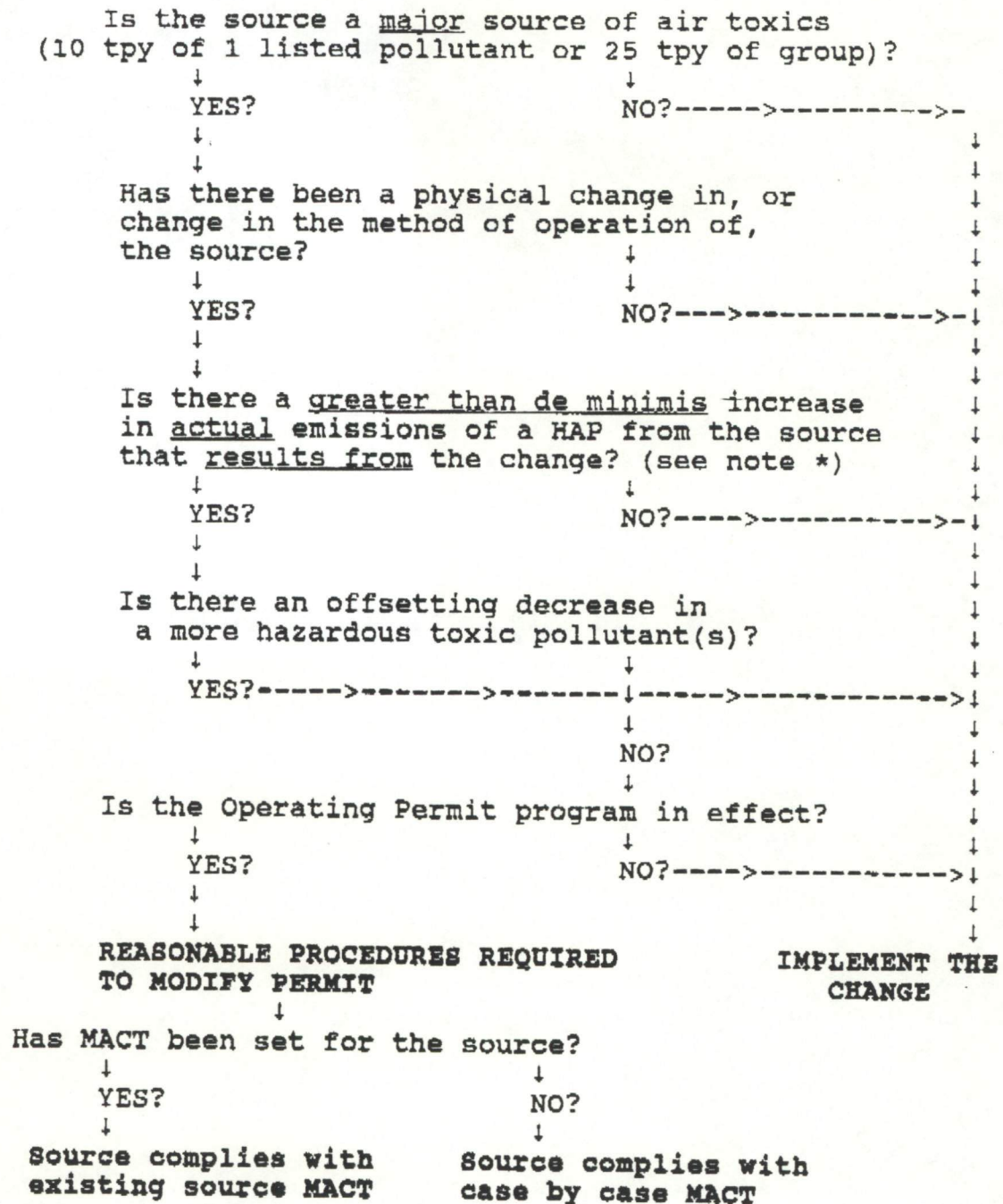
TO: Jeff Holmstead

FROM: Teresa Gorman

Document Originally
Attached to
Following Page

DRAFT

TITLE III MODIFICATION FLOWCHART



* NOTE: The concept of internal offsets for the reductions in the same HAP is incorporated into § 112(g)(1) in that a modification will exist only where there is an actual emissions

DRAFT

TITLE V MODIFICATION FLOWCHART

Will there be a change within the permitted facility that is restricted by a permit term?

YES

NO -----> Implement the change.

Is the proposed change contained in the permit as a possible operating scenario?

YES-----> Implement the change.

NO

Will the change result in the facility exceeding the allowable numerical emission limits (pursuant to Title I, III, or IV) set by the permit?

YES

NO -----> Give 7 days notice and implement the change.

Will the change trigger Title I modification procedures?

YES

NO

Title I procedures.

Will the change trigger Title III modification procedures?

YES

NO -----> proceed with change;
statute does not require notice.

Follow reasonable procedures to modify permit.

THE WHITE HOUSE

WASHINGTON

March 16, 1990

MEMORANDUM FOR THE FILE

FROM: JEFFREY R. HOLMSTEAD *JRH*
ASSISTANT COUNSEL TO THE PRESIDENT

SUBJECT: An Analysis of Petroleum Industry Costs
Associated With Air Toxics Amendments
to the Clean Air Act

I have reviewed the above-referenced document, which will be used in on-going discussions regarding the President's proposed amendments to the Clean Air Act. No further action is necessary.

ID # _____ CU

WHITE HOUSE CORRESPONDENCE TRACKING WORKSHEET

rec'd 2/27
3:00pm

- ☐ O - OUTGOING
☐ H - INTERNAL
☐ I - INCOMING
 Date Correspondence
 Received (YY/MM/DD) 1/1

Name of Correspondent: James E. Ford☐ MI Mail Report

User Codes: (A) _____ (B) _____ (C) _____

Subject: An Analysis of Petroleum Industry Costs
Associated With Air Sales Arrangements To
The Clean Air Act

ROUTE TO:

ACTION

DISPOSITION

Office/Agency	(Staff Name)	Action Code	Tracking Date YY/MM/DD	Type of Response	Code	Completion Date YY/MM/DD
	<u>CUOFA</u>	ORIGINATOR	<u>40 02 26</u>			<u>1 1</u>
		Referral Note:				
	<u>CUOFA 17</u>	<u>H</u>	<u>40 10 21 26</u>		<u>S</u>	<u>40 10 31 05</u>
		Referral Note:				
	<u>CUOFA 02</u>	<u>I</u>	<u>1 1</u>			<u>1 1</u>
		Referral Note:				
	<u>CUOFA</u>	<u>I</u>	<u>1 1</u>			<u>1 1</u>
		Referral Note:				
			<u>1 1</u>			<u>1 1</u>
		Referral Note:				

ACTION CODES:

A - Appropriate Action
 C - Comment/Recommendation
 D - Draft Response
 F - Furnish Fact Sheet
 to be used as Enclosure

I - Info Copy Only/No Action Necessary
 R - Direct Reply w/Copy
 S - For Signature
 X - Interim Reply

DISPOSITION CODES:

A - Answered
 B - Non-Special Referral
 C - Completed
 S - Suspended

FOR OUTGOING CORRESPONDENCE:

Type of Response = Initials of Signer
 Code = "A"
 Completion Date = Date of Outgoing

Comments: Also see

Keep this worksheet attached to the original incoming letter.
 Send all routing updates to Central Reference (Room 75, OEOB).
 Always return completed correspondence record to Central Files.
 Refer questions about the correspondence tracking system to Central Reference, ext. 2590.



1333 New Hampshire Ave. N.W.
Suite 1001
Washington, DC 20036
Telephone 202 457 6221

James E. Ford
Director
Federal Government Relations

**AN ANALYSIS OF PETROLEUM INDUSTRY COSTS
ASSOCIATED WITH AIR TOXICS AMENDMENTS
TO THE CLEAN AIR ACT**

Prepared by

**Jeff Jones
Gary Marfin**

Delta Management Group

Lisa Hoffman

**Policy Analysis Department
The American Petroleum Institute**

October 17, 1989

Interim Final

TABLE OF CONTENTS

Sections	Page
EXECUTIVE SUMMARY	i
INTRODUCTION	1
PART I: CAPITAL COST ESTIMATES	
•Production Sector	10
•Marketing Sector	15
•Transportation Sector	19
•Refining Sector	24
PART II: OPERATIONS & MAINTENANCE and ANNUALIZED COSTS	
•O&M Cost Estimates	34
•Annualized Capital Cost	37
•Permit Life and Interest Rate Scenarios	38
Appendices	40

EXECUTIVE SUMMARY

This report summarizes the results of a preliminary effort to determine the cost impact of certain proposed air toxics controls on the petroleum industry. Members of the Air Toxics Work Group developed these cost estimates with assistance from other representatives from each industry sector: production, marketing, transportation and refining.

Several bills to control air toxic emissions from stationary sources have been introduced. In structure the bills share important features:

- Each contains a list of air toxic pollutants, and posits a schedule for controlling specific categories of major industrial sources of the listed pollutants.
- None of the bills define with specificity the level of emissions control that is to be achieved; the proposed standard is "maximum achievable control technology (MACT)," considering cost and feasibility.
- Each bill contains a residual risk provision. This provision allows the Administrator to require additional controls if the control initially imposed to meet the statutory standard leave an "unacceptable level of risk."

The estimates of control cost are sensitive to a number of factors. Two of the most important of these factors are: (1) the implementation of "maximum achievable control technology (MACT)," and (2) whether and how regulation based on residual risks might be implemented.

The Air Toxics Work Group developed the following cases to bracket the range of possible technologies that could be required:

- Case I estimates assume MACT is interpreted to require nationwide controls approximately equivalent to the controls required now in some nonattainment areas and there are no additional requirements based on residual risks.
- Case II is an estimate of additional costs (i.e., beyond those of Case I) if technologies which are currently experimental or not otherwise in significant commercial use are required due to either a stringent interpretation of MACT or findings of significant residual risk resulting

from the use of risk assessment techniques that are likely to overstate actual risks.

The two cases are summarized in Table 1 below. The sum of the two cases is also provided since, as is discussed below, under some scenarios the impacts are additive.

Table 1

POTENTIAL COST OF AIR TOXICS CONTROL ON PETROLEUM SECTORS
(Million \$)

	CASE I	CASE II	COMBINED CASES
Capital Costs			
Production	8,500	27,000	35,000
Transportation	900	3,000	4,000
Refining	1,300	14,000	15,000
Marketing	4,300	9,200	14,000
Total	15,000	53,000	68,000
Total Annualized Cost	3,200	9,600	13,000

Assessment of the two cases, and the combination of the two cases, permits the calculation of potential costs for several scenarios:

- Scenario A MACT is interpreted to require lower severity controls and there are no additional requirements based on residual risks. Total capital costs are Case I estimates alone, i.e. approximately \$15 billion.
- Scenario B Initially MACT is interpreted to require lower severity controls (Case I). Subsequently residual risk concerns could necessitate introduction of higher severity controls (Case II). Total capital costs can be calculated by adding Case I and II estimates, approximately \$68 billion total over the same period.
- Scenario C Alternatively MACT may be interpreted to require higher severity controls from the beginning which would also result in capital costs of \$68 billion although these costs would likely be expended over a shorter time frame.

The summary table displays the wide range between the two cases and uncertainty created by the eventual interpretation of

MACT itself. Indeed, one of the principal findings of this report is that the ultimate cost impact of air toxics legislation on petroleum industry sources is highly sensitive to the interpretation of maximum achievable control technology.

These cost estimates were developed under the pressure of a short deadline to be responsive to current legislative developments. As a consequence many simplifying assumptions were necessary and many potential cost elements were not included. Elements not included fall into two categories: air toxics issues or provisions not considered and types of costs not taken into account. Examples of the former are: (1) catastrophic releases of acutely toxic substances like ammonia, chlorine, and hydrogen sulfide. Such releases are not subject to the control technologies considered for the type of low level continuous emissions of prime concern in these proposed bills; and (2) proposals to modify the constituents of motor gasoline.

Other potentially important cost factors not considered include:

- The cost of dismantling Case I controls. To install Case II controls it may be necessary in some instances to dismantle controls installed in Case I. Any costs associated with dismantling Case I to install Case II controls were not considered in this report.
- The effects of proposals to reduce the emissions of volatile organic compounds under the Clean Air Act. Such reductions may overlap or interact with the air toxic controls.
- The impact of forcing marginally viable industry operations out of service. The magnitude of the estimated costs make it possible that marginally viable industry operations will be forced out of service. No attempt was made to account for this effect. Similarly no effort was made to estimate the costs associated with diminished industry capacity or oil and product import impacts.

Other factors not considered that are unique to the individual industry sectors (for example refinery downtime to install fugitive controls) are identified in the appropriate section for that sector.

Introduction

This report analyzes costs to the petroleum industry of certain pending air toxics legislative proposals. The cost estimates reported here are based on data from the public literature and API member companies, particularly those with facilities familiar with California's stringent stationary source controls. These estimates cover every sector of petroleum industry operations--production, refining, transportation and marketing.

Emission reduction estimates are not developed for this report. The Work Group recognized that such estimates are important for developing cost-effectiveness estimates but time and other constraints limited the scope of the report to estimates of cost.

Legislative Background

Several bills to control air toxics emissions from stationary sources have been introduced. In structure, the bills are similar:

- Each contains a list of air toxic pollutants, and posits a schedule for controlling specific categories of major industrial sources of the listed pollutants.
- None of the bills defines with specificity the level of emissions control that emitters of toxic air pollutants are required to achieve; the proposed standard is "maximum available control technology" considering cost and feasibility.
- Each bill contains a residual risk provision. This provision allows the Administrator to require additional controls if the controls initially imposed to meet the statutory schedule leave an "unacceptable" level of risk.

Method of Analysis

The eventual interpretation of "maximum achievable control technology" for petroleum industry source categories presents the first uncertainty in estimating control costs. It is likely the level of control needed to comply with air toxics legislation will be more stringent than the level of VOC controls now in place for ozone nonattainment areas and possibly as stringent as the controls now under consideration in California, especially the South Coast Air Quality Management District. The residual risk provisions alone could drive the nation toward California-

The report itself is divided into two parts.

- The costs analyzed in Part I are capital equipment costs including the cost of installation. No attempt was made to analyze the time necessary to install required control technology; in many cases several years could be required to achieve full compliance. All costs are in current dollars (except where noted).
- Part II of the report contains operation and maintenance costs, and annualized costs for both cases. It should be noted that the capital recovery factors used to estimate annualized cost do not include taxes.

Because of the uncertainties and assumptions that are incorporated in this analysis, care must be taken in interpreting the results. The costs presented in this report are estimates of industry costs and they are dependent on the assumptions underlying the analysis as well as the uncertainties discussed above. Moreover, the figures used have been rounded to reduce unnecessary complexity; as a result, some of the tables' percentages do not sum to 100%.

type controls or beyond. It is important to note that the cost of controls at California's level of stringency is not the only uncertainty to reckon with; in many instances, the technical feasibility of those controls is under question.

To estimate potential compliance costs, a range of controls that roughly bracket the likely stringency of eventual regulatory standards is assumed.

- o Case I estimates (Lower severity controls) assume MACT is interpreted to require nationwide controls approximately equivalent to the controls required now in some ozone nonattainment areas and there are no additional requirements based on residual risks.
- o Case II (Higher severity controls) is an estimate of additional costs if technologies which are currently experimental or not otherwise in significant commercial use are required due to either a stringent interpretation of MACT or because of findings of significant residual risks resulting from the use of risk assessment techniques that are likely to overstate actual risks.

Assessment of the two cases permits the calculation of potential costs for several scenarios:

- | | |
|------------|---|
| Scenario A | MACT is interpreted to require lower severity controls and there are no additional requirements based on residual risks. Total capital costs are Case I estimates alone, i.e. approximately \$15 billion. |
| Scenario B | Initially MACT is interpreted to require lower severity controls. Subsequently residual risk concerns necessitate introduction of higher severity controls, i.e. , approximately \$53 billion additional, or \$68 billion over the same period. |
| Scenario C | Alternatively MACT may be interpreted to require higher severity controls from the beginning which would also result in capital costs of \$68 billion although these costs would likely be expended over a shorter time frame. |

The large range in these estimates reflects the uncertainty in the definition of MACT itself. The ultimate cost to the petroleum industry of air toxics legislation is thus dependent in

large measure on the definition of MACT as prescribed in the legislation and/or interpreted by EPA in regulatory proceedings.

This analysis departs in concept from previous attempts to analyze petroleum industry costs for air regulations. Many of these analyses were based on estimating emissions from various industry facilities (usually relatively large point sources) and assuming a cost per ton for reducing these emissions. The definitions of major and area sources contemplated in current legislative proposals make it likely that many more small emissions sources will be covered by emissions standards. Because of the number and relatively small individual contribution of these sources to emissions, their control could be considerably more expensive on a per-ton basis. For this reason, the Work Group chose to perform a bottom-up analysis of the costs of new amendments to the Clean Air Act to more accurately account for small source control costs.

The first step was to identify potential sources of VOC emissions as a "marker" for the pollutants listed in various legislative proposals and potential control options for these sources. Next, available data were gathered on the number of these sources as well as the unit cost of selected control measures. Total cost estimates for each source were then calculated by multiplying the number of sources by the unit cost of the selected control.

Assembling an analysis of this sort depends on numerous assumptions because of missing or incomplete data as well as the large uncertainties discussed above. In most instances both the counts of industry facilities, units, and equipment as well as the unit cost information reflect estimates rather than actual data. In addition these estimates are based on an "average" facility, unit, or piece of equipment. Using these "averages" obviously ignores differences that might result in significant cost adjustments. Forecasting unit costs presents additional difficulties. In some cases costs are estimated for control technologies that have never been used in the petroleum industry; in others, units costs may drop as markets for current "fringe technologies" grow. Accordingly, the actual capital and installation costs may be significantly different.

We have documented assumptions to permit reviewers to appreciate the key assumptions underlying each estimate. In addition, clearly specifying assumptions makes it easier to adjust calculations as new data are supplied or more appropriate assumptions are suggested.

The report itself is divided into two parts. The costs analyzed in Part I are capital equipment costs, including the cost of installation. No attempt was made to analyze the time necessary to install the required control technology; in many

cases several years could be required to achieve full compliance. Part II of the report contains operation and maintenance costs, and annualized costs for both cases. All costs are in current dollars (except where noted).

Factors Not Included

These cost estimates were developed under the pressure of a short deadline to be responsive to current legislative developments. As a consequence many simplifying assumptions were necessary and many potential cost elements were not included. Elements not included fall into two categories: air toxics issues or provisions not considered and types of costs not taken into account. Examples of the former are: (1) catastrophic releases of acutely toxic substances like ammonia, chlorine, and hydrogen sulfide. Such releases are not subject to the control technologies considered for the type of low level continuous emissions of prime concern in these proposed bills; and (2) proposals to modify the constituents of motor gasoline.

Other potentially important cost factors not considered include:

- o The cost of dismantling Case I controls. To install Case II controls it may be necessary in some instances to dismantle controls installed in Case I. Any costs associated with dismantling Case I to install Case II controls were not considered in this report.
- o The effects of proposals to reduce the emissions of volatile organic compounds. Such reductions may overlap or interact with the air toxic controls identified in this report.
- o The impact of forcing marginally viable industry operations out of service. The magnitude of the estimated costs make it possible that marginally viable industry operations will be forced out of service. No attempt was made to account for this effect. Similarly, no effort was made to estimate the costs associated with diminished industry capacity or oil and product import impacts.

Other factors not considered that are unique to the individual industry sectors (for example refinery downtime to install fugitive controls) are identified in the appropriate section for that sector.

Use of This Analysis

Because of the uncertainties and assumptions that are incorporated in this analysis, care must be taken in interpreting the results. The results are assumption dependent: both in terms of the text and interpretation of particular legislative language as well the counts and unit costs used. For this reason it would be a mistake to take the total cost estimated in Table 1 and make the blanket statement that this number represent the cost of air toxics legislation for the petroleum industry. This number does represent an estimate of industry costs which is dependent on the assumptions underlying the analysis as well as the uncertainties discussed above.

Discussion of Results

Table 2 summarizes the results of the cost impact analysis for Cases I and II. Tables 3-6 summarize the results for each emission source in the Production, Refining, Transportation, and Marketing sectors respectively. Because these are cost estimates, they have been rounded in the text to reflect no more than three, and in the preponderance of cases, no more than two significant digits. Due to rounding percentages may not sum to 100%.

Table 2

CASE I

Cost Items	Cost (\$ Million)	% Sector Cost	%Tot Co
<u>Production Sector</u>			
Casing Vent Recovery for Oil Well	400	5%	
Internal Floating Cover for Stor.	3,800	45%	2
Covers on New Water Tanks	2,800	33%	1
Air:Fuel Ratio Controller	900	11%	
Air:Fuel Ratio Controller	300	4%	
Three-Way Cat. for Compressors	200	2%	
Carbon Filters Gas Production	80	1%	
Carbon Filters for Glycol Venting	2	0%	
Subtotal	8,500	100%	5
<u>Marketing Sector</u>			
Service Station Refueling	2,800	65%	1
Bulk Plant Tanks	500	12%	
Bulk Terminal Racks	400	9%	
Bulk Terminal Tanks	300	7%	
Large Marine Loading Terminal	200	4%	
Small Marine Loading Terminal	100	2%	
Bulk Plant Loading Racks	20	1%	
Subtotal	4,300	100%	2
<u>Transportation Sector</u>			
Inland Barge	500	56%	
Ocean Barge	100	11%	
Product Carrier	100	11%	1
Small Marine Terminal Loading	100	11%	
Tanks	40	4%	
Crude Carrier	20	2%	
Subtotal	900	100%	

Refining Sector

Cone Roof Tanks	400	31%
Marine Vapor Recovery	800	62%
Sewer System Drains	30	2%
Flares-Tip&Instr'n	40	3%
I.C. Engines-Air:Fuel Controller	10	1%
Safety Valves Rupture Dis	10	1%
Subtotal	1,300	100%
Total Cost All Sectors Case I	15,000	

Note: Some totals do not sum due to rounding.

CASE II

	Cost (\$ Million)	% Sector Cost	%Total Cost
<u>Production Sector</u>			
Vap. Rec. for Storage Tanks	9,500	35%	18
ThreeWay Cat. for ICs	2,700	10%	5
Replace v/f/c oil prod	8,500	32%	16
Replace v/f/c gas prod	4,500	17%	
Replace v/f/c gas plants	1,700	6%	
Subtotal	26,900	100%	50
<u>Marketing Sector</u>			
Bulk Plant Tanks (per plant)	4,000	44%	
Bulk Terminal Tanks			
Int. Floating Roof	2,600	28%	
Ex. Floating Roof	2,000	23%	
Bulk Terminal Racks	500	5%	
Subtotal	9,100	100%	1
<u>Transportation Sector</u>			
Pipeline Pump Station Valves	1,500	50%	
Tanks Ext Floating Roof	800	27%	
Tanks Int. Floating Roof	400	13%	
Pipeline Pump Station Pumps	200	7%	
Subtotal	3,000	100%	

Refining Sector

Flanges Replace Bead Weld	3,300	24%	
Valves Leakless over 1 in	1,800	13%	
Valves Leakless under 1 in	2,000	14%	
External fl. roof tanks dome/vap	1,600	12%	
Internal fl. roof tanks/vapor rec	1,500	11%	
Pumps barrier fluid	1,100	8%	
Upgrade vap rec systems	900	6%	
Compressors Vents to Clos. Sys	700	5%	
I.C. Engines-3-way Catalyst	30	0%	
Main Seperator/Vapor Rec	200	1%	
Truck Loading:Add Incin.	30	0%	
Gas Recovery Compressor Upgrade	500	4%	
Flares-Additional	200	1%	
Subtotal	13,800	100%	2
Total Cost To All Sectors	53,000		10

Note: Some totals do not sum due to rounding.

Part I

Capital Cost Estimates for the Production Sector

TABLE 3
COST OF AIR EMISSION CONTROLS
(excluding California)

<u>UNIT COST</u>	<u>TOTAL COST</u>	<u>ITEM</u>	<u>NUMBER</u>
Casing Vent Recovery for Oil Well	407,120	\$1,000	\$400,000,000
Covers or New Water Tanks	378,497	\$7,500	\$2,800,000,000
Air Fuel Ratio Controller for Fired Vessels at Production Facilities	28,724	\$10,000	\$300,000,000
3-Way Catalyst and Air Fuel Ratio Controller for Compressors and Fired Vessels at Gas Plants	5,792	\$40,000	\$230,000,000
Carbon Filters with Small Vapor Blowers for Glycol Venting at Gas Plants	724	\$2,500	\$2,000,000
Carbon Filters for 50% of Gas Production Facilities	31,570	\$2,500	\$80,000,000
SUBTOTAL 1			<u>\$3,800,000,000</u>
LOWEST COST CONTROLS FOR STORAGE TANKS, I-Cs, PROD. FACILITIES & GAS PLANTS			
Internal Floating Cover for Storage Tanks	510,970	\$7500	\$3,800,000,000
Air Fuel Ratio Controller for all I-Cs	90,282	\$10,000	\$900,000,000
SUBTOTAL 2			\$4,700,000,000

HIGHEST COST CONTROLS FOR STORAGE TANKS, I-Cs, PROD., FACILITIES & GAS PLANTS

Vapor Recovery for Storage Tans	189,250	\$50,000	\$9,500,000,000
3-Way Catalyst for all I-Cs at non-gas plants	90,282	\$30,000	\$2,700,000,000
Replacing Every Valve and Welding Every Flange at Oil Production Facilities	2,872,440 11,489,760	\$1,000 \$500	\$2,800,000,000 \$5,700,000,000
(20 valves X 143,622) (80 flanges X 143,622)			
Replacing Every Valve and Welding Every Flange at Gas Production Facilities	1,515,384 6,061,536	\$1,000 \$500	\$1,500,000,000 \$3,000,000,000
(24 valves X 63,141) (96 flanges X 63,141)			
Replacing Every valve and Welding Every Flange at Gas Plants	543,000 2,172,000	\$1,000 \$500	\$540,000,000 \$1,000,000,000
(750 valves X 724) (3000 flanges X 724)			
SUBTOTAL 3			\$27,000,000,000
CASE I TOTAL (SUBTOTALS 1 & 2)			\$8,500,000,000
CASE II TOTAL (SUBTOTAL 3)			\$27,000,000,000

AIR EMISSION SOURCE ESTIMATES
(excluding California)

827,050 OIL & GAS WELLS

- 574,487 Oil with 542,827 artificial lift
 - 75% of artificial lift vent casing as 407,120 vents
 - 5% of artificial lift have internal combustion engines
 - 27,141 internal combustion engines
- 252,563 Gas

206,763 PRODUCTION FACILITIES (1 production facility/4 wells)

- 143,622 production facilities for Oil
 - Fired vessels at 20% of Oil production facilities 28,724 fired vessels
 - 1% of oil production facilities have flares 1436 flares
- 63,141 production facilities for Gas
 - 1 internal combustion engine at every Gas production facility
 - 63,141 internal combustion engines
 - 50% of Gas production facility have glycol vents 31,570 vents

567,745 OIL & 378,497 WATER STORAGE TANKS

- Every tank has volatile organic carbon emissions
- 10% of oil storage tanks have vapor recovery units

FUGITIVE EMISSIONS FOR PRODUCTION FACILITIES

- 5 valves/flanges/connections per oil wellhead
- 10 valves/flanges/connections per gas wellhead
- 20 valves/flanges/connections per well at production facility
 - Oil production facility = $(5 + 20) \times 4 \text{ wells} = 100 \text{ valves/flange connections}$
 - Gas production facility = $(10 + 20) \times 4 \text{ wells} = 120 \text{ valves/flanges/connections}$

724 GAS PLANTS

- 1 flare/plant
- 3-10 compressors, 8 median (200-500 horsepower each)
- 2 fired vessels (0.5 - 1 million BTUs each)
- Glycol venting
- Amine venting--30% of gas plants

FUGITIVE EMISSIONS FOR GAS PLANTS

Plant size	<u>Small</u>	<u>Medium</u>	<u>Large</u>
Valves	250	750	2500
Relief valves	4	12	40
Compressor seals	2	6	20
Pump seals	2	6	20
Flange/connection	1000	3000	10,000
Open-ended lines	50	150	500

- 10% of gas plants are required to comply with New Source Performance Standard Regulations

- Using medium size plant for estimate
API Exploration and Production Work Group estimates a net cost of \$8000 per plant for quarterly inspection and maintenance (2 work weeks at \$1000/week)

Capital Cost Estimates for Marketing Sector

Table 4
MARKETING SECTOR AIR TOXICS EMISSION CONTROL COSTS

Case I

	Number	Unit Cost	Total Cost (\$ Million)
Bulk plant tanks	51,994	10,000	\$500
Bulk plant loading racks	3,377	7,500	\$20
Bulk terminal tanks	4,155	80,000	\$300
Bulk terminal racks	764	500,000	\$400
Service station refueling			\$2,800 ¹
Small marine loading terminal	119	1,200,000 ²	100
Large marine loading terminal	24	7,500,000	200
		Subtotal	4,300

Case II

Bulk plant tanks (per plant)	10,131	400,000	\$4,000
Bulk terminal tanks			
Ext. floating roof	5,194	400,000	\$2,000
Int. floating roof	10,389	250,000	\$2,600
Bulk terminal racks (per plant)	2,293	200,000	\$500
		Subtotal	\$9,000

Basis for Marketing Sector Cost Estimates

¹ Initial capital costs for existing stations over 4 year-period from analysis prepared for API by James Sample. Assumptions are nationwide requirements for stage II. Approximately 330,000 public and private refueling facilities are covered.

² 1987 National Research Council estimate. Note: API member companies have recently conducted engineering design estimates of marine vapor recovery facilities which range from \$4 to \$15 million.

AIR EMISSION SOURCES

CASE I

Tanks: Convert Fixed Roof Tanks to Floating Roofs

API's Above-ground Storage Tank (AST) Survey lists 67,577 marketing sector tanks containing gasoline, distillates and non-potable waste water. All tanks with capacity up to 1000 barrels were assumed to be bulk plant tanks; all tanks greater than 1000 barrels were assumed to be bulk terminal tanks.

Bulk Terminals: 15,583

Bulk Plant: 51,994

Analysis assumes 2/3 terminal tanks are in non-attainment (NA) areas, 40% with external floating roofs (EXT) and 60% with internal floating roofs (INT). Of tanks in attainment (ATT) areas, 80% are fixed roof (FR) and 20% are external floating roof tanks.

Area	FR	INT	EXT	TOTAL
NA		6,233	4,156	10,389
ATT	4,155		1,039	5,194
				15,583

In Case I, fixed roof tanks are converted to internal floaters.

Loading Racks: Install vapor recovery system in attainment areas

Bulk Plants:	10,131
Bulk Terminals	2,293

Source: Census of Wholesale Trade

Assuming 1/3 of bulk plants and terminals are in current attainment areas, 3,377 and 764 respectively would require vapor recovery in Case I.

Service Station Refueling: Add stage II refueling vapor controls

Analysis uses EPA model plants 1-5 with per station costs ranging from \$10,700 to \$30,000. The number of stations was assumed to be approximately 330,000. Costs may be slightly understated if the number of stations is held constant, since many new service stations are larger than the largest model plant assumed in the EPA analysis. However, if the total volume of gasoline is assumed to be fixed, then economies of scale will push Stage II implementation costs down, and the estimate presented here actually overstates such costs.

Marine Terminals: Install marine vapor recovery systems

The number of marine terminals was obtained from the API Above-ground storage tank (AST) survey. Of the 119 marketing sector terminals, 20% (24) were assumed to be large terminals loading ships and barges, and 80% (95) small terminals loading barges only.

CASE II

Tanks: Add domes to external floating roof tanks and install vapor recovery

After Case I, 10,389 internal floaters and 5,194 external floaters remain. Case II costs, adding domes to external floaters and vapor recovery, are costed on a per terminal or plant basis for 2,293 and 10,131 terminals and plants respectively.

Loading Racks: Add incineration and improved vapor recovery

Capital Cost Estimates for Transportation Sector

Table 5
TRANSPORTATION SECTOR AIR TOXICS CONTROL COSTS

CASE I

	Number	Unit Cost	Total Cost (\$ Million)
Small marine terminal loading	52	1,200,000 ³	\$100
Ocean barge	500	266,000 ⁴	\$100
Inland barge	3,300	168,000	\$500
Crude carrier	125	170,000	\$20
Product carrier	150	831,000	\$100
Pump station tanks	352	120,000	\$40
		Subtotal	\$900

³ 1987 National Research Council estimate. Note: API member companies have recently conducted engineering design estimates of marine vapor recovery facilities which range from \$4 to \$15 million.

⁴ National Research Council estimate.

CASE II

Pipeline pump station⁵

Pumps	8,500	30,000	\$200
Valves (w/ assoc. flanges)	76,500	20,000	\$1,500

Tanks

Ext. floating roof	1,761	450,000	\$800
Int. Floating Roof	1,761	250,000	\$400
		Subtotal	<u>\$3,000</u>

⁵ Does not include gas transmission pipelines

Basis for Transportation Sector Cost Estimates

AIR EMISSION SOURCES

CASE I

Marine Terminals: Install marine vapor recovery system

The number of marine terminals was obtained from the API Above-ground storage tank (AST) survey. The 52 terminals listed for the transportation sector were all assumed to be small terminals capable of barge loading only.

Vessels: Install vessel vapor recovery hardware

API's Transportation Department estimates approximately 3,800 product-carrying barges, of which about 3300 are inland and ocean barges, respectively. There are an estimated 275 tankers, of which about 125 and 150 carry crude and product respectively.

Pump Stations: Monthly inspection and maintenance program

The number of pipeline pump stations was estimated by assuming one pump station per 50 miles of pipeline. The Basic Petroleum Data Book lists 170,000 miles of liquid pipeline mileage in the US which results in an estimate of 3400 pump stations nationwide. Each pump station is estimated to have 2-3 pumps (2.5 for purposes of calculations), 20-25 (22.5) valves, and 40-50 (45) flanges, and monthly I&M is estimated at \$2000 per station. (1/2 day per station, 12 times per year, 250 man-days per man-year, at rate of \$75,000 per year plus 10% clerical expenses => \$82,500 per man-year.)

Tanks: Convert fixed roof tanks to internal floating roof

The API AST survey lists 3,523 tanks in the transportation sector of 1000 barrels and greater containing gasoline and distillates. Of these 50%, 40%, and 10% are estimated to be external floating roof, internal floating roof, and fixed roof respectively.

Type	Number
EXT	1,761
INT	1,409
FR	352

In Case I fixed roof tanks are converted to internal floaters.

CASE II

Pump Stations: Convert to "leakless" pumps, valves, and flanges

In Case II "leakless" equipment replaces existing pumps, valves, and flanges.

Tanks: Add domes to external floating roof tanks and add vapor recovery system

In Case II external floaters are covered and vapor recovery is added to both types of floating roof tanks.

Capital Cost Estimates for Refining Sector

Table 6

COST OF CASE I AIR EMISSION CONTROLS REFINING

ITEM	NUMBER	TOTAL COST
Cone Roof Tank	5,025	\$400,000,000
Description: Cost reflects installation cost to convert cone roof tanks to internal floating roof tanks. Number of cone roof tanks derived from API survey of above ground storage tanks. Assumed gasoline is not stored in cone roof tanks. Survey data show:		
Tank Type	Number in Category	
Fluid Heavy Oil	4,222	
Distillate	4,914	
Non-potable	915	
Gasoline	5,062	
Total	15,113	
Cone roof tanks assumed to be 1/2 of total tanks, excluding gasoline tanks. Assume \$80M to convert to internal floaters. Source of cost data: Marketing and Transportation Group.		

Marine Loading	108	\$800,000,000
Description: Cost reflects installation cost of vapor recovery system at each marine loading facility. Number of marine loading facilities obtained from Marketing/Transportation. Cost obtained from marketing/transportation group per unit of \$7.5mm.		

Safety Valves	70,140	\$14,000,000
Description: Install rupture disc to reduce atmospheric release. Installed cost is based on company estimate of \$200/disc.		

Flares	476	\$36,000,000
Description: Cost to improve flare tip and instrumentation. Number of flares is based on assumption that large refinery has approximately 7 flares (company source). Industry wide flare number developed proportioning downward by refinery size as follows:		

Refinery Size	No. of Ref x Flare No.	Total
>200,000 bbl/day	20 x 7	140
100-200,000 bbl/day	36 x 4	144
50-100,000 bbl/day	34 x 3	102
<50,000	90 x 1	90
Total Flares		476

Unit cost of \$75,000/flare is midway between range received from company sources.

Sewer System Drains	86,000	\$31,000,000
---------------------	--------	--------------

Description: Cost to install p-trap seals on drains. Assume approximately 50 drains per process unit. Process unit total is 1,722. Assume \$150 per trap and one man day to install. Total installation cost is \$355/drain.

Combustion Engines	1,063	\$11,000,000
--------------------	-------	--------------

Description: Cost to install air:fuel ratio controller on IC engines. Number of engines estimate from ERT report conducted for API in 1987. Unit cost of \$10,000 obtained from production work group.

TOTAL CASE I COST		\$1,300,000,000
-------------------	--	-----------------

COST OF CASE II AIR EMISSION CONTROL REFINING

ITEM	NUMBER	TOTAL COST
Valves		
60% < 1 in.	2,007,706	
36% 1-8 in.	1,204,624	
04% > 8 in.	133,847	\$3,800,000,000

Description: Cost reflects installation of leakless valves.
Note: cost for 4% large valves not reflected in above total because unavailable. Labor cost to install all but large valves is \$500/day. Cost for small valve is \$500/valve; for intermediate \$1,000/valve. Thus, unit cost for small valve is \$1,000; for intermediate valve, \$1,500.

Pumps	39,907	\$1,100,000,000
-------	--------	-----------------

Description: Cost to install dual mechanical seals with barrier fluid. Unit cost obtained from two company sources. Used estimate of \$27,000/pump.

Compressors	4,323	\$700,000,000
-------------	-------	---------------

Description: Costs to tie compressor vents to closed system. Two company estimates received. Range \$80M to \$250M/compressor. Unit cost selected was \$160M.

Flanges	6,692,534	\$3,300,000,000
---------	-----------	-----------------

Description: Cost to change gaskets and bolting on all flanges and weld to prevent leakage. Unit cost from company source at \$500/flange. Number assumed that flanges are two times number of valves.

Central Vapor Recover System

<50,000 bbl/day	90 @ \$2.5MM	
50-100,000 bbl/day	34 @ \$5.0MM	
100-200,000 bbl/day	36 @ \$7.5MM	
>200,000 bbl/day	20 @ \$10.0MM	\$900,000,000

Description: Cost reflects enhance of vapor recovery system to handle additional load collected relief venting, compressor venting, sample point venting and other potential atmospheric releases. Total cost to upgrade system obtained from one company\$10.0MM for large refinery. Assumed cost was tied to refinery/system size.

Flare	120	\$200,000,000
-------	-----	---------------

Description: Cost to install spare flare for handling additional load. Cost obtained from one company source. Assumed one spare flare installed for every 4 flares in refinery. Total flare count 476 as given in Case I. Unit cost of\$1.5MM/flare.

Gas Recovery Upgrade	240	\$500,000,000
----------------------	-----	---------------

Description: Cost to upgrade gas recovery compressors to enhance capture of routine gas emissions routed to flare. Assumes 1 system for every 2 flares at unit cost of \$2MM to upgrade. Company source supplied ratio of units to source and unit cost.

Main Separator Battery	308	\$200,000,000
------------------------	-----	---------------

Description: Cost to install vapor recovery unit for oil/water separator battery. Assume:

Refinery Capacity (bbl/day)	No. of Ref.	No. of Batt.	Total
> 200,000	20	3	60
100,000-200,000	36	2.5	90
50,000-100,000	34	2	68
< 50,000	90	1	90
Total			308

Each battery costs \$750,000. Count and unit cost data from company source.

External Floating Roof Tanks 4,024 \$1,600,000,000

Description: Cost to add dome and vapor recovery system to external roof tanks. Count data from API AST survey. Non-cone roof tanks=10,061. Assume 40% are external float. Cost estimate from marketing/transportation of \$400M/tank.

Internal Floating Roof Tanks 6,037 \$1,500,000,000

Description: Cost to add vapor recovery to install internal floating roof tanks. Assume internal floaters are 40% of non-cone roof tanks. Unit cost of \$250M from marketing/transportation group.

Internal Combustion Engines 1,063 \$32,000,000

Description: Cost reflects cost to install 3-way catalyst on IC engines. Unit cost of \$30M from production used. Number of IC engines obtained from API ERT study of 1987.

Truck Loading 141 \$28,000,000

Description: Cost to add incineration and improve vapor recovery. Number of facilities covered and unit cost @200M per facility obtained from marketing/transportation group.

Total CASE II Estimate \$13,800,000,000

*Cost estimate does not include costs associated with waste water treatment system costs downstream of API separator. Nor does it include the cost of refinery downtime to install controls.

Process Unit Estimates

The number of valves, flanges, pumps and compressors in the refining industry was derived from an estimate of the number of process units. The Oil and Gas Journal identifies processing capacity by process type. Based on that data, and industry assessments of the typical process unit size, inferences were made on the number of process unit types. For example, with respect to crude units, it is assumed that capacity below and up to 100,000 bbl/day consists of one crude unit, while over 300,000 bbl/day capacity would include three crude units. The assumptions made in deriving process unit estimates are contained below. Company estimates were supplied on the number of valves, flanges, compressors, and pumps associated with each major unit type, irrespective of unit size. The number of units were multiplied by these estimates. Thus, there are at least two major assumptions in this estimate: that the number of valves, flanges, and so on, is not dependent on the size of the unit, and, given the validity of that assumption, that the estimate of the number of each unit type is adequate for the purpose of deriving a count of valves, flanges, compressors and pumps.

(Based on Oil and Gas Journal survey entries)

Process Unit Type
Total

Factor

Crude Unit

- 188 entries reporting capacity
- Capacity Range of 2,000-493,000 bbl/day
- Avg. approximately 84,000 bbl/day
- Assumptions

Size (1000 bbl/day)	No. of units	No. of refineries	
< 100	1	124	124
101-200	2	32	64
201-300	2.5	13	33
>300	3	7	21
Total		242	

Thermal Distillation

- 72 entries reporting capacity
- Capacity Range of 2,000-90,000 bbl/day
- Avg. approximately 26,000
- Assumptions

Size (1000 bbl/day)	No. of units	No. of refineries	
<50	1	59	59
>50	2	13	26
Total			85

Catalytic Reformer

- 165 entries reporting capacity
- Range 1,000-338,000 bbl/day
- Avg. approximately 26,000
- Assumptions

Size (1000 bbl/day)	No. of units	No. of refineries	
<50	1	149	149
51-160	2	16	32
>160	3	1	3
Total			184

Catalytic Hydro-Cracking Unit

- 46 entries reporting capacity
- Range 3,000-45,000 bbl/day
- Avg. approximately 26,000 bbl
- Assumptions

Size (1000 bbl/day)	No. of units	No. of refineries	
<45	1	40	40
>45	2	5	10
Total			50

Catalytic Hydro-Treating Unit

- 288 entries reporting capacity
- Range 1,000-143,000 bbl/day
- Avg. approximately 24,000 bbl
- Assumptions

Size (1000 bbl/day)	No. of units	No. of refineries	
<24	1	193	193
25-80	2	83	166
>80	3	10	30
Total			389

Catalytic Hydro-Reforming Unit

- 69 reporting capacity
- Range 1,000-96,000 bbl/day
- Avg. approximately 34,000
- Assumptions

Size (1000 bbl/day)	No. of units	No. of refineries	
<40	1	44	44
>40	2	27	54
Total			98

Catalytic Cracking Unit

- 110 entries reporting capacity
- Range of 1,000-195,000 bbl/day
- Avg. approximately 30,000
- Assumptions

Size (1000 bbl/day)	No. of units	No. of refineries	
<30	1	57	57
>31-70	2	44	88
>71-180	2.5	17	43
>190	3	1	3
Total			191

Alkylation/Polymerization Unit

- 141 entries reporting capacity
- Capacity Range 1,000-33,000 bbl/day
- Avg. approximate 7,000 bbl/day
- Assumptions

Size (1000 bbl/day)	No. of units	No. of refineries	
------------------------	--------------	-------------------	--

< 10	1	108	108
>10-20	2	25	50
>20	3	8	24
Total			182

Aromatic/Isomerization Unit

- 106 entries reporting capacity
- Range of 1,000-45,000
- Avg. approximately 7,000 bbl/day
- Assumptions

Size (1000 bbl/day)	No. of units	No. of refineries	
<10	1	86	86
10-20	2	16	32
> 20	3	6	18
Total			136

Lube Unit

- 34 entries reporting capacity
 - Average Capacity 6,000 bbl/day
- 34

Asphalt Unit

- 78 entries reporting capacity
 - Average Capacity 9,000 bbl/day
- 78

Coking Unit 53

Process Unit Total 1722

Summary of Process Unit Compressor, Pump and Valves Counts

Unit	No.	Comps.	Pumps	Valves	Total Valves	Total Comp.	Total Pumps
Crude	242	1	50	2,790	675,180	242	12,100
CatReform	184	1	8	1,080	198,720	184	1,472
CatHyCrk	50	1	14	550	27,500	50	700
Thermal	85	1	6	720	61,200	85	510
CatHyTrt	389	1	6	720	280,080	389	2,334
CatHyRef	98	1	6	676	66,248	98	588
CatCrk	191	4	50	3,615	690,465	764	9,550
Alky/Poly	182	10	40	4,160	757,120	1,820	7,280
Lubes	34	1	80	8,140	276,760	34	2,720
Asphalt	78	6	12	1,642	128,076	468	936
Coking	53	1	17	2,076	110,028	53	901
Arom/Isom	136	1	6	550	74,800	136	816
Total	1,722				3,346,177	4,323	39,907

For arom./isom. number used for valves is equivalent to cat. hy. crck. For pumps and compressors numbers correspond to thermal and cat hy. trt. units. No other numbers were available.

Part II

Part II contains estimates of the operation and maintenance (O&M) costs associated with the controls identified in Part I. In addition, the capital cost and O&M costs estimates are combined into equivalent line items.

I. Annual Operation and Maintenance (O&M) Costs

The O&M cost estimates below are incremental costs. For example, if a pump, compressor, or valve is replaced with another piece of equipment with the same function but lower expected emissions, then the incremental O&M costs will be low or zero. For situations where new equipment is added, e.g., vapor recovery systems, incremental O&M costs are those associated with the new facility.

For the purpose of estimating annual operating and maintenance costs, the capital expenditures were divided into five categories, and a percentage of capital costs was used for each category of equipment to represent O&M costs. The categories included:

- (0) equipment where incremental O&M costs are expected to be zero because equipment is replaced by similar but lower emitting equipment;
- (1) relatively passive equipment, such as vents, drains, piping and tubing, etc;
- (2) equipment that is an "average" mix of equipment and machinery, where we can use overall industry averages to estimate O&M costs;
- (3) rotating, reciprocating, or highly mechanical equipment, where we expect O&M costs to be higher than industry averages; and
- (4) Stage II (where independent estimates of O&M costs are available.)

Category (2) formed the basis for deriving categories (1) and (3). Category (2) O&M costs were estimated as follows. In 1985 composite oil and gas drilling and production annual operating costs were 4.26% of total well and lease equipment costs. This percentage is assumed to be a reasonable estimate of operating and maintenance costs for similar equipment and facilities; that is, where there is a mix of pumps, motors, engines, valves, etc., and fixed, "no moving parts" equipment, such as structures. This estimate is consistent with (or similar to) the general literature on construction and operating costs,

and also close to the Stage II O&M costs listed below. Category (1) facilities have few or no electrical or active mechanical equipment, and therefore tend to have lower O&M costs, which are estimated as half (2.13%) those of category (2). In contrast, category (3) facilities consisting entirely of active equipment will have higher annual O&M equipment than "industry in general," and these costs are estimated as 50% higher (6.39%) than category (2). The percentage used are summarized in the table below:

Table of Capital Costs of Various Equipment Categories

<u>Category</u>	<u>% of Capital Cost</u>
(1) little active equipment	2.13%
(2) industry in general	4.26%
(3) mostly active equipment	6.39%
(4) Stage II	8.25%

Inspection and maintenance of valves, flanges, pumps, compressors, etc. in refineries has been considered as a separate activity and line item in most industry sectors. Therefore, it was assumed that in most cases there would be no incremental O&M for these items above and beyond the stiffened I&M requirements.

O&M cost for each case and each sector within each case is summarized in the table below. Detailed estimates of the O&M cost for each line item are contained in the tables in the appendix I.

O&M CONTROL COSTS		
	Case I	Case II
Production	550.0	810.0
Marketing	300.0	400.0
Transportation	65.0	120.0
Refining	175.0	340.0
Total	1,100.0	1,700.0

As noted in the introduction, MACT may be interpreted to require higher severity controls initially (that is, a combination of Case I and Case II controls over a short timeframe) or residual risk controls may eventually culminate in a combination of Case I and Case II controls. The total O&M cost for this scenario is \$2.8 billion.

II. Annualized Capital Cost

(a) Useful Life of Capital Equipment

It is necessary to estimate the average useful life of capital equipment in order to calculate an annualized cost. Cost is calculated as if equipment is replaced at the end of its useful life, and after the end of the life of the replacement, and so on. The useful lives used here were five years for equipment associated with internal combustion engines, and ten to twenty years for most other equipment.

(b) Annualized Capital Cost

Annualized capital cost is calculated as the equivalent constant annual payment stream, over the useful life of the equipment, that has a net present value equal to the cost of the capital equipment. This is equivalent to paying off a loan with principal amount equal to the capital cost in equal installments over the life of the equipment, and replacing the equipment after the useful life is over and continuing the payments ad infinitum. Annualized costs are then calculated as follows:

Let i = the discount rate, and
 n = the useful life of the equipment. Scrap value is assumed to be zero.
and $\alpha = 1/(1 + i)$

Then,

$$F = (1 - \alpha) / (1 - \alpha^n), \text{ and}$$

$$(\text{Annualized capital cost}) = (\text{Capital cost}) * F.$$

F can be thought of as a "capital recovery factor." Note that taxes are ignored. Had taxes been factored in, annualized cost estimates would be higher than those reported below. Total annualized costs are thus the sum of annualized capital costs and annual operating and maintenance costs.

The two tables below summarize the annualized capital cost estimates for Case I and Case II respectively. In addition, the tables include the total annual O&M estimates. The sum of both O&M and annualized capital cost estimates constitutes the total annualized cost:

Case I Total Annualized Cost

	Total Annual O&M (\$Mills)	Total Annualized Capital Cost (\$Mills)	Total Annualized Cost (\$Mills)
Production	550.0	1,220.0	1,770.0
Marketing	300.0	600.0	900.0
Transport.	65.0	140.0	200.0
Refining	175.0	180.0	350.0
Total	1,100.0	2,100.0	3,200.0

Case II Total Annualized Cost

	Total Annual O&M (\$Mills)	Total Annualized Capital Cost (\$Mills)	Total Annualized Cost (\$Mills)
Production	810.0	4,450.0	5,260.0
Marketing	400.0	1,100.0	1,500.0
Transport.	120.0	350.0	470.0
Refining	340.0	2,000.0	2,340.0
Total	1,700.0	7,900.0	9,600.0

Appendix I of the report contains line item totals for each of the control options in both cases.

As noted above, the control measures in both Case I and Case II could be implemented if: (1) MACT is interpreted to require severe control measures up front or (2) if residual risk concerns necessitate the implementation of higher severity controls. In either case, the total cost of control is the sum of Case I and Case II controls. The total annualized cost of both cases is \$13.0 billion.

c) The Impact of Permit life.

The estimates of useful life developed for the purpose of calculating annualized cost ranged in most cases from 10 to 20 years. A five year life was assumed if internal combustion engines were associated with the equipment.

Useful, or working, life is not the only factor affecting the timing of equipment replacement. Legislative and regulatory permit requirements can also affect the rate of replacement. Consider, for example, the Administration's bill. The Administration's bill establishes a permit program under Title IV. The program directs the Administrator (within 12 months of enactment) to establish "the minimum elements" of a permit program. The bill specifies some of these elements. Significantly, one of the elements specified is a requirement that "the permitting authority have adequate authority to issue permits for a fixed term, not to exceed five years. . ." (Section 402(d)(5)(B)).

A limit of five years on permits may have the same effect as a five year useful life insofar as it may necessitate the replacement of equipment in five year intervals. For this reason, it is important to compare the cost impact of a five year permit life to that of a normal useful life. The table below displays that comparison:

Air Toxics Controls: Total Annualized Costs (\$Mills)		
	Normal Useful Life	5-Year Permit Life
Case I	\$3,200.0	\$4,700.0
Case II	\$9,600.0	\$14,000.0
Combined Cases	\$12,800.0	\$19,000.0

The table shows the cost increases approximately 50% under the 5-year permit life scenario. The impact of a 5-year permit life on each line item is contained in appendix II of the report.

d) The Impact of Varying Interest Rates

The annualized capital costs are sensitive to the interest rate used in calculating them. The calculations above assumed an interest rate of 10%. The table below, and the accompanying graphs, illustrate how varying interest rates impact the cost estimates. More specifically, the table displays the impact of six different interest rates on both cases under the normal and permit life scenarios.

Total Annualized Costs: Varying Interest Rates (\$Mills)

Rates	Case I		Case II	
	Useful	Permit	Useful	Permit
6%	2,900.0	4,500.0	8,500.0	13,500.0
8%	3,000.0	4,600.0	9,000.0	13,900.0
10%	3,200.0	4,700.0	9,600.0	14,300.0
12%	3,300.0	4,800.0	10,000.0	14,800.0
14%	3,500.0	4,900.0	10,700.0	15,000.0
16%	3,700.0	5,100.0	11,000.0	15,600.0

Appendices

INDEX TO TABLES IN APPENDIX I

Contents of Tables	Pages
Case I: Line Item O&M Costs, Annualized Capital, and Total Annualized Cost	1-2
Case II: Line Item O&M Costs, Annualized Capital and Total Annualized Costs	3-4
Case I & Case II: Variables Used in O&M Costs, and Annualized Cost Calculations, Interest Rate Sensitivity Cases	5

INDEX TO TABLES IN APPENDIX II

Contents of Tables	Pages
Case I: 5-year Permit Life, Line Item Impact on Total Annualized Cost	1-2
Case II: 5-year Permit Life Line Item Impact on Total Annualized Cost	3-4
Case I & Case II: Interest Rate Sensitivity on 5-Year Permit Life	5

APPENDIX I

Air Toxics Control: Annualized Costs									
							Total Annual	Annualized	Total
		Capital	Total	Useful	Equip-	Annual	Operating	Capital	Annualized
		Cost Per	Capital Cost	Life	ment	Operating	Cost	Cost	Cost
	Number	Unit	\$ Millions	Years	Category	Cost/Unit	\$ millions	\$ millions	\$ millions
CASE I									
Production Sector									
Internal Floating Cover/Storage	510,970	7,500	3,832.3	15	1	160	81.6	458.0	539.7
Covers or New Water Tanks	378,497	7,500	2,838.7	15	0	0	0.0	339.3	339.3
Air/Fuel Ratio Controller ICs	90,282	10,000	902.8	5	3	639	57.7	216.5	274.2
Casing Vent Recovery Oil Wells	407,120	1,000	407.1	10	1	21	8.7	60.2	68.9
Air/Fuel Ratio Controller Fired Vsls	28,724	10,000	287.2	5	3	639	18.4	68.9	87.2
Three-Way Cat. for Compressors	5,792	40,000	231.7	5	3	2,556	14.8	55.6	70.4
Quarterly 1&M Oil Production	143,622					1,600	229.8	0.0	229.8
Quarterly 1&M Gas Production	63,141					2,000	126.3	0.0	126.3
Carbon Filters Gas Production	31,570	2,500	78.9	5	3	160	5.0	18.9	24.0
Quarterly 1&M Gas Plants	652					16,000	10.4	0.0	10.4
Carbon Filters Glycol Venting	724	2,500	1.8	5	3	160	0.1	0.4	0.5
Subtotal			8,580.6				552.8	1,217.9	1,770.7
Marketing Sector									
Service Station Refueling			2,836.4	11	5		234	397.0	631.0
Bulk Plant Tanks-Floating Roof	51,994	10,000	519.9	15	1	213	11.1	62.1	73.2
Bulk Terminal Racks-Vapor Rec.	764	500,000	382.0	10	3	31,950	24.4	56.5	80.9
Bulk Terminal Tanks	4,155	80,000	332.4	15	1	1,704	7.1	39.7	46.8
Large Marine Loading Terminal-V.Rec.	24	7,500,000	180.0	10	3	479,250	11.5	26.6	38.1
Small Marine Loading Terminal-V. Rec.	119	1,200,000	142.8	10	3	76,680	9.1	21.1	30.3
Bulk Plant Loading Racks	3,377	7,500	25.3	10	3	479	1.6	3.7	5.4
Subtotal			4,418.9				298.8	606.9	905.7
Transportation Sector									
Marine Terminal Vapor Recovery	52	1,200,000	62.4	10	3	76,680	4.0	9.2	13.2
Inland Barge-Vapor Recovery	3,300	168,000	554.4	10	3	10,735	35.4	82.0	117.4
Ocean Barge-Vapor Recovery	500	266,000	133.0	10	3	16,997	8.5	19.7	28.2
Product Carrier-Vapor Recovery	150	831,000	124.7	10	3	53,101	8.0	18.4	26.4
Crude Carrier	125	170,000	21.3	10	3	10,863	1.4	3.1	4.5
Tanks-Conversion to Int. Floating Roof	352	120,000	42.2	15	1	2,556	0.9	5.0	5.9
Pumps, Valves, and Flanges 1&M	3,400					2,000	6.8	0.0	6.8
Subtotal			937.9				64.9	137.6	202.5

		Capital	Total	Useful	Equip-	Annual	Total Annual	Annualized	Total
		Cost Per	Capital Cost	Life	ment	Operating	Operating	Capital	Annualized
	Number	Unit	\$ Millions	Years	Category	Cost/Unit	\$ millions	\$ millions	\$ millions
Refining Sector									
Marine Loading Vapor Recovery	108	7,500,000	810.0	10	3	479,250	51.8	119.8	171.6
Cone Roof Tanks-Int. Floating Roof	5,052	80,000	404.2	15	1	1,704	8.6	48.3	56.9
I&M, V/F/P/C	3,346,177					33	110.4	0.0	110.4
Flares-Tip & Instr'n	476	75,000	35.7	10	2	3,195	1.5	5.3	6.8
Sewer System Drains	89,000	355	31.6	20	1	8	0.7	3.4	4.0
Safety Valves Rupture Disks	70,140	200	14.0	10	2	9	0.6	2.1	2.7
L.C. Engines-Air Fuel Control	1,063	10,000	10.6	5	3	639	0.7	2.5	3.2
Subtotal			1,306.1				174.3	181.4	355.7
Total Cost to All Sectors			15,243.5				1,090.8	2,143.8	3,234.6

CASE II									
							Total Annual	Annual	Total
	Capital	Total Capital	Useful	Equip-	Annual	Operating	Capital	Annualized	
	Cost Per	Cost	Life	ment	Operating	Cost	Cost	Cost	
	Number	Unit	\$ Millions	Years	Category	Cost/Unit	\$ Millions	\$ Millions	\$ Millions
Production Sector									
Vapor Recovery for Storage Tanks	189,250	50,000	9,462.5	10	3	3,195	604.7	1,400.0	2,004.6
Replace V/F/C Oil Production						0			
20 valves x 143,622	2,872,440	1,000	2,872.4	10	0	0	0.0	425.0	425.0
80 flanges x 143,622	11,489,760	500	5,744.9	8	0	0	0.0	978.9	978.9
Replace V/F/C Gas Production									
24 valves x 63,141	1,515,384	1,000	1,515.4	10	0	0	0.0	224.2	224.2
96 flanges x 63,141	6,061,536	500	3,030.8	8	0	0	0.0	516.5	516.5
Three Way Cal. for ICs	90,282	30,000	2,708.5	5	3	1,917	173.1	649.5	822.6
Replace V/F/C Gas Plants									
750 valves x 724	543,000	1,000	543.0	10	0	21	11.4	80.3	91.7
3,000 flanges x 724	2,172,000	500	1,086.0	8	0	11	23.9	185.1	209.0
Subtotal			26,963.4				813.0	4,459.5	5,272.5
Marketing Sector									
Bulk Plant Tanks (per plant)-Dome & VR	10,131	400,000	4,052.4	15	2	17,040	172.6	484.3	657.0
Bulk Terminal Tanks						0			
Internal Floating Roof-Dome & VR	10,389	250,000	2,597.3	15	2	10,650	110.6	310.4	421.1
External Floating Roof-Dome & VR	5,194	400,000	2,077.6	15	2	17,040	88.5	248.3	336.8
Bulk Terminal Racks	2,293	200,000	458.6	15	3	12,780	29.3	54.8	84.1
Subtotal			9,185.9				401.1	1,097.9	1,499.0
Transportation Sector									
Pump Station Leakless Valves	76,500	20,000	1,530.0	15	2	852	65.2	182.9	248.0
Tanks Ext. Floating Roof-Domes & VR	1,761	450,000	792.5	15	2	19,170	33.8	94.7	128.5
Tanks Internal Floating Roof-VR	1,761	250,000	440.3	15	2	10,650	18.8	52.6	71.4
Pump Station Leakless Pumps	8,500	30,000	255.0	10	0	0	0.0	37.7	37.7
Subtotal			3,017.7				117.7	367.9	485.6

							Total Annual	Annual	Total
		Capital	Total Capital	Useful	Equip-	Annual	Operating	Capital	Annualized
		Cost Per	Cost	Life	ment	Operating	Cost	Cost	Cost
	Number	Unit	\$ Millions	Years	Category	Cost/Unit	\$ Millions	\$ Millions	\$ Millions
Refining Sector									
Leakless Valves									
Small	2,007,706	1,000	2,007.7	10	0	0	0.0	297.0	297.0
Intermediate	1,204,624	1,500	1,806.9	10	0	0	0.0	267.3	267.3
Large	133,847	0	0.0	10	0	0	0.0	0.0	0.0
Flanges	6,692,534	500	3,346.3	8	0	0	0.0	570.2	570.2
Ext. Floating Roof Tanks-Dome & VR	4,024	400,000	1,609.6	15	2	17,040	68.6	192.4	261.0
Int. Floating Roof Tanks-VR	6,037	250,000	1,509.3	10	3	15,975	96.4	223.3	319.7
Pumps	39,907	27,000	1,077.5	10	3	1,725	68.9	159.4	228.3
Central Vapor Recovery-Upgrade:									
<50 mbpd refinery	90	2,500,000	225.0	15	2	106,500	9.6	26.9	36.5
50-100 mbpd refinery	34	5,000,000	170.0	15	2	213,000	7.2	20.3	27.6
100-200 mbpd refinery	36	7,500,000	270.0	15	2	319,500	11.5	32.3	43.8
>200 mbpd refinery	20	10,000,000	200.0	15	2	426,000	8.5	23.9	32.4
Compressors	4,323	160,000	691.7	15	1	3,408	14.7	82.7	97.4
Gas Recovery Compressor Upgrade	240	2,000,000	480.0	10	3	127,800	30.7	71.0	101.7
Flares-Additional	120	1,500,000	180.0	15	2	63,900	7.7	21.5	29.2
Main Separator Battery-VR	308	750,000	231.0	15	2	31,950	9.8	27.6	37.5
L.C. Engines-3 way catalyst	1,063	30,000	31.9	5	3	1,917	2.0	7.6	9.7
Truck Loading-Improved VR & Incinerate	141	200,000	28.2	10	3	12,780	1.8	4.2	6.0
Subtotal									
			13,865.0				337.5	2,027.7	2,365.2
Total Cost All Sectors									
			53,032.0				1,669.3	7,953.0	9,622.3

APPENDIX II

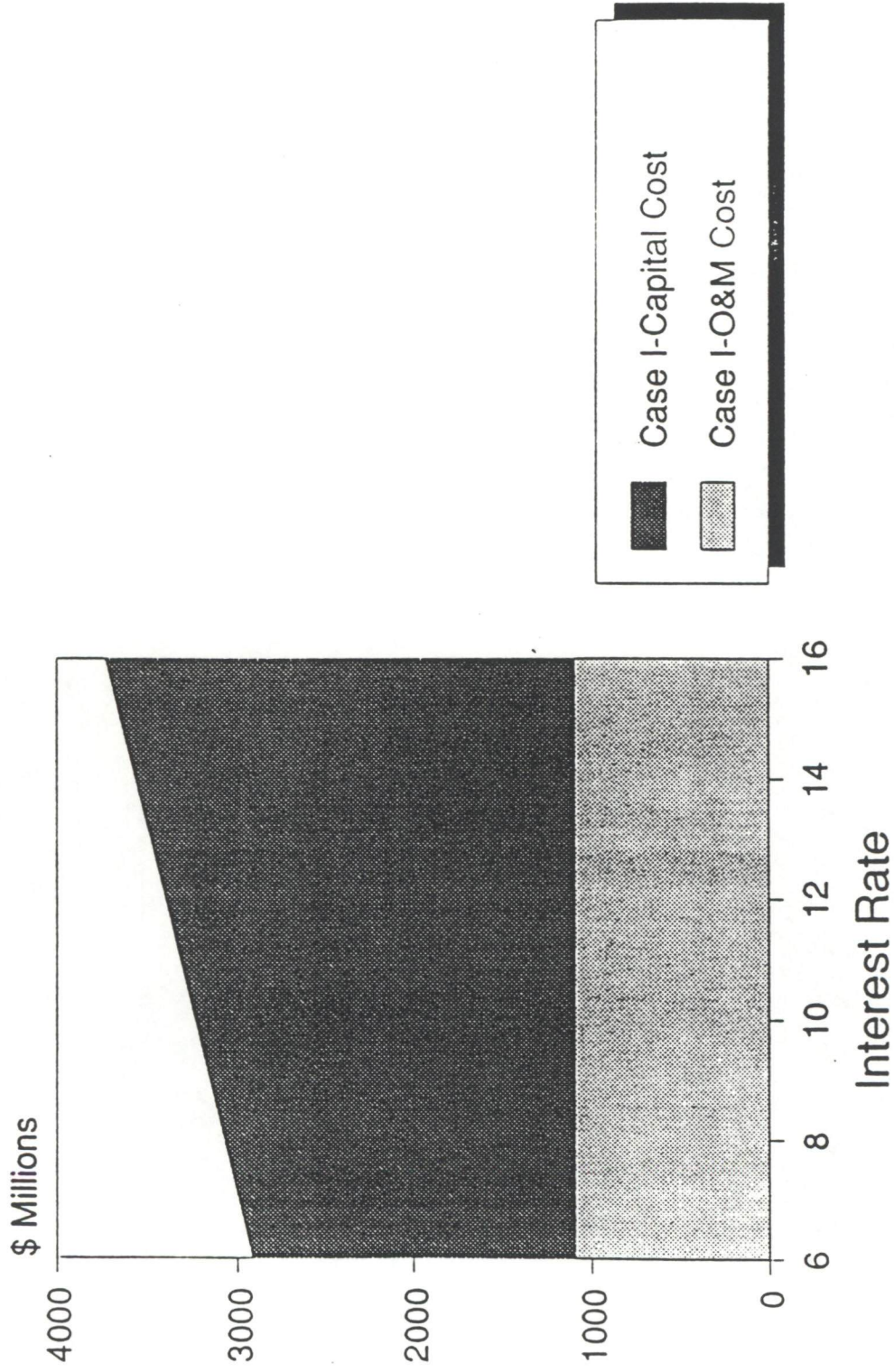
Air Toxics Control: Annualized Costs									
(5 Year Useful Life)									
		Capital	Total	Useful	Equip-	Annual	Total Annual	Annualized	Total
		Cost Per	Capital Cost	Life	ment	Operating	Operating	Capital	Annualized
	Number	Unit	\$ Millions	Years	Category	Cost/Unit	\$ millions	\$ millions	\$ millions
CASE I									
Production Sector									
Internal Floating Cover/Storage	510,970	7,500	3,832.3	5	1	160	81.6	919.0	1,000.7
Covers or New Water Tanks	378,497	7,500	2,838.7	5	0	0	0.0	680.8	680.8
Air-Fuel Ratio Controller ICs	90,282	10,000	902.8	5	3	639	57.7	216.5	274.2
Casing Vent Recovery Oil Wells	407,120	1,000	407.1	5	1	21	8.7	97.6	106.3
Air-Fuel Ratio Controller Fired Vss	28,724	10,000	287.2	5	3	639	18.4	68.9	87.2
Three-Way Cat. for Compressors	5,792	40,000	231.7	5	3	2,556	14.8	55.6	70.4
Quarterly B&M Oil Production	143,622					1,600	229.8	0.0	229.8
Quarterly B&M Gas Production	63,141					2,000	126.3	0.0	126.3
Carbon Filters Gas Production	31,570	2,500	78.9	5	3	160	5.0	18.9	24.0
Quarterly B&M Gas Plants	652					16,000	10.4	0.0	10.4
Carbon Filters Glycol Venting	724	2,500	1.8	5	3	160	0.1	0.4	0.5
Subtotal			8,580.6				552.8	2,057.8	2,610.6
Marketing Sector									
Service Station Refueling			2,836.4	5	5		234	680.2	914.2
Bulk Plant Tanks-Floating Roof	51,994	10,000	519.9	5	1	213	11.1	124.7	135.8
Bulk Terminal Racks-Vapor Rec.	764	500,000	382.0	5	3	31,950	24.4	91.6	116.0
Bulk Terminal Tanks	4,155	80,000	332.4	5	1	1,704	7.1	79.7	86.8
Large Marine Loading Terminal-V.Rec.	24	7,500,000	180.0	5	3	479,250	11.5	43.2	54.7
Small Marine Loading Terminal-V. Rec.	119	1,200,000	142.8	5	3	76,680	9.1	34.2	43.4
Bulk Plant Loading Racks	3,377	7,500	25.3	5	3	479	1.6	6.1	7.7
Subtotal			4,418.9				298.8	1,059.7	1,358.5
Transportation Sector									
Marine Terminal Vapor Recovery	52	1,200,000	62.4	5	3	76,680	4.0	15.0	19.0
Inland Barge-Vapor Recovery	3,300	168,000	554.4	5	3	10,735	35.4	133.0	168.4
Ocean Barge-Vapor Recovery	500	266,000	133.0	5	3	16,997	8.5	31.9	40.4
Product Carrier-Vapor Recovery	150	831,000	124.7	5	3	53,101	8.0	29.9	37.9
Crude Carrier	125	170,000	21.3	5	3	10,863	1.4	5.1	6.5
Tanks-Conversion to Int. Floating Roof	352	120,000	42.2	5	1	2,556	0.9	10.1	11.0
Pumps, Valves, and Flanges B&M	3,400					2,000	6.8	0.0	6.8
Subtotal			937.9				64.9	224.9	289.9

		Capital	Total	Useful	Equip-	Annual	Total Annual	Annualized	Total
		Cost Per	Capital Cost	Life	ment	Operating	Operating	Capital	Annualized
	Number	Unit	\$ Millions	Years	Category	Cost/Unit	\$ millions	\$ millions	\$ millions
Refining Sector									
Marine Loading Vapor Recovery	108	7,500,000	810.0	5	3	479,250	51.8	194.3	246.0
Cone Roof Tanks-Int. Floating Roof	5,052	80,000	404.2	5	1	1,704	8.6	96.9	105.5
I&M, VIF/PIC	3,346,177					33	110.4	0.0	110.4
Flares-Tip & Instr'n	476	75,000	35.7	5	2	3,195	1.5	8.6	10.1
Sewer System Drains	89,000	355	31.6	5	1	8	0.7	7.6	8.2
Safety Valves Rupture Disks	70,140	200	14.0	5	2	9	0.6	3.4	4.0
I.C. Engines-Air Fuel Control	1,063	10,000	10.6	5	3	639	0.7	2.5	3.2
Subtotal			1,306.1				174.3	313.2	487.5
Total Cost to All Sectors			15,243.5				1,090.8	3,655.6	4,746.5

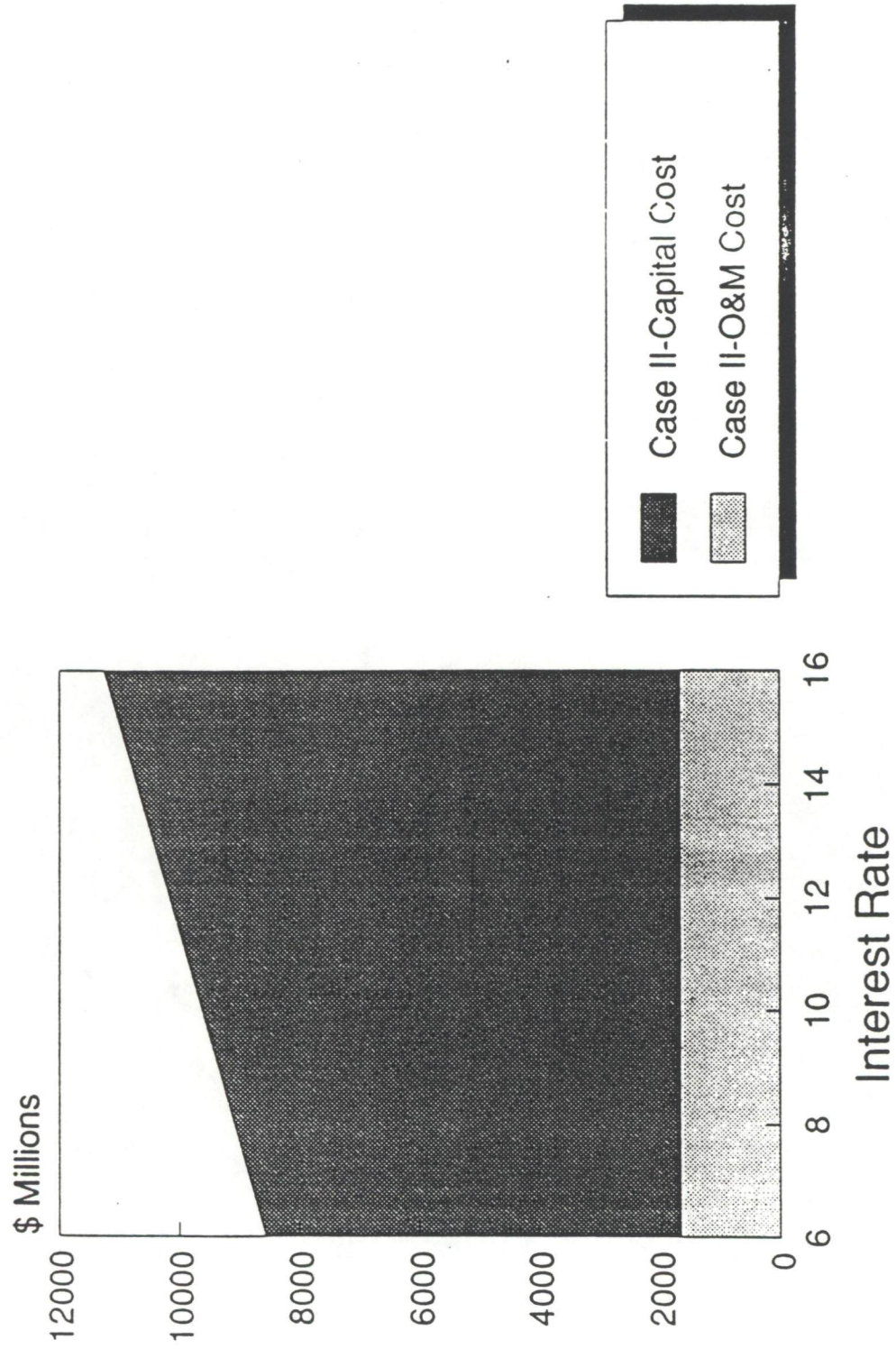
CASE II									
							Total Annual	Annual	Total
	Capital	Total Capital	Useful	Equip-	Annual	Operating	Operating	Capital	Annualized
	Cost Per	Cost	Life	ment	Operating	Cost	Cost	Cost	Cost
	Number	Unit	\$ Millions	Years	Category	Cost/Unit	\$ Millions	\$ Millions	\$ Millions
Production Sector									
Vapor Recovery for Storage Tanks	189,250	50,000	9,462.5	5	3	3,195	604.7	2,269.3	2,873.9
Replace V/F/C Oil Production						0			
20 valves x 143,622	2,872,440	1,000	2,872.4	5	0	0	0.0	688.9	688.9
80 flanges x 143,622	11,489,760	500	5,744.9	5	0	0	0.0	1,377.7	1,377.7
Replace V/F/C Gas Production									
24 valves x 63,141	1,515,384	1,000	1,515.4	5	0	0	0.0	363.4	363.4
96 flanges x 63,141	6,061,536	500	3,030.8	5	0	0	0.0	726.8	726.8
Three Way Cal. for ICs	90,282	30,000	2,708.5	5	3	1,917	173.1	649.5	822.6
Replace V/F/C Gas Plants									
750 valves x 724	543,000	1,000	543.0	5	0	21	11.4	130.2	141.6
3,000 flanges x 724	2,172,000	500	1,086.0	5	0	11	23.9	260.4	284.3
Subtotal			26,963.4				813.0	6,466.3	7,279.3
Marketing Sector									
Bulk Plant Tanks (per plant)-Dome&VR	10,131	400,000	4,052.4	5	2	17,040	172.6	971.8	1,144.5
Bulk Terminal Tanks						0			
Internal Floating Roof-Dome & VR	10,389	250,000	2,597.3	5	2	10,650	110.6	622.9	733.5
External Floating Roof-Dome & VR	5,194	400,000	2,077.6	5	2	17,040	88.5	498.2	586.7
Bulk Terminal Racks	2,293	200,000	458.6	5	3	12,780	29.3	110.0	139.3
Subtotal			9,185.9				401.1	2,202.9	2,604.0
Transportation Sector									
Pump Station Leakless Valves	76,500	20,000	1,530.0	5	2	852	65.2	366.9	432.1
Tanks Ext. Floating Roof-Domes & VR	1,761	450,000	792.5	5	2	19,170	33.8	190.0	223.8
Tanks Internal Floating Roof-VR	1,761	250,000	440.3	5	2	10,650	18.8	105.6	124.3
Pump Station Leakless Pumps	8,500	30,000	255.0	5	0	0	0.0	61.2	61.2
Subtotal			3,017.7				117.7	723.7	841.4

							Total Annual	Annual	Total
		Capital	Total Capital	Useful	Equip-	Annual	Operating	Capital	Annualized
		Cost Per	Cost	Life	ment	Operating	Cost	Cost	Cost
	Number	Unit	\$ Millions	Years	Category	Cost/Unit	\$ Millions	\$ Millions	\$ Millions
Refining Sector									
Leakless Valves									
Small	2,007,706	1,000	2,007.7	5	0	0	0.0	481.5	481.5
Intermediate	1,204,624	1,500	1,806.9	5	0	0	0.0	433.3	433.3
Large	133,847	0	0.0	5	0	0	0.0	0.0	0.0
Flanges	6,692,534	500	3,346.3	5	0	0	0.0	802.5	802.5
Ext. Floating Roof Tanks-Dome & VR	4,024	400,000	1,609.6	5	2	17,040	68.6	386.0	454.6
Int. Floating Roof Tanks-VR	6,037	250,000	1,509.3	5	3	15,975	96.4	361.9	458.4
Pumps	39,907	27,000	1,077.5	5	3	1,725	68.9	258.4	327.3
Central Vapor Recovery-Upgrade:	180								
<50 mbpd refinery	90	2,500,000	225.0	5	2	106,500	9.6	54.0	63.5
50-100 mbpd refinery	34	5,000,000	170.0	5	2	213,000	7.2	40.8	48.0
100-200 mbpd refinery	36	7,500,000	270.0	5	2	319,500	11.5	64.8	76.3
>200 mbpd refinery	20	10,000,000	200.0	5	2	426,000	8.5	48.0	56.5
Compressors	4,323	160,000	691.7	5	1	3,408	14.7	165.9	180.6
Gas Recovery Compressor Upgrade	240	2,000,000	480.0	5	3	127,800	30.7	115.1	145.8
Flares-Additional	120	1,500,000	180.0	5	2	63,900	7.7	43.2	50.8
Main Separator Battery-VR	308	750,000	231.0	5	2	31,950	9.8	55.4	65.2
L.C. Engines-3 way catalyst	1,063	30,000	31.9	5	3	1,917	2.0	7.6	9.7
Truck Loading-Improved VR & Incinerate	141	200,000	28.2	5	3	12,780	1.8	6.8	8.6
Subtotal			13,665.0				337.5	3,325.1	3,662.5
Total Cost All Sectors			53,032.0				1,669.3	12,717.9	14,387.2

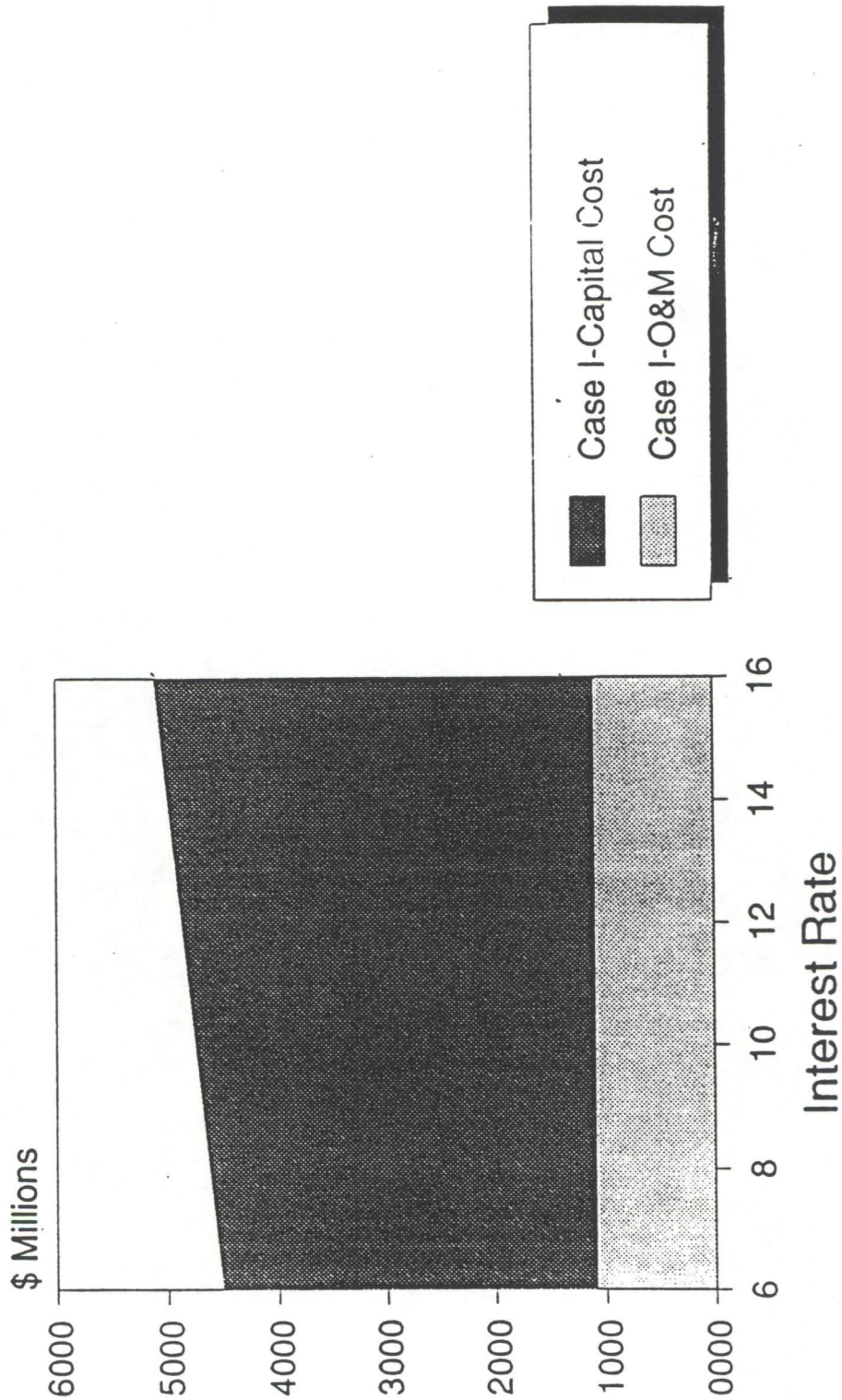
Case I - Annual Capital and O&M Costs at Variable Interest Rates



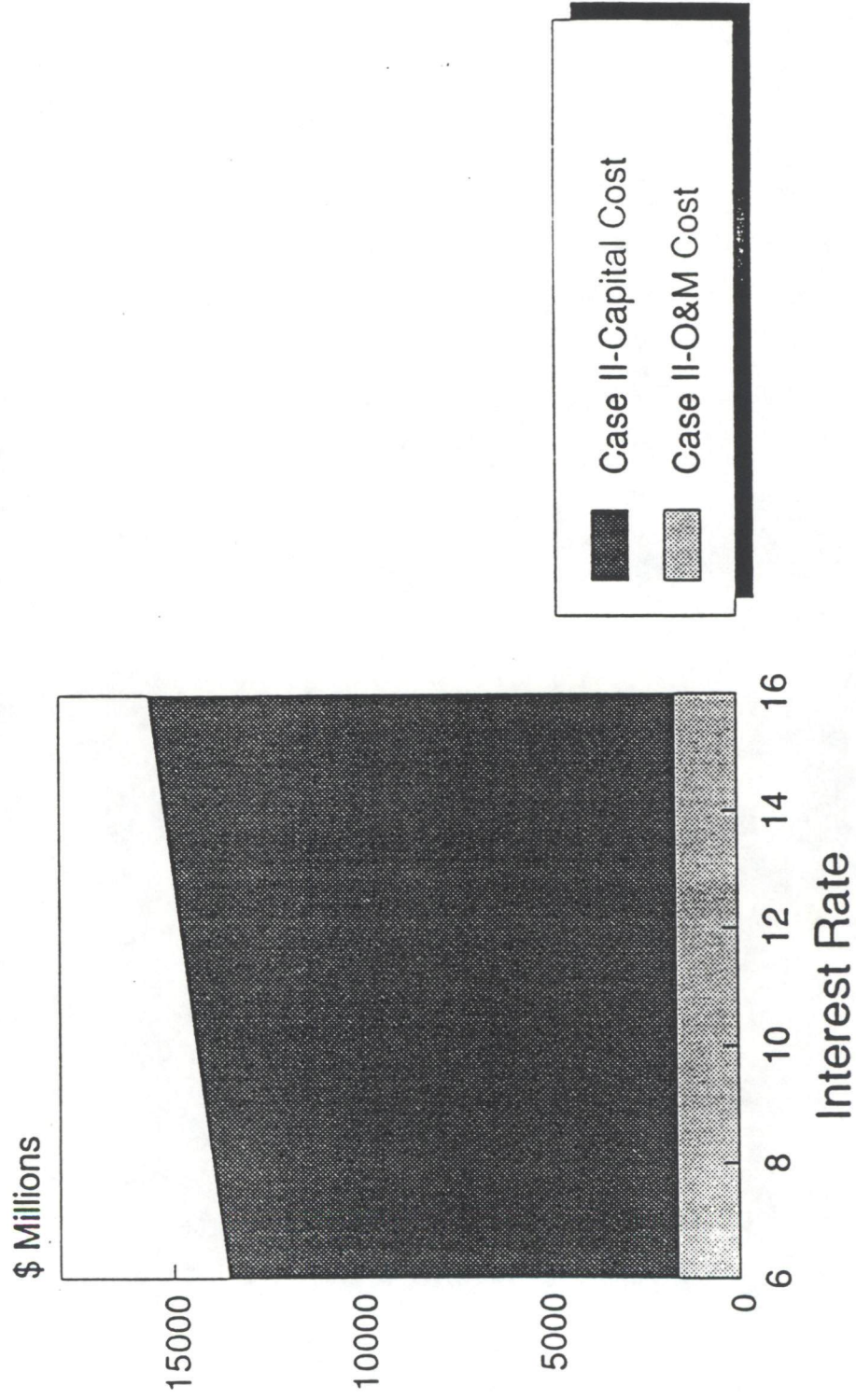
Case II - Annual Capital and O&M Costs at Variable Interest Rates



Case I - Annual Capital and O&M Costs at Variable Interest Rates (5 Year Useful Life)



Case II - Annual Capital and O&M Costs at Variable Interest Rates (5 Year Useful Life)



THE WHITE HOUSE

WASHINGTON

March 16, 1990

MEMORANDUM FOR THE FILE

FROM: JEFFREY R. HOLMSTEAD *JRH*
ASSISTANT COUNSEL TO THE PRESIDENT

SUBJECT: Impact of S. 1630 on the State of Louisiana
Chemical Operations

I have reviewed the above-referenced document, which will be used in on-going discussions regarding the President's proposed amendments to the Clean Air Act. No further action is necessary.

WHITE HOUSE CORRESPONDENCE TRACKING WORKSHEET

☒ O - OUTGOING☒ H - INTERNAL☒ I - INCOMINGDate Correspondence
Received (YY/MM/DD) 1/1Name of Correspondent: James H. Ford☐ MI Mail Report

User Codes: (A) _____ (B) _____ (C) _____

Subject: Letter of 5.16.30 on the State of
South Carolina

ROUTE TO:

ACTION

DISPOSITION

Office/Agency	(Staff Name)	Action Code	Tracking Date YY/MM/DD	Type of Response	Code	Completion Date YY/MM/DD
<u>CUON</u>		ORIGINATOR	<u>10/02/22</u>			<u>1/1</u>
		Referral Note:				
<u>11</u>		<u>A</u>	<u>10/02/22</u>			<u>10/02/22</u>
		Referral Note:				
<u>11</u>		<u>I</u>	<u>1/1</u>			<u>1/1</u>
		Referral Note:				
<u>11</u>		<u>I</u>	<u>1/1</u>			<u>1/1</u>
		Referral Note:				
<u>11</u>		<u>I</u>	<u>1/1</u>			<u>1/1</u>
		Referral Note:				

ACTION CODES:

A - Appropriate Action
C - Comment/Recommendation
D - Draft Response
F - Furnish Fact Sheet
to be used as Enclosure

I - Info Copy Only/No Action Necessary
R - Direct Reply w/Copy
S - For Signature
X - Interim Reply

DISPOSITION CODES:

A - Answered
B - Non-Special Referral
C - Completed
S - Suspended

FOR OUTGOING CORRESPONDENCE:

Type of Response = Initials of Signer
Code = "A"
Completion Date = Date of Outgoing

Comments: _____

Keep this worksheet attached to the original incoming letter.

Send all routing updates to Central Reference (Room 75, OEOS).

Always return completed correspondence record to Central Files.

Refer questions about the correspondence tracking system to Central Reference, ext. 2590.

ARCO 

Facsimile Transmission

Outgoing		Incoming	
To	C. Boyden Gray	To	
Location	fax 456-28830 26379	Location	
From	James E. Ford	From	
Location	ARCO	Location	
Number of pages	36 + cover		
Time	am	☐ a.m. ☐ p.m.	
Comments	John Schmitz needs this for his meeting immediately	Comments	
Operator's initials		Operator's initials	

Urgent

ARCO-1189-C

(12-87)

FEB-20-1990 09:51 FROM

94576287 P.04

Petrochemical Industry
FEB 20 1990**DRAFT****IMPACT OF S. 1630 ON THE STATE OF LOUISIANA CHEMICAL OPERATIONS**

The state of Louisiana will be heavily impacted if the Senate's proposed Clean Air Act Air Toxics Title (Title III) is enacted. As one of the primary petrochemical states in the country, broad sweeping requirements for the addition of costly controls will have major ramifications. These are summarized below.

Cost Impact

The current cost of controlling emissions from chemical plants is approximately \$150 million per year. The air toxics requirements, as specified in the Senate bill, could add an additional cost to chemical operations of approximately \$700 million dollars per year.

Employment Impact

Since chemical manufacturing and processing is so diverse in our society, any disruption in cost or supplies could have dramatic impact on employment. Some of the large industries in Louisiana which rely on chemical products include: oil and gas extraction, fabricated metal, paper, transportation, textiles, apparel, and leather products. Including chemical and allied products employment, total downstream employment in the state of Louisiana for chemical products is 214,500.

Specific Impacts

The two provisions which will have the greatest impact on the State of Louisiana are: Maximum Achievable Control Technology (MACT) standards, and requirements to meet residual risk levels.

Many sites in Louisiana will be subject to both requirements. For instance, one site has, primarily through voluntary efforts, reduced emissions of five listed compounds from 950 tons per year in 1983 to 206 tons per year in 1988. Based on planned reductions, the source expects to reduce these emission levels to 90 tons per year by 1993. If MACT is required, these levels will be reduced even further to 26 tons per year, and if all available technology is used, the emissions will be just 3.3 tons per year. Even after the source reduced its emissions to 3.3 tons per year, the emission source will still pose a greater than 1 in 1,000,000 risk level using EPA's risk assessment methodology.

The costs per ton removed to achieve these reductions goes up dramatically as more technology is added. For instance, the cost to reduce emissions from 950 tons per year to 206 tons per year is around \$1500 per ton removed. These costs go to \$7400 per ton removed to reach the planned reductions (90 tons per year). To reach MACT, the cost will be \$30,000 per ton, and if all available technology were applied, the cost would be a staggering \$450,000 per ton removed. Remember, this still would not get the site to a level below a 1 in 1,000,000 risk level.

These scenarios will be repeated throughout the state.

FEB-20-1990 10:26 FROM

TO

94576287

P.02

Petrochemical Industry

LOUISIANA

MACT/Residual Risk

At one site in Louisiana, a company has reduced emissions of five listed compounds from 950 tons per year in 1983 to 206 tons per year in 1988. Based on planned reductions, the source expects to reduce these emission levels to 90 tons per year by 1993. If MACT is required, these levels will be reduced even further to 26 tons per year, and if all available technology is used, the emissions will be just 3.3 tons per year. Even after the source reduced its emissions to 3.3 tons per year, the emission source will still pose a greater than 1 in 1,000,000 risk level if EPA risk assessment methods are used.

The costs per ton to achieve these reductions goes up dramatically as more technology is added. For instance the cost to reduce emissions from 950 tons per year to 206 tons per year is around \$1500 per ton removed. These costs go to \$7400 per ton removed to reach the planned reductions (90 tons per year). To reach MACT, the costs will be \$30,000 per ton, and if all available technology were applied, the cost would be a staggering \$430,000 per ton removed. Remember, this still would not get the site to a level below a 1 in 1,000,000 risk level using EPA risk assessment methodology.

FEB-20-1990 10:26 FROM

TO

94576287 P.03

LOUISIANAMaximum Achievable Control Technology (MACT)

Current State regulations require emissions of VOC from barge loading operations to be controlled at facilities that load large quantities of organic materials. Facilities that currently load smaller quantities of listed substances will likely be required under MACT to install controls similar to those used by larger facilities. One small facility estimates that the capital cost of MACT on barge loading operations at the facility would be \$1 million. The reduction in emissions of listed substances would only be 20 tons/year.

February 20, 1990

FEB-20-1990 10:27 FROM

TO

94576287

P.04

LOUISIANA**Residual Risk**

A chemical process uses a listed substance to produce an elastomer. Less than 1 lb per hour of the listed substance is emitted to the air from fugitive sources such as small leaks from valves, pumps and other equipment. Based on a modeling study, these emissions are estimated to exceed the 1×10^{-6} residual risk target if EPA risk assessment methodology is used. The company evaluated two approaches for reducing emissions to meet the 1×10^{-6} residual risk target. Under one approach, an enclosure (i.e., a building) would be constructed around the process and the building exhaust would be treated to remove the listed substance with a carbon absorber. The capital investment to implement this approach is estimated to be \$18 million, or about \$3.3 million per ton of listed substance reduced. The second approach involved eliminating the possible emission points by rebuilding the entire process. This would require a capital investment of about \$8 million, or about \$0.9 million per ton of listed pollutant removed.

The EPA repeatedly cautions that their methodology predicts an upper bound of risk and should be used to compare relative risk - not try to pinpoint actual risk. Huge new costs and societal disruptions should not be driven by these risk assessments.

FEB-20-1990 10:27 FROM

TO

94576287

P.05

LOUISIANA**Permits**

One company has approximately 450 point sources at one facility in Louisiana which require 30 permits. Each year, this site must get approximately 7 new permits. The approval time for these permits ranges from 3 to 24 months. Under S. 1630, many, if not all of these permits would have to be re-written resulting in much lost time and resources for the plant, the state and EPA for no environmental benefit. Facilities permitted under existing state programs should not have to be re-permitted under this new, duplicative permit program.

February 20, 1990

FEB-20-1990 09:50 FROM

TO

94576287

P.02

FEB 20 1990

DRAFT**IMPACT OF S. 1630 ON THE STATE OF TEXAS CHEMICAL OPERATIONS**

The state of Texas will be heavily impacted if the Senate's proposed Clean Air Act Air Toxics Title (Title III) is enacted. As one of the primary petrochemical states in the country, broad sweeping requirements for the addition of costly controls will have major ramifications. These are summarized below.

Cost Impact

The current cost of controlling emissions from chemical plants is between \$150 and \$200 million per year. The air toxics requirements, as specified in the Senate bill, could add an additional cost to the chemical industry alone of approximately \$1.19 billion dollars per year.

Employment Impact

Since chemical manufacturing and processing is so diverse in our society, any disruption in cost or supplies could have dramatic impact on employment. Some of the large industries in Texas which rely on chemical products include: oil and gas extraction, electrical machinery, electronic equipment, transportation, apparel and accessory stores, and hospitals. Including chemical and allied products employment, total downstream employment in the state of Texas for chemical products is 1, 429,200.

Specific Impacts

The two Air Toxics provisions which will have the greatest impact on the State of Texas are: Maximum Achievable Control Technology (MACT) standards, and requirements to meet residual risk levels.

The concern with MACT is that cost effectiveness is not a criterion for determining where to set MACT. The best technology must be applied to all sources in a category, regardless of whether the marginal benefit accrued by the addition of the technology is worth the additional cost. For example, one plant in Texas is currently constructing an activated sludge wastewater treatment plant which will require a \$1.5M closed-loop cooling system. The system will meet all Federal and state requirements. However, if the Senate bill is enacted, MACT could be defined by a small company in the northeast U.S. to be a covered treatment unit with a carbon absorption system for off-gases. If it is, the cost to retrofit this technology would be \$10 million; this does not include the loss of depreciation etc. of the closed-loop cooling system. While the covered treatment unit may make sense for a small plant, it does not for a larger plant, thus highlighting the potential problems with choosing the best of the best technology without regard to cost.

FJB-20-1990 09:51 FROM

TO

94576287 P.03

Requirements to meet a theoretical numerical risk level will add considerable costs with questionable benefits. These risk numbers (one in one million in the Senate bill), greatly exaggerate actual risk. While it is prudent to err on the side of caution when protecting the public, the protection must be from a real risk.

An ethylene manufacturer in Texas produces a by-product stream containing benzene. The facility meets all of the requirements of the recently issued benzene NESHAP. Nonetheless, emissions from the plant are estimated to exceed a one in one million residual risk target (using EPA's methodology). To meet the risk target, the company would have to rebuild the process to eliminate sources of fugitive emissions at a cost of \$9.6 million, or a cost effectiveness of \$1.1 million per ton of benzene removed.

FEB-20-1990 10:28 FROM

TO

94576287

P.06

TEXASMaximum Achievable Control Technology (MACT)

A company operates an acrylonitrile plant near Port Lavaca, Texas. The plant was completed in 1981. The plant provides work for 150 full time employees in addition to about 300 contract employees.

BACT was installed on all sources of VOC's. As a result, the company has already achieved a high level of control compared to uncontrolled emissions. For example, in 1988 the plant emitted 22 pounds of acrylonitrile emissions from all sources per million pounds of production as compared to 551 pounds from a comparable older plant. Additional reductions are planned under the facility's Waste and Release Reduction Program, but large percent reductions from the existing level of control are simply impossible.

This raises two concerns with regard to S. 1630. First, the MACT standard may require huge expenditures for little environmental benefit if the standard exceeds BACT. Of the 22 pounds of acrylonitrile emissions per million pounds of production, only 3 pounds are from point sources. These sources are already controlled to a high level. For example, loading scrubbers and incinerators achieve 99.9% reduction of VOC's. However, there are comparable loading scrubbers and incinerators which achieve higher levels of control. S. 1630 would require existing sources to meet the most stringent control achieved in practice that is "generally feasible." While EPA may determine that, for example, 99.99% control is generally feasible for loading scrubbers and incinerators in acrylonitrile service, little additional reduction would be gained from an existing source meeting BACT and the cost would be great. Conceivably, existing control equipment would have to be scrapped and replaced to achieve a fraction of a percent additional controls.

A similar concern applies to non-point "fugitive" releases which account for the remaining 19 pounds of emissions. The facility has a leak detection and repair program in place which meets NSPS. If EPA decides to require "leakless" valves or other extreme controls under MACT for existing sources, the plant will experience tremendous cost and feasibility problems for relatively little benefit. While the desire to set a stringent level for MACT is understandable, setting it equal to the "best of the best" presents major problems for existing facilities which were constructed recently to high levels of control.

FEB-20-1990 13:04 FROM

TO

94576287

P.01

7

TEXAS

Residual Risk

An ethylene manufacturing process produces a by-product stream containing benzene. The process has no stack discharges of benzene. The facility emits less than 1 lb per hour of benzene from fugitive sources such as leaking valves, pumps, and other equipment. These emissions are currently controlled by a leak detection and repair program under the Benzene NESHAP. Nonetheless, emissions from the facility are estimated to exceed a 1×10^{-6} residual risk target by EPA risk assessment methodology. To meet the 1×10^{-6} residual risk target, the company would have to reduce emissions by rebuilding the process to eliminate sources of fugitive emissions. The capital costs to rebuild the process are estimated to be \$9.6 million, or a cost effectiveness of \$1.1 million per ton of benzene removed. However, the new "leakless" technology that would be used to replace existing equipment may not be feasible for other similar chemical processes.

FEB-20-1990 10:29 FROM

TO

94576287 P.07

TEXAS

Maximum Achievable Control Technology (MACT)

A replacement activated sludge wastewater treatment plant for a lagoon system is currently under construction and is expected to be completed this year. BACT was defined through the permitting process to require a \$1.5M closed-loop cooling system. MACT may be defined by a small company in the northeast U.S. to be a covered treatment unit and carbon absorption system for off-gases with low concentration VOC's. Estimated costs for retrofitting this technology to this unit is \$10M. These costs are unreasonable because of the differences in scale between this plant and the smaller plant used to define MACT.

FEB-20-1990 13:05 FROM

TO

94576287

P.02

7

TEXASMaximum Achievable Control Technology (MACT)

A company is currently installing high efficiency drift eliminators to reduce hexavalent chromium emissions. Cost is approximately \$25-30K per cooling tower cell, for 90% efficient control. We expect MACT would require non-chrome inhibitor systems. While we are trying to move in this direction, our practical experience on fast paced switching to a non-chrome system on one of our units showed severe equipment corrosion with associated capital equipment losses and unsafe equipment conditions occurred. Indiscriminate application of technology requirements can potentially result in higher risk to the public.

February 20, 1990

FEB-20-1990 10:30 FROM

TO

94576287

P.08

TEXAS**MACT Examples:**

The basis for this case is 40 existing fixed roof tanks, with emissions of 282.4 klb/yr.

BACT Installation of internal floating roofs in these tanks. Internal floating roofs are 96% efficient, compared to fixed roofs.

Costs. Floating roofs, \$75k each, for a total of \$3M.

Emission reduction is $282.4 \text{ klb} \times 0.96 = 271.1 \text{ klb}$.

$\$3\text{M} / 0.2711 \text{ Mlb} = \underline{\$11/\text{lb}}$

LAER Piping of fixed roof tank emissions to five incinerators, each located in the existing tank farm. Incinerators are 99.5% efficient.

Costs. Incinerators, \$1.8M each, for a total of \$9M.

Piping from tanks to incinerators, \$1M.

Total cost = \$10M.

Emission reduction is $282.4 \text{ klb} \times 0.995 = 281 \text{ klb}$.

$\$10\text{M} / 0.281 \text{ Mlb} = \underline{\$36/\text{lb}}$

Incremental Cost Cost of reduction between BACT and LAER.
 $\$7\text{M} / 0.0099 \text{ Mlb} = \underline{\$700/\text{lb}}$ (more than 15 times more expensive than the cost of LAER)

Wastewater Collection and Treatment

The basis for this case is 12 operating units with sewer drains feeding into six oil-water separators. Sewer drain emissions are 50.47 klb, and separator emissions are 64.55 klb.

BACT Steam strippers at each unit, separators covered and vented to the atmosphere.

Steam strippers are 95% efficient.

Costs. Strippers are \$1M each, for a total of \$12M.

Emission reduction is $115.02 \text{ klb} \times 0.95 = 109.27 \text{ klb}$.

$\$12\text{M} / 0.10927 \text{ Mlb} = \underline{\$110/\text{lb}}$

FEB-20-1990 10:30 FROM

TO

94576287 P.09

-2-

LAER BACT plus incinerators at each separator vent.

Incinerators are 99.5% efficient.

Costs. Incinerators \$1.8M each, for a total of \$10.8M.

Emission reduction is 109.27 klb (from BACT) +
5.75 klb X 0.995 = 114.99 kl.

$\$22.8\text{M} / 0.11499 \text{ Mlb} = \$198/\text{lb}$

Incremental Cost $\$10.8\text{M} / 0.00572 \text{ Mlb} = \$1900/\text{lb}$
(almost 10 times the cost of LAER)

Thermal

The basis for thermal destruction is 9.6 Mlb VOC to the unit.

BACT Four existing flares, 99.5% efficient.

Operating costs are \$50K each, for a total of \$0.2M

Emission reduction is 9.6 Mlb X 0.995 = 9.552 Mlb.

$\$0.2\text{M} / 9.552 \text{ Mlb} = \$0.02/\text{lb}$

LAER BACT plus four new incinerators. Flares are required for accidental loads, as incinerators large enough to handle them would be uneconomical to build and operate. Incinerators are 99.9% efficient.

Capital. \$20M each for a total of \$80M.

$\$80\text{M} \times 0.16276 = \$13.02\text{M}.$

Operating costs are \$40k each, for a total of \$0.16M.

Total annualized cost is \$13.38M.

Emission reduction is 9.6 Mlb X 0.999 = 9.59 Mlb.

$\$13.36\text{M} / 9.59\text{Mlb} = \$1.40/\text{lb}.$

Incremental Cost $\$13.38\text{M} / (9.59\text{Mlb} - 9.552\text{Mlb}) = \$352/\text{lb}.$

FEB-20-1990 10:31 FROM

TO

94576287

P.10

TEXAS**Credit for Early Reductions**

A second concern with S. 1630 relates to the MACT compliance extension for sources which achieve a voluntary reduction of 90% by 12/31/92 from a base year of 1985 or later. Because the reduction is from actual emissions in a base year, plants which were built "clean" or achieved significant reductions prior to 1985 are penalized relative to dirtier plants. Furthermore, since the reductions must be "voluntary," very few plants will qualify. While the plant described above was designed to meet BACT, the level of control is a requirement of the permit and, thus, may not be determined to be "voluntary." In general, when the facility notifies the Texas Air Control Board that it has achieved reductions or has implemented a plan to study options, the reductions or studies end up as permit requirements. The only way to equitably provide credit (and thus incentives) for early reductions is to make equivalency and extension determinations based on how close the emissions are relative to the final standard (the closer the better) and how long before the standard these levels were achieved (the longer the better).

FEB-20-1990 10:31 FROM

TO

94576287

P.11

TEXAS**Permits**

One company has approximately 1100 point sources at one facility in Texas which require 250 permits. Each year, this site must get around 50 new permits. The approval time for these permits ranges from 3 to 12 months. Under S. 1630, many, if not all of these permits would have to be re-written resulting in much lost time and resources for no increased environmental benefit.

FEB-22-1990 08:42 FROM

TO

94576287

P.02

IOWA & OHIO

Maximum Achievable Control Technology (MACT)

The bill provides that the Administrator is to determine a technology-based emissions standard for each category or subcategory of sources which are established pursuant to this section. Several criteria are given within the bill to determine the degree of reduction in emissions that is achievable for new and existing sources within a category or subcategory but, generally, such levels equate to the maximum degree of reduction in emissions achieved in practice by source, or sources, within the category or subcategory.

The Environment and Public Works Committee Report on this bill states that "The benchmark for the categorical standard is not an average level (or some other percentile) of control across sources in the category, but, at a minimum, the most stringent level of control achieved in practice by a source of a similar size, type, and character." Further, that such control would equate to those "achieved by any comparable source in practice." The report points out that "The Administrator may consider the type of process employed in making decisions on subcategories and standards.

Several companies within my state have raised a concern that the language in the bill does not match the intent expressed by the Committee Report. These companies point out that a given chemical, or group of chemicals with similar chemical makeup, can be made by several different manufacturing processes. For instance, there are three specific type processes utilized to manufacture certain plastics. Not all processes, even for a chemically similar compound, can make all variations of the plastic required by the marketplace. For this reason, several different types of processes must be employed.

In the case of this plastic, the three processes employed each have different emissions levels, dependent not upon the types of controls employed, but upon the types and combination of processing steps required to make the end product. Even with control technologies well up in the 90+% range from an uncontrolled base, emission levels for this plastic can differ by factors of 10 to 20.

Therefore, as the Committee recognizes in its report, the emission levels should be established for sources in categories or subcategories based upon a "comparable" basis, which "consider the type of process employed". Without such provisions clearly delineated in the bill, the Administrator may possibly proceed to establish standards for the "lowest common denominator" process for the category, which could provide severe economic hardship, and even shutdown, of certain processes within the category. This provision must be modified accordingly.

February 20, 1990

FEB-22-1990 08:42 FROM

TO

94576287 P.03

KANSAS**Credit for Early Reduction**

A chemical facility near Wichita, Kansas voluntarily installed a flare to control reaction vent emissions in 1987 at a cost of over \$1,000,000. Although not required by the regulations, the flare was included in the permit for a facility expansion. This company is concerned that EPA will not credit these reductions (toward a MACT compliance extension) since they are now required by the permit.

FEB-22-1990 08:43 FROM

TO

94576287

P.04

KENTUCKY

One company operates a multi-unit facility in Western Kentucky. The company is particularly concerned about the impact of the emission reduction credit section (alternative emission limitations) as currently proposed in S. 1630. In 1986, Kentucky issued regulation requiring facilities to meet certain health based or technology standards. In 1987 the company proposed a compliance plan and has been implementing portions of it since then even though the state of Kentucky has been unable to process all the permit applications it received as a result of this program.

Credit for Early Reductions

The company has recently reduced emissions by over 2000 tons at a cost of between \$6-10 million. Even though these emission projects have not been approved by the state, they believe that they will not be credited as early reductions since these projects were implementing a regulatory program.

Permitting

In addition to concerns about the emission reduction credit section, there are serious doubts as to whether Kentucky will be able to handle the significant increase in permitting required by the proposed permits section. As stated earlier, Kentucky has not been able to process any operating permit applications from one company since the call for air toxic permit applications in 1987. The state has chosen to spend their limited resources writing construction permits (just to keep things from shutting down completely).

FEB-22-1990 08:43 FROM

TO

94576287

P.05

NORTH CAROLINA**Residual Risk**

A synthetic fiber manufacturing facility produces a wastewater stream containing a small amount of a listed substance. The wastewater stream is treated on site in a biological treatment pond. Evaporation of the listed substance from the biological treatment pond is estimated to result in emissions of less than 1 lb per hour. Nonetheless, based on modeling, a significant reduction in emissions would be needed to meet a residual risk level of 1×10^{-6} calculated by EPA risk assessment methodology. In a recent study, the company evaluated several waste treatment pond controls and other alternatives concluded that the most cost-effective approach for meeting the residual risk target of 1×10^{-6} would be to modify their process to eliminate sending the wastewater stream to the treatment pond. The process modification is estimated to cost about \$250,000 per ton reduced of the listed substance. This is about 100 times more costly than controls considered to Best Available Control. Elimination of the wastewater stream may not be feasible at other similar facilities.

FEB-22-1990 08:44 FROM

TO

94576287

P.06

SOUTH CAROLINA

Maximum Achievable Control Technology (MACT)

A South Carolina facility has batch operation units which would probably fall into the source category of "Pesticide Manufacture." The facility recently instituted an extensive odor reduction program which included routing reactor vents to flares and improving condenser efficiencies. These measures reduced emissions of benzene and Xylene. However, since an incinerator has been used in at least one source, MACT for the Pesticide Manufacture source category will probably be incineration which would require scrapping the existing flares (cost \$150,000). The required incinerator would provide little additional control for substantially greater cost.

Another operating unit at the facility would also fall into the Pharmaceutical Manufacture source category. This facility also uses condensers and flares for control of methanol emissions. Incineration will probably be MACT for the Pharmaceutical source category; again substantial additional cost for little additional emission reduction.

In a typical scenario experienced by other facilities in the state, the facility submitted an application for a consolidated air permit. In general, applications for new processes are reviewed within three months and the South Carolina Department of HEC then gives approval to manufacture the product without actually issuing an operating permit. Approval for production of experimental products (<50,000 lbs.) can be obtained in 2-3 weeks. The permitting provisions of S. 1630 will slow down, if not eliminate the development of new products and markets for these products.

WYOMING

Residual Risk

A phosphate fertilizer plant generates a "gypsum stack" as a necessary part of its operation. The gypsum stack typically covers several acres and is a source of radionuclide emissions. Radionuclide emissions are a listed substance in the CAA bill. Recent analyses performed by EPA for the radionuclides NESHAP indicate that a 1×10^{-6} residual risk level may not be achievable, with any technology for this source of radionuclide emissions. As a result, this facility may be forced to shut down. Plant shut down would result in a loss of 200 permanent jobs.

Petroleum Industry

IMPACT OF SENATE AIR TOXICS PROVISIONS -- IN S-1630 ON FOURTEEN STATES IN THE U.S.

The air toxics provisions of Senate bill S-1630 contain two series of requirements with significant ramifications for the petroleum industry. These include:

- o A stringent technology-based requirement termed "Maximally Available Control Technology" (MACT) that calls for emission controls based on the best performing plant, or better, that is in use in each source category; and
- o A severe residual risk requirement, after MACT, that calls for "all available controls" to reach a risk limit of 1/1,000,000 to the "Maximally Exposed Individual" (MEI).

This paper briefly addresses the impact of these requirements on the petroleum refining, marketing and production sectors in 14 key states in the U.S.¹ In addition, impacts are also reviewed for the same states as a result of the recent "Senate Agreement" on air toxics distributed early in February, 1990.

REFINING

For the refining sector, the severe residual risk limits of 1/1,000,000 in S-1630 would result in large scale expenditures to reduce emissions, even beyond MACT, for both large and small refining facilities. API has assessed the cost of "all available controls" nationwide for the refining sector. These costs would be upwards of \$15 billion dollars in capital expenditures nationwide for the refining sector, or over \$2.5 billion annually.²

The Department of Energy (DOE) contracted a study of air toxics control costs on the refining sector to assess the impact on a

¹ The states addressed in this paper include: Alabama, Arizona, Arkansas, Delaware, Georgia, Kentucky, Louisiana, Nebraska, North Carolina, Ohio, South Carolina, Tennessee, Texas, and West Virginia.

² The annual costs of \$2.5 billion assume that an adequate "useful life" is provided to recoup costs for equipment, at an annual interest rate of 10 percent. If a shorter period is necessary to recoup costs, due to permitting requirements necessitating changes every 5 years for example, the annualized costs would increase approximately 50 percent over the \$2.5 billion per year estimate.

"cost per barrel of crude oil" basis, and in terms of the impact on large and small refinery profit margins.³ These impacts were developed, based on the API cost study, for different regions of the country, and serve as the basis for this analysis on the refining sector.

The DOE study concluded that air toxics cost requirements as mandated by S-1630 would be as much as \$0.40 per barrel for large, complex refineries, and as much as \$0.50 per barrel for small, simple refineries (compared to total refining costs of \$4 to \$5 per barrel). The DOE study also concludes that such costs under the best product market conditions could reduce U.S. Gulf refiner cash operating margins by as much as 29 percent; and under less favorable market conditions would greatly increase U.S. refiner operating losses and potentially lead to closure of some marginal facilities. The regional impact estimates from the DOE study, for requirements such as mandated by S-1630, are presented in Table 1.

Most of the fourteen states included in this analysis contain substantial refining facilities, especially small refineries, that would be impacted by S-1630. Table 2 includes a state by state total of the number of small and large refineries. Based on the DOE study, the operating margin of small refineries in the states of Alabama, Arizona, Arkansas, Georgia, Kentucky, Louisiana, Ohio, Tennessee, Texas, and West Virginia could be severely reduced. The small refinery crude handling capacity of these states alone is on the order of several million barrels per day. In addition, the operating margin for the total refining capacity of the Gulf Coast region could be adversely affected, including the states of Alabama, Louisiana, Texas, and perhaps Arkansas, with a total crude oil refining capacity in 1988 of over 6.5 million barrels per day.⁴

³ Office of Planning and Environment, U.S. Department of Energy, "The Potential Impact of Proposed Hazardous Air Pollutant Legislation on the U.S. Refining Industry", Contract No. DE-AC-01-88FE61679, Task 9. November, 1989.

⁴ Oil and Gas Journal, March 21, 1988. "Survey of Operating Refineries in the U.S. (state capacities as of January 1, 1988).

3

TABLE 1
POTENTIAL IMPACT OF S-1630 AIR TOXIC REGULATIONS
ON U.S. REFINERIES
(1989 DOLLARS PER BARREL)

REGION	SMALL REFINERIES		LARGE REFINERIES	
	LOW PROFIT	HIGH PROFIT	LOW PROFIT	HIGH PROFIT
<u>East Coast</u>				
Refiner Margin	\$1.09	\$1.80	\$2.24	\$4.19
Compliance Cost	\$0.50	\$0.50	\$0.41	\$0.41
Adjusted Margin	\$0.59	\$1.30	\$1.83	\$3.78
<u>Midwest</u>				
Refiner Margin	\$0.48	\$2.11	\$1.53	\$3.82
Compliance Cost	\$0.50	\$0.50	\$0.41	\$0.41
Adjusted Margin	(\$0.02)	\$1.61	\$1.12	\$3.41
<u>Gulf Coast</u>				
Refiner Margin	(\$0.75)	(\$0.25)	(\$0.10)	\$1.41
Compliance Cost	\$0.50	\$0.50	\$0.41	\$0.41
Adjusted Margin	(\$1.25)	(\$0.75)	(\$0.51)	\$1.00
<u>West North Central</u>				
Refiner Margin	\$2.33	\$3.45	\$3.11	\$4.74
Compliance Cost	\$0.50	\$0.50	\$0.41	\$0.41
Adjusted Margin	\$1.83	\$2.95	\$2.70	\$4.33
<u>West Coast</u>				
Refiner Margin	(\$0.63)	\$0.80	\$1.88	\$4.17
Compliance Cost	\$0.50	\$0.50	\$0.41	\$0.41
Adjusted Margin	(\$1.13)	\$0.30	\$1.47	\$3.76

Notes:

Small Refinery = less than 100,000 b/cd

Large Refinery = 100,000 b/cd or above.

Data adapted from Tables IV-1 and IV-2 of the DOE report "The Potential Impact of Proposed Hazardous Air Pollutant Legislation on the U.S. Refining Industry," November 1989.

4

TABLE 2

TOTAL NUMBER OF LARGE AND SMALL
REFINERIES IN FOURTEEN STATES,
WITH REFINING CAPACITY

STATE	TOTAL REFIN- ERIES	LARGE REFIN- ERIES	SMALL REFIN- ERIES	TOTAL CAPAC- ITY
Alabama	3		3	138,750
Arizona	1		1	5,710
Arkansas	6		6	58,570
Delaware	1	1		140,000
Georgia	2		2	36,800
Kentucky	2	1	1	218,900
Louisiana	17	8	9	2,274,515
Nebraska	0			0
North Carolina	0			0
Ohio	4	3	1	482,650
South Carolina	0			0
Tennessee	1		1	57,000
Texas	31	17	14	4,068,350
West Virginia	2		2	15,500
TOTALS	70	30	40	7,496,135

NOTES:Adapted from Oil and Gas Journal, March 20, 1989.

Small refinery = less than 100,000 b/cd

Large refinery = 100,000 b/cd or more.

MARKETING

The Marketing sector of the petroleum industry could potentially be severely impacted as a result of air toxic provisions in S-1630. Although no marketing facilities would likely be classed as a "major source" under S-1630, there is a blanket provision that area sources can be listed with major source categories, requiring the installation of either MACT or GACT (Generally Available Control Technology). In addition, area source categories listed with major sources would also be subject to residual risk requirements under S-1630. EPA has a draft "Source Category Ranking System" final report that rates, out of 360 total source categories, bulk petroleum terminals, petroleum marketing and gasoline marketing in the top 25 categories listed.⁵ Given the high ranking of the marketing sector in the draft EPA source category ranking system, the provisions included in S-1630 would likely result in marketing facilities needing to meet MACT/GACT or residual risk requirements along with major facilities.

Using "all available controls" to meet emission reduction requirements, API estimates that the nationwide capital cost to the marketing sector as a result of S-1630 would total as much as \$14 billion, or over \$2 billion annually. These costs would follow from extensive vapor control requirements on marketing terminals, bulk plants and service stations in both urban and rural areas.

Of particular concern to the marketing sector is the potential impact of S-1630 on bulk terminals and service stations in rural areas. These facilities, with relatively low volume and minimal profit margins, would more likely curtail operations instead of installing extensive vapor control requirements to comply with S-1630. Fuel shortages in rural settings, because of reduced numbers of gasoline service stations and a much limited distribution network for both motor gasoline and home heating fuel, is a looming possibility if S-1630 is enacted as proposed.

The proportion of large marketing terminals to bulk terminals is presented in Table 3 for the fourteen states included in this analysis. States such as Arkansas, Kentucky, Nebraska, North Carolina, South Carolina, Texas, and West Virginia, with a preponderance of bulk plants relative to larger bulk terminals, would likely be more adversely impacted by S-1630 compared to other states. However, rural areas in all states could be adversely effected.

⁵ EPA draft final report "Source Category Ranking System," Pollution Assessment Branch, North Carolina, Contract No. 68-02-4330, August 31, 1988.

6

TABLE 3

TOTAL NUMBER OF MARKETING TERMINALS AND
BULK TERMINALS IN 1982 FOR 14 STATES

STATE	BULK TERMINALS	BULK PLANTS	RATIO OF BULK TERMINALS TO BULK PLANTS
Alabama	48	222	0.22
Arizona	21	74	0.28
Arkansas	29	218	0.13
Delaware	9	13	0.69
Georgia	64	265	0.24
Kentucky	38	228	0.17
Louisiana	60	293	0.20
Nebraska	25	223	0.11
North Carolina	69	419	0.16
Ohio	76	376	0.20
South Carolina	38	202	0.19
Tennessee	53	228	0.28
Texas	161	874	0.18
West Virginia	18	96	0.19

SOURCE:

U.S. Department of Commerce, Census Bureau, "1982 Census of Wholesale Trade, Industry Series, Miscellaneous Subjects," WC82-I-4, 1985.

PRODUCTION

The provisions of S-1630 result in the production sector being potentially vulnerable to air toxic requirements in two ways. First, a "facility" could easily be defined in S-1630 as an entire production field including all wells, tanks and gathering systems over a large area. Production facilities could thereby be listed as a major source with MACT and residual risk requirements imposed on all equipment in a production field regardless of the remoteness or insignificance of the emissions. Second, area sources including production can be included in S-1630 for MACT/GACT and residual risk requirements at the discretion of the Administrator.

The nationwide capital cost of "all available controls" on the production sector has been estimated to be as much as \$35 billion, with an annual cost of as much as \$7 billion per year. Instead of meeting the requirements of S-1630, many marginal "stripper wells" would curtail operations. API estimates, using DOE methodology, that at least 29,000 stripper wells would shut down nationwide as a result of S-1630 requirements. The states of Texas and Louisiana would be particularly effected.

SIGNIFICANCE OF THE "SENATE AGREEMENT"

The Senate agreement of February 1990 has three provisions of particular relevance to the petroleum industry:

- o Establishing MACT based on the performance average of the top ten percent in each source category;
- o Preventing facility shut-down if a site determination indicates that risk to the most exposed actual person (MEAP) is less than 1/10,000; and
- o Preventing the aggregation of production wells into a major source.

The first provision would reduce the initial overall impact of MACT requirements to some extent, especially for the refining sector. However, retention of 1/1,000,000 residual risk requirements still results in large scale expenditures, especially since "no cost considerations" can be factored into the regulations, and since "all available controls" would still be required for facilities in addressing the 1/1,000,000 criteria.

The second provision is important in reducing the impact of the 1/10,000 shut down criteria included in S-1630. Using the MEAP, it is likely that many fewer petroleum facilities would automatically need to shut down. However, the economic ramifications of using "all available controls" to meet the

1/1,000,000 risk requirements remain in the agreement, with economic viability becoming a predominant factor potentially leading to facilities, especially in the marketing sector, curtailing operations.

The agreement is unclear with regard to installation of "all available controls" for the 1/1,000,000 criteria. Would meeting the criteria based on the MEAP be sufficient, or would facilities be required to meet 1/1,000,000 criteria for the theoretical MEI instead? The latter would be a much more severe requirement since a many fold further reduction in emissions would be required compared to MEAP based calculations.

The third provision would significantly reduce impacts of S-1630 on the production sector. Preventing aggregation of wells into major sources would likely reduce the severe impacts anticipated for MACT and residual risk requirements on production operations.

September 26, 1989

ECONOMIC IMPACTS OF AIR TOXICS LEGISLATION ON OIL AND GAS EXPLORATION AND PRODUCTION

The API Air Toxics Cost Study estimates that the upfront capital cost of air toxics legislation on oil and gas exploration and production will be \$8.6 billion. Expenses of this magnitude would have a significant impact on the oil industry. Approximately 25% of existing oil wells would become uneconomical to operate. Roughly 29,000 oil wells are expected to be permanently plugged and abandoned, and annual oil production would decline by 52 million barrels. Future development would also be stunted with an estimated 4200 fewer wells drilled each year.

An estimated 68,000 oil and gas industry jobs would be lost as a result, and another 88,000 jobs in other sectors of the economy would be lost due to decreased expenditures for goods and services. Another result of lost jobs and reduced production would be decreased state revenues. Severance taxes which are paid to the states would decline by \$54 million. Royalties which are paid to state, federal or private landowners would decrease by \$125 million.

Following is a table showing statistics on job loss and reduced production for selected states.

STATE	NEW WELLS NOT DRILLED	Wells Plugged	Oil Not Produced (thous. b/d)	Industry Jobs Lost	Total Jobs Lost	Severance Tax Loss (million)	Royalty Tax Loss (million)
*//KN	713	4594	19.8	8516	12,960	11.1	17.4
LA	149	458	2.4	873	3502	0.6	2.1
MI	33	331	1.4	480	3434	0.7	1.2
MT	21	257	1.1	370	887	0.4	1.0
NM	37	1727	7.6	2446	4774	- 0 -	6.4
OK	515	7189	33.31	10,581	21,726	21.2	27.9
TX	1278	7380	39.4	11,993	31,291	15.9	32.9
WY	61	694	3.9	1120	2505	1.7	3.3
US TOTAL	4213	29,030	142.8	67,645	155,584	54.3	125.0

September 25, 1989

PROCESS OF AIR TOXICS LEGISLATION

HR 3030:

1. Congress enacts a statutory list of air toxics that include constituents of crude oil and natural gas (i.e., benzene, toluene, xylenes, ethyl benzene, hydrogen sulfide), as well as chemicals used in E&P operations (methanol, ethylene glycol, diethanolamine, hydrofluoric acid, chlorine), and combustion products such as formaldehyde and nickel.

2. Within one year, EPA must publish a list of all categories of major sources (10 tons per year or greater of any single toxic) and area sources (that warrant regulation based on actual or estimate aggregate toxic emissions in an area).

2.a. EPA already has a list of source categories (approximately 350 categories). The source categories are ranked into 10 priorities, with 1 as the highest priority. Oil and gas production is listed twice (no reason given for dual listing), and is ranked as a priority 6. Natural gas plants are ranked 9.

2.b. EPA may withdraw a source category/subcategory from the list if it finds that the sources in the category present a negligible risk to public health.

3. EPA shall promulgate technology based emission standards for each category of major and area sources. (Phase I)

3.a. Emission standards will apply to new and existing major and area sources, and shall require the maximum degree of emission reduction (including a prohibition of emissions if achievable), taking into consideration cost and any related health and environmental impacts.

3.b. EPA may require area sources to use generally available control technologies rather than maximum available control technology.

4. Legislated schedule for emission standard promulgation:

within 2 years of enactment -	10 categories
within 4 years of enactment -	25% of categories
within 7 years of enactment -	25% of categories
within 7 years of enactment -	remaining categories (50%) shall be reviewed and EPA will designate categories that warrant regulation.
within 10 years of enactment -	standards for remaining designated categories

4.a. In determining the priorities for scheduling standards EPA will consider:

- quantity and location of emissions from each category/subcategory
- known and anticipated adverse effects

NOTE: Quantity and location of emissions are specifically considered not to determine which source categories should be regulated, but to determine which source categories should have emissions standards first.

5. Unreasonable Risk Evaluation (Phase II)

After application of standards, EPA will evaluate any residual risk. If unreasonable risk remains, EPA will promulgate additional standards.

6. Alternative Emission Limitations -

6.a. States with approved programs can permit individual sources to comply with alternatives to the regular standards if the owner/operator demonstrates a negligible risk.

6.b. EPA may identify source categories/subcategories (including area sources for which combined source emissions are to be controlled) which cannot have alternative emission limitations.

NOTE: Hopefully, the area source categories this provision has in mind are sources like dry cleaners.

Significant Differences of HR 3030 to S 816: (Baucus bill)

- Includes adverse effects to environment as well as to human health
- sets a minimum emission rate for each air toxic
 - all sources emitting more than the minimum emission rate will be subject to standards (good concept)
- specifies 90% reduction from uncontrolled levels is appropriate benchmark for standards for existing sources
- first priority of categories scheduled for promulgation of standards are those that emit benzene or one of 11 other toxics
- last 50% of categories do not have a second review by EPA
- residual risk evaluation of one in one million to the maximum exposed individual will trigger revised, stricter standards
- contains sudden, accidental release provisions
- hydrogen sulfide does not appear to be on initial list of toxics, but will be studied separately, evaluating current state and industry controls and standards (good provision)

Significant Differences of HR 3030 to HR 2585: (Waxman bill)

- emphasis on major sources
- area sources in Metropolitan Statistical Areas will be studied and important area source categories will have emission standards promulgated. (good concept, however, we still have some concerns: hydrogen sulfide is included on this toxic list and would therefore contribute to the 10 ton major source trigger; Metropolitan Statistical Areas can cover thousands of square miles; since the definition of source includes all sources under common control and in a contiguous area, some E&P operations that are unitized or that have several adjacent leases could be major sources).

Paper Industry

ESTIMATED COST OF PAPER MILLS TO ACHIEVE 10^{-6} RISK LEVEL (SELECTED STATES)

<u>STATE</u>	<u>NO. OF EFFECTED MILLS</u>	<u>TOTAL COSTS</u>
ALABAMA	10 mills	\$154 million
ARIZONA	1 mill	15.4 million
ARKANSAS	4 mills	61.6 million
GEORGIA	5 mills	77 million
KENTUCKY	2 mills	31 million
LOUISIANA	4 mills	61.6 million
NORTH CAROLINA	4 mills	61.6 million
OHIO	1 mill	15.4 million
SOUTH CAROLINA	3 mills	46 million
TENNESSEE	2 mills	31 million
TEXAS	5 mills	71 million

Textile Industry Examples Air Toxics Costs

One North Carolina-based company has estimated the partial costs its North Carolina facilities would face under the air toxics provisions of S. 1630, as follows:

- a. Installing Maximum Achievable Control Technology (MACT) on these facilities' stacks could cost some \$5,000,000.
- b. This estimate does not include the costs for controlling the fugitive emissions from such facilities, nor does it include any costs for added controls which are likely to be required under residual risk.

Unlike some other industries' emissions, the textile industry's air emissions are quite diluted (low concentration of chemicals in high volume discharges) and, as such, installing MACT to control such emissions provides less direct benefit than in controlling very concentrated emissions.

Permitting Costs

This same North Carolina based company currently spends approximately \$40,000 a year just to maintain and operate a monitor -- on one stack -- monitoring NOx and opacity; capital costs to purchase such equipment are extra.

- a. Each of this company's facilities may have as many as 50 stacks. The costs for installing, maintaining and operating monitoring equipment for a wide variety of chemicals at as many as 50 stacks per facility would be quite significant.

Acid Rain Costs

- a. With operations in several Southern states, one Georgia based company estimates S. 1630 would result in increased energy costs of \$750,000 to \$1 million each year for the company.
- b. One South Carolina-based company now pays some \$3.6 million for electricity each year at one of its largest textile manufacturing facilities. With estimated nationwide increases in utility costs ranging from 6 to 15 percent, this facility and the company overall will face significantly larger utility bills.

The textile industry is generally an energy-intensive operation, although different segments of the industry such as dyeing and finishing are more energy reliant than others.

General Textile Facts

Some 59% of the U.S. apparel and apparel fabric market has been

penetrated by imports and imports are up 14% in 1989 over 1988 figures; thus, the industry is in a precarious economic position. Employment figures offer similar evidence. In January, 1990, textile mill employment nationwide was 714,000 -- the lowest since January, 1987. As such, excessive costs of regulation cannot be easily absorbed by the domestic textile industry.

500

THE WHITE HOUSE

WASHINGTON

March 16, 1990

MEMORANDUM FOR THE FILE

FROM: JEFFREY R. HOLMSTEAD *JRH*
ASSISTANT COUNSEL TO THE PRESIDENT

SUBJECT: Effect of a 10^{-4} Risk Standard for the
"Maximum Exposed Actual Person"

I have reviewed the above-referenced document, which will be used in on-going discussions regarding the President's proposed amendments to the Clean Air Act. No further action is necessary.

ID # _____ CU

Rec'd 2/6
9:00amWHITE HOUSE
CORRESPONDENCE TRACKING WORKSHEET☐ O - OUTGOING☐ H - INTERNAL☐ I - INCOMINGDate Correspondence
Received (YY/MM/DD) 1 1Name of Correspondent: Frank Blake☐ MI Mail Report

User Codes: (A) _____ (B) _____ (C) _____

Subject: Effect of a 10⁻⁴ Risk Standard for the
"Minimum Exposed Adult Person"

ROUTE TO:

ACTION

DISPOSITION

Office/Agency	(Staff Name)	Action Code	Tracking Date YY/MM/DD	Type of Response	Code	Completion Date YY/MM/DD
	<u>Chief</u>	ORIGINATOR	<u>90102105</u>			<u>1</u> <u>1</u>
	<u>Chief 17</u>	Referral Note:	<u>I</u>	<u>90102105</u>		<u>59010209</u>
	<u>Chief 02</u>	Referral Note:	<u>I</u>	<u>1</u> <u>1</u>		<u>1</u> <u>1</u>
	<u>Chief 14</u>	Referral Note:	<u>I</u>	<u>1</u> <u>1</u>		<u>1</u> <u>1</u>
		Referral Note:		<u>1</u> <u>1</u>		<u>1</u> <u>1</u>

ACTION CODES:

A - Appropriate Action
 C - Comment/Recommendation
 D - Draft Response
 F - Furnish Fact Sheet
 to be used as Enclosure

I - Info Copy Only/No Action Necessary
 R - Direct Reply w/Copy
 S - For Signature
 X - Interim Reply

DISPOSITION CODES:

A - Answered
 B - Non-Special Referral
 C - Completed
 S - Suspended

FOR OUTGOING CORRESPONDENCE:

Type of Response = Initials of Signer
 Code = "A"
 Completion Date = Date of Outgoing

Comments: _____

Keep this worksheet attached to the original incoming letter.
 Send all routing updates to Central Reference (Room 75, OEOB).
 Always return completed correspondence record to Central Files.
 Refer questions about the correspondence tracking system to Central Reference, ext. 2590.

SWIDLER & BERLIN

CHARTERED

3000 K STREET, N.W.

SUITE 300

WASHINGTON, D.C. 20007-3841

(202) 944-4300

TELECOPIER TRANSMITTAL

TELEX: 701131

TELECOPIER (202) 944-4296

TODAY'S DATE

2/5/90

TIME

TRANSMITTAL TO

Boydew Gray

NAME OF COMPANY

DIRECT PHONE#

MAIN PHONE#

TELECOPIER#

456 6279

TOTAL NO. PAGES

4

(including cover page)

TRANSMITTAL FROM

Francis S. Blake
(Swidler & Berlin, Chartered)

BILLING CODE#

ADDITIONAL MESSAGE (if any):

=====

IF THERE IS ANY PROBLEM IN THIS TRANSMISSION, PLEASE CALL:

OPERATOR

Trudy

CONFIRMATION#

(202) 944-4300, Extension#4727

=====

Effect of a 10^{-4} Risk Standard for the "Maximum Exposed Actual Person"

Issue: Does a 10^{-4} Risk standard for the "maximum exposed actual person" resolve the air toxics issues faced by industries such as the steel industry?

Analysis:

1. Steps in EPA's Current Risk Assessment:

- A) EPA applies a computer model (the Human Exposure Model (HEM)) that combines emission estimates with meteorological data to estimate the maximum concentration of a pollutant at a receptor site.
- B) The maximum concentration is multiplied by a Unit Risk Estimate -- based on an upper bound 95 percent confidence interval and a linear dose-response relationship.
- C) The Agency then assumes an exposure pattern -- e.g., 70 years of exposure, 24 hours a day.

2. "Maximum Exposed Actual Person"

This concept could entail several improvements in the current process, but even these improvements would only change the existing risk estimates by an order of magnitude (a factor of 10). The changes include:

- A) More realistic exposure time and exposure location estimates. Use of more realistic estimates could result in a reduction of calculated MEIs by a factor of 6.
- B) Use of more accurate air quality dispersion models; use of on-site meteorological data (as opposed to airport data); and use of more accurate emission numbers (actual vs. allowable). These changes could result in a reduction of calculated MEIs by a factor of approximately 5.
- C) The single largest factor in the conservative risk assessment methodology is the unit risk estimate, yet this would not apparently be addressed by the "actual person" approach. A change in the unit risk estimate from the conservative, upper bound 95 percentile approach to a "maximum likelihood estimate" would change the MEI by a factor of 16.

3. Impact on the Steel Industry:

As shown in the attached chart, an order of magnitude change in the risk estimates does not resolve the air toxics issue for the steel industry. The majority of plants would still

fail to pass a 10^{-4} "actual" test. To achieve that standard, the industry would have to attain, on average, a five-fold reduction in emissions from their already controlled levels. This would require coke ovens to move to the 98-99% control range. EPA's best estimate is that 96% control range is what is technologically feasible for coke ovens.

4. What Is Wrong with the Maximum Exposed Actual Person Concept?

- A) From Ruchelahauss through to Thomas and Reilly, EPA has recognized that the MEI concept has to be balanced against aggregate population risk. Whether the maximum exposed individual is "actual" or "hypothetical," the public health issue is the population exposure.
- B) A risk of 1×10^{-4} for the maximum exposed individual (again, whether actual or hypothetical) translates into a risk of one cancer incidence over 700,000 years -- or a risk of one cancer incidence over the lifetime of human history. It is absurd to have a "shutdown" standard at this level of protection.
- C) The pitfalls of an arbitrary 10^{-4} test are apparent from EPA's benzene NESHAP decision. In that case, one source category had an MEI of 4×10^{-4} -- thus flunking the shutdown test. Yet for the source category involved, only 10 people out of a total modeled population of 70 million faced a risk greater than 10^{-4} . Again, the cancer incidence for those 10 people would equate to approximately one incidence in 70,000 years.

from Riebelly to Wapman

Attachment #4

COKE OVEN MAXIMUM INDIVIDUAL RISK ESTIMATES **
March 1989

PLANT	MAXIMUM RISK *	X 10 ⁻⁴
Bethlehem Steel, Bethlehem, PA	1.1 in 100	110
Geneva Steel, Provo, UT	1.1 in 100	110
Inland Steel, E. Chicago, IN	1.4 in 100	140
Koppers, Woodward, AL	1.7 in 100	170
USX, Gary, IN	1.1 in 100	110
USX, Clairton, PA	1.8 in 100	180
ABC Coke, Tarrant, AL	9.9 in 1,000	99
Acme Steel, Chicago, IL	2.0 in 1,000	20
Armco Inc., Ashland, KY	2.6 in 1,000	26
Armco Inc., Middletown, OH	7.4 in 1,000	74
Citizens Gas, Indianapolis, IN	5.1 in 1,000	51
Detroit Coke, Detroit, MI	1.0 in 1,000	10
Empire Coke, Holt, AL	4.5 in 1,000	45
Gulf States Steel, Gadsden, AL	9.9 in 1,000	99
LTV Steel, Warren, OH	1.6 in 1,000	16
LTV Steel, Cleveland, OH	4.3 in 1,000	43
LTV Steel, Pittsburgh, PA	8.3 in 1,000	83
National Steel, Granite City, IL	1.6 in 1,000	16
New Boston, Portsmouth, OH	2.2 in 1,000	22
Sharon Steel, Monessen, PA	1.6 in 1,000	16
Shenango, Pittsburgh, PA	1.3 in 1,000	13
Sloss Industries, Birmingham, AL	9.1 in 1,000	91
Toledo Coke, Toledo, OH	1.5 in 1,000	15
USX, Lorain, OH	8.2 in 1,000	82
Welsh Coke, Terre Haute, IN	3.3 in 1,000	33
Wheeling-Pitt, E. Steubenville, WV	6.9 in 1,000	69
Bethlehem Steel, Burns Harbor, IN	5.6 in 10,000	56
Bethlehem Steel, Sparrows Pt., MD	2.0 in 10,000	20
Bethlehem Steel, Lackawanna, NY	1.7 in 10,000	17
Erie Coke, Erie PA	2.1 in 10,000	21
Lone Star Steel, Lone Star, TX	4.1 in 10,000	41
LTV Steel, So. Chicago, IL	6.0 in 10,000	60
National Steel, Ecorse, MI	1.7 in 10,000	17
Rouge Steel, Dearborn, MI	9.3 in 10,000	93
Tonawanda, Buffalo, NY	8.6 in 10,000	86
USX, Fairfield, AL	2.6 in 10,000	26
		347.7
		49.6 = 0.5%

* EPA proposed NESHAPs for coke oven emissions on April 23, 1987. The risk estimates in the table are based upon estimated baseline emissions calculated as described in the preamble to the proposed rule. The above data have been updated to reflect current plant operating status and fine-tuning of the geographical locations.

** Source: U.S. EPA

THE WHITE HOUSE

WASHINGTON

March 16, 1990

MEMORANDUM FOR THE FILE

FROM: JEFFREY R. HOLMSTEAD *JRH*
ASSISTANT COUNSEL TO THE PRESIDENT

SUBJECT: Residual Risk Implementation Cost
Estimates-S. 1630

I have reviewed the above-referenced document, which will be used in on-going discussions regarding the President's proposed amendments to the Clean Air Act. No further action is necessary.

ID # _____ CU

rec'd 2/26
3:20pm

WHITE HOUSE CORRESPONDENCE TRACKING WORKSHEET

☐ O - OUTGOING☐ H - INTERNAL☐ I - INCOMINGDate Correspondence
Received (YY/MM/DD) _____

Name of Correspondent: _____

☐ MI Mail Report

User Codes: (A) _____ (B) _____ (C) _____

Subject: Residual Risk Implementation Cost Estimates -5.16.26

ROUTE TO:

ACTION

DISPOSITION

Office/Agency	(Staff Name)	Action Code	Tracking Date YY/MM/DD	Type of Response	Code	Completion Date YY/MM/DD
	<u>Croft</u>	ORIGINATOR	<u>00102126</u>			<u>1 1</u>
	<u>Quat 11</u>	Referral Note:	<u>A</u>	<u>00102126</u>	<u>E</u>	<u>00102126</u>
	<u>Quat 11</u>	Referral Note:	<u>A</u>	<u>1 1</u>		<u>1 1</u>
	<u>Quat 11</u>	Referral Note:	<u>I</u>	<u>1 1</u>		<u>1 1</u>
	<u>Quat 11</u>	Referral Note:		<u>1 1</u>		<u>1 1</u>
	<u>Quat 11</u>	Referral Note:		<u>1 1</u>		<u>1 1</u>

ACTION CODES:

A - Appropriate Action
C - Comment/Recommendation
D - Draft Response
F - Furnish Fact Sheet
to be used as Enclosure

I - Info Copy Only/No Action Necessary
R - Direct Reply w/Copy
S - For Signature
X - Interim Reply

DISPOSITION CODES:

A - Answered
B - Non-Special Referral
C - Completed
S - Suspended

FOR OUTGOING CORRESPONDENCE:

Type of Response = Initials of Signer
Code = "A"
Completion Date = Date of Outgoing

Comments: _____

Keep this worksheet attached to the original incoming letter.

Send all routing updates to Central Reference (Room 75, OEOB).

Always return completed correspondence record to Central Files.

Refer questions about the correspondence tracking system to Central Reference, ext. 2590.

KINKO'S Chapel Hill
(919) 967-0790 Store
(919) 967-9243 Fax
114 W. Franklin St.
Chapel Hill, NC 27516

KINKO'S Charlotte
(704) 347-8192 Store
(704) 358-0100 Fax
601 S. King St.
Charlotte, NC 28204

KINKO'S Durham
(919) 682-4346 Store
(919) 687-4529
1121 W. Main St.
Durham, NC 27701

KINKO'S Greensboro
(919) 273-5865 Store
(919) 273-2927 Fax
401 S. Tate St.
Greensboro, NC 27403

KINKO'S Greenville
(919) 752-0875 Store
(919) 830-4709 Fax
321 E. Tenth St.
Greenville, NC 27834

KINKO'S North Raleigh
(919) 787-8636 Store
(919) 787-8437 Fax
4112-132 Pleasant Valley Rd.
Raleigh, NC 27612

KINKO'S Raleigh
(919) 832-4533 Store Number
(919) 856-1132 Fax Number
2316-106 Hillsborough St.
Raleigh, NC 27607

KINKO'S

the copy center

4112-132 Pleasant Valley Rd.
Raleigh, NC 27612
Tel#: (919) 787-8636
FAX #: (919) 787-8437

FAX#: 202 456 6279 DATE: 2-26-90

TO: JOHN SCHMITZ

COMPANY: _____

TELEPHONE: 202 456 6611

FROM: DALE DENNY

COMPANY: _____

TELEPHONE: 919-782-8390 (7)

YOU SHOULD HAVE RECEIVED 20 PAGES INCLUDING
COVER SHEET. PLEASE CALL (919) 787-8636 IF YOU ARE
HAVING PROBLEMS OR IF YOU ARE MISSING ANY PAGES.

INSTRUCTIONS:

URGENT!

RATES:

Outgoing Long Distance U.S.:	\$4.95 (first page). Each additional page \$2.00.
Outgoing International:	\$9.95 (first page) + phone call charge. Each additional page \$2.00
Incoming Reception:	\$1.00 per page.

DENNY TECHNICAL SERVICES

5001 HOLLYRIDGE DRIVE, RALEIGH, NC 27612 • (919) 782-8390

February 25, 1990

To: Jim Ford

From: Dale Denny

Subject: Residual Risk Implementation Cost Estimates - S.1630

My February 22th memo to you indicated a general lack of data regarding cost estimates to implement the residual risk requirements contained in S. 1630. I have included with this cover memo additional information covering cost estimates for particulate point source carcinogens, and fugitive organic chemical carcinogens. I have also included an analysis of the possible cost impacts of using the actual most exposed individual (AMEI) instead of the theoretical most exposed individual (TMEI) in exposure estimates. The conclusions from each of the three studies are summarized below.

Impact of AMEI: Organic Chemical Carcinogens - Point Sources

Using AMEI as a basis for risk calculations and subsequent compliance cost calculations would reduce compliance costs to about one third of the levels based on TMEI. The remaining costs are still significant as summarized below.

	<u>Residual Risk</u>		
	10^{-4}	10^{-5}	10^{-6}
TMEI (\$Billion/yr)	6.6	17.9	54.8
AMEI (\$Billion/yr)	2.0	5.7	16.4

Impact of AMEI: Particulate Carcinogens - Point Sources

Using AMEI as a basis for risk calculations and subsequent compliance cost calculations would reduce compliance costs to about one third of the levels based on TMEI. The remaining costs are still significant as summarized below. The TMEI estimates are new data that have not been published before. These costs would be additive to the point source organic chemical carcinogen costs.

	<u>Residual Risk</u>		
	10^{-4}	10^{-5}	10^{-6}
TMEI (\$Billion/yr)	5.8	18.0	56.0
AMEI (\$Billion/yr)	1.7	5.3	16.4

Residual Risk Compliance Costs: Organic Chemical Carcinogens – Fugitive Emissions

A fairly detailed analysis of control costs for 36 fugitive organic chemical carcinogens indicates the control costs based on TMEI would be about \$38 billion per year. Essentially a complete change of fittings, pumps, valves, etc., would be required to achieve compliance. Using AMEI, some facilities might be able to achieve a one in one million risk level with enhanced monitoring and maintenance programs. Facilities that emit the more potent carcinogens would not likely be able to comply with monitoring and maintenance programs. No estimates of the cost reduction that could be expected using AMEI. Fugitive emissions control costs would be additive to those for point sources.

If you need any further information, please contact me at (919) 782 8390.

IMPACT OF AMEI ON RESIDUAL RISK COMPLIANCE COSTS ORGANIC CHEMICAL CARCINOGENS - POINT SOURCES

An analysis was performed to estimate the cost impact of using the actual maximum exposed individual (AMEI) when compared to the theoretical maximum exposed individual (TMEI). A TMEI would be exposed to ambient emissions 70 years, 365 days per year, 24 hours per day, for a total of 613,200 hours per life time. Lifetime risk is assumed to be proportional to exposure time. Three cases were evaluated.

<u>Case</u>	<u>Exposure Scenario</u>	<u>Hours/year</u>
1.	40 years outside work at 2,000 hours/year	80,000
	2 hours per day outside for 30 years	<u>21,900</u>
	AMEI (hours per year)	101,900
	Fraction of TMEI	0.165
2.	10 years outside work at 2,000 hours/year	20,000
	2 hours per day outside for 60 years	<u>43,800</u>
	AMEI (hours per year)	63,800
	Fraction of TMEI	0.104
3.	2 hours per day outside for 70 years	<u>51,100</u>
	AMEI (hours per year)	51,100
	Fraction of TMEI	0.083

No exposures due to alternative pathways or due to indoor air were considered.

Figure 1 contains a representation of the compliance costs for the TMEI and the three cases evaluated for the AMEI. The costs are shown as a function of the level of residual risk that would be achieved. The top values at each residual risk level are those taken from the Business Roundtable (BRT) report. The BRT costs were calculated based on the TMEI. The lower points at each residual risk level were calculated for each of the three AMEI cases described above.

AMEI RESIDUAL RISK COMPLIANCE COSTS ORGANIC CHEMICAL CARCINOGENS-PONT SOURCES

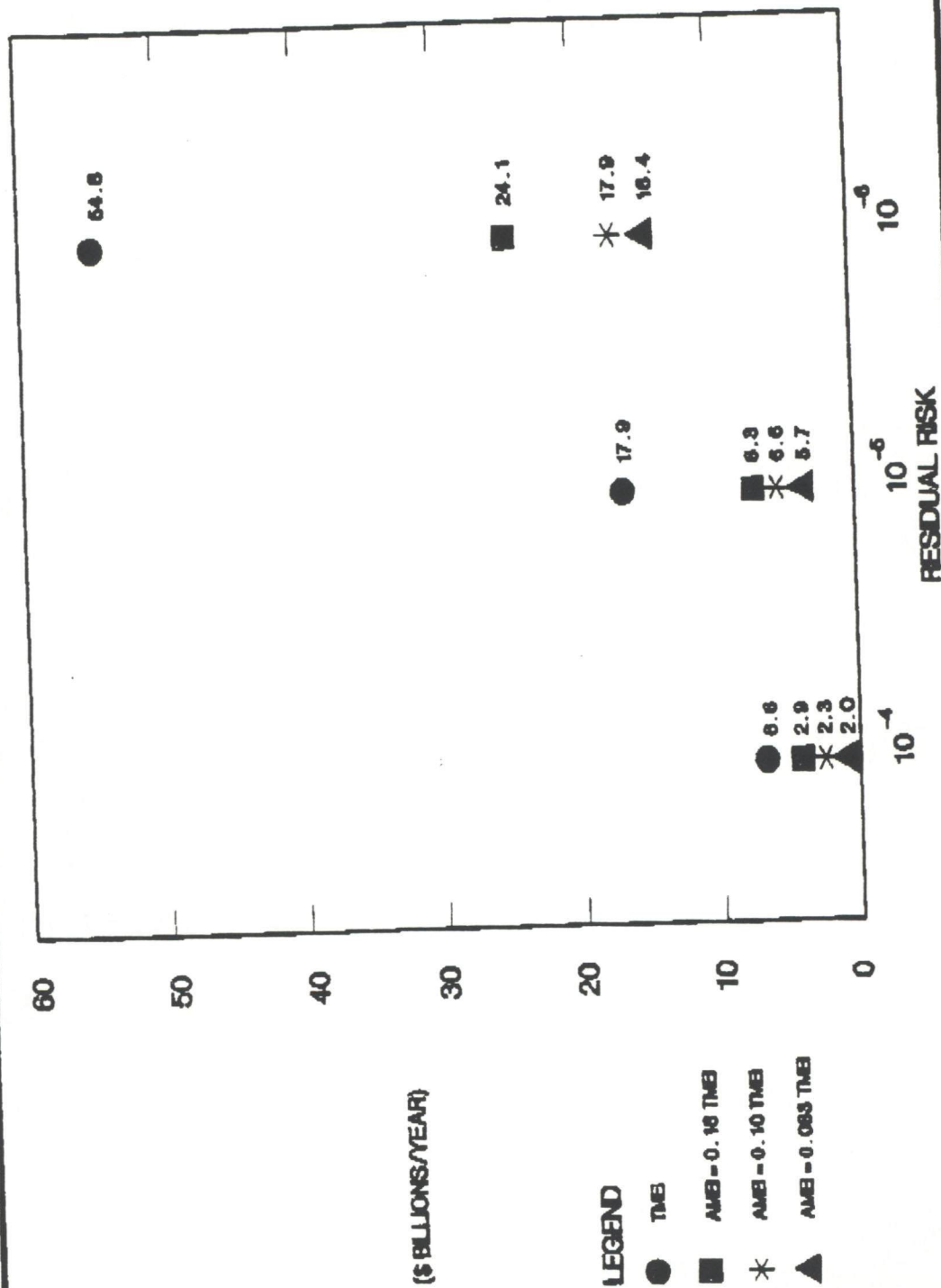


Figure 1

An AMEI with exposure at one tenth of the TMEI would have a lifetime cancer risk of one tenth of that for the TMEI. The compliance cost reduction would be less than directly proportional to risk reduction. The cost estimates in Figure 1 reflect that lack of proportionality.

Conclusions

Compliance costs would be dramatically reduced if residual risk compliance requirements were based on the AMEI. However, if the AMEI were as low as 8.3 percent of TMEI, Case 3 above, the costs would still be \$2.0 billion per year to achieve one in ten thousand residual risk, \$5.7 billion per year to achieve one in one hundred thousand residual risk, and \$16.4 billion per year to achieve one in one million residual risk.

AMEI RESIDUAL RISK COMPLIANCE COSTS PARTICULATE CARCINOGENS-POINT SOURCES

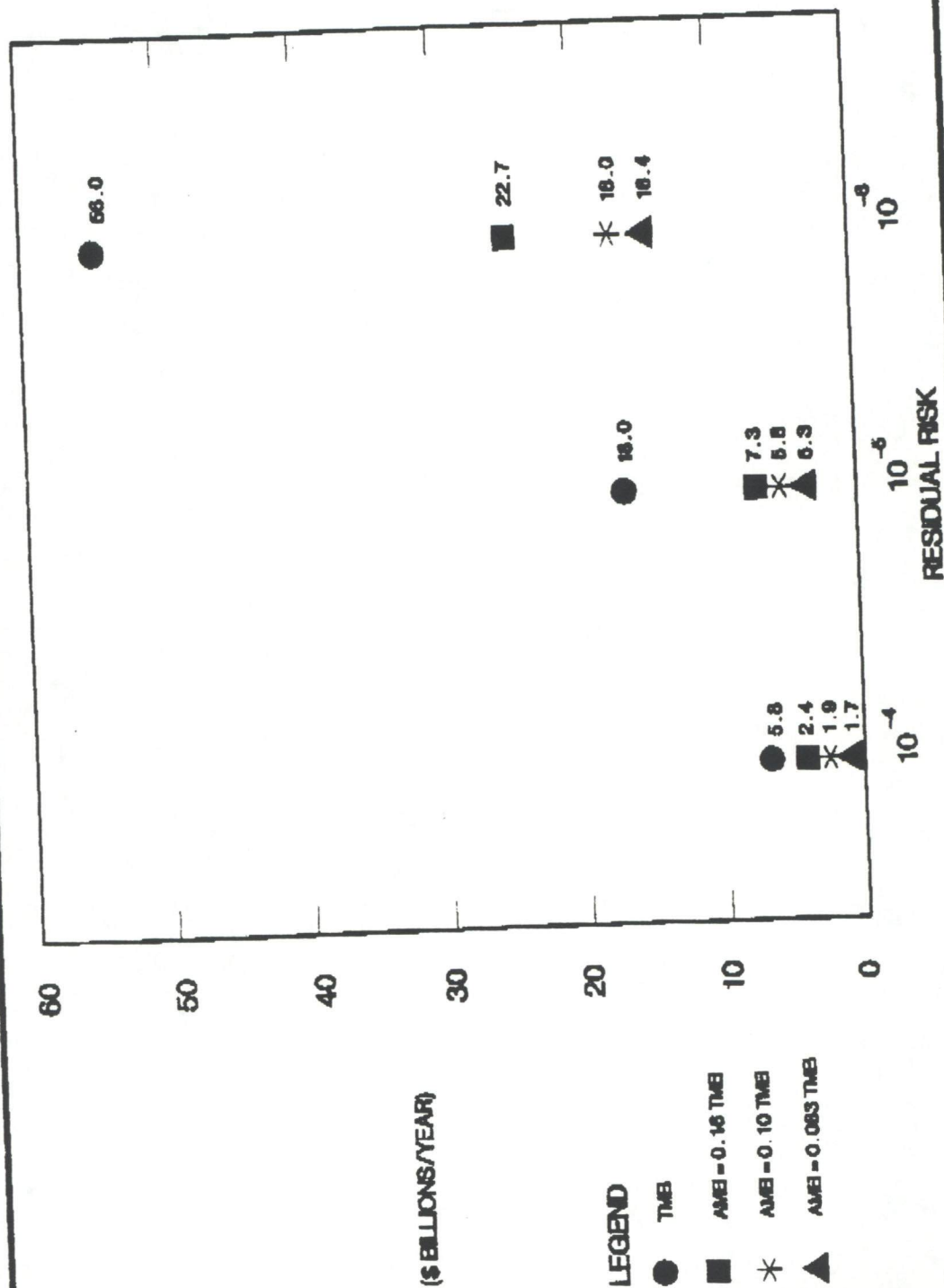


Figure 1

IMPACT OF AMEI ON RESIDUAL RISK COMPLIANCE COSTS PARTICULATE CARCINOGENS - POINT SOURCES

An analysis was performed to estimate the cost impact of using the actual maximum exposed individual (AMEI) when compared to the theoretical maximum exposed individual (TMEI). A TMEI would be exposed to ambient emissions 70 years, 365 days per year, 24 hours per day, for a total of 613,200 hours per life time. Lifetime risk is assumed to be proportional to exposure time. Three cases were evaluated.

<u>Case</u>	<u>Exposure Scenario</u>	<u>Hours/year</u>
1.	40 years outside work at 2,000 hours/year	80,000
	2 hours per day outside for 30 years	<u>21,900</u>
	AMEI (hours per year)	101,900
	Fraction of TMEI	0.165
2.	10 years outside work at 2,000 hours/year	20,000
	2 hours per day outside for 60 years	<u>43,800</u>
	AMEI (hours per year)	63,800
	Fraction of TMEI	0.104
3.	2 hours per day outside for 70 years	<u>51,100</u>
	AMEI (hours per year)	51,100
	Fraction of TMEI	0.083

No exposures due to alternative pathways or due to indoor air were considered.

Figure 1 contains a representation of the compliance costs for the TMEI and the three cases evaluated for the AMEI. The costs are shown as a function of the level of residual risk that would be achieved. The top values at each residual risk level are those calculated in the same way as the organic chemical point source carcinogens taken from the Business Roundtable (BRT) report. The particulate costs were also calculated based on the TMEI. The lower points at each residual risk level were calculated for each of the three AMEI cases described above.

An AMEI with exposure at one tenth of the TMEI would have a lifetime cancer risk of one tenth of that for the TMEI. The compliance cost reduction would be less than directly proportional to risk reduction. The cost estimates in Figure 1 reflect that lack of proportionality.

Conclusions

Compliance costs would be dramatically reduced if residual risk compliance requirements were based on the AMEI. However, if the AMEI were as low as 8.3 percent of TMEI, Case 3 above, the particulate control costs would still be \$1.7 billion per year to achieve one in ten thousand residual risk, \$5.3 billion per year to achieve one in one hundred thousand residual risk, and \$16.4 billion per year to achieve one in one million residual risk.

RESIDUAL RISK COMPLIANCE COSTS ORGANIC CHEMICAL CARCINOGENS -- FUGITIVE EMISSIONS

Emissions Data Base

S. 1630 would require the reduction of risk from fugitive emissions as well as point sources. The emissions data base chosen to evaluate the costs associated with this requirement was that from the Title III, Section 313 reporting requirements. The 313 data are more current and have a larger number of known, probable, and possible human carcinogens than EPA's speciation data base. There are 41 chemicals in the 313 data base for which unit risk factors are available. The emissions for these chemicals were grouped into high, medium, and low ranges as were the unit risk values. The chemicals were then placed in each group as shown in Figure 1.

Seven chemicals were chosen from the 41 as a basis for evaluating the costs to comply with the reductions that would be required. They are aniline, benzene, 1,3-butadiene, hexachloro-benzene, hydrazine, 2-nitropropane, and 1,1,2-trichloroethane as indicated by the rectangles in Figure 1. These chemicals were chosen because they represent each of the combinations of unit risk and emissions rates for the entire group of 41 chemicals. The one range not included in the sample is that of low emissions volume and low unit risk. The cost for that group of two chemicals is not expected to be significant.

Exposure values were calculated using a simplified version of EPA's Industrial Source Complex Long-term (ISCLT) air dispersion model. A stack height of six feet was used in the calculation. Because there is no data available relating the emissions to facility size, four different distances (120, 1,000, 5,000, and 9,000 feet) to the property fence line were used to estimate exposure concentrations. The costs were calculated to obtain the emissions reduction required to reduce off-site risks to one in a million for each of the distances to the fence line. The costs assume there are sufficient point sources at each site to classify it as a major source subject to the one in a million risk reduction requirement. For facilities whose individual chemical fugitive emission rates are greater than 20,000 lb/year, that assumption is not necessary.

CHEMICALS FOR FUGITIVE EMISSIONS COST ESTIMATE

EMISSIONS (lbs/yr)

Less than 100,000 100,000-1,000,000 Greater than 1,000,000

Arsenic Beryllium Benzidine Bis 2-Chloromethylether Heptachlor Acrylamide PCB Hydrazine I	Cadmium Chromium 2-Nitropropane II	Acrylonitrile 1,3-Butadiene VI Carbontetrachloride Chloroform Dichloroethane Ethylene Oxide Formaldehyde
Bis 2-Chloroethylether Chlordane Hexachlorobenzene II Hexachloro 1,3-Butadiene 4,4'-Methylene-bis (2-Chloroaniline) Thiourea Methyl Hydrazine	Dichloroethylene Dinitrotoluene Nickel Tetrachloroethane 1,1,2-Trichloroethane IV	Acetaldehyde Benzene VII Dichloromethane Tetrachloroethylene Trichloroethylene Vinyl Chloride
Hexachloroethane Trichlorophenol	Aniline V Dioxane Epichlorohydrin	

Greater than
0.001

UNIT
RISK

0.000989-
0.00001

Less than
0.00001

Figure 1

Control Technology Unit Costs

The basis for the control technology cost was taken from a paper presented to the American Institute of Chemical Engineers in August of 1988. Three facilities with fugitive emissions were analyzed to determine the technologies and costs required to achieve a one in a million risk at the property fence line. The pollutants evaluated included benzene, butadiene, chloroform, and carbon tetrachloride.

Control technologies included canned pumps, valves with bellow seals, and, when possible, welded joints in piping instead of flanges. Flanges that could not be eliminated would be covered with shrouds, which would be vacuum purged to an incinerator. Essentially the pumps, fittings, and valves would have to be completely replaced at all three facilities.

The annualized cost estimates ranged from \$482,000 to \$692,000 per ton of emissions reduced. Emissions from these facilities ranged from 6,000 to 16,880 lb/year. Those values are representative of data reported in the SARA 313 responses. The average cost estimate of \$578,000 per ton of fugitives emissions eliminated, for the three facilities studied, was used to generate the cost estimates in this report. The capital investment to achieve the emissions reductions would range from \$7.7 to \$22 million dollars for the three facilities. The average capital investment would be \$13.1 million per facility.

Cost Calculations

Facility emissions rate and distance to the facility fence line would be expected to have a significant effect on exposure levels, risk levels, and subsequently, the cost to achieve one in a million risk levels. To determine the sensitivity of those variables on costs, facilities were grouped by emissions rate. The emissions reductions required to achieve one in a million risk were calculated for the four fence line distances stated earlier. The emissions rate groups were 0-499, 500-999, 1,000-9,999, 10,000-9,999, 10,000-49,999, and greater than 50,000 lb/year. The distribution of number of facilities in each emissions size range for

aniline is shown in Figure 2. The distribution for aniline is typical of that for the other chemicals studied. There are a large number of facilities with no reported fugitive emissions. The number of facilities decreases to a minimum in the 500 to 999 lb/year range, reaches a maximum in the 1,000 to 9,999 lb/year range, and decreases sharply as the size range increases to those greater than 50,000 lb/year.

A sample cost calculation for the 19 aniline emitting facilities with the emissions range at 1,000-9,999 lb/year and a fence line distance of 120 feet is shown below.

Sample Cost Calculation - Aniline

The risk associated with exposure to a substance is simply the annual average exposure concentration times the unit risk factor for the substance.

$$\text{Risk} = C_{\text{aniline}}(\text{ug}/\text{m}^3) * \text{unit risk}(\text{ug}/\text{m}^3)^{-1}$$

For the 19 facilities the average fugitive emissions rate is 3,817 pounds per year. The total emissions from facilities in the 1,000-9,999 lb/year range is 72,518 lb/year. The unit risk for aniline is $7.4 * 10^{-4} (\text{ug}/\text{m}^3)^{-1}$ and the maximum off-site concentration, from the simplified ISCLT model, is 19 ug/m³/ton emissions.

$$\begin{aligned} C_{\text{aniline}} &= 19 \text{ ug}/\text{m}^3/\text{ton emissions} * 3,817/2000 \text{ ton emissions} \\ &= 36.3 \text{ ug}/\text{m}^3 \end{aligned}$$

$$\begin{aligned} \text{Risk} &= 36.3 (\text{ug}/\text{m}^3) * 7.4 * 10^{-4} (\text{ug}/\text{m}^3)^{-1} \\ &= 268 * 10^{-4} \end{aligned}$$

For the risk to be $1 * 10^{-4}$, the exposure concentration would have to be

$$\begin{aligned} C_{\text{aniline}} &= \text{Risk}/\text{unit risk} \\ &= 1 * 10^{-4} / 7.4 * 10^{-4} \\ &= 0.135 \text{ ug}/\text{m}^3 \end{aligned}$$

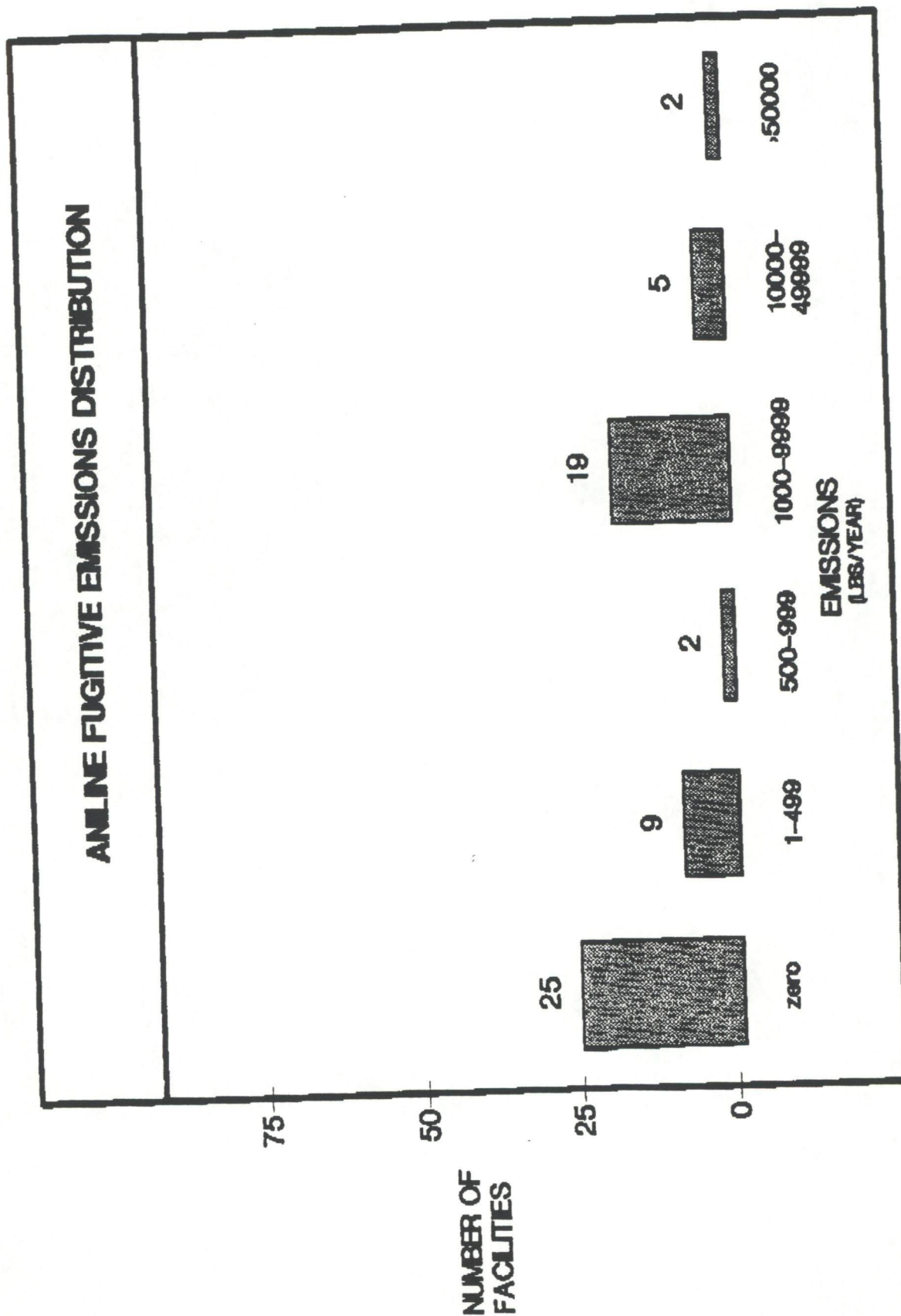


Figure 2

The percentage emissions reduction to achieve a one in a million risk would then be

Percentage Emissions Reduction

$$\begin{aligned} &= \{(36.3 - 0.135)/36.3\} * 100 \\ &= 99.6 \% \end{aligned}$$

The total emissions reduction for the 1,000-9,999 lb/year range would be the fraction emissions reduction required times the total emissions for the range.

Range Emissions Reductions

$$\begin{aligned} &= 0.996 * (72,518 \text{ lb/year}) / (2000 \text{ lb/ton}) \\ &= 36.1 \text{ ton/year} \end{aligned}$$

The cost to achieve the 36.1 ton/year reduction would be the total tons times the average cost per ton to replace valves, flanges, and pumps.

$$\begin{aligned} \text{Range Cost} &= 36.1 \text{ ton/year} * \$578,000/\text{ton} \\ &= \$20.9 \text{ million/year} \end{aligned}$$

This cost calculation was repeated for the five emissions ranges for each of the four fence line distances. The results are shown in Figure 3. Inspection of Figure 3 shows that when the annual emissions range is 1,000-9,999 lb/year or greater, the cost is essentially independent of the distance to the fence line. The conclusion is that greater than 99 percent emissions reduction would be required for all facilities in that range to achieve a one in a million risk. For smaller emissions ranges, the cost drops off as the fence line distance increases. A lower aniline emissions rate at a large facility would require substantially less than a 99 percent fugitive emissions reduction to comply with the legislative requirements.

As might be expected, the higher emission range sources dominate the total cost picture. Costs for sources in ranges 1,000-9,999 lb/year or greater are two orders of magnitude higher than those for the lower ranges. Aniline is typical of the seven chemicals

ANLINE-Fugitive Emissions Control Costs

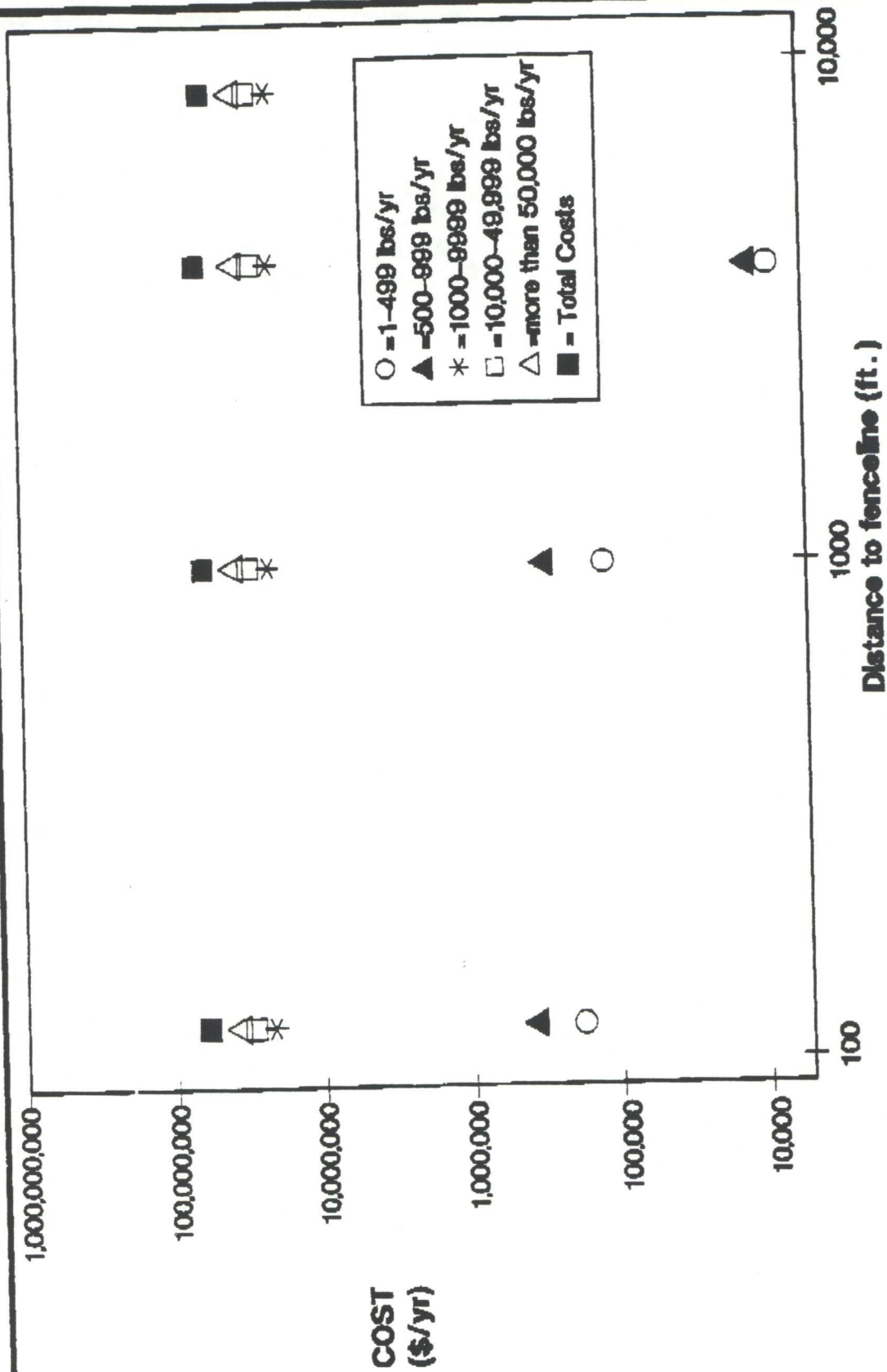


Figure 3

evaluated, and the total cost to achieve less than one in a million risk due to fugitive emissions exposure is nearly independent of distance to the fence line. This feature is illustrated by the filled squares in Figure 3. For aniline, the total costs drop from \$79.7 million per year at a fence line distance of 120 feet to \$72.8 million per year at a fence line distance of 9,000 feet.

Total Fugitive Emissions Control Costs

Calculations similar to those described above for aniline were performed for all seven chemicals studied. The results are summarized in Figure 4. The total costs for the seven chemicals studied would be \$7.43 billion per year. The range is from nearly \$5.5 billion per year for benzene to \$300 million per year for hexachlorobenzene. A total of 561 facilities would be affected by the proposed legislation. There are 36 organic chemicals among the 41 species for which unit risk factors are available. Assuming the costs for the seven chemicals studied are representative of the 36 organics, the cost to achieve one in a million risk for the entire group would be

$$\begin{aligned}\text{Total Fugitive Control Costs} &= \$7.43 \times (36/7) \\ &= \$38.2 \text{ billion/year}\end{aligned}$$

Discussion

The facilities upon which the costs estimates are representative of the facilities that occurred with the highest frequency in the SARA 313 data base (1,000-9,999 lb/year emissions). The pollutants evaluated at those sites were butadiene, carbon tetrachloride, chloroform, and benzene. All those chemicals are included in the list from which chemicals were selected for this study.

The costs used in this analysis are the minimum estimates given in the three facility cost study. One option considered in that cost study was to enclose the process in a building and vent to building air to an incinerator. That option was rejected as too costly.

**REPRESENTATIVE CHEMICAL
FUGITIVE EMISSIONS CONTROL COST**

<u>Chemical</u>	<u>Group</u>	<u>Cost (\$Million/year)</u>
Hydrazine	I	\$4.3
Hexachlorobenzene	II	0.3
2-Nitropropane	III	51.9
1,1,2-Trichloroethane	IV	183.9
Aniline	V	79.4
1,3-Butadiene	VI	1613.9
Benzene	VII	<u>5497.1</u>
	TOTAL	\$7,430.8

Figure 4

Of the 804 facilities that reported emissions for the seven chemicals studied, 243 (29 percent) reported no fugitive emissions. The explanation for this fact is not clear. Perhaps the facilities reporting had no knowledge of fugitive emissions or no reasonable means to estimate them. In any case, it is likely that a significant percentage of those reporting zero fugitive emissions actually would have measurable quantities. To the extent that is true the costs provided here have been underestimated.

The analysis does not include costs for reducing emissions of pollutants with human health or environmental effects threshold exposure limits. There are approximately 150 VOC's on the toxics list in the proposed legislation. This study contains a control cost estimate for only the 36 for which unit risk values are available. There will certainly be some threshold limited fugitive emissions that would require controls. The extent to which that is the case will determine the increase in the cost estimate.

There may be facilities that emit more than one fugitive toxic pollutant. Where that is the case, replacing valves and flanges, and covering pumps may reduce the emissions of more than one pollutant. To the extent that happens, the costs in this report are over estimated.

Small fugitive sources may be at facilities that would not trigger the 10/25 ton rule. Those facilities would still be subject to the area sources provisions of the proposed legislation. Control costs for small emitters may be of significance to individual companies, but they have little impact on the overall estimate. Leaving them out or including them would not change the magnitude of the estimate.

The calculations assume that the nearest human receptor would be located at the point of maximum off-site concentration for 70 years, the theoretically maximally exposed person. If receptors are located at some other location near the facility, or if the receptor were not located at the point of maximum concentration for the full 70 years, emissions reduction requirements would be less than those calculated here. Such a determination

would have to be made on a case-by-case basis. The estimated fugitive emissions control costs would be less.

Using an exposure estimate for an actual maximum exposed individual (AMEI) instead of the theoretical maximum exposed individual (TMEI) as was used in this cost analysis would result in lower emissions reduction requirements. Facilities that would be required to reduce emissions by more than 99.9 percent under the TMEI would still have to reduce emissions by greater than 99 percent under an AMEI equal to 0.1 of the TMEI. Such reductions would not be likely even with enhanced monitoring and inspection and maintenance programs. Facilities that would be required to reduce emissions less than 99.9 percent would have the requirement reduced to something less than 99 percent under an AMEI equal to 0.1 TMEI. It might be possible for those facilities to achieve compliance with a one in a million residual risk requirement with enhanced monitoring and inspection and maintenance programs. The extent to which using the AMEI as a basis for emissions reduction requirements would reduce the \$38 billion per year cost estimate has not been evaluated.

ID # _____ CU

WHITE HOUSE CORRESPONDENCE TRACKING WORKSHEET

 rec'd
2/5
2:35
☐ O - OUTGOING☐ H - INTERNAL☐ I - INCOMINGDate Correspondence
Received (YY/MM/DD) 1/1Name of Correspondent: John Korman☐ MI Mail Report

User Codes: (A) _____ (B) _____ (C) _____

Subject: Charts - the Administration Bill Advocates
comparable benefits of substantially lower
costs - and updated versions of the chart

ROUTE TO:

ACTION

DISPOSITION

Office/Agency	(Staff Name)	Action Code	Tracking Date YY/MM/DD	Type of Response	Code	Completion Date YY/MM/DD
<u>Chap</u>		ORIGINATOR	<u>01/02/05</u>			<u>1/1</u>
<u>Chart 14</u>		Referral Note:	<u>2 01/02/05</u>		<u>5</u>	<u>01/21/08</u>
<u>Chart 12</u>		Referral Note:	<u>4</u>	<u>1/1</u>		<u>1/1</u>
<u>Chart 12</u>		Referral Note:	<u>2</u>	<u>1/1</u>		<u>1/1</u>
		Referral Note:		<u>1/1</u>		<u>1/1</u>
		Referral Note:				

ACTION CODES:

 A - Appropriate Action
 C - Comment/Recommendation
 D - Draft Response
 F - Furnish Fact Sheet
 to be used as Enclosure

 I - Info Copy Only/No Action Necessary
 R - Direct Reply w/Copy
 S - For Signature
 X - Interim Reply

DISPOSITION CODES:

 A - Answered
 B - Non-Special Referral
 C - Completed
 S - Suspended

FOR OUTGOING CORRESPONDENCE:

 Type of Response = Initials of Signer
 Code = "A"
 Completion Date = Date of Outgoing
Comments: No response required. JKH 2/14/90

Keep this worksheet attached to the original incoming letter.

Send all routing updates to Central Reference (Room 75, OEOP).

Always return completed correspondence record to Central Files.

Refer questions about the correspondence tracking system to Central Reference, ext. 2590.

Subject :

CAA - Air

Toxic

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, NC 27711



FACSIMILE REQUEST AND COVER SHEET

PLEASE PRINT IN BLACK INK ONLY

TO

John Schmitz

OFFICE/PHONE

REGION/LAB/LOCATION

FROM

Tim Mohin

PHONE

919 541 5349

MAIL CODE

OFFICE

OACPS

DATE

2/5

NUMBER OF PAGES TO INCLUDE THIS COVER SHEET

3

Please number all pages

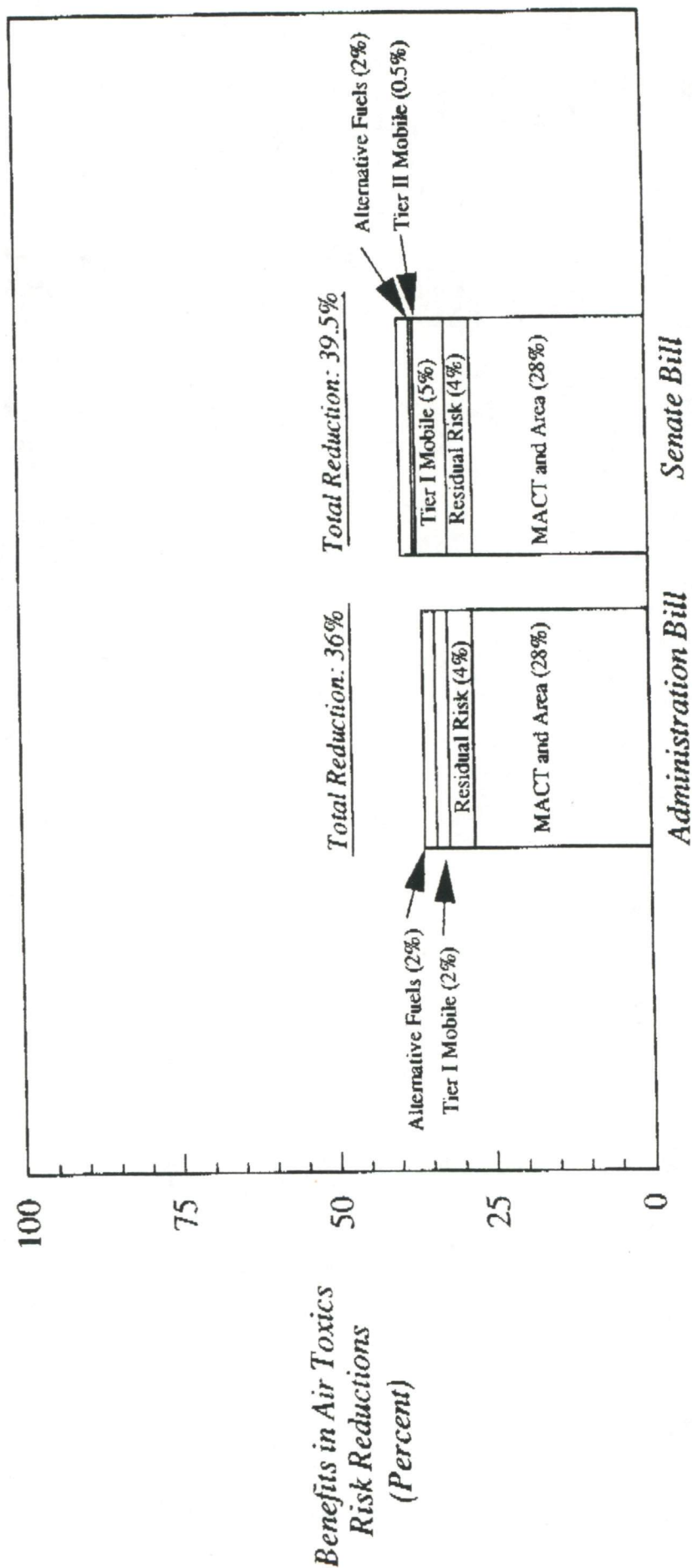
INFORMATION FOR SENDING FACSIMILE MESSAGES

LOCATION	EQUIPMENT	FACSIMILE NUMBER	VERIFICATION NUMBER
10th Floor	PANAFAX PX-100	FTS: 629-5661 Comm: (919) 541-5661	FTS: 629-5580 Comm: (919) 541-5580
8th Floor	PITNEY BOWES 8000	FTS: 629-5663 Comm: (919) 541-5663	FTS: 629-5641 Comm: (919) 541-5641
5th Floor	PITNEY BOWES 8000	FTS: 629-0804 Comm: (919) 541-0804	FTS: 629-5665 Comm: (919) 541-5665

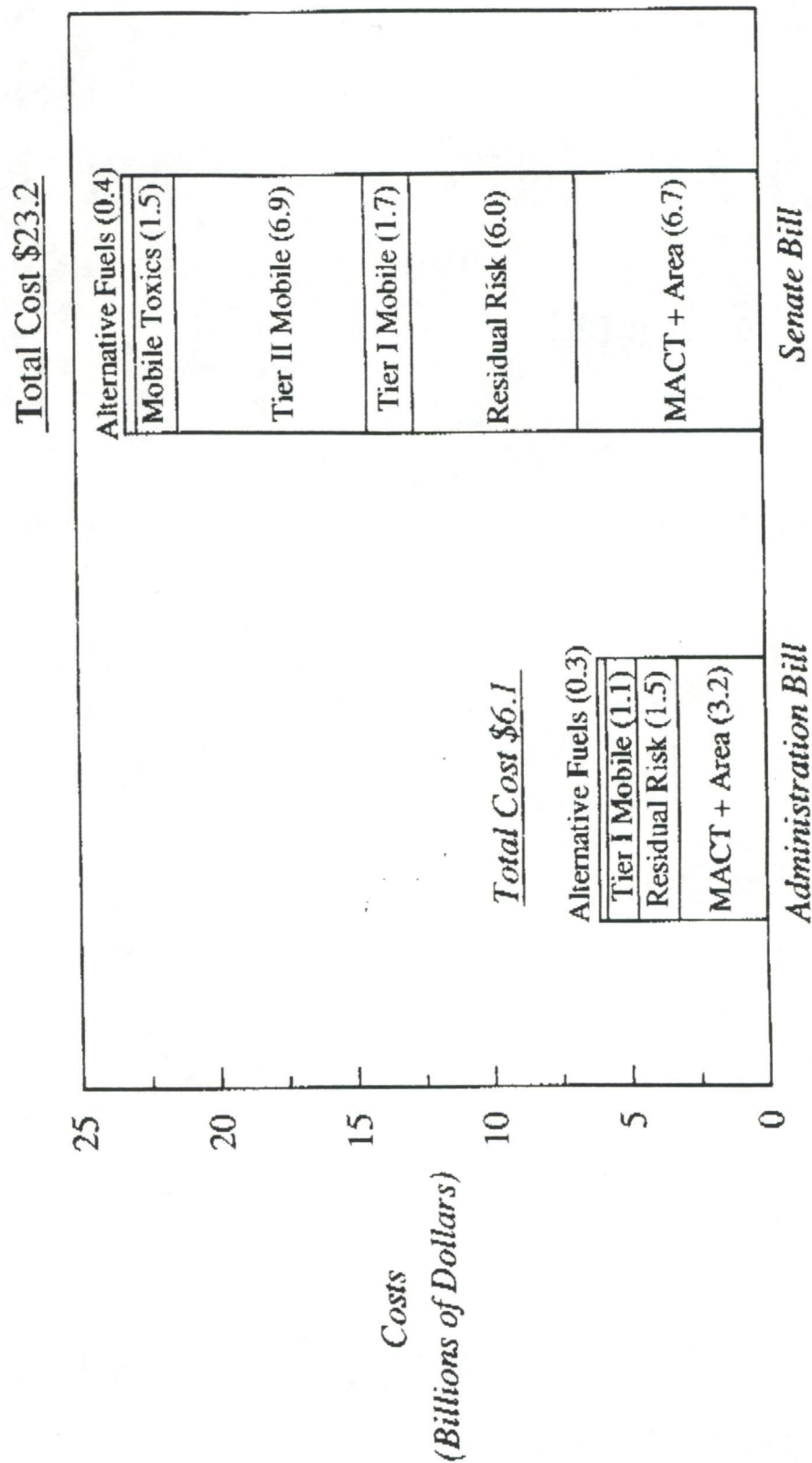
Chart per Tom Kipman's instructions.

PAGE ____ OF ____ PAGES

The Administration Bill achieves comparable benefits ...



... at substantially lower costs.



Note: MACT includes both stationary and area sources, and accidental release program/leak detection.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, NC 27711



FACSIMILE REQUEST AND COVER SHEET

PLEASE PRINT IN BLACK INK ONLY

TO

John Schmitz

OFFICE/PHONE

REGION/LAB/LOCATION

FROM

Tim Mohin

PHONE

919 541 5349

MAIL CODE

OFFICE

OAQPS

DATE

2/5

NUMBER OF PAGES TO INCLUDE THIS COVER SHEET

3

Please number all pages

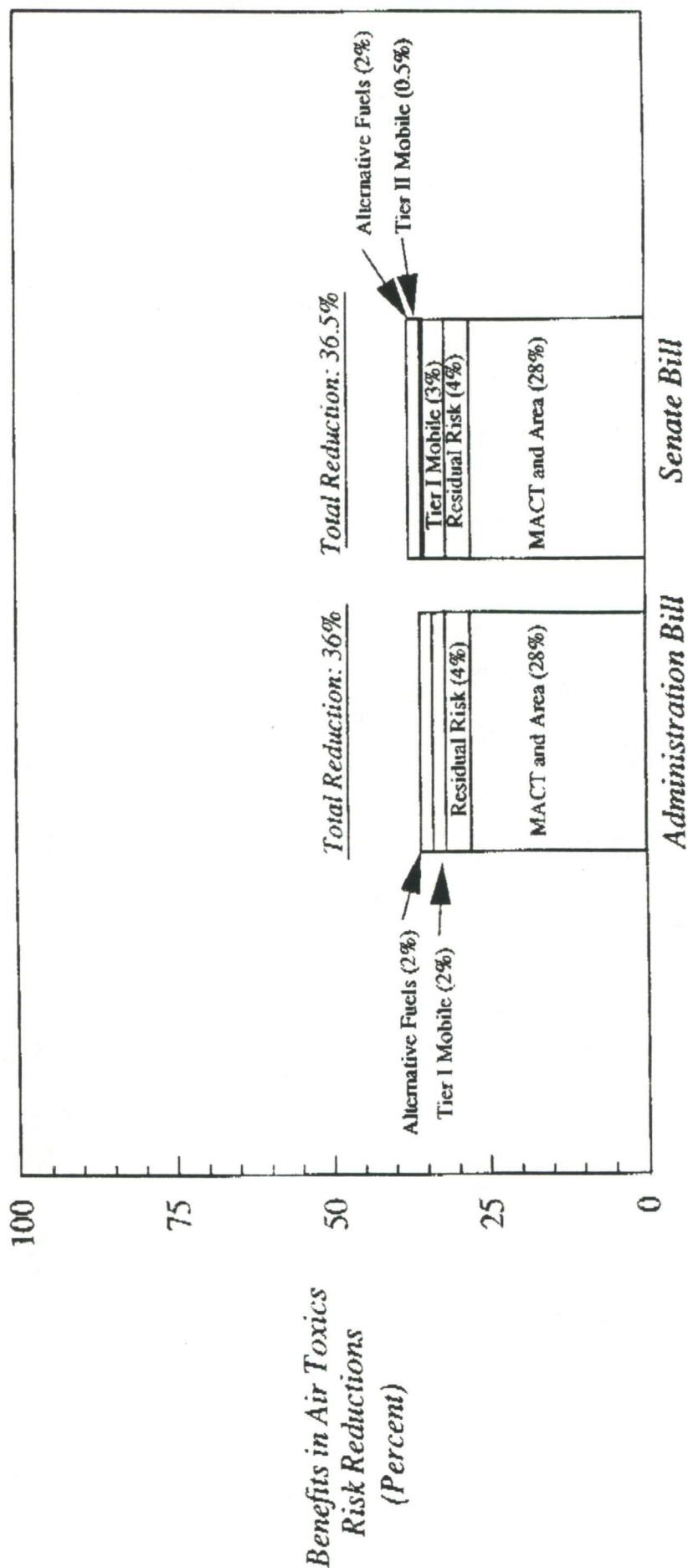
INFORMATION FOR SENDING FACSIMILE MESSAGES

LOCATION	EQUIPMENT	FACSIMILE NUMBER	VERIFICATION NUMBER
10th Floor	PANAFAX PX-100	FTS: 629-5661 Comm: (919) 541-5661	FTS: 629-5580 Comm: (919) 541-5580
8th Floor	PITNEY BOWES 8000	FTS: 629-5663 Comm: (919) 541-5663	FTS: 629-5641 Comm: (919) 541-5641
5th Floor	PITNEY BOWES 8000	FTS: 629-0804 Comm: (919) 541-0804	FTS: 629-5665 Comm: (919) 541-5665

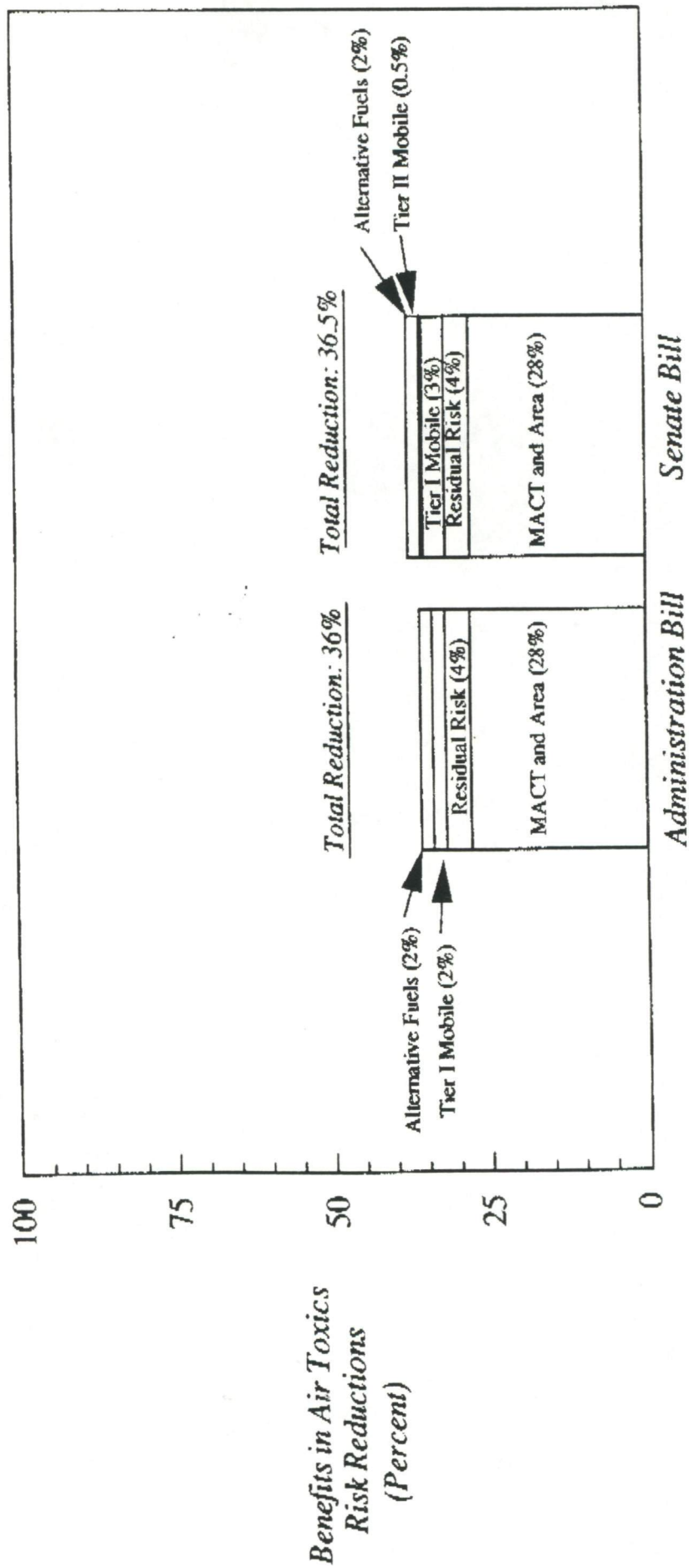
Chart per Tom Kierman's instructions.
UPDATED: Tier I Mobile Source benefits

PAGE ____ OF ____ PAGES

The Administration Bill achieves comparable benefits ...



The Administration Bill achieves comparable benefits ...



rec'd 2/6
9:00amWHITE HOUSE
CORRESPONDENCE TRACKING WORKSHEET☐ O - OUTGOING☐ H - INTERNAL☐ I - INCOMINGDate Correspondence
Received (YY/MM/DD) 1/1/Name of Correspondent: Jim Keenan☐ MI Mail Report

User Codes: (A) _____ (B) _____ (C) _____

Subject: Charts - The Administration Bill
achieves comparable benefits at substantially
lower costs

ROUTE TO:

ACTION

DISPOSITION

Office/Agency	(Staff Name)	Action Code	Tracking Date YY/MM/DD	Type of Response	Code	Completion Date YY/MM/DD
	<u>Cuofc</u>	ORIGINATOR	<u>90102105</u>			<u>1/1</u>
	<u>Chart 17</u>	Referral Note: <u>I</u>	<u>90102105</u>		<u>S</u>	<u>90102105</u>
	<u>Chart 02</u>	Referral Note: <u>I</u>	<u>1/1</u>			<u>1/1</u>
	<u>Auglay</u>	Referral Note: <u>I</u>	<u>1/1</u>			<u>1/1</u>
		Referral Note: _____	<u>1/1</u>			<u>1/1</u>
		Referral Note: _____	<u>1/1</u>			<u>1/1</u>

ACTION CODES:

A - Appropriate Action
C - Comment/Recommendation
D - Draft Response
F - Furnish Fact Sheet
to be used as EnclosureI - Info Copy Only/No Action Necessary
R - Direct Reply w/Copy
S - For Signature
X - Interim Reply

DISPOSITION CODES:

A - Answered
B - Non-Special Referral
C - Completed
S - Suspended

FOR OUTGOING CORRESPONDENCE:

Type of Response = Initials of Signer
Code = "A"
Completion Date = Date of OutgoingComments: No action required. JKH 2/27/90

Keep this worksheet attached to the original incoming letter.

Send all routing updates to Central Reference (Room 75, OEOB).

Always return completed correspondence record to Central Files.

Refer questions about the correspondence tracking system to Central Reference, ext. 2590.

Subject :

CAA - AFV

Toxics

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, NC 27711



FACSIMILE REQUEST AND COVER SHEET

PLEASE PRINT IN BLACK INK ONLY

TO

OFFICE/PHONE

REGION/LAB/LOCATION

FROM

PHONE

MAIL CODE

OFFICE

DATE

NUMBER OF PAGES TO INCLUDE THIS COVER SHEET

Please number all pages

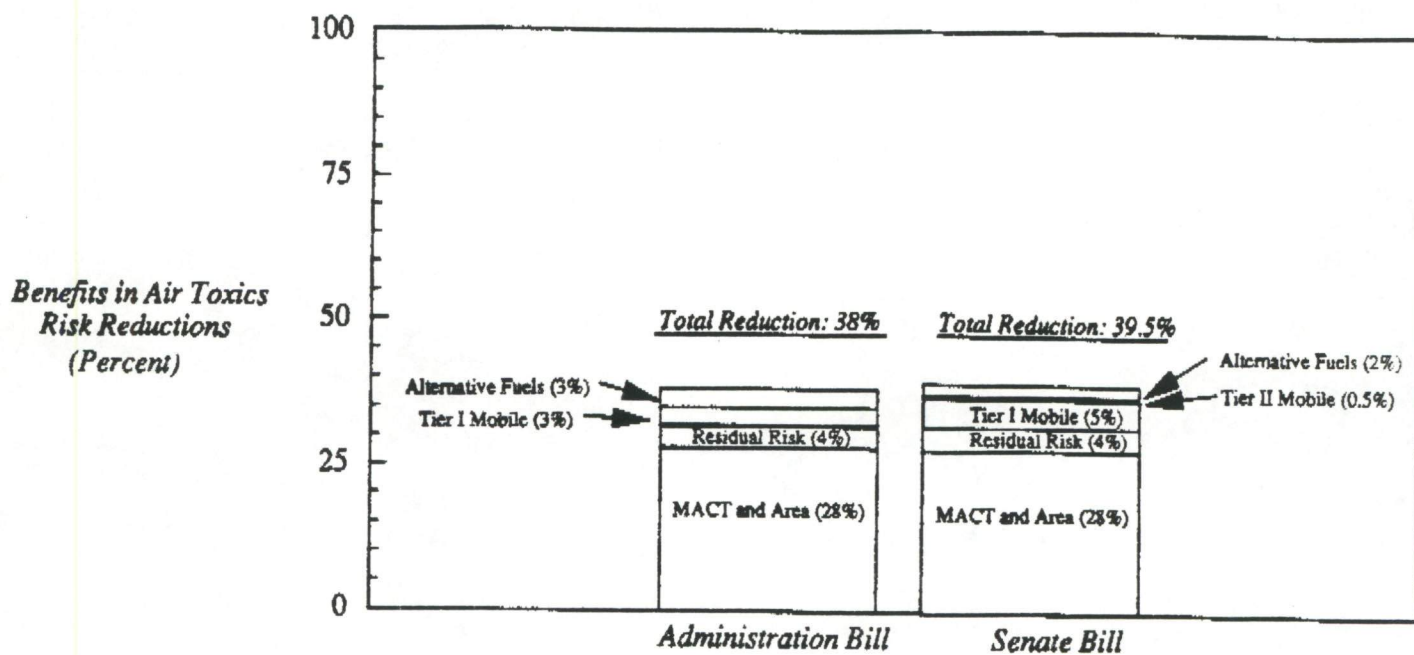
INFORMATION FOR SENDING FACSIMILE MESSAGES

LOCATION	EQUIPMENT	FACSIMILE NUMBER	VERIFICATION NUMBER
10th Floor	PANAFAX PX-100	FTS: 629-5661 Comm: (919) 541-5661	FTS: 629-5680 Comm: (919) 541-5680
8th Floor	PITNEY BOWES 8000	FTS: 629-5663 Comm: (919) 541-5663	FTS: 629-5641 Comm: (919) 541-5641
5th Floor	PITNEY BOWES 8000	FTS: 629-0804 Comm: (919) 541-0804	FTS: 629-5665 Comm: (919) 541-5665

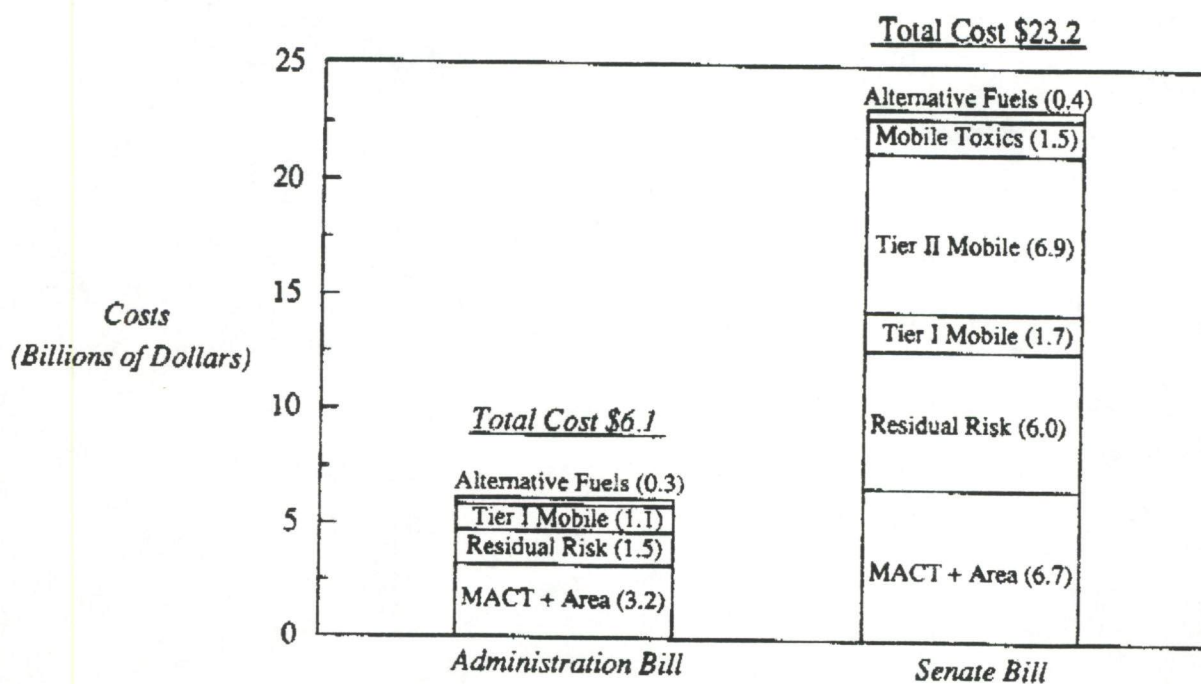
Updated

Toxics Chart

The Administration Bill achieves comparable benefits ...



... at substantially lower costs.



Note: MACT includes both stationary and area sources, and accidental release program/leak detection.

rec'd 2/21
11:10 am

WHITE HOUSE CORRESPONDENCE TRACKING WORKSHEET

☐ O - OUTGOING☐ H - INTERNAL☐ I - INCOMINGDate Correspondence
Received (YY/MM/DD) 1 / 1Name of Correspondent: Art Iraas☐ MI Mail Report

User Codes: (A) _____ (B) _____ (C) _____

Subject: ① EPA'S Decision Process for Benzene NESHAP
② Two Alternatives on Language

ROUTE TO:

ACTION

DISPOSITION

Office/Agency	(Staff Name)	Action Code	Tracking Date YY/MM/DD	Type of Response	Code	Completion Date YY/MM/DD
	<u>Cuige</u>	ORIGINATOR	<u>90.02.20</u>			<u>1 / 1</u>
	<u>Cuat 17</u>	Referral Note: <u>H</u>	<u>90.02.20</u>		<u>59002.28</u>	
	<u>Cuat 02</u>	Referral Note: <u>I</u>	<u>1 / 1</u>			<u>1 / 1</u>
	<u>Cuigay</u>	Referral Note: <u>I</u>	<u>1 / 1</u>			<u>1 / 1</u>
		Referral Note: _____	<u>1 / 1</u>			<u>1 / 1</u>
		Referral Note: _____				

ACTION CODES:

A - Appropriate Action
C - Comment/Recommendation
D - Draft Response
F - Furnish Fact Sheet
to be used as Enclosure

I - Info Copy Only/No Action Necessary
R - Direct Reply w/Copy
S - For Signature
X - Interim Reply

DISPOSITION CODES:

A - Answered
B - Non-Special Referral
C - Completed
S - Suspended

FOR OUTGOING CORRESPONDENCE:

Type of Response = Initials of Signer
Code = "A"
Completion Date = Date of Outgoing

Comments: No response required. Jett 2/26/90

Keep this worksheet attached to the original incoming letter.

Send all routing updates to Central Reference (Room 75, OEOB).

Always return completed correspondence record to Central Files.

Refer questions about the correspondence tracking system to Central Reference, ext. 2590.

Subject:

CAA - Air-

Toxics



REGULATORY INFORMATION SERVICE CENTER
Washington, D.C. 20503

Executive Director

FAX TRANSMITTAL

DATE: 2/16/90

TIME: _____

TO: John SchmitzFROM: ~~Mark O. Schoenberg~~ Art FraasTOTAL NUMBER OF PAGES INCLUDING THIS COVER SHEET: 3

RECIPIENT'S FAX NO.: _____

RECIPIENT'S TELEPHONE NO.: _____

COMMENTS: First page: EPA's Decision Process for Benzene NESHAP
Second page: Two alternatives on language
I much prefer the Benzene NESHAP process!

NOTE: IF YOU DO NOT RECEIVE ALL OF THE PAGES PLEASE CALL AS SOON
AS POSSIBLE.

OUR TELEPHONE NO.: 395-6993

OUR FAX NO.: 395-7285 (Rm. 5216, NEOB)

SENDER: _____

Decision Process: Benzene NESHAP

The Environmental Protection Agency (EPA) has selected an approach based on the judgment that the first step decision on the acceptability of risk cannot be reduced to any single factor. EPA believes that a Maximum Individual Risk of approximately one in ten thousand should ordinarily be the upper end of the range of acceptability. As risks increase above this level, they become presumptively less acceptable under Section 112, and would be weighed with other health risk information in making an overall judgment on acceptability. This other information includes: the overall incidence of cancer or other serious health effects, the number of persons exposed within individual lifetime risk ranges, the science policy assumptions and uncertainties associated with the risk estimates, effects due to collocation. EPA believes that all of these are important factors to be considered in the acceptability judgment.

As the second step of the inquiry -- determining an ample margin of safety -- EPA considers whether to reduce risks even further. In this step, EPA strives to provide protection to the greatest number of persons possible to lifetime levels of approximately one in one million. In this decision, EPA considers both the health risk information (again) and other information including costs and economic impacts of further control, technological feasibility, uncertainties and other relevant factors.

Alternative Language for a Residual Risk Test

Option 1

As the second step of the inquiry -- determining residual risks -- EPA considers the need to reduce risks even further. In this step, EPA strives to protect the greatest number of persons possible at lifetime levels of approximately one in one million or less. In this decision, EPA considers both the health risk information and other information including costs and economic impacts of further control, technological feasibility, uncertainties and other relevant factors.

Option 2

As the second step of the inquiry -- determining residual risk -- EPA considers the need to reduce risks even further. In this step, EPA would assure that the average risk to the exposed population (within the 50 km radius typically used in modeling) would be below one in one million.

QUENTIN N. BURDICK, NORTH DAKOTA, CHAIRMAN
DANIEL PATRICK MOYNIHAN, NEW YORK
GEORGE J. MITCHELL, MAINE
MAX BAUCUS, MONTANA
FRANK R. LAUTENBERG, NEW JERSEY
JOHN S. BREAUX, LOUISIANA
HARRY REID, NEVADA
BOB GRAHAM, FLORIDA
JOSEPH I. LIEBERMAN, CONNECTICUT
JOHN H. CHAFFE, RHODE ISLAND
ALAN K. SIMPSON, WYOMING
STEVE SYMME, IDAHO
DAVE DURENBERGER, MINNESOTA
JOHN W. WARNER, VIRGINIA
JAMES M. JEFFORDS, VERMONT
GORDON J. HUMPHREY, NEW HAMPSHIRE

DAVID M. STRAUSS, STAFF DIRECTOR
ROBERT F. MURLEY, MINORITY STAFF DIRECTOR

United States Senate

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
WASHINGTON, DC 20510-8175

TELECOPIER NUMBER -- 202-224-5167
OFFICE NUMBER -- 202-224-8832

TO: John Beale
FAX NUMBER: 475 9-66
FROM: Senator Lautenberg
DATE: 2/7/90

NUMBER OF PAGES 15 (EXCLUDING COVER SHEET)

MESSAGE _____

February 7, 1990

Text of Agreement on Air Toxics

Residual Risk

On page 345 beginning with line 1 strike all through line 25 on page 345 and insert in lieu thereof:

"(3)(A) With respect to standards established pursuant to subsection (f), the Administrator shall, after consultation with the State in which the source is located, grant an existing source an exception from the standard, if the Administrator determines, based on a site-specific health assessment provided by the owner or operator of the source and other information, that the standard cannot be achieved by the source using all available technology and controls and the Administrator establishes an alternative emissions limitation for the source which assures (upon the showing of the owner or operator) that the actual person living within the vicinity of the source who is most exposed to emissions of hazardous air pollutants from the source will not experience an expected risk of carcinogenic

-2-

effects exceeding one in ten thousand as the result of such exposure.

"(B) The alternative emissions limitation shall, to the extent possible using available technology and mitigation measures, reduce the expected risk of carcinogenic effects to the actual person most exposed to emissions from the source to a level not exceeding one in one million. To the extent that such level cannot be achieved, the Administrator shall assure that all available technology and mitigation measures are employed and that the alternative emissions limitation is reviewed at the time the permit for the source is renewed to determine whether further technology and controls are available. No alternative emissions limitation authorized by this paragraph shall be less stringent than an emissions limitation established pursuant to subsection (d).".

On page 346 beginning at line 12 strike "For purposes of this subparagraph the phrase 'all available technology and operational controls' shall include all measures which are technically feasible including process modifications and materials substitution to reduce emissions of hazardous air pollutants from the source.".

-3-

On page 346 after line 22 insert the following new subparagraph and redesignate succeeding subparagraphs accordingly:

"(B) With respect to standards established pursuant to subsection (f)(1)(b), the Administrator (or the State) shall, after consultation with the State in which the source is located, grant an existing source an exception from the standard, if the Administrator determines, based on a site-specific health assessment provided by the owner or operator of the source and other information, that the standard cannot be achieved by the source using all available technology and controls and the Administrator establishes an alternative emissions limitation for the source which assures (upon the showing of the owner or operator) that the actual person living within the vicinity of the source who is most exposed to emissions of hazardous air pollutants from the source will not experience an expected risk of carcinogenic effects exceeding one in one million as the result of such exposure. The alternative emissions limitation shall also assure that such person will not experience an expected additive risk of carcinogenic effects exceeding one in one hundred thousand as the result of exposure to all carcinogens emitted by the source. No alternative emissions limitation authorized by this paragraph shall be less stringent than an emissions limitation established pursuant to subsection (d).".

-4-

[On page 346 at line 24 strike "six months" and insert in lieu thereof "two years"; and on page 347 at the end of line 7 add "Any source for which an alternative emissions limitation is established under this paragraph shall be in compliance with such limitation on the date for which compliance would have been required with respect to a standard promulgated under subsection (f) in the absence of such alternative emissions limitation.".]

On page 347 after line 23 add the following new paragraphs and redesignate succeeding paragraphs accordingly:

"(5) The owner or operator of any source seeking an exception under paragraph (3) or (4)(B) may employ mitigation measures to reduce expected risks of carcinogenic effects to actual persons living within the vicinity of the source, except that any stack height credit used in a modeling demonstration shall be based on the lesser of the actual stack height of the source as it existed on January 1, 1988, or the GEP formula of $H+1.5L$. To the extent that mitigation measures include relocation of persons living within the vicinity of the source or a greenbelt around the source, the Administrator shall assure whenever the permit is renewed for such source that such measures continue to be effective.

-5-

"(6) Any request for an exception under paragraph (3) or (4)(B) shall be submitted within two years of the date on which an emission limitation applicable to the source is promulgated pursuant to subsection (f) and shall include all of the information necessary for the Administrator to make a determination with respect to the eligibility of the source for an exception and the appropriate alternative emissions limitation. The site-specific health assessment submitted by the owner or operator of the source in support of a request for an exception shall comply with rules for preparing such health assessments which have been promulgated by the Administrator pursuant to paragraph (7). The Administrator shall make a determination upon any request before the date of compliance established for the emissions limitation promulgated pursuant to subsection (f) and the alternative emissions limitation shall be effective upon such date.

"(7)(A) Not later than five years after the date of enactment of this paragraph, the Administrator shall, after notice and opportunity for public comment, promulgate rules for the preparation of site-specific health assessments which may be prepared in support of requests for exceptions pursuant to paragraphs (3) and (4)(B). Health assessments conducted pursuant to this paragraph shall be based on the most likely actual exposure to hazardous air pollutants emitted from the source

-6-

experienced by persons living within the vicinity of the source taking into account the configuration of the facility, actual meteorology and terrain of the site, emissions dispersion modeling reflecting actual rates of operation of the source confirmed by monitoring of ambient concentrations of hazardous air pollutants within the vicinity of the source, direct and indirect exposure pathways, and the typical lifestyle (including length of residency within the vicinity of the source) and patterns of activity of the residents of the area. For purposes of this subsection "expected risks of carcinogenic effects" for actual persons exposed to emissions of hazardous air pollutants from any source shall mean risks estimated using site-specific information as required pursuant to this subparagraph and unit risk factors for each hazardous air pollutant as determined by the Administrator. Regulations promulgated under this section shall specify emissions factors, dispersion models and monitoring methods which may be used to complete site-specific health assessments submitted pursuant to paragraph (3) or (4)(B).

"(B) The health assessments shall identify the actual person or persons most exposed to emissions of hazardous air pollutants from the source and shall estimate expected risks of carcinogenic risks to such person. To the extent that mitigation strategies are used to relocate such persons, the health assessment shall determine the expected risk of carcinogenic effects to the actual person or persons who would be most exposed after all mitigation

-7-

measures are implemented including an estimate of the alternative emissions limitation which would be necessary to protect such person or persons from expected risks of carcinogenic effects exceeding one in ten thousand and one in one million which result from exposure to emissions of hazardous air pollutants from the source.

"(8) Prior to the issuance of any permit incorporating an alternative emissions limitation authorized by paragraph (3) or (4)(B), the Administrator shall publish a notice of the request for an exception along with a brief analysis of the health assessment and make the analysis along with the health assessment available to the public and provide an opportunity to comment on the site-specific health assessment in writing and at a public hearing held within the vicinity of the source. The notice of the hearing shall be published in a general circulation newspaper and include sufficient information as necessary to provide a reasonable explanation of the health assessment. The health assessment shall be made available to the public not less than 60 days before such hearing. The Governor of the State in which the source is located may seek the assistance of the Agency for Toxic Substances and Disease Registry in reviewing any health assessment prepared pursuant to this paragraph and such Agency is authorized to conduct a review using funds available to it through annual appropriations. The Administrator shall respond

-8-

to any written comments received from the public on the health assessment before issuing a permit incorporating any alternative emissions limitation.".

On page 320 after line 3 add the following new paragraph:

"(9) The term "available" with respect to a control technology or method or a mitigation method means that such technology, including process modifications or material substitution, or method could be installed or carried out at a source without imposing costs which would force the closure of the source or which would severely impair continuation of the source as an economic entity.".

Leak Detection

On page 400 beginning at line 9 strike all through page 400 line 16 and insert in lieu thereof:

"(g) Detection.-- Within thirty-six months of enactment, the Administrator shall conduct a study and report to Congress, assessing the best available technology to monitor all devices and systems (including, but not limited to, pumps, compressors, valves, flanges, pipes, and pipelines, connectors, processes, containers and vessels), storage facilities, and transfer points

-9-

adequate to detect immediately and report concurrently to the facility operator accidental releases of such substances from covered facilities [extremely hazardous substances listed pursuant to subsection (c) from any facility handling such substances in more than threshold amounts]. Such study shall include an assessment of the cost effectiveness and feasibility of each technology. [The study shall build upon and not duplicate work conducted pursuant to section 305(b) of the Emergency Planning and Community Right-to-Know Act of 1986]. The Administrator shall promulgate within twenty-four months of completion of the study, regulations pursuant to subsection (f) to include requirements for installation and use of best available technology, taking into account the cost effectiveness and feasibility findings, for such devices and systems, storage facilities, and transfer points adequate to detect immediately and report concurrently to the facility operator accidental releases of such substances from covered facilities [extremely hazardous substances listed pursuant to subsection (c) from facilities handling such substances in more than threshold amounts].".

Electric Utility Boilers

Beginning on page 335 at line 22 strike all through line 2 on page 336 and insert in lieu thereof:

-10-

"(5)(A) The Administrator shall conduct, and transmit to the Congress not later than three years after the date of enactment of this paragraph, a study of emissions of hazardous air pollutants which are particulates from electric utility steam generating units.

"(B) The Administrator shall conduct, and transmit to the Congress not later than four years after the date of enactment of this paragraph, a study of mercury emissions from electric utility steam generating units considering the rate and mass of such emissions, the health and environmental effects of such emissions, technologies which are available to control such emissions and the costs of such technologies.

"(C) Notwithstanding the requirements of subsection (e), standards under subsection (d) for the control of emissions of hazardous air pollutants which are particulates and mercury emissions from electric utility steam generation units shall be promulgated not sooner or later than five years after the date of enactment of this paragraph. Electric utility steam generating units shall be in compliance with such standards not later than eight years after the date of enactment of this paragraph.

"(D) Notwithstanding the provisions of this section, the Administrator shall not be required to promulgate standards to control emissions of organic or inorganic acid gases from electric utility steam generating units unless the Administrator

-11-

finds that such standards are warranted to protect public health or the environment.

"(E) Emissions of organic and inorganic acid gases shall be included in determining whether an electric utility steam generating unit is a major source of hazardous air pollutants under this section.".

Mandatory MACT for All Source Categories

On page 318 at the end of line 20 add "Notwithstanding the provisions of this paragraph, emissions from any oil or gas exploration or production well and emissions from any pipeline compressor station shall not be aggregated with emissions from other similar units, whether or not such units are in a contiguous area or under common control, to determine whether such wells or stations are major sources.".

On page 329 after line 14 add the following new paragraph:

"(7) Notwithstanding the provisions of paragraph (1), the Administrator shall not be required to list any source category for which--

"(A) the hazardous air pollutants emitted by sources in the category (in quantities greater than 10 tons per year for any pollutants or 25 tons per year for any combination

-12-

from a source) are all known, probable or possible human carcinogens with no other adverse health or environmental effect; and

"(B) no source in the category emits such pollutants in quantities which may cause a lifetime risk of carcinogenic effects greater than one in one million to the individual in the population who is most exposed to emissions of such pollutants (or stream of pollutants) from a source in the category.".

Area Sources and Monitoring

On page 360 beginning at line 19 strike "including a reduction of not less than 75 per centum in the incidence of cancer attributable to emissions from such sources".

On page 364 add at the end of line 18 "The strategy shall assure, considering control of emissions of hazardous air pollutants from major sources required under this section, a reduction of not less than 75 per centum in the incidence of cancer attributable to emissions of such pollutants from all sources.".

Beginning on page 361 at line 24 strike all through line 10 on page 363 and redesignate succeeding paragraphs accordingly.

-13-

On page 365 after line 9 insert the following:

"(G) As part of such strategy the Administrator shall prescribe rules for ambient monitoring and emissions modeling for all Metropolitan Statistical Areas with a population exceeding two hundred and fifty thousand persons sufficient to demonstrate with a high degree of confidence that the goals and objectives of the strategy are being met.".

Accidental Releases

On page 388 at the end of line 21 insert "The Administrator shall conduct compliance audits of hazard assessments prepared pursuant to this subsection reviewing not less than 1.4 per centum. The requirements of this subsection shall be enforced in the same manner as requirements of section 114. The Administrator is authorized to issue administrative orders pursuant to section 113 to assure compliance with the requirements of this subsection.".

Definition of MACT

On page 331 beginning at line 6 strike "if the Administrator determines that the level of control applicable to new sources is

-14-

generally technically or economically infeasible for existing sources in the category or subcategory and, considering, sequentially, the level of control achieved by existing sources in the category or subcategory beginning with the most stringent such level, establishes an emissions limitation which is generally feasible and assure the maximum total reductions in emissions from all sources in the category or subcategory" and insert in lieu thereof "provided, that, the emissions limitation for existing sources in the category or subcategory shall not be less stringent than the average emissions limitation achieved by the best performing 10 per centum of the existing sources in the category or subcategory, and may be more stringent".

On page 331 at line 16 strike "that a reduction" and insert in lieu thereof "that an average reduction"; and on page 331 at line 19 insert "in the category or subcategory" after "existing sources".

New Source Compliance Date

On page 352 after line 20 add the following new paragraph:

"(13) A source for which construction or reconstruction is commenced after the date an emissions standard applicable to such source is proposed pursuant to subsection (d) but before the date

-15-

an emissions standard applicable to such source is proposed pursuant to subsection (f) or (g) shall not be required to comply with the emissions standard under subsection (f) or (g) until the date ten years after the date construction or reconstruction is commenced.".

Outline of Agreement on Air Toxics

Residual Risk

① EPA is to conduct a 2 year residual risk review after MACT compliance date for each source category.

② At the end of the 2 year period EPA is to promulgate emissions standards that would achieve risk levels for the MEI (theoretical) of 10-4 and 10-6. The compliance date for the standards is 3 years after enactment. *- use realistic sup. pollutant*

③ Risks Greater Than 10-4:

Sources which cannot meet 10-4 emissions standard with available technology may do a site-specific health assessment to measure risk to the actual population. The public must have the opportunity to review and comment on the health assessment before a permit is issued.

? Sources that exceed 10-4 to the maximum exposed actual person must correct the problem before the compliance date (3 years after promulgation) or shut down. In addition to controls, mitigation measures, except tall stacks, may be used to reduce risks.

Sources that can reduce emissions below 10-4 risk levels to the maximum exposed actual person must use available technology to achieve a 10-6 risk to the maximum exposed actual person.

Sources that cannot reach 10-6 risk levels to the maximum exposed actual person must employ available technology and be reviewed for further control every five years.

The legislation is to contain a definition of "available" based on committee report language.

Risks Less Than 10-4

Sources which do not exceed 10-4 emissions standard have three options:

(Option 1) Sources may comply with the 10-6 emissions standard.

(Option 2) Sources that cannot reach 10-6 risk level to the MEI (theoretical) may employ available technology and be reviewed for further control every five years.

(Option 3) Sources that cannot reach 10-6 with available technology may conduct a site-specific health assessment (subject to public comment) and demonstrate that risks to the maximum exposed actual person are below 10-6 for each pollutant and below 10-5 on an additive basis for all pollutants. In addition to controls, demonstrations may include mitigation measures, except tall stacks. Actual exposures must be reconsidered when permits are renewed.

Leak Detection

Senator Reid has prepared specific legislative language. The Administration would like changes in the Reid language.

Electric Utility Regulation

EPA will conduct a study of particulate emissions from electric utility boilers to be completed three years after enactment.

EPA will conduct a study of mercury emissions from electric utility boilers considering emissions, the health and environmental effects of the emissions, control technologies and the costs of control to be completed four years after enactment.

EPA will promulgate MACT standards for particulates and mercury not later than five years after enactment. Utilities shall comply with the standards not later than eight years after enactment.

MACT standards for the acid gases chlorine, fluorine and _____ shall not be required. However, emissions of the acid gases are counted to determine whether a source is a major source.

Mandatory MACT for All Source Categories

The Senate bill except:

Emissions from oil and gas wells and compressor stations which are in contiguous areas and under common control shall not

be aggregated for the purpose of determining whether the well or station is a major source.

EPA is not required to list a category of sources for control, if it determines that no source in the category emits carcinogenic pollutants presenting a risk greater than 10⁻⁶ to the MEI.

Area Sources and Monitoring

The Senate bill except:

EPA's national urban air toxics strategy to be submitted to the Congress in 5 years is to demonstrate that cancer risks attributable to all sources of air toxics including major sources will be reduced by 75%.

The requirement that all cities above 250,000 conduct monitoring for air toxics will be deleted. In the alternative, EPA is to prescribe monitoring and modeling requirements as part of the national strategy which are sufficient to demonstrate that the strategy is achieving the cancer reduction goal. |

Accidental Releases

The Senate bill except:

EPA is to conduct an annual audit of X% of the hazard assessments which are prepared.

EPA is to enforce hazard assessment as if it were a section 114 requirement and is authorized to issue administrative orders to assure compliance.

Definition of MACT

For existing sources the "top-down" procedure is to be replaced with a floor based on the average control achieved by the top 10% of sources in the category.

The benchmark language is to be clarified to indicate that the benchmark is an average reduction over the source category and not applicable to individual sources.

02/10/90 09:53

☎ 303 223 9360

CATHY FROMME →→ IRI

CAA -

PUY

Air Toxics

and environmentalists at the

City mile high in toxic air compounds

By Thomas Graf
Denver Post Environment Writer

When it comes to levels of toxic compounds in Denver's air, Denver is second to none.

Those levels, measured during 1987 and 1988, are similar to those found in Boston, Chicago, Houston and Southern California, according to an Environmental Protection Agency report issued yesterday.

Although the levels are much higher than levels found in rural areas, they are nothing to be alarmed about, according to EPA scientists who prepared the report.

"We really didn't see that much of an increase compared to previous measurements here during the 1970s," said Mark Komp, an environmental scientist with the EPA regional office in Denver. Winona Victory, an EPA scientist in North Carolina who is one of the co-authors of the report, said, "I wouldn't be alarmed if I lived in Denver."

A second phase of the Denver air toxics study, due to be released this spring, is expected to identify the primary sources of the toxic elements and to estimate the health risks they

TOP TOXIC-EMITTING FIRMS	
Here are the five largest local industrial emitters of toxics measured in pounds during 1988:	
ADOLPH COORS CO.	880,047
SYNTEX CHEMICALS	697,900
BALL MANUFACTURING	643,798
MARTIN MARIETTA	536,678
STORAGE TECHNOLOGY	403,956

present for Denver residents.

The leading toxics found in Denver's air are benzene and toluene, the report said. Both toxics are probable human carcinogens.

Benzene levels of 12 to 14 parts per billion were found in Denver's air during the summer of 1987 and during the winter of 1988-89, and toluene was found at levels of 20 to 30 parts per billion during that winter.

The primary source of airborne benzene is the automobile, although large amounts are emitted by the Conoco and Total refineries in Commerce City and from gas pumps. Toluene is used as a solvent by many local manufacturers, including Conoco, Whirlpool, Syntex Chemicals and Martin Marietta, according to industry inventories filed with the EPA.

Komp said amendments to the federal Clean Air Act, now being debated in Congress, would require industries to reduce most of their toxic emissions by 90 percent. Reductions in toxic compounds emitted by trucks and automobiles are also proposed by the EPA.

02/10/90 09:52

303 223 9360

CATHY FROMME --- IRI

EPA gives Denver mixed review

City's air pollution much worse than rural areas

By The Associated Press

DENVER — Air in metro Denver contains "much higher" levels of toxic compounds than air in rural areas, the Environmental Protection Agency said Thursday.

However, the city's air carries about the same amount of toxic compounds as in other urban areas.

Toxic pollutants, about half of which come from motor vehicles and half from factories, power plants and the like, include many compounds commonly found in solvents, pesticides and the like.

For decades, they have taken a back seat in air pollution control efforts to so-called "conventional" pollutants, such as carbon monoxide, particulates and sulfur and nitrogen oxides, the EPA said.

The report released Thursday stems from an air toxics monitoring program conducted by the EPA and the Colorado Department of Health of conventional

and toxic pollutants from June through September in 1987 and also that winter, from November through February 1988.

It was the first long-term study of such compounds in Denver-area air, said Mark Komp, an EPA environmental scientist in Denver.

"We now have a 'snapshot' of toxics in metro air," said Irv Dickstein, EPA's Air and Toxics Division Director.

"Based on two limited sampling periods, we have an idea which of the toxics could be troublesome. We now need more data to see if trends exist, to help us evaluate the risk toxics may present to people's health and to determine if standards are needed."

A second phase of the study, expected this spring, will attempt to determine where the toxics come from and what their health effects are, Dickstein said.

Toxic compounds were

detected in Denver at parts-per-billion levels similar to those in cities like Boston, Chicago, Houston and Los Angeles, but "much higher" than in the countryside, Komp said.

For example, Komp said, benzene, a principle component of gasoline, measured 20 to 30 parts per billion in Denver-area air, about the same as in those other cities. In the countryside, levels of benzene range from .3 to 14 parts per billion.

Like conventional pollutants, concentrations of the toxic pollutants was highest during the winter and when the atmosphere was stable, the report said.

It did not identify sources of the pollutants but said several of the chemical groups are associated with fuel burning, petroleum refining and chemical manufacturing and use, the EPA said.

The problem probably is tied to many sources over the entire metro area, the agency said.

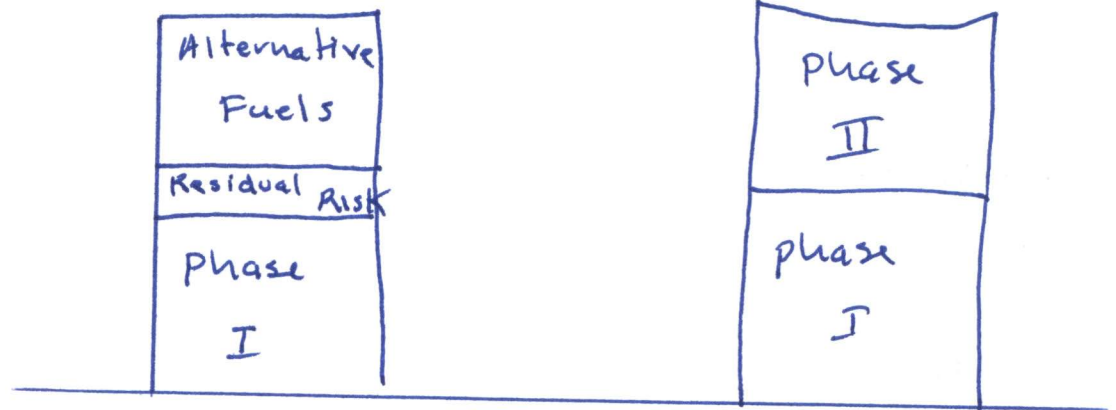
Col 2/9

CAAs!

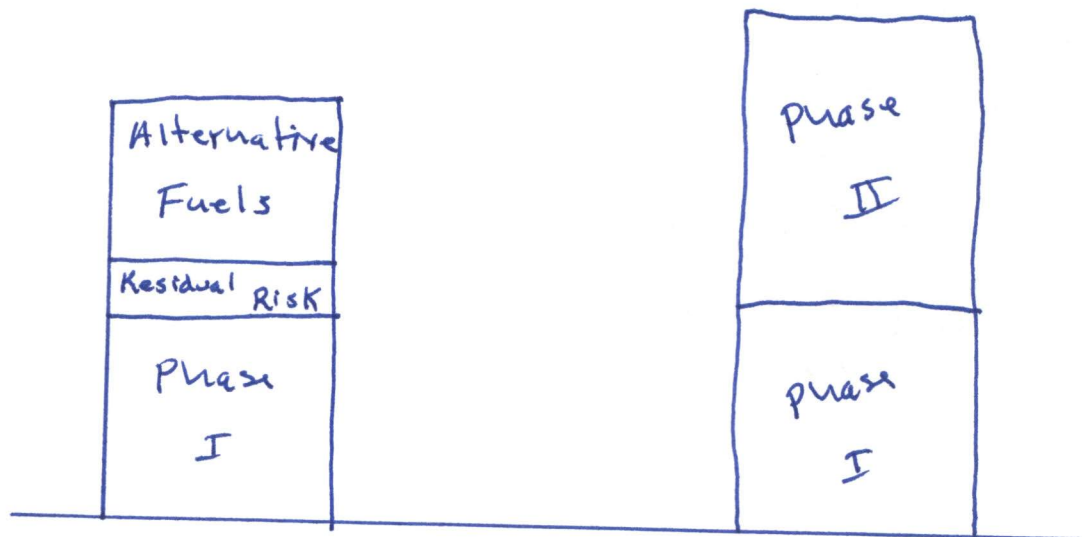
Administration
Bill

Senate
Bill

Benefits in
Air Toxics
Reductions



Costs



Faxed to Tom Kiernan 1/29/90

Benefits in
Air To

**WARREN
BROOKES**

Billions into the air-toxics breeze

1/17/90 WT
A top career executive in the Environmental Protection Agency was asked how he would spend his budget to achieve the maximum reduction in premature cancer deaths.

"I would give it all to the American Cancer Society," he is reported to have said without hesitation.

The story which has been circulated widely might well be apocryphal, but it has a serious point, well-illustrated by the Air Toxics section (Title III) of the Clean Air Amendments (S 1630) now before the U.S. Senate.

Industry groups now estimate the likely cost of this section alone to the U.S. economy is between \$20 billion and \$30 billion. That's 10 to 15 times the \$1.8 billion we now spend on the National Cancer Institute for a disease killing 470,000 per year.

Yet, the EPA estimates that even using the most-extreme-risk models only 1,700-2,700 cancer cases a year are caused by air toxics. Since 900-1,600 of those are blamed on motor-vehicle emissions (covered by other controls) the total range for all industrial air toxics is only 700 to 1,100.

And, because the bill only targets those plants emitting 10 tons or more of any one pollutant, its maximum potential remediation is said to be between 350 and 500, even assuming the Senate bill's insistence on cutting effective risk to one in 1 million.

That represents a cost per cancer avoided of between \$40 million and \$86 million each. If these numbers shock you, read the careful analysis of the air-toxics madness in the winter issue of Regulation Magazine, out next week from Cato Institute.

In it, two engineers, Frederick Rueter and Wilbur Steger, admittedly consultants to industry, nevertheless use the EPA's own data to show the costs and benefits of dealing with just two of the key air toxics, coke-oven emissions, and benzene.

The EPA itself estimates air toxics from coke ovens are responsible for 6.9 cancer cases a year nationwide,

see BROOKES, page F4

Warren T. Brookes is a nationally syndicated economics columnist.

BROOKES

From page F1

and benzene emissions for about 3.9 cases. (See Table)

Last year the EPA issued a proposed NESHAP (National Emissions Standards for Hazardous Air Pollutants) rule on coke emissions. It said that using "best-available technology" (BAT) coke emissions could be reduced enough to cut cancer incidence from 6.9 per year to 4.0, a net saving of 2.9 cases, at a cost of \$19.3 million per year. (an implied capital cost of \$200 million). That's \$6.8 million per case.

On benzene, EPA's NESHAP ruling last September called for cutting the total cancers presumed from that emission source from 3.9 to .5 per year, a saving of 3.4 cancers per year, at a cost of \$200 million a year

For investing \$20 billion to \$30 billion on all air toxics, the likely reduction in cancers is not 350 to 500 a year, but something on the order of 3 to 5, or \$4 billion to \$9 billion per life prolonged.

(an implied capital cost of \$2 billion.) Messrs. Steger and Rueter say, "This amounts to more than \$58 million per life prolonged. It should not be difficult to find other applications for \$200 million per year that would achieve much larger reductions in cancer risk...."

That's especially true since "the EPA's cancer risk estimates are extreme overestimates of the actual risks" for air toxics. Why? Virtually all those are extrapolated for the general population from epidemiological studies of workers actually employed on the emitting source sites, or from high-dosage rodent tests.

But as Messrs. Rueter and Steger point out, that assumes a straight-line risk relationship between very high exposure and very low exposure. Not only is there no such connection with low-exposure workers (whose cancer rates are uniformly below EPA risk-model expectations) but none exists on the general population.

For example, they looked at the largest concentration of industrial coke ovens in the nation, Allegheny County, Pa. They calculated the age-adjusted cancer rates for the 30 geographic areas in that county for the period from 1969-1971, well before substantial emissions reductions took place, in order to get the maximum possible health effect.

Even so, they found no pattern of raised rates. Indeed around two of the three coke plants, cancer rates were from 20 to 40 percent lower than the county as a whole. They

concluded "the risk levels are so low they cannot even be detected in epidemiological studies of population exposures to outdoor concentrations of coke-oven emissions that were (1969-1971) substantially higher than those prevalent currently."

The EPA admits its technique of extrapolating risk from high to low exposure has "no solid scientific basis." Worse, the EPA risk model assumes the average individual is exposed to the maximum possible ambient level of the pollutant for 24 hours a day through his entire 70-year life span. Since most of our life is spent inside our homes, and since we move on average every six years, such an assumption is a ludicrous exaggeration.

For coke, the two engineers conclude: "EPA assumptions result in the overestimate of those cancer risks by at least a multiple of 100." So, the likely national risk for all coke emissions currently is 0.07 cancers per year. The likely reduction from investing \$200 million in capital is .03 cancers per year, or about 1 every 30 years or so.

For investing \$20 billion to \$30 billion on all air toxics, the likely reduction in cancers is not 350 to 500 a year, but something on the order of 3 to 5, or \$4 billion to \$9 billion per life prolonged.

As the EPA executive suggested, there must be myriad better ways to spend our money on health improvement than this.

EPAS AIR TOXICS PROGRAM COST/BENEFITS

(Cancers per year — nationwide)

Coke-oven emissions	EPA Risk Model	Realistic Risk
■ Current baseline	6.86	0.069
■ Using Best-Available Control Technology (BAT)	4.03	0.041
■ Net Reduction	2.83	0.028
■ Annual Cost Total	\$ 19.3 million	\$ 19.3 million
■ Cost/cancer avoided	\$ 6.8 million	\$ 682.0 million
Benzene		
■ Current Baseline	3.91	0.039
■ Using BAT	0.51	0.005
■ Net Reduction	3.40	0.034
■ Annual Cost	\$200 million	\$200 million
■ Cost/cancer avoided	\$ 58.8 million	\$5,880 million

Sources: All Data in First Column From EPA's NESHAP Data in Second Column from realistic risk assessment in "Air Toxics and Public Health: Exaggerating Risks and Misdirecting Policy," Regulation Magazine, Winter 1990.

REVIEW & OUTLOOK

The Next Lynching

WSJ 1/17/90

We reprint nearby the full text of questions that have been sent by the Senate Judiciary Committee to Clarence Thomas, President Bush's nominee to fill a vacant seat on the U.S. Court of Appeals in Washington. We of course are not on the committee staff's routing list, but the document was forwarded to us by a relatively unconcerned recipient, appalled by a fishing expedition offending standards of fair play.

Mr. Thomas is extraordinarily well qualified to serve as a federal appeals judge. A graduate of Yale Law School, he understands the way the modern federal government works, perhaps the most important qualification for the D.C. circuit. He has worked with the U.S.'s civil-rights laws for more than a decade and knows their oppor-

Employment Opportunity Commission in the Reagan administration.

The Lynch Team. The team was put together by Nan Aron of the Alliance for Justice, which this summer prepared the set of charges against Mr. Thomas. The Judiciary Committee document reflects her charges.

The Lynch Team will be quarter-backed by Joe Biden, who has led his team to its current level of fame. Offensive coordinator for Mr. Biden will be Diana Huffman, chief committee counsel. At Mr. Biden's side will be Lynch Team veterans Ted Kennedy and Howard Metzenbaum.

Background: The history of this event can be summed up in three words: Bork, Lucas and Marshall.

Mr. Thomas has been nominated to fill the appeals-court vacancy created



©1989 United Feature Syndicate, Inc. Reprinted by permission

tunities and limits; he is sometimes assailed for his views on quotas and affirmative action, which are the views of the Supreme Court. His judicial philosophy is conservative, like other Bush judicial appointees.

Mr. Thomas is being singled out for the kind of scrutiny displayed alongside for one reason and one reason only. He is black.

In a world of normal morality and justice, his nomination to this high position would be seen widely as a source of great pride to all black Americans. He would be the first black named to the Washington appeals court in a decade. But he has a double handicap: He is both black and conservative. So, as we suspect is clear to anyone who spends time in the agate type nearby, Mr. Thomas, like William Lucas before him, is being prepared for a political lynching.

Stringing up the political careers of innocent men and women has become such a community event in Washington, that we have decided to preview this one as a sporting event, a kind of grotesque Washington entertainment.

Place: The U.S. Senate Judiciary Committee Hearing Room.

Time: Early February.

Participants: Clarence Thomas, the former chairman of the Equal

when Robert Bork resigned his seat after the Lynch Team finished with his nomination to serve on the Supreme Court.

Lucas is William Lucas, who was nominated by Mr. Bush to be Assistant Attorney General for Civil Rights. Like Clarence Thomas, Mr. Lucas is a black conservative, and therefore had to be wiped out, lest other uppity blacks start to leave the Liberal Plantation.

Finally, the Thomas nomination goes beyond one appeals-court seat. Many think that if Justice Thurgood Marshall leaves the Supreme Court, President Bush might want to nominate a Judge Thomas.

Analysis: Keeping Mr. Thomas off the appeals bench may not be easy. The allegations center on a supposed failure to bring age-discrimination cases at the EEOC. Agency figures show a rapid increase in these cases under Mr. Thomas. Also, some civil-rights groups are silently or quietly supporting Mr. Thomas. They may be growing edgy about being associated with another assault by white politicians on an accomplished black.

Betting Line: The odds are 2-1 that Mr. Thomas will be approved for the court. On whether he will be trashed in the process, there is no book.