LOCATION:

California Environmental Protection Agency

Air Resources Board

PUBLIC MEETING AGENDA

County Administration Center
Supervisors Chambers, Room 310
1600 Pacific Highway
San Diego, California 92101-2470

This facility is accessible by public transit. For transit information, call: (619) 233-3004. (This facility is accessible to persons with disabilities.)

April 27, 2000
9:30 a.m.

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The Board Book is comprised of a number of individual documents, many of which are individually numbered. The Board Book itself is numbered in the top right and left hand corners. These numbers are reflected in the Table of Contents above.

CONTACT CLERK OF THE BOARD, 2020 L Street, Sacramento, CA 95814 **(916) 322-5594**
FAX: (916) 322-3928
ARB Homepage: www.arb.ca.gov

To submit written comments on an agenda item in advance of the meeting.
To request, in advance of the meeting, to be placed on the list to testify on an agenda item.
To request special accommodations for those persons with disabilities (at least 7 days prior to the meeting date please).
For persons with a hearing or speech impairment, please use our telephone device for the deaf
TDD: (916) 324-9531 or (800) 700-8326.

SMOKING NOT PERMITTED AT MEETINGS OF THE CALIFORNIA AIR RESOURCES BOARD

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April 27, 2000
9:30 a.m.

00-4-1 **Public Hearing to Consider the Adoption of a Proposed Airborne Toxic Control Measure for Emissions of Chlorinated Toxic Air Contaminants from Automotive Maintenance and Repair Activities**

The Air Resources Board (Board) will consider the adoption of a proposed Airborne Toxic Control Measure (ATCM) for emissions of certain chlorinated toxic air contaminants from automotive maintenance and repair activities. The proposed ATCM is intended to reduce toxic emissions from cleaning and degreasing products that are predominantly used in automotive maintenance and repair activities.

00-4-2 **Public Meeting to Update the Board on the Status of the Portable Fuel Container Spillage Control Regulations**

In September 1999, the Board approved regulations to control spillage, evaporative and permeation emissions from portable fuel containers. At the public hearing, several portable fuel container manufacturers expressed concern about meeting the permeation standard of 0.4 grams per gallon per day by January 1, 2001, due to the cost and uncertainty of barrier treatment technologies. The Board requested that the staff provide an update in six months. The staff will provide a status report on manufacturers' progress toward meeting the permeation standard.

00-4-3 **Public Meeting to Consider an Informational Update on California-Mexico Border Activities**

The Air Resources Board (ARB) has been involved in several air quality management activities in the California-Mexico border region, which will assist in the development of air quality management plans for the region. These efforts include ambient air monitoring, vehicular emissions studies, and heavy-duty diesel vehicle inspections. ARB staff will present an overview of these projects and future planning efforts.

(Agenda is continued on other side)

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SMOKING NOT PERMITTED AT MEETINGS OF THE CALIFORNIA AIR RESOURCES BOARD

00-4-4 **Public Meeting to Consider an Informational Update on Current Activities and Issues in Indoor Air Quality**

Staff will update the Board on current activities and issues in indoor air quality, including concerns regarding school indoor environments. ARB's Indoor Air Quality and Personal Exposure Assessment Program sponsors research, assesses Californian's indoor exposures to toxic air contaminants, and works closely with other agencies and organizations to reduce indoor pollution and risk.

00-4-5 **Public Meeting to Consider Research Proposals:**

Proposal Number 2450-213 entitled "Refinement and Demonstration of a New Indoor Continuous Nitrogen Dioxide Monitor," submitted by Battelle, for a total amount not to exceed $89,947.

Proposal Number 2448-213, entitled "Development of Reactivity Scales via 3-D Grid Modeling of California Ozone Episodes," submitted by the University of California, Berkeley, for a total amount not to exceed $20,000.

Proposal Number 2449-213 entitled "Demonstration of the High Volume Collection System (HVCS) for Direct Measurement of Mass Emission Rates of Hydrocarbon Leaks," submitted by the University of California, Berkeley, for a total amount not to exceed $109,000.

OPEN SESSION TO PROVIDE AN OPPORTUNITY FOR MEMBERS OF THE PUBLIC TO ADDRESS THE BOARD ON SUBJECT MATTERS WITHIN THE JURISDICTION OF THE BOARD

Although no formal Board action may be taken, the Board is allowing an opportunity to interested members of the public to address the Board on items of interest that are within the Board's jurisdiction, but that do not specifically appear on the agenda. Each person will be allowed a maximum of five minutes to ensure that everyone has a chance to speak.

THOSE ITEMS ABOVE WHICH ARE NOT COMPLETED ON APRIL 27 WILL BE HEARD BEGINNING AT 8:30 A.M ON APRIL 28.

THE AGENDA ITEMS LISTED ABOVE MAY BE CONSIDERED IN A DIFFERENT ORDER AT THE BOARD MEETING.

SUMMARY OF BOARD ITEM

ITEM # 00-4-1

PUBLIC HEARING TO CONSIDER THE ADOPTION OF AN AIRBORNE TOXIC CONTROL MEASURE FOR EMISSIONS OF CHLORINATED TOXIC AIR CONTAMINANTS FROM AUTOMOTIVE MAINTENANCE AND REPAIR ACTIVITIES

STAFF RECOMMENDATION:

The staff recommends the Board adopt the proposed airborne toxic control measure (ATCM) for emissions of chlorinated toxic air contaminants from automotive maintenance and repair activities (AMR).

DISCUSSION:

The Board has identified perchloroethylene (Perc), methylene chloride (MeCl) and trichloroethylene (TCE) as toxic air contaminants with no identifiable threshold level.

At the November 21, 1996, hearing, the Board adopted amendments to the Consumer Products Regulation, which included exempting Perc as a volatile organic compound (VOC). The Board also directed staff to conduct an assessment of the need to control Perc use in consumer products under the State's Toxic Air Contaminant Identification and Control Program (Health and Safety Code sections 39650-39675)

Staff initially focused on Perc use in brake cleaners, but later expanded the assessment to address the use of Perc, MeCl and TCE in brake cleaners, carburetor or fuel-injection air intake cleaners (carburetor cleaners), engine degreasers, and general purpose degreasers. In developing this ATCM, staff conducted two extensive surveys of product manufacturers and automotive maintenance facilities; participated in over 150 site visits; engaged in over 500 telephone contacts; conducted 7 conference calls, 8 working group meetings, and 5 workshops.

SUMMARY AND IMPACTS:

Automotive consumer products are most commonly used in AMR activities at approximately 25,000 facilities in California (service stations, fleets, general automotive repair shops, dedicated brake repair shops, and new and used car dealerships). Staff estimate that these activities emit over 5.2 tons per day (tpd) of Perc, MeCl, and TCE. Potential cancer risk based on modeling at specific and generic AMR facilities was as high as 60 and 110 chances per million, respectively.

The proposed ATCM prohibits brake cleaners, carburetor cleaners, engine degreasers, and general purpose degreasers manufactured for sale in California after December 31, 2002, from containing Perc, MeCl, or TCE. Products containing Perc, MeCl, or TCE and manufactured prior to December 31, 2002, may be sold in California until June 30, 2004: The proposed ATCM also prohibits AMR facility owners and operators from using these products in their facilities after June 30, 2005, if they contain Perc, MeCl, or TCE.

The main environmental benefit of the proposed ATCM is the reduction of 5.2 tpd of Perc, MeCl, and TCE emissions in California from the four product categories. An additional benefit is a reduction in ambient levels of Perc, MeCl, and TCE which should achieve overall statewide risk reduction benefits. The proposed ATCM will also positively affect wastewater treatment, hazardous waste disposal, and worker exposure.

The increased use of VOC products may adversely impact the reduction in VOC emissions expected from the October 1999 amendments to the Consumer Products Regulation. In the South Coast Air Basin, we expect an increase in VOC emissions of approximately one tpd.

No significant economic impacts are expected from the proposed ATCM. Automotive Consumer Products are manufactured or marketed by 60 companies nationwide, of which 10 are based in California. Nationwide, these companies manufacture and market an estimated total of 186 VOC and 66 chlorinated toxic air contaminant products. Further, over 60 percent of products currently sold in California would comply with the proposed regulation. Companies that do not currently have non-chlorinated products and choose to formulate one are expected to be able to absorb the cost of reformulation with no adverse impacts on their profitability.

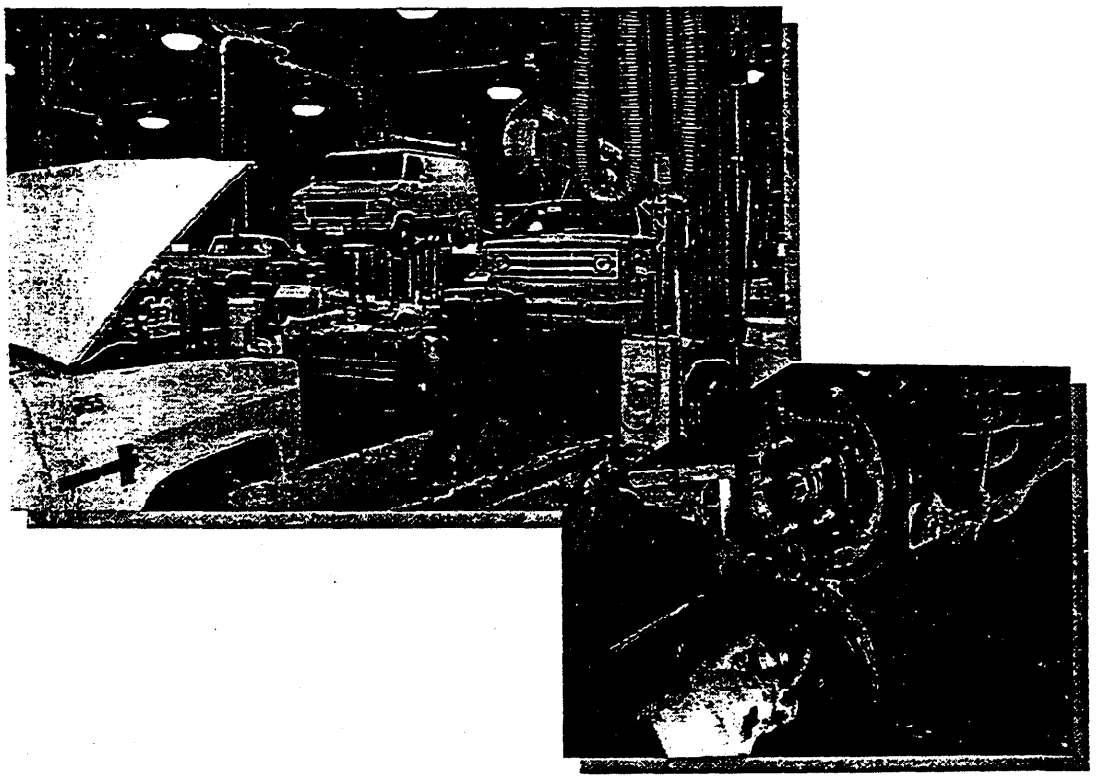
Product manufacturers raised the issue that AMR facilities need to continue their usage of chlorinated aerosols because of a concern over flammability. However, inquiries to fire departments and associations across the State and visits to AMR facilities did not identify any reports of fires, injuries, or other incidents related to the use of non-chlorinated products in AMR facilities.

Product manufacturers also raised the issue of efficacy, claiming that chlorinated products are more effective cleaners and the use of other products might lead to safety problems. However, most manufacturers market more non-chlorinated products than chlorinated products and claim that both are suitable and effective. Additionally, AMR facility operators and representatives of brake parts manufacturers have indicated that non-chlorinated aerosols and water-based brake washers are effective brake cleaning products.

California Environmental Protection Agency

Air Resources Board

Staff Report: Initial Statement of Reasons for the Proposed Airborne Toxic Control Measure for Emissions of Chlorinated Toxic Air Contaminants from Automotive Maintenance and Repair Activities



Stationary Source Division
Emissions Assessment Branch

Release Date:
March 10, 2000

TITLE 17. CALIFORNIA AIR RESOURCES BOARD

NOTICE OF PUBLIC HEARING TO CONSIDER THE ADOPTION OF A PROPOSED AIRBORNE TOXIC CONTROL MEASURE FOR EMISSIONS OF CHLORINATED TOXIC AIR CONTAMINANTS FROM AUTOMOTIVE MAINTENANCE AND REPAIR ACTIVITIES

The Air Resources Board (the ARB or Board) will conduct a public hearing at the time and place noted below to consider adopting a regulation to reduce emissions of chlorinated toxic air contaminants from the use of several automotive consumer products. The proposed regulation is intended to reduce emissions from cleaning and degreasing products that are predominantly used in automotive maintenance and repair activities. The proposed regulation would establish prescriptive standards for these products.

DATE:	April 27, 2000
TIME:	9:30 a.m.
PLACE:	San Diego County Administration Center Supervisors Chambers, Room 310 1600 Pacific Highway San Diego, California

This item will be considered at a two-day meeting of the ARB, which will commence at 9:30 a.m. on April 27, 2000, and may continue at 8:30 a.m., April 28, 2000. This item may not be considered until April 28, 2000. Please consult the agenda for the meeting, which will be available at least 10 days before April 27, 2000, to determine the time when this item will be considered.

This facility is accessible to persons with disabilities. If accommodation is needed, please contact ARB's Clerk of the Board by April 13, 2000, at (916) 322-5594, or TDD (916) 324-9531, or (800) 700-8326 for TDD calls from outside the Sacramento area, to ensure accommodation.

INFORMATIVE DIGEST OF PROPOSED ACTION AND PLAIN ENGLISH POLICY STATEMENT OVERVIEW

Sections Affected: Proposed adoption of section 93111, title 17, California Code of Regulations (CCR), and proposed incorporation by reference of "Air Resources Board Test Method 310, Determination of Volatile Organic Compounds (VOC) in Consumer Products," adopted September 25, 1997 as last amended September 3, 1999.

Background

The California Toxic Air Contaminant Identification and Control Program (Program), established under California law by Assembly Bill 1807 (Chapter 1047, Statutes of 1983) and set forth in Health and Safety Code (HSC) sections 39650 - 39675, requires the ARB to identify and control air toxics in California. The Board identified methylene chloride (MeCl), trichloroethylene (TCE), and perchloroethylene (Perc) as toxic air contaminants (TACs) at its July 1989, October 1990, and October 1991 Board hearings, respectively. Each TAC was identified without a Board-specified threshold exposure level

Following the identification of a substance as a TAC, HSC section 39665 requires the ARB, with participation of the air pollution control and air quality management districts, and in consultation with affected sources and interested parties, to prepare a report on the need and appropriate degree of regulation for that substance. HSC section 39665(b) requires that this "needs assessment" address, among other things, the technological feasibility of proposed airborne toxic control measures (ATCMs) and the availability, suitability and relative efficacy of substitute products or processes of a less hazardous nature. A needs assessment for Perc was conducted from 1991 to 1993 as part of the ARB's development of the ATCM for Emissions of Perchloroethylene from Dry Cleaning Operations, August 1993 (title 17, California Code of Regulations, sections 93109 and 93110). The ARB staff has prepared an Initial Statement of Reasons (ISOR) for this proposed regulation that serves as the report on the need and appropriate degree of regulation for the two other TACs, MeCl and TCE.

Once the ARB has evaluated the need and appropriate degree of regulation for a TAC, HSC section 39666 requires the ARB to adopt regulations (ATCMs) to reduce emissions of the TAC. Since Perc, MeCl, and TCE do not have Board-specified threshold exposure levels, HSC section 39666 also requires that the proposed ATCM be designed to reduce emissions to the lowest level achievable through the application of best available control technology (BACT) or a more effective control method, in consideration of cost, risk, environmental impacts, and other specified factors. In developing the proposed ATCM, state law also requires assessment of the appropriateness of substitute products or processes.

It is important to note that the proposed ATCM is not a consumer products regulation. Consumer products regulations are developed under authority granted to the ARB by the California Clean Air Act (1998), and specifically HSC section 41712. HSC section 41712 requires the ARB to adopt regulations to achieve the maximum feasible reduction in reactive organic compounds (ROCs) emitted by consumer products (note: ROC is equivalent to VOC). As discussed previously, we are proposing this ATCM under the authority granted to the ARB by Assembly Bill 1807 (The Toxic Air Contaminant Identification and Control Program) as codified in HSC sections 39650 through 39675.

However, since the automotive consumer products industry has previously been subject to regulations developed under ARB's Consumer Products Program, we have used the phrase

"consumer products" and definitions similar to those in ARB's consumer products regulations in an attempt to make our ISOR more familiar and comprehensible to consumer products manufacturers, automotive maintenance and repair (AMR) facility operators, and others who may use these products.

Description of the Proposed Regulatory Action

The proposed ATCM would minimize emissions of Perc, MeCl, and TCE from AMR activities by regulating automotive consumer product content and usage. Specifically, the proposed ATCM requires that brake cleaners, carburetor or fuel-injection air intake cleaners (carburetor cleaners), engine degreasers, and general purpose degreasers manufactured after December 31, 2002 and sold or intended for sale in California not contain Perc, MeCl, or TCE. The proposed ATCM provides that a product is considered to contain Perc, MeCl, or TCE if it has one percent or more (by weight) of any one of the three TACs. This allowed content accounts for the detection limit of the prescribed test method. The proposed ATCM also prohibits AMR facility owners and operators from using these automotive consumer products if they contain Perc, MeCl, or TCE in their facilities after June 30, 2005.

Administrative Requirements

The proposed regulation would provide manufacturers an 18-month sell-through period for the specified Perc, MeCl, or TCE-containing automotive consumer products manufactured on or before December 31, 2002. The sell-through period would end June 30, 2004. In addition, AMR facility owners and operators would be provided 12 months from the end of the sell-through period to use chlorinated products.

For compliance purposes, manufacturers would be required to display a date or date-code on the product container indicating date of manufacture and to provide the date-code key to the ARB.

Variances

The proposed regulation is not expected to cause or result in significant economic hardship to any person or manufacturer. However, to further reduce this possibility, any person who cannot comply with the requirements of the proposed ATCM, due to reasons beyond the person's reasonable control, may apply in writing for a variance. The proposed variance procedures for the ATCM closely mirror other ARB variance procedures specified in ARB regulations.

Test Method

Testing is necessary to determine compliance with the proposed standards. The proposed test method is a modification of Air Resources Board Test Method 310, Determination of Volatile Organic Compounds (VOC) in Consumer Products, adopted September 25, 1997, as last amended September 3, 1999, which is to be incorporated by reference.

Comparable Federal Regulations

There are no comparable federal regulations covering emissions from the use of automotive consumer products containing chlorinated toxic air contaminants in automotive maintenance and repair activities. Staff reviewed federal regulations governing worker safety (the requirements for cleaning asbestos brakes and the use of aerosol products in the vicinity of ignition sources) to ensure there were no conflicting provisions.

AVAILABILITY OF DOCUMENTS AND AGENCY CONTACT PERSON

The ARB staff has prepared a Staff Report: Initial Statement of Reasons (ISOR) for the proposed regulatory action which includes the full text of the proposed regulatory language, a summary of the environmental and economic impacts of the proposal, and supporting technical documentation. Copies of the ISOR may be obtained from the ARB's Public Information Office, 2020 L Street, Sacramento, California 95814, (916) 322-2990, at least 45 days prior to the scheduled hearing (April 27, 2000). To obtain the ISOR in an alternative format, please contact the Air Resources Board ADA Coordinator at (916) 322-4505, TDD (916) 324-9531, or (800) 700-8326 for TDD calls from outside the Sacramento Area. This notice, the ISOR, and all subsequent regulatory documents are being made available on the ARB Internet site for this rulemaking, http://www.arb.ca.gov/regact/amr/amr.htm.

The staff has also compiled a record which includes all information upon which the proposal is based. This material is available for inspection upon request to the contact person identified below.

The ARB has determined that it is not feasible to draft the regulation in plain English due to the technical nature of the regulation; however, a plain English summary of the regulation is available from the agency contact person named in this notice, and is also contained in the ISOR for this regulatory action.

Further inquiries regarding this matter should be directed to the agency contact person for this rulemaking, Mr. Tony Andreoni, Manager, Process Evaluation Section, Stationary Source Division, at (916) 324-6021.

COSTS TO PUBLIC AGENCIES AND TO BUSINESSES AND PERSONS AFFECTED

The determinations of the Board's Executive Officer concerning the cost or savings necessarily incurred in reasonable compliance with the proposed regulatory action are presented below.

The Executive Officer has determined that the proposed regulatory action will not create costs or savings, as defined in Government Code section 11346.5(a)(6), to any state agency or in federal funding to the State, costs or mandate to any local agency or school district whether or not reimbursable by the State pursuant to Part 7 (commencing with section 17500), Division 4, Title 2 of the Government Code, or other nondiscretionary savings to local agencies. However, the ARB may incur additional implementation or enforcement costs at some future time.

In developing this regulatory proposal, the ARB staff evaluated the potential economic impacts on businesses and private persons. The Executive Officer has determined, pursuant to Government Code section 11346.5(a)(3)(B), that the regulation may affect small business. However, the Executive Officer has also determined, pursuant to Government Code section 11346.5(a)(8), that adoption of the proposed regulatory action will not have a significant adverse economic impact on businesses, including the ability of California businesses to compete with businesses in other states.

The Executive Officer has determined that there will be no, or an insignificant, potential cost impact, as defined in Government Code section 11346.5(a)(9), on private persons or businesses directly affected resulting from the proposed action.

Finally, in accordance with Government Code section 11346.3, the Executive Officer has determined that the proposed regulatory action should have negligible impacts on the creation or elimination of jobs within the State of California, negligible impacts on the creation of new businesses and the elimination of existing businesses within the State of California, and negligible impacts on the expansion of businesses currently doing business within the State of California. A detailed assessment of the economic impacts of the proposed amendments can be found in the ISOR.

Before taking final action on the proposed regulatory action, the ARB must determine that no alternative considered by the agency would be more effective in carrying out the purpose for which the action is proposed or would be as effective and less burdensome to affected private persons or businesses than the proposed action.

SUBMITTAL OF COMMENTS

The public may present comments relating to this matter orally or in writing at the hearing, and in writing or by e-mail before the hearing. To be considered by the ARB, written submissions must be addressed to and received by the Clerk of the Board, Air Resources Board, P.O. Box 2815, Sacramento, CA 95812, or 2020 L Street, 4th Floor, Sacramento, CA 95814, no later than 12:00 noon Pacific Time April 26, 2000, or received by the Clerk of the Board at the hearing. To be considered by the ARB, e-mail submissions must be addressed to amratcm@listserv.arb.ca.gov and received at the ARB no later than 12:00 noon Pacific Time April 26, 2000.

The ARB requests, but does not require 30 copies of any written submission. Also, the ARB requests that written and e-mail statements be filed at least 10 days prior to the hearing so that ARB staff and Board Members have time to fully consider each comment. The ARB encourages members of the public to bring any suggestions for modification of the proposed regulatory action to the attention of staff in advance of the hearing.

STATUTORY AUTHORITY AND REFERENCES

This regulatory action is proposed under the authority granted to the ARB in sections 39600, 39601, 39650, 39655, 39656, 39658, 39659, 39665, and 39666, Health and Safety Code. This action is proposed to implement, interpret, or make specific sections 39002, 39600, 39650, 39655, 39656, 39658, 39659, 39666, and 40000, Health and Safety Code.

HEARING PROCEDURES

The public hearing will be conducted in accordance with the California Administrative Procedure Act, Title 2, Division 3, Part 1, Chapter 3.5 (commencing with section 11340) of the Government Code. Following the public hearing, the ARB may adopt the regulatory language as originally proposed or with nonsubstantial or grammatical modifications. The ARB may also adopt the proposed regulatory language with other modifications if the modifications are sufficiently related to the originally proposed text that the public was adequately placed on notice that the regulatory language as modified could result from the proposed regulatory action. In the event that such modifications are made, the full regulatory text, with the modifications clearly indicated, will be made available to the public for written comment at least 15 days before it is adopted.

The public may request a copy of the modified regulatory text from the ARB's Public Information Office, 2020 L Street, Sacramento, California 95814, (916) 322-2990.

CALIFORNIA AIR RESOURCES BOARD

Michael P. Schaibl

for MICHAEL P. KENNY
EXECUTIVE OFFICER

Date: February 29, 2000

State of California
AIR RESOURCES BOARD

STAFF REPORT: INITIAL STATEMENT OF REASONS FOR PROPOSED RULEMAKING

Public Hearing to Consider

PROPOSED ADOPTION OF AN AIRBORNE TOXIC CONTROL MEASURE FOR EMISSIONS OF CHLORINATED TOXIC AIR CONTAMINANTS FROM AUTOMOTIVE MAINTENANCE AND REPAIR ACTIVITIES

To be considered by the Air Resources Board on April 27, 2000, at:

San Diego County Administration Center
Supervisors Chambers, Room 310
1600 Pacific Highway
San Diego, California

Air Resources Board
P.O. Box 2815
Sacramento, CA 95812

This report has been prepared by the staff of the California Air Resources Board. Publication does not signify that the contents reflect the views and policies of the Air Resources Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

State of California
AIR RESOURCES BOARD

PROPOSED AIRBORNE TOXIC CONTROL MEASURE FOR EMISSIONS OF CHLORINATED TOXIC AIR CONTAMINANTS FROM AUTOMOTIVE MAINTENANCE AND REPAIR ACTIVITIES

Executive Summary
and
Technical Support Document

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February 2000

ACKNOWLEDGMENTS

We wish to acknowledge the participation and assistance of the consumer products manufacturing industry and its associations, the automotive maintenance and repair industry, district and state agency staff, and others. We thank the automotive maintenance and repair facility representatives for showing us their operations and providing product information.

We also wish to acknowledge the technical support we received from the following ARB units:

Field Enforcement Section, Compliance Division
Program Review Section, Compliance Division
Office of Legal Affairs, Executive Office
Evaluation Section, Monitoring and Laboratory Division
Client Support Services Section, Planning and Technical Support Division
Emissions Inventory Methods Section, Planning and Technical Support Division
Emissions Inventory Analysis Section, Planning and Technical Support Division
Modeling Support Section, Planning and Technical Support Division
Implementation Section, Stationary Source Division
Measure Development Section, Stationary Source Division

Staff Report: Initial Statement of Reasons for the Proposed Airborne Toxic Control Measure for Emissions of Chlorinated Toxic Air Contaminants from Automotive Maintenance and Repair Activities

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State of California
AIR RESOURCES BOARD

Staff Report: Initial Statement of Reasons for the Proposed Airborne Toxic Control Measure for Emissions of Chlorinated Toxic Air Contaminants from Automotive Maintenance and Repair Activities

Volume I:
Executive Summary

I. INTRODUCTION

This executive summary presents the Air Resources Board (ARB or Board) staff's Proposed Airborne Toxic Control Measure (ATCM) for Emissions of Chlorinated Toxic Air Contaminants from Automotive Maintenance and Repair Activities. The proposed control measure addresses emissions of three toxic air contaminants (TACs): perchloroethylene (Perc), methylene chloride (MeCl), and trichloroethylene (TCE). These TACs are found in automotive consumer products commonly used in automotive maintenance and repair (AMR) activities. Automotive consumer products are aerosol and liquid products that remove grease, grime, and dirt from a variety of automobile parts. They are generally available as pre-packaged aerosol sprays or bulk liquid products that are easily added to refillable pump sprayers. Examples of applications where these products are used include engine degreasing, the servicing of carburetors and throttle bodies, and brake service and repair operations. The majority of these products are used in commercial AMR facilities with much smaller usage from do-it-yourself enthusiasts.

This summary is based upon the Technical Support Document (TSD) found in Volume II of this Initial Statement of Reasons (ISOR). The TSD provides a more detailed presentation of the technical basis and supporting analyses for the proposed control measure.

II. HISTORY AND BACKGROUND

1. Why did we perform this assessment?

At its November 21, 1996, hearing, the Board adopted amendments to exempt Perc from the volatile organic compound (VOC) definition in California's Regulation for Reducing VOC Emissions from Consumer Products (Consumer Products Regulation; section 94521, title 17, California Code of Regulations). This action allowed manufacturers to reformulate consumer products with Perc to meet the VOC limits of the Consumer Products Regulation.

During the hearing, the Board expressed concerns about the potential for an increase in the use of Perc in consumer products, and the possible health impacts that might result. Therefore, the Board directed the ARB staff to conduct an assessment under the State's TAC control program of the need to control Perc use in these products. Staff initially focused on the use of Perc in brake cleaning products because this product category represented the greatest use of Perc among the various products. The preliminary results of this initial assessment were discussed in the Perchloroethylene Needs Assessment for Automotive Consumer Products: Status Report released in June 1997 (June 1997 Status Report) and presented to the Board at its June 26, 1997, meeting. An additional update on the assessment, incorporating additional data and analyses, was provided to the Board in a May 1998 Memorandum. These documents indicated that, based on the available information, an ATCM should be developed to reduce Perc emissions from brake cleaning products.

The assessment was later expanded to address the use of MeCl and TCE in brake cleaning products, and the use of all three compounds in carburetor or fuel-injection air intake cleaners (carburetor cleaners), engine degreasers, and general purpose degreasers. This expansion was based on information and observations during site visits indicating that: (1) brake cleaning products could potentially be reformulated with MeCl or TCE, and (2) carburetor cleaners, engine degreasers, and general purpose degreasers could be used interchangeably with or substituted for brake cleaning products.

2. What authority does the Air Resources Board have to control emissions of TACs?

This control measure is developed under the authority of the California Toxic Air Contaminant Identification and Control Program (Air Toxics Program), established under California law by Assembly Bill 1807 and set forth in Health and Safety Code (HSC) sections 39650 thru 39675. The Board identified MeCl, TCE, and Perc as TACs and potential human carcinogens at its July 1989, October 1990, and October 1991 Board hearings, respectively. In each case, the Board determined there was not sufficient available scientific evidence to identify a threshold level of exposure below which no adverse health effects are likely to occur.

Following the identification of a substance as a TAC, HSC section 39665 requires the ARB, with participation of the air pollution control and air quality management districts (districts), and in consultation with affected sources and interested parties, to prepare a report on the need and appropriate degree of regulation for that substance. A needs assessment for Perc was conducted from 1991 to 1993 as part of the ARB's development of the Airborne Toxic Control Measure (ATCM) for Emissions of Perchloroethylene from Dry Cleaning Operations (Dry Cleaning ATCM), August 1993 (title 17, CCR, sections 93109 and 93110). During that assessment, the ARB staff determined that dry cleaning operations and solvent degreasing operations accounted for about 80 percent of the Perc use in California. Therefore, staff focused their attention on dry cleaning and degreasing uses of Perc first and is now addressing other uses of Perc. Additionally, Volume II of this ISOR serves as the report on the need and appropriate degree of regulation for MeCl and TCE. Once the ARB has evaluated the need and appropriate degree of regulation for a TAC, HSC section 39666 requires the ARB to adopt ATCMs to reduce emissions of that TAC. When adopting ATCMs, HSC section 39666 requires that any control measure for a TAC without a Board-specified threshold level be designed to reduce emissions to the lowest level achievable through the application of best available control technology (BACT) or a more effective control method.

3. Is the proposed ATCM a Consumer Products Regulation?

It is important to note that the proposed ATCM is not a consumer products regulation. Consumer products regulations are developed under authority granted to the ARB by the California Clean Air Act (1998), and specifically HSC section 41712. HSC section 41712 requires the ARB to adopt regulations to achieve the maximum feasible reduction in reactive organic compounds (ROCs) emitted by consumer products (note: ROC is equivalent to VOC).

As discussed previously, we are proposing this ATCM under the authority granted to the ARB by Assembly Bill 1807 (the Toxic Air Contaminant Identification and Control Program) as codified in HSC sections 39650 through 39675.

However, since the automotive consumer products industry has previously been subject to regulations developed under ARB's Consumer Products Program, we have used the phrase "consumer products" and definitions similar to those in ARB's consumer products regulations in an attempt to make our ISOR more familiar and comprehensible to consumer products manufacturers, AMR facility operators, and others who may use these products.

III. PUBLIC OUTREACH

For this assessment, we developed an extensive outreach program that involved automotive consumer products manufacturers and their associations, AMR facility operators and their associations, national, state and local regulatory agencies, environmental/pollution prevention and public health advocates, and other interested parties. These entities participated in the development and review of the necessary surveys and draft reports, conference calls, working group meetings, and workshops. Outreach efforts also provided participants a forum in which to address their concerns. ARB outreach activities included:

- the establishment of the Perc Needs Assessment working group;
- eight meetings, four workshops, and seven conference calls;
- more than 500 telephone conversations with the working group and facility operators;
- mailing or faxing working group agendas, minutes, draft surveys, survey analyses, draft and final status reports to over 80 people;
- mailing workshop notices to over 6,000 people;
- mailing the Brake Cleaner and Perc-Containing Automotive Products Survey to 37 manufacturers and 23 other interested parties (including associations);
- mailing the Automotive Repair Facility Survey to 25,000 facilities;
- visiting a total of 158 AMR facilities to gather information on: (1) the amount of product used for brake service and repair, building dimensions, and receptor locations; (2) aqueous brake cleaning units; and (3) flammability issues;
- meeting with the Sacramento Valley Fire Marshals Association to discuss flammability issues;
- reviewing information provided to us by the sanitation districts on increasing concentrations of Perc in the influent to publicly owned treatment works (POTWs). Additionally, a representative of the County Sanitation Districts of Los Angeles County presented this information during the May 1999 and January 2000 workshops; and,
- participating with the Institute for Research and Technical Assistance (IRTA) on visits to Los Angeles area AMR facilities conducting brake service and repair operations. These facilities were participants in a study of alternative brake cleaning products and the visits

provided technical information on the availability, cleaning effectiveness, and relative cost of non-aerosol brake cleaning products.

IV. POTENTIAL EMISSIONS AND HEALTH IMPACTS

1. How much Perc, MeCl, and TCE is emitted from AMR Activities?

Automotive consumer products are used in a variety of applications and industries throughout California. They are most commonly used in AMR activities at approximately 25,000 AMR facilities in California (AMR facilities include service stations, fleets, general automotive repair shops, dedicated brake repair shops, and new and used car dealerships). Although brake repair and engine degreasing are common do-it-yourself activities, the vast majority of Californians look to AMR facilities for their maintenance and repair needs. In these facilities, automotive consumer products are used to remove grease, grime, and dirt from a variety of automobile parts. Examples of applications include engine degreasing, the servicing of carburetors and throttle bodies, and brake service and repair operations. These commercial facilities use both aerosol and liquid products (chlorinated and non-chlorinated) contained in a variety of delivery mechanisms.

Emissions of Perc, MeCl, and TCE from these products were estimated based on information collected from surveys and site visits to AMR facilities. The surveys conducted included the Brake Cleaner and Perc-Containing Automotive Products (Manufacturer) Survey, the Automotive Service Facility Questionnaire (Facility Survey), and the 1997 Commercial and Consumer Products (Consumer Products) Survey. Additional information was collected from 158 site visits to AMR facilities. Based on the survey data, over 8 million brake service and repair operations (brake jobs) are performed in California each year. Table 1 summarizes the estimated statewide emissions of Perc, MeCl, and TCE from the four automotive consumer product categories.

Table 1. Statewide Emission Estimates from Automotive Consumer Products[1]

Compound	Emissions [tons/day]
Perc	4.2
MeCl	0.7
TCE	0.3
Total	5.2

1. Source: 1997 Consumer and Commercial Products Survey.

2. What are the potential health effects associated with exposure to Perc, MeCl, and TCE?

Exposure to Perc, MeCl, or TCE may result in both cancer and non-cancer (acute and chronic) health effects to off-site receptors and on-site workers. The primary route of human exposure for these compounds is inhalation. Non-cancer effects from exposure to Perc include headache, dizziness, rapid heartbeat, and liver and kidney damage. Non-cancer effects from exposure to MeCl include cardiac arrhythmia and loss of consciousness. Non-cancer effects from exposure to TCE include headache, nausea, tremors, and respiratory irritation. These health effects may also result from exposures that occur within the workplace for all three compounds. A more detailed discussion of health effects is presented in Chapter VI of the TSD.

3. How were the potential health impacts from AMR facilities assessed?

Air dispersion models and pollutant-specific health effects values were used to estimate the potential health impacts from AMR facilities. Information required for the air dispersion model includes emission estimates, physical descriptions of the source, and emission release parameters. Combining estimated concentrations from the air dispersion model with the pollutant-specific health values provides an estimate of the off-site potential cancer and non-cancer health impacts from the emissions of a TAC. The risk assessment methodologies used in assessing potential health impacts were consistent with the California Air Pollution Control Officers Association (CAPCOA) risk assessment guidelines. Additionally, the pollutant-specific health effects values have been approved by the ARB and the Office of Environmental Health Hazard Assessment (OEHHA) and the air dispersion models have been approved by the United States Environmental Protection Agency (U.S. EPA). Furthermore, the air dispersion models have been recommended by ARB for use in risk assessments. Health effects values are summarized in Chapter VI of the TSD.

4. What are the potential health impacts to individuals from exposure to AMR activities using products containing Perc, MeCl, or TCE?

To assess potential health impacts, ARB staff conducted individual health risk assessments for 54 specific AMR facilities and three generic facilities. These specific and generic facilities represent a broad range of AMR facilities and allow for the reasonable approximation of potential health impacts statewide. The risk assessments were based on Perc-containing brake cleaners using source characteristic information collected during the site visits. Forty-one of the specific facilities were modeled using a screening air dispersion model and the remaining 13 specific facilities were evaluated using a refined air dispersion model. Potential cancer risk in the screening assessments were as high as 50 chances in a million at the near-source location (a near-source location is defined as a minimum modeled distance of 20 meters from the center of the facility) and as high as 60 chances in a million with the refined model. Potential non-cancer acute and chronic hazard indices were both less than one. Generally, hazard indices less than one are not considered to be a concern to public health.

The generic facility analysis was developed to estimate potential health impacts at a variety of facilities. Potential cancer risk at the generic facilities was as high as 110 chances per million at the near-source location. The modeling results and hazard index estimates show that it is unlikely for significant acute or chronic off-site non-cancer health effects to result from the emissions of Perc-based brake cleaners. Both the chronic and acute hazard indices are less than one at the minimum modeled distance. As previously mentioned, hazard indices less than one are not considered to be a concern to public health.

Additional modeling analyses performed for brake cleaners formulated to contain MeCl and/or TCE, and for carburetor cleaners, engine degreasers, and general purpose degreasers formulated to contain Perc, MeCl, or TCE indicates that these products would also pose potential adverse health impacts. A more detailed discussion of health impacts is presented in Chapter VI of the TSD.

V. SUMMARY OF THE PROPOSED AIRBORNE TOXIC CONTROL MEASURE

1. What would the proposed ATCM require?

The proposed ATCM requires that automotive consumer products (aerosol and liquid brake cleaners, carburetor cleaners, engine degreasers, and general purpose degreasers) manufactured after December 31, 2002 for sale or use in California not to contain Perc, MeCl, or TCE. It would also require that automotive consumer products manufactured on or before December 31, 2002 not be sold in California after June 30, 2004 if they contain Perc, MeCl, or TCE. The proposed ATCM accounts for the detection limits of the prescribed test method by providing that a product is considered to contain Perc, MeCl, or TCE if it has one percent or more (by weight) of any of the three compounds Perc, MeCl, or TCE (either alone or in combination). This provision also addresses the issue of inadvertent contamination that may occur when manufacturers convert a production line from one product formulation to another. Table 2 summarizes the requirements of the proposed ATCM.

Table 2. Requirements of the Proposed ATCM

Applicability	Exemptions	Requirements
Applies to any person who sells, supplies, offers for sale, or manufactures automotive consumer products (aerosol and liquid brake cleaners, carburetor cleaners, engine degreasers, and general purpose degreasers) for use in California. Applies to the owner or operator of any AMR facility that uses automotive consumer products in California.	Does not apply to any automotive consumer product manufactured in California for shipment and use outside of California. Does not apply to any manufacturer or distributor who sells, supplies, or offers for sale an automotive consumer product intended for shipment and use outside of California.	Effective December 31, 2002: Automotive consumer products manufactured after this date for sale or use in California cannot contain Perc, MeCl, or TCE. Effective June 30, 2004: After this date, automotive consumer products manufactured on or before December 31, 2002 that contain Perc, MeCl, or TCE can not be sold or distributed for use in California. Effective June 30, 2005: After this date, AMR facilities can not use automotive consumer products that contain Perc, MeCl, or TCE.

2. What is the basis for the proposed ATCM?

The proposed ATCM is based on staff's evaluation of best available control technology (BACT), in consideration of alternative products and processes. In evaluating BACT, information from surveys, site visits, third-party studies, and brake parts manufacturers was analyzed to determine that:

- brake cleaners, carburetor cleaners, engine degreasers, and general purpose degreasers are often used interchangeably;
- Perc, MeCl, and TCE are suitable and readily available replacements for each other;
- the removal of Perc alone could result in significantly increased emissions of MeCl and TCE with an associated increase in exposure to these TACs;
- non-chlorinated products are currently used at nearly two-thirds of AMR facilities;
- alternative products that use non-chlorinated formulations and alternative processes such as aqueous-based portable brake cleaning units and parts washers are currently in use (62 to 90 percent of automotive consumer products are non-chlorinated and 60 percent of AMR facilities use aqueous-based processes);
- most manufacturers market both chlorinated and non-chlorinated aerosol and bulk liquid products and claim that both are suitable and effective;

- alternative products and processes are effective in cleaning and degreasing based on claims that manufacturers make on the product labels of non-chlorinated products and on their websites;
- a recently conducted study for the U.S. EPA demonstrated that aqueous-based portable brake cleaning units are effective and less costly than chlorinated products;
- based on the Facility Survey, brake jobs performed with VOCs used less product than brake jobs performed with Perc, MeCl, or TCE; and,
- discussions with a variety of facility operators and mechanics indicate that alternative products, including non-chlorinated aerosols and bulk liquids, are suitable and effective cleaning products.

As a result, staff considers the proposed ATCM to be technically feasible, providing facility operators and other users with safe, effective, and less-hazardous products.

3. What alternatives to the proposed ATCM did staff consider?

HSC section 39665 requires the ARB to consider and evaluate alternatives to the proposed ATCM. Staff identified three alternatives to the proposed control measure: workplace practices, a chlorinated compound limit, and a chlorinated compound phase-out. Each of the three alternatives were evaluated addressing applicability, effectiveness, enforceability, and cost/resource requirements. We determined that these alternatives would not be as effective at reducing emissions of and exposure to Perc, MeCl, and TCE from AMR activities as the proposed control measure. Furthermore, the three alternatives did not meet the HSC section 39666 criterion to reduce emissions to the lowest level achievable through the application of BACT in consideration of cost, risk, and environmental impacts.

VI. POTENTIAL HEALTH IMPACTS OF THE PROPOSED AIRBORNE TOXIC CONTROL MEASURE

1. How would the proposed ATCM reduce the risk to public health?

The proposed ATCM removes Perc, MeCl, and TCE from automotive consumer products. As a result, the emission and health impact (i.e., potential cancer risk) reduction benefits are nearly 100 percent. Potential cancer risk from AMR facilities that use automotive consumer products that contain Perc, MeCl, or TCE will be reduced to essentially zero.

2. What are the potential adverse health impacts from an increased use of VOCs and other TACs?

With the removal of Perc, MeCl, and TCE, we expect that many users will look to VOC-based automotive consumer products, thereby increasing the use of VOCs. Appendix G of the TSD contains a listing of the compounds used these products based on the Facility Survey.

No adverse health impacts from the compounds on this list (other than Perc, MeCl, and TCE) are expected. The apparent use of benzene (which is a TAC as well as a VOC) was a concern for staff; however, upon further investigation, staff learned that it was only used by one manufacturer (in one product) at concentrations less than two percent. Staff intends to monitor the usage of other TACs and will propose amendments to the ATCM if appropriate. Additionally, manufacturers will be advised to not use identified TACs in their product formulations.

3. How would the proposed ATCM affect workplace exposure to Perc, MeCl, and TCE?

The proposed ATCM will remove Perc, MeCl, and TCE from automotive consumer products. As a result, worker exposure from products that contain these compounds will be eliminated.

VII. ECONOMIC IMPACTS OF THE PROPOSED AIRBORNE TOXIC CONTROL MEASURE

1. What are the expected economic impacts of the proposed ATCM on businesses?

No significant economic impacts are expected from the proposed ATCM. Automotive consumer products are manufactured or marketed by 60 companies nationwide, with ten based in California. The California-based companies account for nine percent of chlorinated TAC and VOC products manufactured or marketed in the State. Most manufacturers already have at least one non-chlorinated VOC product on the market that meets the requirements of the proposed ATCM, and, therefore, are not expected to incur additional costs. Those companies that do not currently have non-chlorinated VOC products and choose to formulate one are expected to be able to absorb the cost of reformulation with no adverse impacts on their profitability.

The analysis has shown that the raw materials costs for chlorinated TAC products are greater than the raw materials costs for VOC products. As a result, it should be less costly to manufacture non-chlorinated VOC products as opposed to products that contain Perc, MeCl, or TCE. However, there are no noticeable differences between the market prices for chlorinated TAC and VOC products. Therefore, no economic impact on the consumer is expected.

The proposed ATCM will primarily impact manufacturers and marketers (companies which outsource the manufacturing of their products). As a result, we do not expect a noticeable change in employment; business creation, elimination or expansion; and business competitiveness in California.

2. Will the proposed amendments be cost-effective?

Based on our analyses, we estimate that the cost-effectiveness of the proposed ATCM ranges from essentially no cost to a high of about $0.23 per pound of Perc, MeCl, and TCE

reduced. The estimated average cost-effectiveness weighted by emissions reductions across all categories is about $0.03 per pound of Perc, MeCl, and TCE reduced. To evaluate the relative impact and effectiveness of the proposed ATCM based on health impact reduction benefits, we calculated the cost per cancer case avoided. The estimated average cost-effectiveness per cancer case avoided is $26,000 with a range of approximately $1,400 to $111,000. The ranges for pound of TAC reduced and cancer cases avoided are significantly less than previously approved ATCMs. In previously approved ATCMs, these amounts have generally fallen within an overall range of $0.64 to $1.77 (adjusted to 1999 dollars) per pound of Perc reduced (1993 Perchloroethylene Dry Cleaning Operations ATCM, title 17, CCR, section 93109) and $6,600 to $18.6 million (adjusted to 1999 dollars) per cancer case avoided (1992 Non-Ferrous Metal Melting ATCM, title 17, CCR, section 93107).

3. Will consumers have to pay more for consumer products subject to the proposed ATCM?

Consumers may have to pay more for some products subject to the proposed ATCM, depending on the extent to which manufacturers are able to pass along their costs to consumers. If all the costs of the proposed ATCM are passed along to consumers, the change in cost per unit would range from no cost to a cost increase of $0.09 per unit, depending on the product category. The average cost per unit, is estimated to be about $0.02. For comparison purposes, this is the same unit sales-weighted average cost increase that was estimated for the October 1999 amendments to the Consumer Products Regulation.

VIII. ENVIRONMENTAL IMPACTS OF THE PROPOSED AIRBORNE TOXIC CONTROL MEASURE

1. What are the expected environmental benefits of the proposed ATCM?

The main environmental benefit of the proposed ATCM is the reduction of 5.2 tons per day (tpd) of Perc, MeCl, and TCE emissions in California. Approximately 2.6 tpd of this reduction is expected to occur in the South Coast Air Basin. The proposed ATCM will also affect (positively) wastewater treatment, hazardous waste disposal as well as reduce the potential for the formation of phosgene, thereby extending a greater level of worker and public health protection from these areas.

Currently, many wastewater treatment plants do not have the equipment necessary to process industrial wastes such as chlorinated solvents. These solvents have been detected at elevated levels at these same plants and have been linked to increased influent concentrations of Perc at four wastewater treatment plants. The influent concentrations of Perc have been high enough to potentially cause violations of the plants' discharge limit of 5 micrograms per liter (µg/L).

Chlorinated automotive consumer products are generally classified as hazardous waste because they contain substances which are listed as toxic substances. Spent baths (as well as other waste disposal containers) contaminated with chlorinated compounds are typically more costly to have removed from the facility and typically do not meet discharge standards set by publicly-owned treatment works (POTWs) and sanitation districts.

The removal of Perc, MeCl, and TCE from these products should lead to a reduction in the amount of chlorinated solvents reaching the storm drains and the wastewater treatment plants. It will also minimize the possibility of chlorinated solvents contaminating aqueous baths, waste oil containers, and hazardous waste disposal drums thereby significantly reducing hazardous waste contamination and disposal costs. Additionally, the proposed ATCM is expected to have a negligible impact on global warming, will reduce workplace exposure from emissions of Perc, MeCl, and TCE, and will minimize the potential for phosgene formation (more information on these benefits can be found in Chapter X of the TSD).

2. Are there any potential negative environmental impacts?

The October 1999 amendments to the Consumer Products Regulation are expected to obtain a reduction of approximately 3.3 tpd in VOC emissions from automotive consumer products. However, the removal of Perc, MeCl, and TCE as formulation options in the proposed ATCM will adversely impact the reduction in VOC emissions that otherwise would have been realized. The removal of Perc, MeCl, and TCE will reduce emissions of these TACs by approximately 5.2 tpd. If we assume a worse case scenario where all current users of chlorinated products switch to non-chlorinated, VOC-based products with Perc, MeCl, and TCE replaced with VOC compounds (irrespective of any current VOC-based formulation limits), then the theoretical increase in statewide VOC emissions would be approximately 5.2 tpd. However, beginning January 1, 2002, the VOC-content of automotive consumer products is subject to VOC-content limits as specified in the October 1999 amendments to the Consumer Products Regulation. As a result of these technically-feasible limits, post-ATCM VOC emissions would increase by no more than 2.3 tpd statewide. However, ARB staff expects that some users of chlorinated automotive consumer products will choose to consider other non-chlorinated alternatives (such as aqueous-based portable brake cleaning units and parts washers) and not switch exclusively to non-chlorinated VOC products. If this occurs, the increase in VOC emissions related to the proposed ATCM would be less than 2.3 tpd statewide. When total VOC emission reductions from both the October 1999 amendments to the Consumer Products Regulation and the proposed ATCM are considered, statewide VOC emissions from the four automotive consumer product categories will be reduced by at least one ton per day.

3. What are the impacts on the State Implementation Plan (SIP) for Ozone?

The proposed ATCM decreases the potential VOC reductions that will be obtained by the October 1999 amendments to the Consumer Products Regulation while achieving substantial reductions in emissions of chlorinated TACs. Perc was considered a VOC in the 1994 ozone SIP

inventory; therefore, substituting non-chlorinated VOC-based products to replace Perc will have no impact on the 1994 SIP (which covers Ventura County, the Sacramento Metropolitan area, the San Joaquin Valley, San Diego County, and the Southeast Desert). In the context of the 1994 SIP, substituting VOC-based products for MeCl will increase VOC emissions by approximately 0.1 tpd in all the 1994 SIP areas combined.

The South Coast Air Quality Management District (SCAQMD) revised their federal ozone plan in 1999, and the U.S. EPA has proposed to approve this plan. In the 1999 revision, Perc is not considered a VOC. In the context of the 1999 revision, if VOC-based products are substituted for all the Perc and MeCl currently used in chlorinated products, we expect an increase of approximately one ton per day of VOC in the South Coast Air Basin. The ARB and the SCAQMD will address this shortfall in the next comprehensive revision of the South Coast ozone SIP.

4. Are there any concerns about the potential flammability of automotive consumer products?

Industry groups representing product manufacturers raised the issue that AMR facilities need to continue their usage of chlorinated aerosols, especially in areas where use may occur near flame, heat, or other ignition sources. However, a search of statewide and national databases as well as inquiries to fire departments and associations across the State were unable to locate any reports of fires, injuries, or other incidents related to the use of non-chlorinated products in AMR facilities. Additionally, the California State Fire Marshal's office indicated that the combustion of gasoline, such as from a leaking fuel line, poses a significantly greater flammability concern than the use of aerosols.

During the site visits, ARB staff observed brake service operations at one facility using a flammable, non-chlorinated aerosol product occurring in one service bay and welding operations occurring in another service bay. ARB staff also observed chlorinated products that were listed as flammable on the product label, which indicates that chlorinated products can also be flammable.

An additional 16 site visits were conducted to specifically investigate flammability issues. Only one facility reported an incident (non-injury) associated with the use of a flammable product. This facility, however, attributed the incident to a vehicle malfunction and continues to use flammable products almost exclusively. Additionally, none of the facilities visited indicated that flammability concerns were a factor when making decisions on which products to buy (cost was the major factor). Instead, discussions with facility operators indicated that most facilities consider all aerosol products flammable and use common safety precautions when using these products. Therefore, we believe flammability is sufficiently addressed by the use of good operating practices on the part of facility owners, mechanics, and technicians. This belief is

supported by the fact that most facilities already use a host of flammable products and that non-flammable alternatives such as aqueous-based portable brake cleaning units and water-based aerosol products are readily available and in use.

IX. RECOMMENDATION

We recommend that the Board adopt the proposed regulation contained in Appendix A of the TSD. The proposed regulation would remove Perc, MeCl, and TCE from automotive consumer products used in AMR activities. In recognition of the requirement to adopt best available control technology when suitable alternatives are available, the proposed regulation would prohibit manufacturers from selling brake cleaners, carburetor cleaners, engine degreasers, and general purpose degreasers that contained Perc, MeCl, or TCE in California. Since non-chlorinated VOC-based products in these four categories predominate, alternative products are considered to be technically feasible and available. Additionally, effective non-aerosol products are also readily available. The proposed regulation would also prohibit facility owners or operators from using products containing Perc, MeCl, and TCE for AMR activities. Benefits from the proposed regulation include nearly 100 percent reductions in emissions, exposure, and risk from Perc, MeCl, and TCE-containing brake cleaners, carburetor cleaners, engine degreasers, and general purpose degreasers. Additional benefits include reduced waste water and hazardous waste contamination, and reduced workplace exposure.

State of California
AIR RESOURCES BOARD

Staff Report: Initial Statement of Reasons for the Proposed Airborne Toxic Control Measure for Emissions of Chlorinated Toxic Air Contaminants from Automotive Maintenance and Repair Activities

Volume II:
Technical Support Document

I. INTRODUCTION

A. Overview

The compounds perchloroethylene (Perc), methylene chloride (MeCl), and trichloroethylene (TCE) are found in automotive consumer products commonly used in automotive maintenance and repair activities (AMR activities). The Air Resources Board (ARB or Board) has identified these compounds as toxic air contaminants (TACs) under California's Toxic Air Contaminant Identification and Control Program.

Once the compounds Perc, MeCl, and TCE were identified as TACs, the ARB was required under the Toxic Air Contaminant Identification and Control Program to: (1) prepare a report on the need and appropriate degree of regulation for the compounds, and (2) adopt regulations to reduce emissions of the compounds. These regulations are called airborne toxic control measures (ATCMs) or control measures. In this report, we use the terms regulation, control measure, and ATCM interchangeably. State law requires that such control measures for TACs without a Board-specified threshold exposure level be based on the best available control technology or a more effective control method in consideration of cost and risk.

This volume of the Initial Statement of Reasons for the Proposed Airborne Toxic Control Measure for Emissions of Chlorinated Toxic Air Contaminants from Automotive Maintenance and Repair Activities, presents information on the toxic air contaminant identification and control process, the report preparation process, and previous identification and control (regulatory) activities for Perc, MeCl, and TCE. It also presents information on consumer product regulatory activities. It then presents compound-specific physical characteristics and information on sources and ambient concentrations. That is followed by a discussion of typical automotive maintenance and repair activities, exposure, and health effects for these three compounds. Finally, this volume presents the proposed control measure, and its health, economic, and environmental impacts.

B. Purpose

At its November 21, 1996, hearing, the Board adopted amendments to exempt Perc from the volatile organic compound (VOC) definition in California's Regulation for Reducing VOC Emissions from Consumer Products (Consumer Products Regulation; section 94521, title 17, California Code of Regulations). This action allowed manufacturers to reformulate consumer products with Perc to meet the VOC limits of the Consumer Products Regulation.

During the hearing, the Board expressed concerns about the potential for an increase in the use of Perc in consumer products, and the possible health impacts that might result. Therefore, the Board directed the ARB staff to conduct an assessment under the State's toxic air contaminant control program of the need to control Perc use in consumer products. At the

basins, then divided by the total population of the state". In other words, the statewide exposure estimate is a weighted average of the basin exposures, with weights determined by the basin populations.

On page 8 of the previous memo, the last paragraph should detail the calculation of basin-specific summary statistics as follows. The minimum, maximum, arithmetic mean, standard deviation and the number of sites are calculated from all values from all sites within the basin. For the basin mean of monthly means, the basin monthly mean is first calculated for each month based on site means for the month. Then the twelve basin monthly means are averaged to obtain the basin-wide annual mean of monthly means. Missing 1997 data have been estimated using 1996 information in the calculation of basin-wide mean of monthly means.

UNCERTAINTY AND LIMITATIONS OF ANALYSIS

There are a number of factors that contribute to uncertainty in the data and in the conclusions drawn from the data. These are not necessarily easy to quantify. Three such factors are discussed below, and they underscore the need to use caution when drawing conclusions from a limited set of data.

One source of uncertainty in our results is attributable to having a very limited number of sites throughout the state and to the infrequency of sampling. As discussed in the March 26, 1998, memo, the statewide population-weighted perchloroethylene exposure is calculated based on a limited data set derived from a statewide network of only 21 or 22 sites that collect one 24-hour sample every twelve days.

MLD conducts performance audits of the toxics program through both laboratory and field audits. Laboratory audits test the analytical methods and are conducted semi-annually. Field audits test the accuracy of the full toxics sampling procedure through a method referred to as "through-the-probe" (TTP) performance audits. These audits test the sample collection, transport, storage and analytical integrity of the toxics sampling effort. TTP audits are quite time consuming and are only conducted annually at each site. MLD publishes the results on the Internet. For perchloroethylene, the latest TTP audit information on the ARB web site indicates an average accuracy for the 20-plus sites to range from -21.5% to +7.2% between 1993 and 1997.

Yet another assumption to keep in mind is that the ambient concentrations of perchloroethylene we used in our analysis represent only outdoor exposures. Essentially, the exposure estimates assume 24 hours a day of outdoor exposure, without considering indoor exposure to this compound. Therefore, caution should be exercised when using these population exposure estimates.

RESULTS

The results of the exposure analysis are summarized in Table 3, with 1997 results added to the far-right column. The estimated statewide population-weighted perchloroethylene

Following the identification of a substance as a TAC, HSC section 39665 requires the ARB, with participation of the air pollution control and air quality management districts (districts), and in consultation with affected sources and interested parties, to prepare a report on the need and appropriate degree of regulation for that substance. A needs assessment for Perc was conducted from 1991 to 1993 as part of the ARB's development of the ATCM for Emissions of Perchloroethylene from Dry Cleaning Operations (Dry Cleaning ATCM), August 1993 (title 17, California Code of Regulations, sections 93109 and 93110). During that assessment, the ARB staff determined that dry cleaning operations and solvent degreasing operations accounted for about 80 percent of the Perc use in California (ARB, 1993a). Therefore, staff focused their attention on dry cleaning and degreasing uses of Perc first and is now addressing other uses of Perc. This Initial Statement of Reasons serves as the report on the need and appropriate degree of regulation for MeCl and TCE.

It is important to note that the proposed ATCM is not a consumer products regulation. Consumer products regulations are developed under authority granted to the ARB by the California Clean Air Act (1998), and specifically Health and Safety Code section 41712. HSC section 41712 requires the ARB to adopt regulations to achieve the maximum feasible reduction in reactive organic compounds (ROCs) emitted by consumer products (note: ROC is equivalent to VOC). As discussed previously, we are proposing this ATCM under the authority granted to the ARB by Assembly Bill 1807 (The Toxic Air Contaminant Identification and Control Program) as codified in HSC sections 39650 through 39675.

However, since the automotive consumer products industry has previously been subject to regulations developed under ARB's Consumer Products Program, we have used the phrase "consumer products" and definitions similar to those in ARB's consumer products regulations in an attempt to make our ISOR more familiar and comprehensible to consumer products manufacturers, AMR facility operators, and others who may use these products.

D. Regulatory Activities

1. Airborne Toxic Control Measures

Once the ARB has evaluated the need and appropriate degree of regulation for a TAC, State law (HSC section 39666) requires the ARB to adopt regulations to reduce emissions of the TAC to the maximum extent feasible in consideration of cost, risk and other factors specified in HSC section 39665. To date, the ARB has developed nine ATCMs. The most recent, the ATCM for Emissions of Perchloroethylene from Dry Cleaning Operations, August 1993 (title 17, California Code of Regulations, sections 93109 and 93110), was expected to result in a 78 percent reduction in statewide Perc emissions from dry cleaning operations when it was fully implemented in 1998.

2. National Emission Standards for Hazardous Air Pollutants

In the federal Clean Air Act Amendments of 1990, the United States Environmental Protection Agency (U.S. EPA) identified Perc, MeCl, and TCE as hazardous air pollutants (HAPs) because they were either known to have or may have adverse effects on human health or the environment. Health and Safety Code section 39658 (b) requires the Board to designate federal HAPs as TACs, and the Board did so in 1993 (AB 2728, Tanner). Therefore, Perc, MeCl, and TCE are TACs both because they have been identified by the Board through the Toxic Air Contaminant Identification and Control Program and because they are HAPs (ARB, 1993b).

In December 1994, the U.S. EPA promulgated the National Emission Standard for Hazardous Air Pollutants: Halogenated Solvent Cleaning (the Degreasing NESHAP) to address emissions of halogenated solvents, including Perc, MeCl, and TCE from degreasing operations (40 CFR Parts 9 and 63). Under HSC section 39658 (b), which provides that U.S. EPA NESHAPs are also ATCMs under certain circumstances, the Degreasing NESHAP is the State ATCM for degreasing operations; therefore, under HSC section 39666 (d) it must be implemented and enforced by the districts, unless the districts seek and receive approval from the U.S. EPA to implement an alternative control measure. Sources subject to the Degreasing NESHAP were required to comply with the regulation beginning on December 2, 1997.

3. "Hot Spots"

In November 1997, ARB staff published the Risk Reduction Audits and Plans Guidelines for Halogenated Solvents Degreasing Operations to assist facilities that have been identified by the districts as significant risk facilities requiring risk reduction audits and plans under Assembly Bill 2588 (the Air Toxics "Hot Spots" Information and Assessment Act) and Senate Bill 1731 as set forth in HSC sections 44300 to 44394. This guideline document contains a self-conducted audit and checklist which helps facility operators determine possible options to reduce the potential risk posed by a facility's degreasing operations.

Automotive maintenance and repair facilities may be subject to the "Hot Spots" Program if: (1) they use substances that are included on the Air Toxic Hot Spot Program list of substances required by HSC section 44321, and (2) those substances are used in sufficient quantities to make the facility type subject. However, AMR facilities are not required to complete emission inventory plans or to submit these plans to the districts because they are not included as a specific facility type in Appendix E of the Emission Inventory Criteria and Guidelines (ARB, 1997e). Although retail gasoline service stations are currently subject to the "Hot Spots" Program, the districts typically require the reporting of only the toxic emissions from gasoline dispensing operations, even if other operations such as brake cleaning operations are occurring at the service station. However, the districts have the authority to evaluate an individual facility under the "Hot Spots" Program and require the facility to comply with the

"Hot Spots" Program if they have good cause to believe that the facility may pose a potential threat to public health.

4. Consumer Products

The Board not only has the authority to develop control measures to reduce emissions of TACs, it also has the authority to develop regulations to reduce emissions of criteria pollutants such as ozone. This section provides a brief background on the ARB's authority to regulate consumer products, followed by information on consumer product regulatory activities.

In 1988, the Legislature enacted the California Clean Air Act (Act), which declared that attainment of the California state ambient air quality standards is necessary to promote and protect public health, particularly that of children, older people, and individuals with respiratory diseases. The Legislature also directed that these standards be attained by the earliest practicable date. California adopted an ambient air quality standard for ozone in 1988. Strategies to reduce ambient ozone concentrations include decreasing emissions of reactive organic compounds (ROCs), also known as volatile organic compounds (VOCs).

The Act added HSC section 41712 requiring the ARB to adopt regulations to achieve the maximum feasible reduction in VOCs emitted by consumer products. To date, the Board has adopted the following six regulatory actions to fulfill the requirements of the Act as it pertains to consumer products:

- the Antiperspirant and Deodorant Regulation was approved in November 1989, and required a reduction in VOC emissions from antiperspirants and deodorants;
- the "Phase I, II, and III" Consumer Products Regulations, and the Midterm Measures II Regulation, were approved in October 1990, January 1992, July 1997, and October 1999, respectively, and required a reduction in VOC emissions from over 40 different consumer products categories; and
- the Aerosol Coatings Regulation was approved in March 1995, and required emissions reductions from 35 categories of aerosol paints and related coating products. In November 1998, the Board adopted revisions to many of the future effective VOC limits in the aerosol coatings regulation after a review of their technological and commercial feasibility.

Relevant to this proposal, the aerosol coatings regulation essentially prohibits "new or increased uses" of Perc. The aerosol coatings regulation allows Perc-containing aerosol coatings to be sold or used in California if they were sold in the State in 1992 and either complied with the standards of the aerosol coatings regulation or could be reformulated to comply with the standards without increasing the Perc content. Perc-containing aerosol coatings that were not sold or used in California in 1992, or those that could not be reformulated to comply with the standards of the aerosol coatings regulation without increasing the Perc content, are not allowed (ARB, 1995).

II. PUBLIC OUTREACH AND REPORT PREPARATION

A. Outreach Efforts

Outreach and public participation are important components of ARB's needs assessment and report preparation process. For this assessment, we developed an outreach program to involve consumer products manufacturers and their associations, AMR facility operators and their associations, national, state and local regulatory agencies, environmental/pollution prevention and public health advocates, and other interested parties. Through these efforts, we have been able to obtain detailed information on the use and emissions of chlorinated automotive consumer products. Additionally, these entities participated in the development and review of the necessary surveys and draft reports, conference calls, working group meetings, and workshops. They also have had a forum to address their concerns.

As part of our outreach program, we have made extensive personal contacts with industry and facility representatives as well as other affected parties through meetings, telephone calls, and mail-outs. Activities included:

- the formation of a Perc Needs Assessment working group;
- seven conference calls with the working group to discuss our activities;
- more than 500 telephone conversations with the working group and facility operators;
- mailing or faxing working group agendas, minutes, draft surveys, survey analyses, draft and final status reports to over 80 people;
- mailing workshop notices to a mailing list of over 6,000 people;
- mailing the Brake Cleaner and Perc-Containing Automotive Products Survey to 37 manufacturers and 23 other interested parties (including associations);
- mailing the Automotive Repair Facility Survey to 25,000 facilities;
- conducting eight meetings and four workshops;
- visiting 137 AMR facilities to gather information on the process and amount of brake cleaning products used, building dimensions, and receptor locations;
- visiting five additional AMR facilities to gather information on aqueous brake cleaning units; and
- visiting 16 additional AMR facilities and meeting with the Sacramento Valley Fire Marshals Association to discuss flammability issues.

B. Public Involvement

As described below, affected industries, other government agencies, and organizations interested in minimizing chlorinated solvent use have been involved in this assessment from the beginning. To increase the general public's participation in this assessment, we have made

information available via the ARB's Internet web site (http://www.arb.ca.gov/toxics/acp.htm), and have conducted four public workshops.

1. Industry Involvement

Automotive consumer products manufacturers and brake service industry representatives have actively participated in the assessment process, providing technical information, comments and suggestions during the development of surveys, and comments on findings. Industry involvement in the process has also included:

- more than 250 telephone conversations with ARB staff;
- the return of 22 of 37 Brake Cleaner and Perc-Containing Automotive Products Surveys representing about 90 percent of California product sales;
- participation of 18 workgroup representatives to review survey and risk assessment results; and
- participation in all needs assessment conference calls and workshops.

2. Government Agency Involvement

Other local, state, and federal agencies with an interest in potential emissions of, or soil/groundwater contamination by, Perc, MeCl, and TCE have been involved in the assessment process to promote statewide consistency in addressing public health concerns and provide a multi-media perspective. These agencies include: air and sanitation districts, the California Department of Industrial Relations/Division of Occupational Safety and Health (Cal/OSHA), the California Environmental Protection Agency's (Cal/EPA's) Office of Environmental Health Hazard Assessment (OEHHA), Cal/EPA's Department of Toxic Substances Control (DTSC), and the U.S. EPA.

We have apprized the air districts of our activities through the California Air Pollution Control Officers Association's (CAPCOA) Toxics Committee, and have also requested information that they may have on the brake cleaning process and how districts regulate the AMR industry. This work has included telephone calls to the districts and presentations to the CAPCOA Toxics Committee.

We have reviewed information provided to us by the sanitation districts on increasing concentrations of Perc in the influent to publicly owned treatment works (POTWs). Additionally, a representative of the County Sanitation Districts of Los Angeles County has presented this information during the May 1999 and January 2000 workshops (CSDLA, 1999b).

We have also requested information that other agencies may have on chlorinated solvent cleaning and pollution prevention case studies. Both the U.S. EPA and DTSC have published pollution prevention guides for the automotive maintenance and repair industry that were reviewed in the preparation of this report.

3. Private Organization Involvement

Two private organizations have also been involved in the assessment process. The Institute for Research and Technical Assistance (IRTA) recently partnered with the U.S. EPA (the study's sponsor), DTSC, and the South Coast Air Quality Management District to conduct a study of the effectiveness of aqueous brake cleaning units. IRTA is a non-profit organization that assists industries, primarily small businesses, in reducing or eliminating their use of ozone depleting substances and chlorinated solvents through demonstration and evaluation of new technologies, solvent substitutes, and process modifications. IRTA invited ARB staff to join them in visits to Los Angeles area automotive repair facilities conducting brake service operations. These facilities were participants in a study of alternative brake cleaning products. IRTA has provided technical information on the availability, cleaning effectiveness, and relative cost of non-aerosol brake cleaning products.

Tri-TAC, a technical advisory committee sponsored by the League of California Cities, the California Association of Sanitation Agencies, and the California Water Environment Association presented information about the amount of chlorinated solvents reaching POTWs, and has participated in the development of the proposed ATCM.

C. Data Collection Tools to Assist in Report Preparation

ARB staff developed three surveys to gather Perc usage and emissions data for use in this assessment: the Brake Cleaner and Perc-Containing Automotive Products Survey (Manufacturer Survey), the Automotive Repair Facility Questionnaire (Facility Survey), and the Brake/Automotive Repair Facility Survey for site visits (Site Visit Survey). Additionally, information from the 1997 Consumer and Commercial Products Survey (Consumer Products Survey) was also used.

1. The Manufacturer Survey

The Manufacturer Survey was developed to gather current sales and formulation data for both chlorinated and non-chlorinated brake cleaning products from manufacturers. It also requested information on future formulation trends that could increase the Perc content of brake cleaning products and other automotive consumer products.

2. The Facility Survey

The Facility Survey was developed to estimate the number of facilities performing brake repair operations, the number of brake jobs performed, and the type and quantity of bulk liquid or aerosol product used.

3. The Site Visit Survey

The Site Visit Survey was developed to gather AMR facility process information and source characteristic information. Process information includes items such as the number of brake jobs performed per day and the amount and types of solvent used in the process. Process information was used to estimate facility emissions. Source characteristic information includes building dimensions and the location of the residential and off-site worker receptors, and is used, in conjunction with facility emissions and an air dispersion model, to assess potential health impacts from a given facility.

4. The Consumer Products Survey

The Consumer Products Survey contains sales and formulation data for all consumer products sold in California, including the four automotive consumer product categories addressd by the proposed ATCM. This survey was conducted in conjunction with the Consumer Products regulations.

III. PHYSICAL CHARACTERISTICS, SOURCES, AND AMBIENT CONCENTRATIONS OF PERCHLOROETHYLENE , METHYLENE CHLORIDE, AND TRICHLOROETHYLENE

This chapter summarizes the readily-available information on physical properties, sources and emissions, ambient concentrations, indoor sources and concentrations, atmospheric persistence, and Air Toxics "Hot Spots" (AB 2588) risk assessment information for Perc, MeCl, and TCE. The information comes from ARB's 1997 reference report, Toxic Air Contaminant Identification List – Summaries unless otherwise noted (ARB, 1997b). This chapter also discusses the presence of these compounds in other environmental media as it was presented in the technical support documents for either the proposed identification of the compound as a toxic air contaminant (MeCl and TCE), or the proposed ATCM (Perc).

A. Perchloroethylene

1. Physical Properties of Perc

Perc is a volatile chlorinated aliphatic hydrocarbon compound containing a double bond. At room temperature, Perc is a non-flammable, colorless, dense liquid with an ethereal odor. Although relatively insoluble in water, it is miscible in alcohol, ether, chloroform, and benzene. Perc decomposes slowly in water to yield trichloroacetic and hydrochloric acids, and is oxidized by strong oxidizing agents.

Physical Properties of Perchloroethylene

Synonyms: tetrachloroethylene; tetrachloroethene; 1,1,2,2-perchloroethylene; ethylene tetrachloride; perc; PCE; Nema; Tetracap; Tetropil; Perclene; Ankilostin; Didakene

CAS Number[1]:	127-18-4
Molecular Formula:	C_2Cl_4
Molecular Weight:	165.85
Boiling Point:	121 °C at 760 mm Hg
Melting Point:	-22 °C
Vapor Pressure:	18.47 mm Hg at 25 °C
Vapor Density:	5.7 (air = 1)
Density/Specific Gravity:	1.6230 at 20/4 °C
Log Octanol/Water Partition Coefficient:	3.40
Conversion Factor:	1 ppb = 6.78 $\mu g/m^3$

[1] The CAS Registry Number or CAS number is a unique accession number assigned by the Chemical Abstracts Service, a division of the American Chemical Society. Other than being guaranteed unique to a given compound, this number has no particular meaning. CAS Registry Numbers are assigned to every uniquely-identifiable substance.

2. Sources of Perc

Perc is used as a solvent primarily in dry cleaning operations. Perc is also used in degreasing operations, paints and coatings, adhesives, aerosols, specialty chemical production, printing inks, silicones, rug shampoos, and laboratory solvents.

There are no producers of Perc in California. The primary stationary sources that have reported emissions of Perc in California are dry cleaning plants, plating and polishing companies, and aircraft manufacturers (ARB, 1999a).

Perc was registered for use as a pesticide, however as of August 1, 1990, it is no longer registered for pesticidal use in California.

3. Emissions of Perc

The reported emissions of Perc from stationary sources in California are estimated to be at least 4.5 million pounds per year, based on data reported under the Air Toxics "Hot Spots" Program (AB 2588) from database year 1998 (ARB, 1999a).

4. Natural Occurrence of Perc

Perc does not occur naturally in the environment.

5. Ambient Concentrations of Perc

Perc is routinely monitored in California by the statewide ARB air toxics network. The ARB's ambient air monitoring network is designed to obtain ambient background, non-source influenced, concentration levels of air toxics from 21 ambient air toxic monitoring stations located statewide. According to ARB's toxics database, the 1998 statewide average concentration for Perc is 0.11 parts per billion (ppb) or 0.77 micrograms per cubic meter ($\mu g/m^3$).

The United States Environmental Protection Agency (U.S. EPA) has compiled ambient concentration data from Columbus, Ohio during 1989 with a mean concentration of 1.59 $\mu g/m^3$, or 0.23 ppb, and the range varied from 0.21 to 40 $\mu g/m^3$ or 0.03 to 5.90 ppb. They also reported concentrations of Perc from 13 study areas during 1989 to 1991. The overall range of concentrations from these areas were from 0.69 to 104 $\mu g/m^3$ or 0.10 to 15.34 ppb with a mean concentration of 3.6 $\mu g/m^3$ or 0.53 ppb.

6. Indoor Sources and Concentrations of Perc

Volatilization from dry cleaned garments is probably the largest source of Perc in indoor air. Brake cleaners, water repellents, and fabric finishes are also important sources of Perc.

Results from both indoor and personal monitoring in California homes indicate that people are exposed frequently to Perc from indoor air. The level of exposure varies among homes because of the different numbers and types of emission sources present in individual homes. In a large Southern California study, the 24-hour average concentrations for residential indoor air ranged from 2.27 to 6.72 $\mu g/m^3$ while concurrent outdoor concentrations ranged from 1.74 to 4.41 $\mu g/m^3$. Using personal nighttime sampling data to approximate indoor air exposure, the 12-hour average indoor nighttime concentrations ranged from 5.45 to 8.56 $\mu g/m^3$ in comparison to the outdoor nighttime concentrations which ranged from 1.24 to 5.72 $\mu g/m^3$.

The most recent California study was conducted in Woodland, California in the spring of 1990. The average concentration of Perc of 124 indoor samples was 1.44 $\mu g/m^3$. Mean indoor concentrations from the Woodland study are approximately 2.7 times greater than the outdoor mean concentration of 0.53 $\mu g/m^3$ from the same study.

7. Atmospheric Persistence of Perc

The dominant tropospheric loss process for Perc is expected to be by reaction with the hydroxyl (OH) radical. The calculated half-life and lifetime for Perc due to gas-phase reaction with the OH radical are 2 months and 3 months, respectively. Both nitrate radical and ozone chemical reaction removal processes are too long to compete with the OH radical reaction. The reaction of the OH radical with Perc has been shown to generate chlorine atoms and that in the atmosphere the reaction forms phosgene and hydrogen chloride as well as other, as yet unidentified, products. Therefore, Perc is sufficiently persistent to be transported throughout an air basin before it is degraded.

8. Health Effects of Perc

See Chapter VI.C. for a discussion of the health effects of Perc.

9. AB 2588 Risk Assessment Information

The Office of Environmental Health Hazard Assessment (OEHHA) reviews risk assessments submitted under the Air Toxics "Hot Spots" Program (AB 2588). Of the risk assessments reviewed as of April 1996, Perc was the major contributor to the overall cancer risk in 43 of the approximately 550 risk assessments reporting a total cancer risk equal to or greater than 1 in 1 million. Perc contributed to the total cancer risk in 79 of these risk assessments. Perc also was the major contributor to the overall cancer risk in 7 of the approximately 130 risk assessments reporting a total cancer risk equal to or greater than 10 in 1 million, and contributed to a total cancer risk in 34 of these risk assessments.

For non-cancer health effects, Perc contributed to the total hazard index in 35 of the approximately 89 risk assessments reporting a total chronic hazard index greater

than 1, and presented an individual hazard index greater than 1 in 19 of these risk assessments. Perc also contributed to the total hazard index in 23 of the approximately 107 risk assessments reporting a total acute hazard index greater than 1, and presented an individual hazard index greater than 1 in 4 of these risk assessments.

10. Perc in the Environment (ARB, 1993a)

Besides the air, Perc is also found in water, soil, fatty foods, fish, and human blood. This section will discuss the presence of Perc in other environmental media.

a. Ground Water and Soil

Perc is a point-source ground water contaminant because of its widespread use and physical characteristics. When waste water containing Perc is discharged into the sewer or Perc is accidentally spilled onto the ground, it can migrate through the soil and into aquifers below. Perc is heavier than water. If discharged into the sewer, Perc can settle to the bottom of the sewer line and migrate through clay sewer pipe into the soil layers and groundwater aquifers. Perc in the sewer pipes can also volatilize to a gas and penetrate the sewer wall. The Perc can then travel through the soil layers into the ground water.

If organic carbon is present in the subsurface materials, Perc can decompose under anaerobic conditions through "sequential reduction". This means that one chlorine atom at a time is removed from the Perc molecule and is replaced with hydrogen atoms. Perc is sequentially reduced to trichloroethene, then to cis-1,2-dichloroethene, and finally to ethene .

Perc can also be degraded by bacteria. There are several bacteria involved in the biodegradation of Perc, such as Clostridium cadaveris, Clostridium limosium, gram positive cocci, large gram positive rods, and filaments. In the degradation process, the Perc molecule is slowly broken down into a hydrogenate compound, with chlorine released as chlorine ions.

b. Ocean

Concentrations of Perc in the ocean are used as an indication of the environmental background concentration in surface waters. The average background concentrations of Perc in the North Atlantic Ocean range from 0.1 to 0.5 ppt (parts per trillion).

c. Precipitation

Perc can be present in precipitation or rainwater. Rainwater collected in 1982 in the Los Angeles area contained 21 ppt of Perc. Perc levels in rainwater in La Jolla, and snow in south-central California, ranged from 1.4 to 5.7 ppt. Rainwater collected in Portland, Oregon had Perc levels that ranged from 0.82 to 9.2 ppt. Rainwater in England's industrial cities contained Perc concentrations up to 150 ppt.

d. Food

Food products have been found to contain Perc. It is believed that airborne Perc is the primary contaminant mechanism for foods. Perc has been found in foods such as: dairy products (0.3 to 13 micrograms of Perc per kilogram of dairy product (μg/kg)); meat, oils, and fats (0.01 to 7.0 μg/kg); beverages (2.0 to 3.0 μg/kg); fruits and vegetables (0.7 to 2.0 μg/kg); and fresh bread (1 μg/kg).

e. Fish

Several European studies have been conducted to determine if Perc accumulates in fish. Eel, cod, coalfish, dogfish, and bid from the Irish Sea were collected and analyzed. Fish tissue concentrations were as high as 43 nanograms of Perc per gram of fish (ng/g) (dry weight). Fifteen species of fish off the coast of Great Britain were found to have Perc levels ranging from between 30 to 100 ng/g.

f. Perc Ingestion by Humans

A study in Japan was conducted to determine the Perc blood levels in individuals who consume well water contaminated with Perc. The Perc levels in the well water ranged from 0.001 to 27 ppb. The study concluded that people who did not use well water for drinking or cooking had non-detectable Perc blood levels (detection limit was not reported). Those people who consumed or used well water had Perc blood levels ranging from 0.9 to 5.1 micrograms of Perc per liter of blood (μg/l).

B. Methylene Chloride

1. Physical Properties of MeCl

MeCl is a volatile, nonflammable, colorless, liquid with a sweetish chloroform-like odor. It is slightly soluble in water and miscible with alcohol, ether, and dimethylformamide. In the absence of moisture, at ordinary temperatures, MeCl is relatively stable. In dry air, MeCl decomposes at temperatures exceeding 120 °C. MeCl evaporates relatively quickly from water. Possible thermal breakdown products of MeCl include phosgene, chlorine, and hydrogen chloride.

Physical Properties of Methylene Chloride

Synonyms: dichloromethane; methylene dichloride; Freon 30; Aerothene NM; Somethine; methylene bichloride

CAS Number:	75-09-2
Molecular Formula:	CH_2Cl_2
Molecular Weight:	84.94
Boiling Point:	39.75 °C at 760 mm Hg
Melting Point:	-95 °C
Vapor Pressure:	349 mm Hg at 20 °C
Vapor Density:	2.93 (air = 1)
Density/Specific Gravity:	1.3255 at 20/4 °C
Log Octanol/Water Partition Coefficient:	1.30
Conversion Factor:	1 ppm = 3.47 mg/m^3

2. Sources and Emissions of MeCl

MeCl is used as a solvent, a blowing and cleaning agent in the manufacture of polyurethane foam and plastic fabrication, and in paint stripping operations. MeCl is also used in some aerosol consumer products, including aerosol paints, and automotive products. However, most consumer products manufacturers have already voluntarily phased out the use of MeCl. In addition, in the case of aerosol paints, the use will be restricted by a provision in ARB's regulation, "Regulation for Reducing Volatile Organic Compound (VOC) Emissions from Aerosol Coating Products" adopted March 1995. MeCl is also found in textiles, paper, plastic, glass, and pharmaceutical manufacturing. For some categories, such as paint removers and aerosols, emissions from evaporation equal the amount used.

Paint removers account for the largest use of MeCl in California, where MeCl is the primary ingredient in paint stripping formulations used for industrial, commercial, military, and domestic applications.

The primary stationary sources that have reported emissions of MeCl in California are manufacturers of ophthalmic goods, manufacturers of plastic foam products, and manufacturers of motor vehicles and car bodies (ARB, 1999a).

MeCl was registered for use as a pesticide; however as of August 1, 1990, it is no longer registered for pesticidal use in California.

3. Emissions of MeCl

The total emissions of MeCl from stationary sources in California are estimated to be approximately 3.5 million pounds per year, based on data reported under the Air Toxics "Hot Spots" Program (AB 2588) from data base year 1998 (ARB, 1999a).

4. Natural Occurrence of MeCl

MeCl does not occur naturally in the environment.

5. Ambient Concentrations of MeCl

MeCl is routinely monitored in California by the statewide ARB air toxics network. The ARB's ambient air monitoring network is designed to obtain ambient backgound, non-source influenced, concentration levels of air toxics from 21 ambient air toxic monitoring stations located statewide. According to ARB's toxics database, the 1998 statewide average concentration for MeCl is 0.62 parts per billion (ppb) or 2.15 micrograms per cubic meter ($\mu g/m^3$).

The U.S. EPA has also reported concentrations of MeCl from 13 study areas during 1989 to 1991. The overall range of concentrations from these areas were from 0.28 to 492 $\mu g/m^3$ (0.08 to 140.57 ppb) with an overall mean concentration of 5.6 $\mu g/m^3$ (1.6 ppb).

6. Indoor Sources and Concentrations of MeCl

Because MeCl is a constituent in many consumer products, short-term indoor concentrations may be several orders of magnitude higher than ambient concentrations. Results from a chamber study where a paint stripper was being used resulted in breathing zone exposures up to 2,000 parts per million (ppm) averaged over one hour with peak breathing zone concentrations of up to 33,000 ppm. Inhalation of MeCl from the indoor environment is expected to vary depending on the degree and manner of use of products containing MeCl.

Data on indoor concentrations of MeCl are extremely limited. During June of 1990, 125 households in Woodland, California were monitored for a variety of toxic air contaminants. Sixty-one homes were sampled for MeCl. The mean of those samples was 83 $\mu g/m^3$ or 23.92 ppb. The detection limit for MeCl was 0.7 $\mu g/m^3$ or 0.20 ppb. The 90th percentile was

160 μg/m³ or 46.11 ppb, with a range from below the quantifiable limit of 0.7 to 1,700 μg/m³ or 0.20 to 489.91 ppb. Mean indoor concentrations are approximately 5.5 times greater than the outdoor mean concentration of 15 μg/m³ or 4.32 ppb from the same study. The use of household consumer products containing MeCl may account for its high prevalence in the homes tested.

As part of a study conducted in Los Angeles County, the indoor and outdoor air of eight homes was sampled during the summer and analyzed for several compounds including MeCl. For these homes, results show overnight indoor concentrations to range from 3.5 to 12.6 μg/m³ or 0.3 to 3.6 ppb with daytime indoor concentrations ranging from 1.05 to 13.65 μg/m³ or 0.3 to 3.9 ppb. Overnight outdoor concentrations range from 0.35 to 4.55 μg/m³ or 0.1 to 1.3 ppb while daytime outdoor concentrations range from 0.7 to 13.65 μg/m³ or 0.2 to 3.9 ppb. The results for this study indicate that indoor concentrations of MeCl in some homes may not be substantially higher than outdoor concentrations.

7. Atmospheric Persistence of MeCl

Reaction with hydroxyl radicals is the dominant mechanism removing MeCl from the atmosphere. The calculated half-life and lifetime of MeCl due to gas-phase reaction with the Oh radical are estimated to be about 0.6 years and 0.9 years, respectively. The product of the Oh radical-initiated reaction is formyl chloride, in 100 percent yield.

8. Health Effects of MeCl

See Chapter VI.C. for a discussion of the health effects of MeCl.

9. AB 2588 Risk Assessment Information

The Office of Environmental Health Hazard Assessment reviews risk assessments submitted under the Air Toxics "Hot Spots" Program (AB 2588). Of the risk assessments reviewed as of April 1996, MeCl was the major contributor to the overall cancer risk in 30 of the approximately 550 risk assessments reporting a total cancer risk equal to or greater than 1 in 1 million and contributed to the total cancer risk in 112 of these risk assessments. MeCl also was the major contributor to the overall cancer risk in 8 of the approximately 130 risk assessments reporting a total cancer risk equal to or greater than 10 in 1 million, and contributed to the total cancer risk in 44 of these risk assessments.

For non-cancer health effects, MeCl contributed to the total hazard index in 24 of the approximately 89 risk assessments reporting a total chronic hazard index greater than 1. MeCl also contributed to the total hazard index in 30 of the approximately 107 risk assessments reporting a total acute hazard index greater than 1, and presented an individual hazard index greater than 1 in 8 of these risk assessments.

10. MeCl in the Environment (ARB, 1989)

Other routes of exposure to MeCl include the ingestion of drinking water and food products. The following comparisons simply illustrate the extent of exposures to MeCl by routes other than inhalation. The comparisons do not imply that equivalent doses via different exposure routes necessarily result in health effects that are equivalent. ARB staff believe that the greatest contribution to total intake is from inhalation of MeCl.

The ARB staff estimate that for the majority of California residents, the intake of MeCl through drinking water is less that 365 μg/year. Between January 1984, and December 1985, the California Department of Health Services (DHS) conducted a study in which groundwater from 2,947 wells, representing 819 public water systems, was analyzed for MeCl. Less than one percent of the wells sampled (eleven wells) contained MeCl at concentrations above the 0.5 μg/liter detection limit. For these eleven wells the median concentration was 3.0 μg/liter, the maximum was 10.0 μg/liter, and the minimum was 0.65 μg/liter.

Groundwater supplies roughly 40 percent of California's domestic use with surface water making up the other 60 percent. The DHS study did not monitor surface waters for MeCl. MeCl released into surface waters is not expected to remain due to its high volatility. The U.S. EPA used results from two major surveys (the National Organics Monitoring Survey and the National Screening Program for Organics in Drinking Water) to predict MeCl concentrations in the potable water of public water systems nationwide. Based on data from both groundwater and surface water, the EPA has estimated that 93.5 percent of U.S. population who are served by public drinking water systems receive water with no MeCl or levels less than 0.5 μg/liter. Furthermore, 99.6 percent of the population receive water with concentrations at or below 10 μg/liter.

ARB staff estimated a range of annual intake through drinking water based on the concentrations found in the DHS monitoring study (less than 0.5 to 10.0 μg/liter). Intake is based on an average drinking water consumption of two liters per day, resulting in an intake ranging from less than 365 μg/year to 7300 μg/year. Because MeCl is not expected to remain in surface waters and because MeCl was not detected in over 99 percent of the groundwater wells that DHS tested, ARB staff believe that the overwhelming majority of California population would have annual intakes less than those reported above.

C. Trichloroethylene

1. Physical Properties of TCE

TCE is a chlorinated aliphatic hydrocarbon compound containing a double bond. It is a dense, nonflammable, volatile, colorless liquid which is only slightly soluble in water but miscible with organic solvents and other halogenated compounds. Most fixed and volatile oils are dissolved by TCE. It is lipophilic. TCE has an odor threshold of 28 parts per million (ppm) and smells similar to ether or chloroform.

Physical Properties of Trichloroethylene

Synonyms: trichloroethene; ethinyl trichloride; Tri-Clene; Trilene; Trichloran; Trichloren; Westrosol; Gemalgene; Chlorylen; acetylene trichloride; 1,2,2-trichloroethylene

CAS Number:	79-01-6
Molecular Formula	C_2HCl_3
Molecular Weight:	130.40
Boiling Point:	86.7 °C
Melting Point:	-73 °C
Flash Point:	89.6 °C
Vapor Pressure:	100 mm Hg at 32 °C
Vapor Density:	4.53
Density:	1.4649 at 20/4 °C
Log Octanol/Water Partition Coefficient:	2.42
Conversion Factor:	1 ppb = 5.33 $\mu g/m^3$

2. Sources of TCE

TCE is used in California in a variety of operations and products, including degreasing operations, polyvinyl chloride production, adhesive formulations, and paints and coatings. TCE is also used in miscellaneous chemical synthesis and solvent applications, and as a refrigerant and heat exchange liquid. The major use of TCE in California, and nationwide is as a degreasing solvent. It is not produced in California. Other sources that emit TCE include publicly owned treatment works; groundwater aeration and air strippers; sanitary sewers; surface impoundments; and municipal landfills. TCE is also present in trace concentrations in waste oil. According to the World Health Organization in its review of TCE, the compound is widely distributed in surface water, rain water, and well water.

The previously discussed 1984-85 DHS groundwater study sampled for TCE in the same 2,947 wells. TCE was found in 188 wells with a median concentration of 3.2 micrograms per liter (µg/l). A maximum concentration of 538 µg/l was also reported. The DHS noted that those

wells supplying heavily urbanized areas generally had the higher concentrations of TCE. The DHS developed an action level for TCE of 5 μg/l.

The primary stationary sources that have reported emissions of TCE in California are manufacturers of pens and mechanical pencils, manufacturers of motor vehicle parts and accessories, and blast furnaces and steel mills (ARB, 1999a).

3. Emissions of TCE

The total emissions of TCE from stationary sources in California are estimated to be 179,000 pounds per year, based on data reported under the Air Toxics "Hot Spots" Program (AB 2588) from data base year 1998 (ARB, 1999a). No control measures have been adopted for TCE under California's air toxic program.

4. Natural Occurrence of TCE

TCE does not naturally occur in the environment.

5. Ambient Concentrations of TCE

TCE is routinely monitored in California by the statewide ARB air toxics network. The ARB's ambient air monitoring network is designed to obtain ambient backgound, non-source influenced, concentration levels of air toxics from 21 ambient air toxic monitoring stations located statewide. According to ARB's toxics database, the 1998 statewide average concentration for TCE is 0.03 parts per billion (ppb) or 0.16 micrograms per cubic meter ($\mu g/m^3$).

The United States Environmental Agency (U.S. EPA) has also compiled ambient air data from Lima, Ohio during 1990 to 1991. The data show a mean concentration of 0.71 $\mu g/m^3$ or 0.13 ppb. They also reported an overall mean concentration of TCE from 11 study areas during 1990 of 2.63 $\mu g/m^3$ or 0.49 ppb.

6. Indoor Sources and Concentrations of TCE

TCE has limited use as a solvent in consumer products and indoor concentrations of this chemical have been found to be quite varied. The most recent California study was conducted in Woodland, California during the spring of 1990. The indoor concentration of TCE of 125 homes ranged from 0.30 to 9.3 $\mu g/m^3$ or 0.06 to 1.74 ppb. The average indoor concentration was 0.65 $\mu g/m^3$ or 0.12 ppb.

The California Total Exposure Assessment Methodology (TEAM) studies were conducted during 1984 and 1987. Los Angeles and Contra Costa County were included during 1984, while Los Angeles was the only area for the 1987 study. Investigators collected volatile organic compounds (VOCs) using personal air, outdoor, and fixed-site indoor samplers. Direct

comparisons of TCE concentrations indoors and outdoors were matched. Mean indoor concentrations of TCE ranged from 0.63 to 3.97 $\mu g/m^3$ or 0.12 to 0.74 ppb. Median indoor concentrations of TCE are 2 to 5 times greater than ambient concentrations although indoor concentrations appear to be very dependent upon the use of consumer products containing TCE.

Concentrations of VOCs in 10 public-access buildings were monitored for three days. Volatile organic compounds were measured at three new buildings before and after occupancy. Mean three-day TCE concentrations after occupancy ranged from 7.94 to 37.68 $\mu g/m^3$ or 1.49 to 7.07 ppb which the authors indicated could have been attributed to use of commercial cleaning products.

7. Atmospheric Persistence of TCE

The primary removal mechanism of airborne TCE is its reaction with hydroxyl (OH) radicals in the troposphere. The calculated half-life and lifetime for TCE due to gas-phase reaction with the OH radical are estimated to be 4 days and 6 days, respectively. The reaction forms formyl chloride and phosgene and chlorine atoms (leading to hydrochloric acid formation in the atmosphere), together with other, unidentified, products.

8. Health Effects of TCE

See Chapter VI.C. for a discussion of the health effects of TCE.

9. AB 2588 Risk Assessment Information

The Office of Environmental Health Hazard Assessment reviews risk assessments submitted under the Air Toxics "Hot Spots" Program (AB 2588). Of the risk assessments reviewed as of April 1996, TCE was the major contributor to the overall cancer risk in 3 of the approximately 550 risk assessments reporting a total cancer risk equal to or greater than 1 in 1 million and contributed to the total cancer risk in 55 of the risk assessments. TCE also contributed to the total cancer risk in 16 of the approximately 130 risk assessments reporting a total cancer risk equal to or greater than 10 in 1 million.

For non-cancer health effects, TCE contributed to the total hazard index in 5 of the approximately 89 risk assessments reporting a total chronic hazard index greater than 1.

10. TCE in the Environment (ARB, 1990)

Other routes of exposure to TCE include the ingestion of drinking water and food products. Water appears to present the major source of exposure through ingestion.

According to the World Health Organization, in its review of TCE, the compound is widely distributed in surface water, rain water, and well water. For example, McConnel et al. (1975) reported that rain water contained TCE in the range of a few micrograms per liter.

Cothern et al. (1986) estimated, based on U.S. EPA surveys, that of the approximately 23 million persons exposed to levels of TCE ranging from 0.5 to 5.0 μg/L, 76 percent of the people obtained their water from surface water supplies. The higher concentrations in this range, however, are thought to come from groundwater systems.

The California Department of Health Services measured a number of toxic compounds including TCE in large public water systems in California (January 1984 to December 1985). Approximately 3,000 wells were sampled. TCE was found in 188 of the wells with a median concentration of 3.2 μg/L. A maximum concentration of 538 μg/L was also reported. The CDHS noted that those wells supplying heavily urbanized areas generally had the higher concentrations of TCE. The Department of Health Services developed an action level for TCE of 5 μg/L. This is based on a cancer risk estimate by the National Academy of Science of a 10^{-6} excess risk of cancer due to lifetime exposure to drinking water containing 5 μg/L TCE.

Concentrations of TCE were also measured in tap water during the TEAM 84 studies. For the February and May sampling times in Los Angeles, the weighted median (and range) of TCE concentrations in water were 0.04 (0.03-0.24) μg/L and 0.03 (0.03-0.56) μg/L, respectively. For the Contra Costa samples, the weighted median (and range) of TCE concentrations was 0.05 (0.03-0.09) μg/L. The median levels of TCE in Los Angeles and Contra Costa were very similar, but the maximum concentrations were higher in Los Angeles.

There is limited information on the concentrations of TCE found in food, especially in food purchased in California. There are reports of TCE in food measured in European countries. McConnel et al. (1975) reviewed the levels of TCE in foods in Great Britain and Europe and reported a range of 0.02 μg/kg measured in Yugoslavian wine to 60 μg/kg measured in tea.

Ofstad et al. (1981) reported on TCE concentrations in fish in Norway. The concentrations of TCE ranged from 5 μg/kg in a commercial salmon fillet to approximately 400 μg/kg in the cod liver oil.

Uhler and Diachenko (1987) reported the concentrations of volatile halocarbons in process water as well as in processed foods. Out of 15 processing plants, two had detectable amounts of TCE in the process water. None of the food items measured in the 15 plants had detectable levels of TCE (limit of less than 1 nanogram [ng] per gram of food).

Entz and Diachenko (1990) reported the concentrations of TCE in 50 margarine samples purchased in 1980-1982 and 18 samples purchased in 1984, all from the Washington, D.C. area. Out of the 50 samples, one sample had TCE concentrations in the 100-500 ppb ranges, nine samples were in the 10-50 ppb range, seven samples were in the 3-10 ppb range, and 35 samples

had undetectable amounts of TCE. Of the 18 samples measured in 1984, three samples were in the 10-50 ppb range, one was in the 3-10 ppb range, and 14 samples had undetectable amounts of TCE.

IV. SUMMARY OF AUTOMOTIVE MAINTENANCE AND REPAIR ACTIVITIES

During the needs assessment phase, usage of perchloroethylene (Perc), methylene chloride (MeCl), and trichloroethylene (TCE) was examined in four automotive consumer product categories: brake cleaners, carburetor and fuel-injection air intake cleaners (carburetor cleaners), engine degreasers, and general degreasers (including most aerosols and some bulk parts washers). This chapter provides a description of each product category and information on how and where the products are used (based on information collected from surveys and site visits).

A. Description of Product Categories

1. Brake cleaner

Automotive brake cleaners are designed to remove oil, grease, brake fluid, brake pad material, and dirt from motor vehicle brake mechanisms. These products are sometimes labeled for use in cleaning dirt or grease from other motor vehicle parts and may be used interchangeably. Automotive brake cleaners are sold in both aerosol and liquid forms.

Aerosol brake cleaners are typically sprayed on the entire brake assembly prior to service or repairs to wet down dust and to remove oil, grease, or other contaminants. Aerosol brake cleaners are also used on individual components after disassembly, often to remove greasy fingerprints or other contaminants from friction surfaces.

Liquid or bulk brake cleaners are used primarily by professional mechanics. The solvent-based bulk brake cleaners can be converted in the shop to an aerosol by using a refillable sprayer that is pressurized using the shop air compressor. Once the product is pressurized, it is used in the same way as the pre-packaged aerosol products. Liquid products can also be transferred to hand-held pump sprayers for use. There are also solvent-based and water-based portable brake cleaning units that are comprised of a base reservoir of cleaning solution with a collection pan on top and a nozzle and brush. Mechanics position the unit under the wheel and typically spray down the entire brake assembly with the cleaning solution and use the brush as necessary to clean the brake components. The dirty solution then drips off the brake assembly and is collected in the pan and routed into the reservoir where it may be filtered to remove brake dust, oil and grease. Some companies that supply these devices to shops establish a recycling schedule where they routinely pick up the spent bath solution and replace it with a fresh bath. Other companies aqueous systems depend on the mechanic to replace or recharge the water-based solutions. There are also portable brake cleaning units available that can be filled with the mechanic's choice of solvent brake cleaner.

2. Carburetor Cleaner

Carburetor and fuel-injection air intake cleaners are products designed to remove fuel deposits, oil, dirt, and other contaminants from a carburetor, choke, throttle body of a fuel-injection system, or associated linkages. Carburetor and fuel-injection air intake cleaners are used during routine maintenance and repairs by both "do-it-yourself" and professional mechanics. These products are sometimes also labeled for use in cleaning dirt or grease from other motor vehicle parts, including brake parts. Both aerosol and liquid products are sold, but each form is used in a different manner.

The aerosols are used to remove deposits from carburetors, throttle bodies, and associated parts, usually while they are still attached to the engine. Aerosols can be used to remove fuel deposits from the inside surfaces of carburetors by spraying into the carburetor throat while the engine is running, or by spraying the carburetor wells or throttle plate with the engine off and then starting and idling the engine. The solvents in the product combine with the fuel and are carried throughout the inside passages of the carburetor, eventually reaching the combustion chamber. Many automotive maintenance and repair (AMR) facilities that responded in the Facility Survey stated that they also used carburetor cleaners for cleaning brakes.

Since aerosol products are designed to be sprayed down the carburetor throat, they are subject to U.S. EPA regulations for fuel additives which require manufacturers to register their formulations. The U.S. EPA also requires manufacturers to collectively fund a literature search on the potential health effects of using their products. Currently, manufacturers can only register formulations with compounds containing five elements: carbon, hydrogen, oxygen, nitrogen, and sulfur. However, formulations containing other elements were registered prior to the 1990 federal Clean Air Act Amendments. These formulations have been essentially grandfathered from the requirement that they contain only compounds with the five elements mentioned. Some of these grandfathered products contain chlorinated solvents such as MeCl and Perc (ARB, 1999).

There are two types of liquid carburetor, choke, or fuel-injection air intake cleaners. The first type is added directly to the fuel lines or the fuel tank of the vehicle to remove deposits from fuel injectors, engine intake valves, and the combustion chamber. These products are often labeled as fuel-injection, intake, or engine deposit cleaners or engine flush or fuel treatments. Carburetor or fuel-injection air intake cleaners that are designed exclusively to be introduced directly to the fuel lines or fuel tank prior to introduction into the carburetor or fuel injectors are not subject to the proposed ATCM.

The second type of liquid carburetor cleaner requires carburetors and associated parts to be disassembled and immersed in a container of the liquid product for several minutes or longer. Some products include a basket within the solvent container that can be used to hold the parts that are immersed, while others must be poured into a separate container to soak parts. Often, sensitive parts made of plastic or rubber must be removed prior to immersion to prevent damage. The cleaned parts are then removed from the solution and pressure rinsed with water. These

types of cleaners are often labeled as "Carburetor and Metal Parts Cleaners" or "Carburetor and Cold Parts Cleaners" and indicate that the product may be used for a variety of parts cleaning tasks. Some of the products contain chlorinated solvents such as Perc, MeCl, and monochlorotoluene.

3. Engine Degreasers

Engine degreasers are specialty cleaning products designed to remove grease, grime, oil and other contaminants from the external surfaces of automotive engines and other mechanical parts and are available in both aerosol and liquid forms. The liquid forms of engine degreasers can further be broken down into solvent-based or water-based concentrates that need to be diluted with water before use. Engine degreasers can also be used to clean engines on motorcycles, boats, lawnmowers, and other powered vehicles. Typically, the entire cleaning process requires a combination of chemicals, using various combinations of solvents to first dissolve the contaminants, and physical action to remove the engine surface contaminants. As a first step, many products instruct users to apply the product when the engine is still warm. Other products direct the user to leave the engine running when applying the product. Most products direct the user to wait 10 to 15 minutes to allow the solvents to penetrate the oil and grime. For tough-to-remove deposits, the user may need to scrub the soil with a brush. At this point, surfactants in water-based products emulsify the dissolved oil into the water contained in the product. The final step requires the user to rinse the emulsified mixture to wash away the contaminants. Although some product labels direct users to dispose of the wash effluent in accordance with applicable environmental regulations, some facilities may discharge the wash effluent into the sewer system.

4. General Purpose Degreasers

General degreasers consist of products designed to remove grease, grime, oil, or other oil-based contaminants from a variety of surfaces. This definition also includes products that are designed to clean miscellaneous metallic parts. These products are currently sold and labeled as solvent parts cleaners or metallic parts cleaners. General degreasers typically do not include products specifically labeled as engine degreasers, tire, gasket or paint removers, or electronics cleaners. This category also does not include general cleaners which are typically defined as products designed for general purpose cleaning, such as floor, kitchen, counter top, bathroom, tile or glass cleaners.

For the proposed ATCM, general degreasers can be defined as aerosols labeled to clean automotive parts, bulk solvent parts cleaners that may be dispensed as an aerosol via a pressurized air sprayer or pump sprayer, or bulk liquids sold in containers designed to permit disassembled parts to be immersed within them. Aerosol general degreasers include only metallic parts cleaners and solvent parts cleaners. A metallic parts cleaner is defined as an organic liquid that is designed to dissolve grease, dirt, or other contaminants solely from miscellaneous metallic parts.

B. Users of Automotive Consumer Products in California

Automotive consumer products are used in a variety of applications and industries throughout California. They are most commonly used in AMR activities at service stations, fleets, general automotive repair shops, dedicated brake repair shops, and new and used car dealerships. The majority of Californians look to these facilities for their maintenance and repair needs. In these facilities, automotive consumer products remove grease, grime, and dirt from a variety of automobile parts. Examples of applications include engine degreasing, the servicing of carburetors and throttle bodies, and brake service and repair operations. These commercial facilities will use both aerosol and liquid products (chlorinated and non-chlorinated) contained in a variety of delivery mechanisms. However, not all vehicle owners look to commercial facilities for their vehicle care needs. Some owners prefer to perform their own services at their residences or other locations. Since most people do not have the benefit of hydraulic lifts, air compression systems, and specialty tools and equipment, the services that they can perform are generally limited. Nonetheless, brake repair and engine degreasing are common do-it-yourself activities. People who service their own vehicles will also use both aerosol and liquid products, but if they use a liquid, it is more likely to be one that is easily converted into an aerosol or pump sprayer.

Some private businesses and government agencies maintain vehicle fleets that are used for a variety of tasks and these fleets can consist of cars, vans, trucks, buses, and other task-specific vehicles. Many fleets operate their own maintenance and repair facilities to handle their maintenance and repair needs. Typically, these fleet operations are indistinguishable from their commercial counterparts with the exception that their services are not available to the general public. Normally, fleet facilities and commercial facilities tend to be similarly equipped and use similar automotive consumer products.

Automotive consumer products used for AMR activities are not limited to cars, trucks, and buses, but can also be used in non-traditional applications on a limited basis. These applications include, but are not limited to, off-road vehicles, marine vessels, and aviation. The ARB believes that automotive consumer products are selected for these applications because they are readily available and suitable for light-duty tasks such as small parts cleaning and degreasing.

C. How Brake Service and Repair Jobs Are Performed

Surveys and site visits revealed that of the four categories of concern, brake cleaners account for the majority of product usage and that the usage occurs primarily in conjunction with brake service operations. As a result, it is important to have a basic understanding of how brake jobs are performed, especially since products from all four automotive consumer product categories discussed here have been used in conjunction with brake service operations.

1. The Brake Service Process

Brake service operations are normally performed directly on the vehicle, with the vehicle raised to a comfortable working height for the mechanic. Brake service operations can include inspections, adjustments, brake pad replacements and rotor resurfacing, and usually require the disassembly, replacement or repair, and reassembly of the brakes.

Brake cleaners are routinely used in brake service operations while engine degreasers, carburetor cleaners, and general purpose degreasers are used less frequently. As discussed in the brake cleaner product category description, automotive brake cleaning products are designed to remove oil, grease, brake fluid, brake pad dust, or dirt from motor vehicle brake mechanisms and generally come in either an aerosol or liquid form. Many mechanics have discovered that products in the other three product categories are designed to remove similar types of grease, dirt, and grime, and can be used interchangeably on a variety of applications. Brake cleaners are applied before, during, and after brake disassembly to dissolve contaminants, and sometimes after reassembly as a final cleaning process to remove oil, brake fluid, and fingerprints that may have inadvertently been redeposited on the brake assembly. After application, the brake cleaner and dissolved contaminants either drip off, or are wiped away from the brake parts.

Many facilities use portable brake cleaning units for brake service and repair operations. Portable brake cleaning units, which include bird bath type units, can be used independently or in conjunction with an aerosol product depending on mechanic preference. They are typically not used in conjunction with other liquid products with the possible exception of liquid products that can be converted to aerosols or pump sprayers. Mechanics use these units in their initial cleaning step to remove the heavier accumulations of grease, grime, and dirt, but many facilities use these units exclusively. Again, some may use aerosols as a follow-up process to remove oil, brake fluid, and fingerprints that may have inadvertently been redeposited on the brake assembly.

Brake parts manufacturers typically issue guidelines and offer instructional materials outlining their recommendations on how their parts should be used in conjunction with brake service operations. When asked about why aqueous based units are demonstrated in their ASE (Automotive Service Excellence) certification clinics, representatives for these manufacturers listed performance, cost, and worker exposure as reasons for not using aerosol products (Raybestos, 1999; Federal-Mogul/Wagner, 1999).

2. Regulatory Issues

To control asbestos exposure from brake and clutch surfaces, the California Occupational Safety and Health Administration adopted mandatory methods for brake and clutch service beginning on July 3, 1996 (title 8, California Code of Regulations, section 5208, Appendix F). This regulation requires that either a negative pressure enclosure/HEPA vacuum system, or a low pressure/wet cleaning method using an aqueous solution, be used to clean asbestos-containing brake parts during brake and clutch inspection, disassembly, repair, and assembly operations.

However, we observed that mechanics tend to use any brake cleaning product they choose after the reassembly process to remove fingerprints, residual grease, and brake fluid. In addition, mechanics may use any brake cleaning products, including water, petroleum solvent parts washers, or other brake cleaners for cleaning non-asbestos brakes. For these purposes, some mechanics use aerosol brake cleaners.

V. EMISSIONS FROM AUTOMOTIVE MAINTENANCE AND REPAIR ACTIVITIES

In order to estimate emissions of perchloroethylene (Perc), methylene chloride (MeCl), and trichloroethylene (TCE) from the four automotive consumer product categories described in Chapter IV, ARB staff used a variety of tools. Specifically, surveys were used to obtain information on product content and composition as well as usage data from automotive maintenance and repair (AMR) facilities statewide. Additionally, site visits were conducted to expand knowledge of AMR activities and how products are used in these activities. This section presents an analysis of the methodologies used to estimate Perc, MeCl, and TCE emissions and summarizes the findings.

A. Brake Cleaner and Perc-Containing Automotive Products (Manufacturer) Survey

In March 1997, the ARB surveyed manufacturers of brake cleaning products to gather sales and formulation data for both chlorinated and non-chlorinated brake cleaning products, as well as information on future formulation trends that could increase the Perc content of brake cleaning products and other automotive consumer products (MeCl and TCE information was not collected from this survey). Perc product sales in the Manufacturer Survey responses account for about 90 percent of total statewide Perc brake cleaning product sales based on the ARB's 1990 Consumer Products Survey (ARB, 1996a).

From the returned surveys (22 surveys out of 37), we received information on 89 different brake cleaning products, 33 of which contain Perc. Based on reported sales of over 2,000,000 units ranging in size from 10 ounces to 55 gallons and Perc content from about 22 to 98 percent, Perc usage was estimated to be approximately 2,400,000 pounds per year (lbs/yr) or 178,000 gallons per year (gal/yr) from Perc-containing brake cleaning products. This usage is extrapolated to 100 percent to capture total Perc brake cleaning product sales, and determine that 1996 Perc sales were approximately 2.7 million pounds. Two subsequent ARB consumer product surveys in 1996 and 1998 found approximately 2.7 and 3.0 million pounds of Perc from California brake cleaning product sales. Of this amount, data from the Manufacturer Survey indicated that approximately 290,000 pounds of Perc brake cleaning product sales (10 percent) are used in residential applications.

The amount of Perc from the Manufacturer Survey is more than the estimated California Perc use from brake cleaning products in the U.S. EPA 1990 Database (ARB's 2,700,000 lbs/yr versus U.S. EPA's 470,000 lbs/yr) (ARB,1996a). It is important to note that the estimate from the U.S. EPA 1990 Database may not be representative of California usage since it was based on a nationwide study. However, some of the difference may be attributed to the reformulation of brake cleaning products that contained 1,1,1-trichloroethane (TCA), which has been phased out

under the Montreal Protocol. For comparison, 1991 Perc usage in dry cleaning operations was approximately 14,800,000 lbs/yr or 1,100,000 gal/yr (ARB, 1993a). Table V-1 summarizes the Manufacturer Survey data.

Table V-1. Summary of Manufacturer Survey Information

Product Type	Number of Products	Product Size		Units Sold in California1	
		Aerosol (oz)	Liquid (gal)	Industrial/ Institutional	Retail/ Household
Perc Products	33	10 to 22	1 to 55	1,883,604	254,009
Non-Perc Products	56	12 to 21	1 to 55	2,397,228	377,901

B. Automotive Service Facility Questionnaire (Facility Survey)

1. Background

As previously discussed, California brake cleaning product sales were extrapolated from the Manufacturer Survey responses to determine that brake cleaning products sold in 1996 contained almost 2.7 million pounds of Perc. In order to verify that this amount was used by automotive maintenance and repair facilities, a survey of automotive maintenance and repair facilities was conducted. This survey requested information on the number of facilities performing brake repair operations, the number of brake jobs performed, and the types and quantities of bulk liquid and aerosol products used.

The survey mailing list was based on information available from existing databases maintained by the California Department of Consumer Affairs, Bureau of Automotive Repair (BAR), the California Board of Equalization, and the United States Census Bureau. These databases showed that there were about 31,000 to 34,000 facilities in the automotive repair and car dealer standard industrial classification (SIC) codes in California as summarized in Table V-2. The BAR database appeared to be the most comprehensive, and identified facilities that, by their name, would most likely not perform brake services. For example, any facility with the words "body", "paint", "transmission", etc. was removed. In January 1998, surveys were mailed to approximately 25,000 remaining automotive maintenance and repair facilities and 6,820 usable surveys were returned (725 were incomplete and were not considered). The number of usable surveys returned was sufficient to be considered representative and accurate for all facilities statewide (2.5% margin of error, 99% confidence level). A copy of the survey form can be found in Appendix B.

Table V-2. Number of Businesses by SIC Code

SIC	Business Type	Number of Facilities
551	new and used car dealers	2,400
552	used car dealers	6,700
554	gas stations, gas & convenience food stores, other gas & truck stops	9,600
7533-4, 7536-8	general auto repair, other auto repair, tire retread	12,800 to 14,800
7539	brake and related auto repair	

Sources: The California Board of Equalization and the 1992 U.S. Economic Census (http://govinfo.kerr.orst.edu/cgi-bin/econ-list?02-state.cas)

2. Summary of Findings

Analysis of the survey data allowed for the determination of the number of facilities performing brake jobs, the various techniques used, the number of facilities using chlorinated products, the amount of chlorinated products used, and market share by product type and manufacturer. In some cases, the Facility Survey results were compared to the Manufacturer Survey results in order to correct for any under-reporting that may have occurred. Since the Manufacturer Survey did not collect information regarding MeCl and TCE from the product manufacturers, no adjustments can be made for these two compounds. As a result, emissions of MeCl and TCE from the Facility Survey may be under-reported.

Table V-3 summarizes the techniques that automotive maintenance and repair facility operators reported used in conjunction with brake service and repair operations. Of the 4,865 facilities performing brake jobs, 3,561 facilities reported using brake cleaning products, 258 facilities reported using other products such as carburetor cleaners or general purpose degreasers, 409 facilities reported using nothing, and 2,151 facilities reported using a aqueous-based portable brake cleaning unit, generally in conjunction with other products. Based on the techniques used, Table V-4 summarizes the product formulations used in the Facility Survey. Of the 3,561 facilities that reported using brake cleaning products, the majority of the facilities (2,192 facilities or approximately 62 percent) reported using a non-chlorinated brake cleaning product. An additional 1,369 facilities reported using products that contained some combination of Perc, MeCl, and TCE. Table V-5 shows total aerosol and bulk product usage and estimated statewide usage.

Table V-3. Brake Cleaning Techniques Used in Facility Survey[1]

Cleaning Technique Used	Number of Facilities Using Technique
Brake cleaning products	3561
Portable brake cleaning unit (aqueous) used in conjunction with aerosols	1514
Portable brake cleaning unit used exclusively	637
Other automotive consumer products[2]	248
Other cleaning techniques	10
No technique reported[3]	409

1. A facility may use more than one cleaning technique.
2. Refers to carburetor cleaners, engine degreasers, and general purpose degreasers.
3. The survey did not request information on the use of solvent-based portable brake cleaning units. As a result, some facilities that reported using nothing may actually be using these units.

Table V-4. Product Formulations Used in Facility Survey

Product Formulation	Number of Facilities Using Product
Non-Chlorinated Products	2192
Chlorinated Products	1363[1]
Perc Products	836
Perc/MeCl Products	443
Perc/TCE Products	27
Perc/MeCl/TCE Products	44
Other Chlorinated Products[2]	13
Unknown Formulations	43

1. Note: Thirty-seven facilities used more than one type of chlorinated product.
2. Other chlorinated products include Perc/TCA, TCE, and TCA formulations.

The Facility Survey contained two fields that requested information on the number of brake jobs performed per week, and the amount of product used per brake job. The product of these two fields is total usage, allowing for verification of usage estimates. Performing this calculation yields 164,000 to 172,000 lbs/year. Although this is only 75 percent of the 218,000 to 228,600 lbs/year of aerosol use identified above, it is reasonable because some products are also used for non-brake applications (based on site visits, see Part C).

Table V-5. Aerosol and Bulk Product Usage for Surveyed Facilities[1]

Compound	Usage	Aerosol Use [lbs/yr]	Bulk Use [lbs/yr]	Statewide Use [lbs/yr[2]]
Perc	Brake Use Only	213,800 to 228,500	9,000 to 9,600	824,600 to 881,400
	Brake & Non-Brake Use	218,400 to 234,000	9,000 to 9,600	841,600 to 901,500
MeCl	Brake Use Only	23,100 to 33,100	900 to 1,000	88,900 to 126,500
	Brake & Non-Brake Use	24,200 to 34,800	900 to 1,000	92,900 to 132,800
TCE	Brake Use Only	2,800 to 7,200	300 to 400	11,700 to 27,900
	Brake & Non-Brake Use	2,900 to 7,700	300 to 400	11,900 to 30,000

1. Rounded to nearest hundred pounds
2. Range of use is due to the range of Perc contents reported in the Manufacturer Survey. Usage is multiplied by the ratio of the total number of facilities (25,243) to the number used in the survey (6820), i.e., 3.701.

Biases for four areas where potential under-reporting could take place were identified and quantified: (1) the percent of facilities using Perc, (2) the percent of Perc-based products, (3) the amount of Perc used per job, and (4) the number of jobs performed. Each of these evaluations is discussed separately below. Again, this analysis is only conducted for Perc.

a. Percent of facilities using Perc

From the survey, 3,561 facilities used Perc or non-chlorinated aerosol products. This accounts for 73 percent of the 4,865 facilities performing brake work. This is consistent with the industry-sponsored study by John Norton of the George Mason University School of Business Administration which showed that 77 percent of the respondents nationwide used aerosols (Norton, 1993). The Facility Survey indicates that about 37 percent of these facilities use Perc-based brake cleaning products (the Norton study did not request information on whether the aerosol cleaners were Perc or non-Perc cleaners). Additionally, the data showed that for facilities using brake cleaners, 37 percent of the brake jobs were performed using a Perc-based brake cleaner. Additionally, 40 percent of the facilities visited during the site visits used a Perc-based product. Therefore, it does not appear that the percent of facilities using Perc has been under-reported.

b. Percent of Perc-based products

The under-reporting of the percent of Perc-based products can be quantified in one of two ways: (1) by looking at the actual numerical distribution of the different product titles reported, or (2) by identifying the percent of units sold that contain Perc. Table V-6 summarizes the actual number of products and their relative percent and shows that the Facility Survey under-reports the percent of Perc-based products by about 14 percent compared with the Manufacturer Survey.

Table V-6. Proportion of Products that Contain Perc

	Facility Survey	Manufacturer Survey
Total Number of Products	183[1]	89
Number of Perc Products	58	33
Percent of Total	32	37

1. There were additional products with unknown formulations, but they were discounted because they only represent 1.6 percent of the total number of product entries.

Table V-7 presents the number of survey entries, where each entry represents a unit of product, while Table V-8 presents the total number of units sold. Comparing Table V-7 to Table V-8 it is apparent that the Facility Survey under-reports the proportion of survey entries that contain Perc, again by about 14 percent.

Table V-7. Proportion of Facility Survey Entries that Contain Perc

Total Number of Entries	3,622
Number of Perc Entries	1,366
Percent of Total	38

Table V-8. Proportion of Manufacturer Survey Entries that Contain Perc[1]

Total Units Sold	4,280,832
Perc Units Sold	1,883,604
Percent of Total	44

1. Units sold include bulk products. However, their numbers constitute less than 0.3 percent of the total.

This under-reporting is likely a result of the emphasis on Perc in the cover letter that accompanied the Facility Survey, and was observed during a few site visits to facilities that had previously submitted surveys. Correcting this bias requires adding 16 percent ([0.44 - 0.38]/0.38), to the range of product estimated earlier in Table V-5 to yield approximately 144,300 lbs/year. Additionally, if the 1.6 percent of products for which formulation data could not be obtained are assumed to be Perc-based products, then an additional 3,900 to 7,300 lbs/year can be added to the total Perc usage.

c. Number of cans used

As previously discussed, reported usage was verified by calculating the product of the number of brake jobs per week and the quantity of solvent used per brake job. For some facilities, this calculated usage was higher than the reported usage indicating that some facilities could be under-reporting their true usage. In many cases, this means that product was most likely used for other tasks besides brake service and repair. Extrapolating statewide yields an additional 127,000 to 137,000 pounds per year Perc that could be included in the total Perc usage.

d. Number of Brake Jobs

There is a potential for an across the board under-reporting of the number of brake jobs performed which can be approximated by applying the normal brake service frequency to the number of vehicles registered in California. According to the 1996 ARB Mobile Source Emissions Inventory database, there are approximately 24 million vehicles registered in California. Information from the Brake Manufacturer's Council indicates that light duty cars and trucks, which account for 88 percent of the registered vehicles (ARB, 1998), typically have their brakes serviced every 3.5 years (Brake Pad Partnership Steering Committee, 1999). Providing that fleets and the remaining 12 percent of vehicles (medium and heavy duty trucks and buses) may require more frequent servicing, the average brake service frequency is approximately once every 3 years. The result is 8,067,000 brake jobs per year or 2,747,000 more brake jobs than represented by the extrapolated Facility Survey result of 5,320,000 brake jobs per year. Assuming, based on the Facility Survey, that 73 percent of these additional brake jobs are performed using a cleaning product, that 37 percent of these are Perc, and that each Perc brake job requires approximately 14.4 ounces of product, an additional 668,000 pounds of Perc per year could be included in the total Perc usage.

e. Total usage

Adding each of the biases evaluated above to the baseline usage of 901,500 pounds per year (from Table V-5) gives 1,858,100 pounds per year as shown in Table V-9.

Table V-9. Total Perc Usage

Baseline Usage	Pounds per Year
ARB baseline estimate - brake cleaning products (max.)	901,500
Adjustments	
Potential under-reporting of Perc-based products used	144,300
Potential under-reporting of products with no formulation data	7,300
Potential under-reporting of the amount of Perc used per job	137,000
Potential under-reporting of the number of brake jobs performed	668,000
Total	1,858,100

The Facility Survey accounts for almost 1.9 million pounds of Perc used per year. Considering the residential usage of approximately 290,000 pounds as discussed in Part A, total Perc usage is almost 2.2 million pounds per year. This is approximately 200,000 pounds less than the amount of Perc brake cleaning product reported sold in the State in the Manufacturer Survey. However, it is about a 750,000 pounds more than the 1.45 million pounds of Perc per year estimated from the amount of Perc that would be used on 24 million vehicles being serviced every 3 years (using Perc for 20 percent of all brake jobs, and 14.4 ounces per job). Therefore, the assignment of these biases is reasonable and appropriate.

Facilities that service and repair brakes do not account for the full amount of brake cleaner sold in California. The additional brake cleaner is potentially being used in three additional areas: (1) facilities that were not sent a facility survey; (2) larger residential usage than previously estimated; and, (3) emissions from the more difficult to quantify off-road, marine, and aviation categories.

C. Brake/Automotive Repair Shop Survey (Site Visits)

In an effort to increase understanding of AMR activities as related to the use of automotive consumer products, ARB staff conducted site visits to 137 AMR facilities across the state (21 additional visits were conducted to observe aqueous-based brake cleaning equipment and to evaluate flammability issues). The areas visited included Sacramento, San Diego, the Los Angeles area, the San Francisco Bay Area, and the North State area. Facilities in Foothill and Sierra Nevada communities were also visited. During the site visits, process and source characteristic information was collected so that modeling could be performed to estimate the potential health impacts associated with Perc, MeCl, and TCE emissions from the use of automotive consumer products. Information collected included building dimensions, the location of potential residential and off-site worker receptors, and product usage information. The site

visits were also an opportunity to talk with shop owners and service technicians about their experiences using chlorinated and non-chlorinated aerosol and liquid products and portable brake cleaning units. The site visits focused primarily on brake cleaning product usage that occurred in conjunction with brake service and repair operations.

1. Product Usage

Of the 137 facilities, 55 were using a chlorinated product, most of which were Perc-based. Overall, the majority of facilities were using non-chlorinated products. Table V-10 summarizes the types of aerosol and liquid products used to do brake work at the site visit facilities.

Many facilities indicated that they felt that chlorinated and non-chlorinated products performed similarly, although a few mechanics indicated definite preferences. A large motivating factor in determining which product was purchased by the facility at any particular time was cost. When replenishing their supply of aerosol brake cleaners, facilities typically asked their suppliers to send the least expensive product. Depending on pricing at the time, this could be either a chlorinated or non-chlorinated product. Furthermore, due to mechanic preferences, some facilities maintained stocks of both chlorinated and non-chlorinated products.

Table V-10. Product Formulations Used in Site Visit Facilities

Product Formulation[1,2]	Number of Facilities Using Product	Product Size	
		Aerosol (oz)	Liquid (gal)
Non-Chlorinated Products	82	5 to 19	1 to 55
Chlorinated Products	55	17 to 25	1
Perc Products	43	19 to 20	1
Perc/MeCl Products	10	17 to 25	none observed
Perc/TCE Products	2	18 to 24	none observed

1. The site visits did not reveal any products the were comprised of either MeCl or TCE as the sole chlorinated component or any multicomponent products consisting of Perc, MeCl, and TCE. This does not indicate that these product formulations do not exist.
2. A product is considered chlorinated if it contains Perc, MeCl, or TCE.

Liquid products are not necessarily convenient to use in the gallon-sized containers they typically come in. As a result, most facilities converted these into aerosol form or into pump sprayers for easier use. The use of portable brake cleaning units (both aqueous and solvent-based) was also prevalent during the site visits. As discussed in Chapter IV, these units can be used either independently or in conjunction with aerosol products. However, a facility

that uses both aerosol brake cleaning products and portable brake cleaning units may not necessarily use these products in tandem. One mechanic may prefer to use the aerosol exclusively and another at the same facility may prefer to use the portable unit exclusively. This mode of use between the two products was the most common observed. The data showed that 78 of the 137 facilities were using a portable brake cleaning unit. Table V-11 summarizes site visit observations of whether portable brake cleaning units were used in conjunction with other products.

Table V-11. Use of Portable Brake Cleaning Units in Site Visit Facilities

Portable Brake Cleaning Unit Usage	Number of Facilities
Used in conjunction with aerosols	69
Used exclusively	9
Total:	78

Portable brake cleaning units gained their popularity as a means to satisfy the asbestos brake dust control regulations. However, many facilities indicated that they also used these units on non-asbestos brakes because they discovered that they worked equally well in controlling brake dust from non-asbestos brakes. Additionally, many shops reported cost savings associated with the use of these units, even after taking into consideration the cost of having the spent baths changed or replaced. In fact, some shops encouraged their technicians to minimize their use of aerosol products in favor of the portable units.

Most of the shops that were visited did not have pre-established guidelines outlining how much aerosol product was to be used. Instead, these facilities relied upon what the mechanic felt was an appropriate amount to complete the task. Additionally, some facilities also reported using brake cleaning products for small parts cleaning and degreasing on a limited basis. A common complaint, however, was that some mechanics would use an excessive amount of aerosol product and that it was difficult for the owner or shop foreman to control this usage; even if pre-established usage criteria was in place. Many facilities felt that the use of portable brake cleaning units minimized these problems and reduced operating costs.

When using liquid-based cleaning methods such as portable brake cleaners, drying time is a reasonable concern. However, most of the 78 facilities that were using these units indicated that drying time was not an issue. According to the mechanics, since brake jobs are typically performed on a per axle basis, the brake assembly on one end has ample time to dry while the other is being serviced. By the time the tires are re-installed, both assemblies have had ample drying time. None of the facilities visited reported any problems, safety concerns, or customer complaints associated with the use of portable brake cleaning units or other liquid cleaning methods.

In addition to aerosols, liquid products, and portable brake cleaning units, other cleaning methods observed included soap and water and brushing. These methods were used at only a few of the facilities visited.

2. Source Characteristics

Source characteristic information was needed to estimate potential health impacts and assist in the development of the generic facilities (discussed in Chapter VI and Appendix D). The information collected here includes the number of brake jobs performed at each facility and the physical dimensions of the service area. The number of brake jobs came directly from the facility owners and shop foremen. When obtaining the physical dimensions, only the portion of the facility building where service work was performed (and hence from where any potential emissions would be emanating) was measured. Other areas of the facility, such as the customer waiting area and adjacent storage rooms, were not considered if they were separated by a normally closed door. If the door was normally open, then those areas were considered as part of the area from which emissions would occur. Table V-12 summarizes the average number of brake jobs and building dimensions (in terms of facility volume) for the site visit facilities. A more detailed compilation of source characteristic information for each facility is presented in Appendix D.

Table V-12. Summary of Source Characteristics

Average Number of Brake Jobs [jobs/year]	Total Number of Brake Jobs [jobs/year]	Average Facility Volume [m^3]	Range of Facility Volumes [m^3]
936	111,956	3,769	206 to 70,679

3. Receptor Locations

Another piece of information collected during the site visits was the location of the nearest residential and off-site worker receptors. The data shows that many receptors tended to be located 50 to 100 meters away from the facility; however, there were a significant number of receptors located less than 30 meters away. Table V-13 summarizes the number of facilities that had receptors located less than 20, 30, 50, and 100 meters away from the facility.

Table V-13. Number of Site Visit Facilities with Receptors at Various Distances[1]

Receptors Less than 20 meters		Receptors Less than 30 meters		Receptors Less than 50 meters		Receptors Less than 100 meters	
Resident	Worker	Resident	Worker	Resident	Worker	Resident	Worker
17	45	33	65	48	84	68	103

1. Receptor distances measured from edge of the facility building.

The facilities with either a residential or off-site worker receptor located nearby tended to be smaller facilities. Larger facilities, which include dealerships and fleets, usually had a buffer created by a large site footprint surrounding the building that housed the service operations. As a result, this limited the proximity of receptors to these facilities. With the smaller facilities, the nearest off-site receptor could be much closer. For all 137 facilities, residential receptor distances ranged from 5 meters to 3219 meters (approx. 2 miles) and off-site worker receptor distances ranged from 2 meters to 483 meters. At the 54 facilities that were modeled, residential receptor distances ranged from 6 meters to 2414 meters (approx. 1.5 miles) and off-site worker receptor distances ranged from 3 meters to 483 meters. See Table VI-2 and Appendix D for more information on modeling results.

4. Emissions from Site Visits

The majority of the information collected during the site visits focused primarily on brake service and repair activities. As a result, emissions estimates (as well as potential health impacts) are based primarily on the number of brake jobs performed. Other activities occurring at the facility impact emissions to the extent that any product used on those activities is also used to perform brake work. This impact is included because ARB staff quantified the total usage of the product used to do brake work, even if it was used to complete other tasks. Therefore, emissions and health impacts are associated with overall product usage rather than just brake service and repair activities.

In quantifying Perc, MeCl, and TCE emissions from automotive consumer products, ARB staff looked at various studies, including those by the ARB, U.S. EPA, and John Norton of George Mason University (Norton, 1993), and could not find sufficient information representative of California automotive maintenance and repair facilities. Therefore, to estimate emissions from individual automotive maintenance and repair facilities, information from the 137 site visits was used to estimate these emissions.

Information was also collected from the California Board of Equalization, the California Department of Consumer Affairs' Bureau of Automotive Repair, and the United States Economic Census to estimate that there are about 31,000 to 34,000 AMR facilities in California (BOE, 1997a; BOE, 1997b; BAR, 1997; U.S. Economic Census, 1992). Based on the standard

industrial classification (SIC) breakdown within the United States Economic Census, approximately 21,000 of these facilities may perform brake services in California. These facilities can be grouped into five categories: service stations, fleets, new and used car dealerships, brake shops, and general automotive repair facilities. Table V-14 gives a description of each facility category.

Table V-14. Description of Automotive Maintenance and Repair Facility Categories

Facility Category	Category Description
Service Stations	Offer automotive repair services where gasoline and other fuels can be purchased. These facilities repair mainly passenger and light-duty vehicles.
Fleets	Governmental agencies and private companies operate fleets of vehicles ranging from passenger cars to heavy-duty trucks and buses. Fleet centers typically encompass a large area, which limits how close offsite receptors can be located.
New and Used Car Dealerships (Dealerships)	Many new and used car dealerships offer a complete range of brake repair services in addition to other automotive repair services. Their services are not limited to customers who purchased a vehicle from them.
Brake shops	Some shops limit their services to brake service and repair activities. In many cases, however, additional repair services are often available.
General Automotive Repair	Includes independently-owned shops, franchises, chain shops, tire replacement and repair shops, and passenger car and truck rental and leasing.

The site visit data indicated that the quantity of Perc, MeCl, and TCE that is emitted per brake job varies with several factors. These factors include the individual mechanic who is servicing the vehicle, the chlorinated content in the product, and the manner in which the product is used. Emissions are also impacted by the size and operating schedule of the facility. Furthermore, the aerosol spray cans that contain the products come in several sizes with the chlorinated content ranging from 20 percent to 99 percent according to manufacturers' material safety data sheets. As a result, the emission estimates summarized in Tables V-15 and V-16 reflect the variability in Perc, MeCl, and TCE content in brake cleaning products and the use of chlorinated brake cleaning products on small parts cleaning, degreasing, and other activities. Based on observations during site visits, up to 100 percent of the Perc, MeCl, and TCE contained in aerosol products may be emitted to the air when used in these activities.

Table V-15. Emission Estimates from Site Visits by Facility Category[1]

Facility Category	Number of Facilities Visited	Range of Annual Perc Emissions [pounds/year]	Range of Annual MeCl Emissions [pounds/year][2]	Range of Annual TCE Emissions [pounds/year][2]
Service Stations	12	20 to 214	0	0
Fleets	6	18 to 1,305	0	0
New and Used Car Dealerships	24	41 to 1,525	0	0
Brake Shops	6	58 to 152	0	0
General Automotive	89	1.6 to 2,091	1.8 to 82	39 to 196

1. Based on usage of brake cleaning products. Emissions based on usage from all four automotive consumer product categories may be higher.
2. MeCl or TCE in brake cleaning products were not observed in use at service stations, fleets, dealerships, or brake shops. Since we didn't specifically look for MeCl and TCE, this does not indicate that emissions of these pollutants do not occur at these facility categories.

Table V-16. Total Emissions of Perc, MeCl, and TCE Estimated from Site Visits

Total Perc Emissions[1] [pounds/year]	Total MeCl Emissions [pounds/year]	Total TCE Emissions [pounds/year]
14,886 to 20,066	125	235

1. Some facilities use a Perc-containing brake cleaning product which shows a Perc content range on the Material Safety Data Sheet; therefore, a range is presented for Perc emissions.

D. Summary of Emissions

Emissions of Perc, MeCl, and TCE from the Facility Survey and site visits are presented in Table V-5 and Table V-16 based on facilities that service and repair brakes and use brake cleaning products. The Facility Survey also contains information on emissions from all four automotive consumer product categories under consideration. Table V-17 summarizes the total emissions from all four automotive consumer product categories at all facilities surveyed by the Facility Survey.

Table V-17. Estimated Maximum Emissions from the Facility Survey

Compound	Emissions [lbs/yr]
Perc	1,858,100
MeCl	224,400
TCE	37,000

The 1997 Consumer and Commercial Products (consumer product) Survey collected sales data from the four automotive consumer product categories. This survey shows emissions of Perc, MeCl, and TCE greater than what is represented by the Facility Survey. As mentioned in Part B, this difference can be attributed to: (1) facilities that were not sent a facility survey; (2) larger residential usage than previously estimated; and, (3) emissions from the more difficult to quantify off-road, marine, and aviation categories. Since the consumer product survey represents a more complete picture of total compound emissions, it used to make the final emission estimates. Table V-18 summarizes the estimated statewide emissions of Perc, MeCl, and TCE from the four automotive consumer product categories.

Table V-18. Statewide Emission Estimates from Automotive Consumer Products[1]

Compound	Emissions [tons/day]
Perc	4.2
MeCl	0.7
TCE	0.3
Total	5.2

1. Source: 1997 Consumer and Commercial Products Survey.

VI. POTENTIAL HEALTH IMPACTS OF PERCHLOROETHYLENE, METHYLENE CHLORIDE, AND TRICHLOROETHYLENE FROM AUTOMOTIVE MAINTENANCE AND REPAIR ACTIVITIES

A. An Overview of Health Risk Assessment

A health risk assessment (HRA) is an evaluation or report that a risk assessor (e.g., Air Resources Board, district, consultant, or facility operator) develops to describe the potential a person or population may have of developing adverse health effects from exposure to a facility's emissions. Some health effects that are evaluated could include cancer, developmental effects, or respiratory illness. The pathways that can be included in an HRA depend on the toxic air pollutants that a person (receptor) may be exposed to, and can include breathing, the ingestion of soil, water, crops, fish, meat, milk, and eggs, and dermal exposure. For this HRA, we are evaluating the impacts for Perc, MeCl, and TCE via the breathing or inhalation pathway only. We are not evaluating other pathways of exposure because at this time the Office of Environmental Health Hazard Assessment (OEHHA) does not routinely use methods for assessing exposure to volatile compounds such as Perc, MeCl, and TCE by exposure routes other than inhalation. Such multiple exposure pathway (multipathway) assessments are traditionally used for lipophilic (fat-loving), semivolatile, or low volatility compounds such as dioxins, polycyclic aromatic hydrocarbons (PAHs), or polychlorinated biphenyls (PCBs).

Generally, to develop an HRA, the risk assessor would perform or consider information developed under the following four steps. The four steps are Hazard Identification, Dose-Response Assessment, Exposure Assessment, and Risk Characterization.

1. Hazard Identification

In the first step, the risk assessor would determine if a hazard exists, and if so, would identify the exact pollutant(s) of concern and the type of effect, such as cancer or respiratory effects.

For this assessment, the pollutants of concern (Perc, MeCl, and TCE) have been formally identified under the AB 1807 Program as toxic air contaminants (TACs) through an open, regulatory process by the ARB (ARB 1991a; ARB 1989; ARB 1990a). In addition, Perc, MeCl, and TCE are hazardous air pollutants under the Federal Clean Air Act (42 U.S.C. 7412).

2. Dose-Response Assessment

In this step of risk assessment, the assessor would characterize the relationship between a person's exposure to a pollutant and the incidence or occurrence of an adverse health effect.

This step of the HRA is performed for the ARB by OEHHA. OEHHA supplies these dose-response relationships in the form of cancer potency factors or unit risk factors (URFs) for carcinogenic effects and reference exposure levels (RELs) for non-carcinogenic effects. The URFs and RELs that are used in California can be found in one of three references: (1) The California Air Pollution Control Officer's Association (CAPCOA) Air Toxics "Hot Spots" Program, Risk Assessment Guidelines, October 1993; (2) The OEHHA Air Toxics "Hot Spots" Program Risk Assessment Guidelines, Part I, The Determination of Acute RELs for Airborne Toxicants, March 1999; and (3) The OEHHA Air Toxics "Hot Spots" Program Risk Assessment Guidelines, Part II, Technical Support Document for Describing Available Cancer Potency Factors, April 1999. The individual URFs and RELs for Perc, MeCl, and TCE that we are using for this HRA are presented in Section B, Part 2.

3. Exposure Assessment

In this step of the risk assessment, the risk assessor estimates the extent of public exposure by looking at who is likely to be exposed, how exposure will occur (e.g., inhalation and ingestion), and the magnitude of exposure.

For automotive maintenance and repair (AMR) activities, the receptors that are likely to be exposed include residents or off-site workers located near the facility. Onsite workers certainly could also be impacted by the emissions; however, they are not included in this HRA because Cal/OSHA has jurisdiction over on-site workers. More discussion on workplace exposure can be found in Chapter VIII. Exposure was evaluated for Perc, MeCl, and TCE via the breathing or inhalation pathway only. The magnitude of exposure was assessed through the following process. Emissions were quantified using emission factors determined from site visits, facility, and manufacturer surveys, and input from industry representatives. During the site visits, other information such as physical dimensions of the source and receptor locations were obtained. Computer air dispersion modeling was used to provide downwind ground-level concentrations of the TACs at near-source, residential, and off-site worker locations.

4. Risk Characterization

This is the final step of risk assessment. In this step, the risk assessor combines information derived from the previous steps. Modeled concentrations, which are determined through exposure assessment, are combined with the URFs (for cancer risk) and RELs (for non-cancer effects) determined under the dose-response assessment. This step integrates this information to quantify the potential cancer risk and non-cancer health impacts.

B. The Tools Used for this Risk Assessment

The tools and information that are used to estimate the potential health impacts from a facility include an air dispersion model and pollutant-specific health effects values. Information required for the air dispersion model includes emission estimates, physical descriptions of the source, and emission release parameters. Combining the output from the air dispersion model and the pollutant-specific health values provides an estimate of the off-site potential cancer and non-cancer health impacts from the emissions of a toxic air contaminant. For this assessment, we are estimating the potential health impacts from Perc, MeCl, and TCE emitted during AMR activities. A brief description of the air dispersion modeling and pollutant-specific health effects values is provided in this Chapter. A more detailed discussion, including example calculations for determining individual acute and chronic health impacts and both individual, regional, and statewide cancer risk is presented in Appendix C. Memorandums regarding modeling results can be found in Appendices D and E.

1. Air Dispersion Modeling

Air dispersion models are used to estimate the downwind, ground-level concentrations of a pollutant after it is emitted from a facility. The downwind concentration is a function of the quantity of emissions, release parameters at the source, and appropriate meteorological conditions. The two models that were used during this HRA are SCREEN3, version 96043, and ISCST3, version 97363. Appendix D provides additional details on the modeling results. Appendix C provides an example calculation illustrating how the outputs from these models are used to calculate potential health impacts. The U.S. EPA recommends the SCREEN3 model for first order screening calculations and ISCST3 model for refined air dispersion modeling (U.S. EPA, 1995a; U.S. EPA, 1995b). Both models are currently used by the ARB, districts, and other states.

2. Pollutant-Specific Health Effects Values

Dose-response or pollutant-specific health effects values are developed to characterize the relationship between a person's exposure to a pollutant and the incidence or occurrence of an adverse health effect. A unit risk factor (URF) or cancer potency factor is used when estimating potential cancer risks and reference exposure levels (RELs) are used to assess potential non-cancer health impacts.

As presented in Chapter VI, Section C, exposure to Perc, MeCl, and TCE may result in both cancer and non-cancer health effects. The inhalation URFs and non-cancer acute and chronic RELs that are used for this HRA are listed in Table VI-1. Also included in Table VI-1 are the non-cancer acute and chronic toxicological endpoints for Perc, MeCl, and TCE. During this assessment, new acute RELs were adopted by OEHHA for Perc and MeCl. Table VI-1 reflects the most current OEHHA-adopted health effects values for these compounds. The acute impacts presented in the June 1997 Status Report or Needs Assessment (ARB, 1997a) used the previous acute REL for Perc. In that report, the acute non-cancer results were all reported to be

less than a hazard index of 1.0. Generally, hazard indices of less than 1.0 are not considered to be a concern to public health. A hazard index is the ratio of the modeled concentration for a toxic pollutant and the reference exposure level for that pollutant. Since the current acute Perc REL is 2.94 times higher than the previous REL and it is used as a denominator in non-cancer hazard index calculations, the net result of the current REL, if it were applied to the results presented in the 1997 Needs Assessment, would show a decrease in the acute hazard indices by a factor of 2.94. Currently, OEHHA is in the process of reviewing studies for developing new or updating existing chronic RELs. MeCl and TCE are among the compounds under review. Once the chronic RELs are adopted by OEHHA, they may be used in HRAs.

Table VI-1. Pollutant-Specific Health Effects Values Used for Determining Potential Health Impacts [1]

Compound	Cancer Unit Risk Factor $(ug/m3)^{-1}$	Non-cancer Reference Exposure Levels (ug/m3)		Toxicological Endpoints	
		Acute	Chronic	Acute	Chronic
Perchloroethylene (Perc)	5.9 E-6	20,000	35	central nervous system; eye & respiratory irritation	kidney; liver and gastrointestinal system
Methylene Chloride (MeCl)	1.0 E-6	14,000	3000	central nervous system	central or peripheral nervous system; liver and gastrointestinal system
Trichloroethylene (TCE)	2.0 E-6	none	640	none	central or peripheral nervous system; liver and gastrointestinal system

1. Health effects values and toxicological endpoints were obtained from three sources:
   A) California Air Pollution Control Officer's Association, Air Toxics Hot Spots Program, Revised 1992 Risk Assessment Guidelines, October 1993.
   B) Office of Environmental Health Hazard Assessment, Air Toxic Hot Spots Program Risk Assessment Guidelines, Part II, Technical Support Document for Describing Available Cancer Potency Factors, April 1999.
   C) Office of Environmental Health Hazard Assessment, Air Toxic Hot Spots Program Risk Assessment Guidelines, Part I, The Determination of Acute Reference Exposure Levels for Airborne Toxicants.

A URF is defined as the estimated upper-confidence limit (usually 95%) probability of a person contracting cancer as a result of constant exposure to a concentration of $1 \mu g/m^3$ over a 70-year lifetime. In other words, using the URF for Perc as an example, which is 5.9×10^{-6} (microgram per cubic meter)$^{-1}$ or $(\mu g/m^3)^{-1}$, the potential excess cancer risk for a person continuously exposed over a 70-year lifetime to $1 \mu g/m^3$ of Perc is estimated to be no greater than 5.9 chances in 1 million (OEHHA, 1999b).

An REL is used as an indicator of potential non-cancer adverse health effects. An REL is defined as a concentration level at or below which no adverse health effects are anticipated. Reference Exposure Levels are designed to protect most sensitive individuals in the population by including safety factors in their development and can be created for both acute and chronic exposures. An acute exposure is defined as one or a series of short-term exposures generally lasting less than 24 hours. Consistent with risk guidelines, a 1-hour exposure is used to determine acute non-cancer impacts (CAPCOA, 1993). Chronic exposure is defined as long-term exposure usually lasting from one year to a lifetime.

C. Potential Health Effects of Perchloroethylene, Methylene Chloride, and Trichloroethylene

This section summarizes the cancer and non-cancer impacts that can result from exposure to Perc, MeCl, and TCE.

1. Perchloroethylene

Exposure to Perc may result in both cancer and non-cancer health effects. The probable route of human exposure to Perc is inhalation (ARB, 1997b).

a. Cancer

The OEHHA staff has performed an extensive assessment of the potential health effects of Perc, reviewing available carcinogenicity data. OEHHA concluded that Perc is a potential human carcinogen with no identifiable threshold below which no carcinogenic effects are likely to occur. The Board formally identified Perc as a toxic air contaminant (TAC) in October 1991 (ARB, 1991a). The State of California under Proposition 65 listed Perc as a carcinogen in April 1988 (OEHHA, 1999c). Table VI-1 presents the current health effects values that are used in this HRA for determining the potential health impacts.

In 1990, the U.S. Congress listed Perc as a hazardous air pollutant (HAP) in subsection (b) of Section 112 of the Federal Clean Air Act (42 U.S.C. 7412). The U.S. EPA has classified Perc in Group B2/C, as a probable human carcinogen, on the basis of sufficient evidence for carcinogenicity in animals and inadequate evidence in humans. The International Agency for Research on Cancer (IARC) has classified Perc in Group 2A, as a probable human carcinogen, based on sufficient evidence in animals and limited evidence in humans (ARB, 1997b).

Epidemiological studies have provided some indication that the use of dry cleaning solvents, primarily Perc, poses an increased risk of cancer for exposed workers. However, investigators were unable to differentiate among exposures to various solvents, and other possible confounding factors, like smoking, were not evaluated. Perc increased the incidence of hepatocellular tumors in laboratory mice after oral and inhalation exposure and mononuclear cell leukemia and kidney tumors in rats after inhalation (ARB, 1997b).

b. Non-Cancer

Short-term (acute) and long-term (chronic) exposure to Perc may result in non-cancer health effects. Acute toxic health effects resulting from short term exposure to high levels of Perc may include headaches, dizziness, rapid heartbeat, and irritation or burns on the skin, eyes, or respiratory tract. Massive acute doses can induce central nervous system depression resulting in respiratory failure. Chronic exposure to lower Perc concentration levels may result in dizziness, impaired judgement and perception, and damage to the liver and kidneys (ARB, 1996b). Workers have shown signs of liver toxicity following chronic exposure to Perc, as well as kidney dysfunction and neurological effects. Effects on the liver, kidney, and central nervous systems from chronic inhalation exposure to Perc have been reported in animal studies (ARB, 1997b).

In addition to CAPCOA and OEHHA listing Perc as having acute and chronic non-cancer RELs (CAPCOA, 1993; OEHHA, 1999a), the U.S.EPA established an oral Reference Dose (RfD) for Perc of 0.01 milligrams per kilogram per day based on hepatotoxicity in mice and weight gain in rats. The U.S. EPA has not established a Reference Concentration (RfC) for Perc (ARB, 1997b). Table VI-1 presents the current health effects values that are used in this HRA for determining the potential health impacts.

Epidemiological studies of women working in the dry cleaning industry showed some adverse reproductive effects, such as menstrual disorders and spontaneous abortions, but study design prevented significant conclusions. Women exposed to drinking water contaminated with solvents including Perc, showed some evidence of birth defects. Inhalation exposure of pregnant rodents to 300 parts per million Perc produced maternal toxicity and fetotoxicity manifested as developmental delays and altered performance in behavioral tests in the offspring of exposed mice and rats. However, Perc is not considered to be a teratogen (ARB, 1997b).

2. Methylene Chloride

Exposure to MeCl (also known as dichloromethane) may result in both cancer and non-cancer health effects. The probable route of human exposure to MeCl is inhalation (ARB, 1997b).

a. Cancer

The OEHHA staff has performed an extensive assessment of the potential health effects of MeCl, reviewing available carcinogenicity data. The OEHHA staff agreed with U.S. EPA and IARC that MeCl is either a possible or probable human carcinogen with no identifiable threshold

below which no carcinogenic effects are likely to occur. The Board formally identified MeCl as a toxic air contaminant (TAC) in July 1989 (ARB, 1989). The State of California under Proposition 65 listed MeCl as a carcinogen in April 1988 (OEHHA, 1999c). Table VI-1 presents the current health effects values that are used in this HRA for determining the potential health impacts.

In 1990, the U.S. Congress listed MeCl as a HAP in subsection (b) of Section 112 of the Federal Clean Air Act (42 U.S.C. 7412). The U.S. EPA has classified MeCl in Group B2, as a probable human carcinogen. The IARC has classified MeCl in Group 2B, as a possible human carcinogen (ARB, 1997b).

b. Non-Cancer

Short-term (acute) and long-term (chronic) exposure to MeCl may result in non-cancer health effects. MeCl vapor is irritating to the eyes, respiratory tract, and skin. It is also a central nervous system depressant including decreased visual and auditory functions and may cause headache, nausea, and vomiting. Acute toxic health effects resulting from short term exposure to high levels of MeCl may include pulmonary edema, cardiac arrhythmias, and loss of consciousness. Chronic exposure can lead to bone marrow, hepatic, and renal toxicity. MeCl is metabolized by the liver with resultant carboxyhemoglobin formation (ARB, 1997b).

In addition to CAPCOA and OEHHA listing MeCl as having acute and chronic non-cancer RELs (CAPCOA, 1993; OEHHA 1999a), the U.S.EPA established an oral Reference Dose (RfD) for MeCl of 0.06 milligrams per kilogram per day based on liver toxicity in rats, and is currently reviewing a Reference Concentration (RfC) (ARB, 1997b). Table VI-1 presents the current health effects values that are used in this HRA for determining the potential health impacts.

No information on adverse reproductive effects in humans from inhalation or oral exposure has been found, but fetotoxicity was observed in pregnant rodents exposed by inhalation to high concentrations of MeCl throughout pregnancy as evidenced by reduced fetal body weight and reduced skeletal ossification (ARB, 1997b).

3. Trichloroethylene

Exposure to Trichloroethylene (TCE) may result in both cancer and non-cancer health effects. The probable routes of human exposure to TCE are inhalation and ingestion (ARB, 1997b).

a. Cancer

The OEHHA staff has performed an extensive assessment of the potential health effects of TCE, reviewing available carcinogenicity data. The OEHHA staff agrees with U.S. EPA and IARC that TCE is a probable human carcinogen with no identifiable threshold below which no carcinogenic effects are likely to occur. The Board formally identified TCE as a toxic air contaminant (TAC) in October 1990 (ARB, 1990a). The State of California under Proposition 65 listed TCE as a carcinogen in April, 1988 (OEHHA, 1999c). Table VI-1 presents the current health effects values that are used in this HRA for determining the potential health impacts.

In 1990, the U.S. EPA listed TCE as a HAP pursuant to subsection (b) of Section 112 of the Federal Clean Air Act (42 U.S.C. 7412). The U.S. EPA has classified TCE in Group B2/C, as a probable human carcinogen. The International Agency for Research on Cancer classified TCE in Group 2A, as a probable human carcinogen, based on sufficient evidence in animals and limited evidence in humans (ARB, 1997b).

The U.S. EPA considers the epidemiologic data on TCE carcinogenicity in humans to be inconclusive. Increases in testicular cancer have been reported in inhalation studies in animals. Carcinogenic responses to TCE inhalation studies in animals are increased incidences of hepatocellular carcinoma and adenoma in male mice; lung adenocarcinomas and malignant lymphomas in female mice; malignant liver tumors in B6C3F1 mice; and renal tumors in rats (ARB, 1997b).

b. Non-Cancer

Short-term (acute) and long-term (chronic) exposure to TCE may result in non-cancer health effects. TCE is a central nervous system depressant and has been used as an anesthetic. It is mildly irritating to the eyes and respiratory tract. Occupational exposure to TCE has resulted in nausea, headache, loss of appetite, weakness, dizziness, ataxia, and tremors. Acute exposures to high concentrations has caused irreversible cardiac arrhythmias, nerve and liver damage and death. Chronic exposure to TCE has also been shown to cause respiratory irritation, renal toxicity, and immune system depression. Alcohol consumption in humans increases the toxicity of TCE and causes "degreaser's flush", which are red blotches on the skin (ARB, 1997b).

A chronic non-cancer REL is listed in the California Air Pollution Control Officers Association (CAPCOA), Revised 1992, Risk Assessment Guidelines, October 1993. Table VI-1 presents the current health effects values that are used in this HRA for determining the potential health impacts. The U.S. EPA currently is reviewing the Reference Concentration (RfC) and the oral Reference Dose (RfD) for TCE (ARB, 1997b).

There is inadequate information to determine whether TCE causes reproductive toxicity in humans. One study reported increased miscarriages in nurses exposed to TCE as well as other anesthetics. An association was found between elevated levels of contaminants, including TCE, in drinking water and congenital heart disease in children. Other studies have not reported adverse reproductive effects in humans exposed to TCE in drinking water. In animal studies, an increase in abnormal sperm morphology in mice exposed by inhalation was reported. Exposure of rats and mice to TCE by inhalation causes a significant delay in fetal maturation and an increase in embryotoxicity (ARB, 1997b).

D. Factors that Affect the Outcome of a Health Risk Assessment at Automotive Maintenance and Repair Facilities

Factors that affect the outcome of potential health impacts at AMR facilities from the use of aerosol and liquid products that contain some combination of Perc, MeCl, or TCE include: (1) the concentration of Perc, MeCl, or TCE in the product(s) used; (2) the facility operating schedule; (3) product use; (4) the physical dimensions of the facility; and (5) local meteorology. The combinations of these factors will ultimately determine the potential impact. Due to the variability of these factors, the potential health impacts can also vary. For example, if only the Perc-content were to increase, and all other factors were held constant, the resulting potential health impacts would also increase. Ultimately, each scenario of interest must be independently analyzed to determine the impacts of the individual factors.

To provide perspective for some of the factors that can affect the HRA results, a discussion looking at the variability of meteorological data sets on specific and generic facilities, the brake job frequency, and building orientation at the generic facilities is provided here for your information. Variability arises from differences in the characteristics of facilities, or inputs used in the models, such as the period of meteorological data, or differences in brake job frequencies week to week. In short, variability can be thought of as the natural variation in conditions or parameters. We are also including a qualitative discussion of the uncertainties in the HRA process. Uncertainty is defined as a lack of knowledge about factors that impact risk where uncertainty may be reduced by further study (U.S. EPA, 1995c). In short, uncertainty can be thought of as the level of confidence in estimating a particular condition or parameter. Variability and uncertainty can be interrelated in the HRA process.

Meteorological conditions can be a source of variability in an HRA. Annual average, model-estimated concentrations from representative off-site meteorological data were used to determine the potential cancer risk and non-cancer hazard indices for 13 specific and three generic facilities using ISCST3. Maximum-hourly concentrations were used to determine the non-cancer acute hazard indices. The methods used to obtain these concentration are consistent with current risk assessment guidance (CAPCOA, 1993). The modeling analyses are discussed in Appendix D and example calculations using this information are in Appendix C.

If source-specific operating conditions are held constant, changes in the meteorology will drive any changes in the health impact estimates. That is, because meteorology conditions vary from hour-to-hour and year-to-year, so too will the health impact estimates. In addition, meteorological conditions will vary depending upon which region of the state a facility is located. The meteorology data sets used in this HRA represent collection periods of as long as six years and are representative of 10 different regions.

Another situation where variability is present in the HRA is the number of brake jobs performed per week. If all other variables remain constant, the potential health impacts are proportional to the number of jobs performed at the facility; therefore, if half the jobs are performed, then the potential health impacts are halved, if the jobs double, the potential health impacts double. In addition to the number of jobs impacting the results, if the nature of the services provided at the facility changes or the brand of product changes these too can impact results. For this HRA, we used the data from our survey data and site visits to estimate that small (G-01) facilities perform 20 brake jobs per week and medium (G-02), and large (G-03) facilities both perform 60 brake jobs per week. The results in Tables VI-7 to VI-13 reflect this assumption.

The building orientation is another parameter that can provide variability in dispersion characteristics and therefore the range of concentration and potential health impacts. For example, rectangular buildings can be arranged so that they are oriented with the smallest side parallel (or at zero degrees), diagonal (or forty-five degrees), or the shorter side perpendicular (ninety degrees) to the predominant wind direction. A building orientation of zero, ninety, and forty-five degrees will yield the highest to lowest concentrations, respectively. For use in modeling generic facilities, the zero orientation was chosen because it is impossible to predict the orientation of the approximately 25,000 AMR facilities in California. By choosing this orientation with default meteorological data, the wind direction is oriented along the length of the rectangle buildings producing maximum concentrations. This practice provides confidence that in most cases we are sure to encompass the potential health impacts of any facility in the State. To evaluate the generic facilities with representative off-site meteorology, the facilities were oriented in the same standard position, however, the representative off-site meteorology was not forced along the length of the rectangle buildings. This exercise provides a range of variability that could result from the three generic facilities using both default and regional meteorological data. See Appendix D for a detailed discussion of the air dispersion modeling methodology used for generic facilities including a sensitivity analysis discussion illustrating the effects of building orientation under default meteorological conditions.

Risk assessment is a complex process which requires the integration of many variables that are intended to simulate real-life processes. Although ARB staff used current California risk assessment methodology, including the most recent cancer potency factors and reference exposure levels, and U.S. EPA approved air dispersion models to conduct the health risk assessments, there is uncertainty in health risk assessment.

An example of uncertainty included in the derivation of its health values used in the risk assessment is the extrapolation of toxicity data from animals to humans. Other examples of uncertainty in an HRA are included in the air dispersion models. For example, while representative off-site meteorological data provides an improved estimate of the dispersion of emissions from a facility over default meteorological data, regional meteorological data is not necessarily site specific. Since regional meteorological data for the facility is not compiled at the actual facility site, there is some uncertainty in the modeled results. Due to microenvironmental factors, the representative off-site meteorological data can either overestimate or underestimate modeled concentrations at AMR facilities. It should be noted that when site-specific or representative off-site meteorological data is not available default meteorological data is typically used. Default meteorology data consists of a standard range of tabulated meteorological conditions. The intent of applying default meteorological conditions is to gain an understanding of the worst-case meteorology that could result in a maximum ground-level impact caused by a particular source.

Effects of exposure to more than one carcinogen or toxicant are also not quantified in risk assessment (CAPCOA, 1993). For example, compounds may act synergistically where effects are greater than additive. Compounds may also have antagonistic effects where effects are less than additive. In these cases, the risk assessment could overestimate or underestimate the potential risks.

Although we are not able to quantify uncertainty in this HRA, to help address the variability in risk assessment, we have provided ranges in our risk assessment results regarding product content and usage, meteorological data sets, building orientation impacts, and receptor type.

E. Summary of the Potential Health Impacts from Automotive Maintenance and Repair Facilities

This section presents the potential health impacts from four types of analyses that were performed for AMR facilities. These four analyses include the results from 54 site-specific HRAs at facilities where site visits were completed. For these 54 facilities, the individual carcinogenic and non-carcinogenic impacts at near source, residential, and worker receptor locations were estimated. Secondly, for 13 of these 54 specific facilities, the regional cancer risk was also evaluated. The third exercise was the estimation of individual receptor potential cancer and non-cancer health impacts from three representative generic facilities. These generic facilities were established utilizing the information from the 137 site visits and two surveys that targeted AMR facilities and product manufacturers. The three generic facilities are modeled using ten representative off-site meteorological data sets and also were evaluated with default meteorological conditions to simulate a location where regional meteorological data was not

available. These ten meteorological data sets are the same as the ones used for 13 of the site-specific facilities in exercise one and all of the facilities in exercise two. The fourth analysis uses data from ARB's ambient monitoring network to estimate the statewide cancer impacts from the use of Perc, MeCl, and TCE in AMR activities.

1. Potential Individual Receptor Impacts at Specific Facilities

The ARB staff conducted individual HRAs for 54 of the facilities staff visited and found to be using Perc, MeCl, or TCE-containing automotive consumer products. These facilities represent a broad range of AMR facilities and allow for a reasonable approximation of health impacts statewide. These 54 facilities are a subset of the 137 AMR facilities where ARB staff has conducted site visits. The other 83 facilities were not assessed because they did not use Perc, MeCl, or TCE-containing products. See Appendix D for a detailed presentation of the air dispersion modeling inputs and results for each of the 54 HRAs. Appendix C provides an example calculation illustrating how the outputs from these models are used to calculate potential health impacts.

All 54 HRAs at specific facilities used facility dimensions, emission release characteristics, operating schedule, product use, and product content information that was obtained during the site visits. The two air dispersion models that were used during this HRA are SCREEN3, version 96043, and ISCST3, version 97363. Thirteen of the 54 HRAs were refined HRAs that used representative off-site meteorological data and were performed using the ISCST3 air dispersion model. The selection criteria that was used to determine which facilities would be run with ISCST3 can be found in Appendix F. Forty-one of the HRAs used default meteorological data and the SCREEN3 air dispersion model.

Table VI-2 provides an overview of the potential health impacts from the 54 specific facility HRAs. These 54 facilities are divided into three groups. The first group contains 29 facilities that use Perc and were run with default meteorology data. The second group was also run with default meteorology and includes 12 facilities that used products with multicomponent formulations of Perc and MeCl, or Perc and TCE. The third group has 13 facilities, all used Perc, and were run with ISCST3 using representative off-site meteorology data. Table VI-2 also includes columns that reflect the number of facilities in each modeled group and at each receptor type with potential cancer risks above ten chances per million and one chance per million. In addition, also noted in Table VI-2 are the number of facilities with potential non-cancer hazard indices above one. These results are presented for information purposes only.

Overall, Table VI-2 shows potential carcinogenic risk ranging from <0.01 to 60 chances per million. All three receptor types, (the near source, maximum exposed individual resident (MEIR), and the maximum exposed individual (off-site) worker (MEIW)) show individual potential cancer risks toward the higher end of this range of potential cancer risk. Regarding non-cancer impacts from the site visits, the modeling results and hazard index estimates show

that it is unlikely for significant acute or chronic non-cancer health effects to result from the emissions of Perc, MeCl, and TCE from these facilities. In addition, both the chronic and acute hazard indices are less than 0.3 at near-source, MEIR, and MEIW locations. Generally, hazard indices less than 1.0 are not considered to be a concern to public health. Tables VI-3 to VI-5 present the individual cancer and non-cancer (acute and chronic) potential health impacts for each of the 54 specific facilities at the near-source, MEIR, and MEIW locations, respectively.

Annual average concentrations from representative off-site meteorological data were used to determine the potential cancer risk and non-cancer hazard indices presented for the 13 facilities using ISCST3 in Table VI-2. Maximum-hourly concentrations were used to determine the non-cancer acute hazard indices. The methods used to obtain these concentrations are consistent with current risk assessment guidance (CAPCOA, 1993).

Table VI-2. Overview of the Potential Health Impacts for the Fifty-Four Specific Facilities[1]

Grouped Model Runs [2] (n=54)	Rec. Type [3]	Receptor Distances [4] (m)	Potential Cancer Risk [5] (x/million)	No. Fac.[6] Above 10 Per Million	No. Fac.[6] Above 1 Per Million	Range of Acute Hazard Indices	Range of Chronic Hazard Indices	No. Fac. Above H.I. of 1 [6,7]
Perc [8] (n=29) (SCREEN3)	NS	20 to 30	0.08 to 50	12	24	<0.01 to <0.2	<0.01 to <0.3	0
	MEIR	6 to 802	0.01 to 22	5	14	<0.01 to <0.2	<0.01 to <0.2	0
	MEIW[9]	6 to 483	0.02 to 15	1[10]	19	<0.01 to <0.2[11]	<0.01 to <0.2[11]	0
Multiple Component[12] Product (n=12) (SCREEN3)	NS	20 to 25	1 to 46	8	12	<0.01 to <0.2	<0.01 to <0.3	0
	MEIR	20 to 2414	<0.01 to 35	2	8	<0.01 to < 0.08	<0.01 to <0.2	0
	MEIW[9]	3 to 49	>0.6[11] to 23	2[10]	10	<0.01 to <0.2[11]	<0.01 to <0.3[11]	0[10]
Perc [8] (n=13) (ISCST3)	NS	32 to 51	2 to 60	10	13	<0.01 to <0.2	<0.02 to <0.3	0
	MEIR	25 to 146	0.05 to 60	6	10	<0.01 to <0.04	<0.01 to <0.3	0
	MEIW[9]	24 to 151	0.3 to 11	1	11	<0.01 to <0.2	<0.01 to <0.2	0

1. All numbers have been rounded.
2. Modeled facilities are divided into three groups of 29, 12, and 13 facilities. The first group is run using the SCREEN3 model with only Perc-containing products. The second group was run using SCREEN3 with automotive products that contain combination formulations of Perc/MeCl and Perc/TCE. The third group was run using ISCST3 at facilities that use Perc-containing automotive products.
3. Results are presented for three receptor types.
   NS (near-source) identifies the location closest to the facility where modeled concentrations could be estimated.
   MEIR (maximum exposed individual resident) represents the residential location that receives the estimated maximum exposure from a facility's emissions.
   MEIW (maximum exposed individual (off-site) worker) identifies the off-site industrial or commercial location that receives the estimated maximum exposure from a facility's emissions.
4. The distance for the near-source receptor is measured from the center of the volume source. The distance listed for the MEIR and MEIW receptors is the estimated distance away from the outside edge of the building to the residential or worker receptor.
5. Potential cancer risk presented in this column reflect the range of results for each modeled group by receptor type.
6. These columns reflect the number of facilities in each modeled group and at each receptor type with potential health impacts above ten chances per million, one chance per million, and hazard indices above one. These results are presented for information purposes only.
7. Includes both chronic and acute hazard indices.
8. These facilities use Perc-containing automotive products which show a Perc content range on the MSDS.
9. Where appropriate, the potential cancer risk estimates are adjusted for a working lifetime of 46 years and to allow for an operating schedule at an off-site facility that does not coincide with, or is shorter than, that of the facility being assessed.
10. The number of facilities may be higher than is listed here because the location of some receptors is closer than the minimum modeled distance. We are unable to predict potential pollutant concentrations and health impacts within the minimum modeled distance. When receptors are located closer than the minimum modeled distance, the potential impacts at the minimum modeled distance are used.
11. The MEIW is located within 20 to 30 meters of the center of the volume source, which is the minimum distance modeled; therefore, the potential health impacts are likely to be greater than those listed here. However, we do not anticipate the impacts to be higher than a hazard index of 1.
12. These facilities use products with multcomponent formulation of Perc/MeCl or Perc/TCE.

a. Potential Health Impacts at the Near Source Location for the Specific Facilities

Table VI-3 summarizes the maximum potential cancer and non-cancer health impacts at each of the 54 specific facilities. The maximum potential health impacts are estimated to occur at near-source locations. Overall, Table VI-3 shows potential carcinogenic risk ranging from 0.05 to 60 chances per million. Non-cancer acute and chronic hazard indices are less than 0.3 at near-source location. Generally, hazard indices less than 1.0 are not considered to be a concern to public health.

For these 54 facilities, we selected a minimum receptor distance of 20 to 51 meters from the center of the volume source or building to define a near-source location. The reason the minimum modeled distance varies by facility is because the air dispersion models must allow for the building dimensions or footprint. The purpose of estimating the potential health impacts at a near-source location is to illustrate what the potential health impacts can be if a receptor was located close to the facilities which were assessed, rather than having an increased "buffer" distance between the receptor location and the edge of the building. During the 137 site visits, ARB staff observed that receptors are present within 51 meters at 87 of the AMR facilities. For a breakdown of the number of facilities with residential and worker receptors within 20, 30, 50 and 100 meters that were observed during the site visits see Table V-12.

Table VI-3. Summary of the Specific Facility Near-Source Potential Health Impacts [1,2]

Facility (n=54)	Facility Type	Individual Cancer Risk (per million)	Acute Hazard Index	Chronic Hazard Index
Group A = Perc-Using Facilities Modeled with SCREEN3 (N=29)				
E [3]	Service Station	2.0 to 2.9	<0.06	<0.02
H [3]	Fleet	0.3 to 0.4	<0.01	<0.01
L [3]	Service Station	4.7 to 6.8	<0.2	<0.04
N	Dealership	3.7	<0.01	<0.02
Q [3]	General Automotive	27 to 39	<0.2	<0.2
R [3]	General Automotive	35 to 50	<0.05	<0.3
V	Brake Shop	0.5	<0.01	<0.01
A-13 [3]	General Automotive	0.08 to 0.1	<0.01	<0.01
A-14 [3]	General Automotive	0.6 to 0.9	<0.03	<0.01
A-15 [3]	General Automotive	2.0 to 2.7	<0.04	<0.02
A-16[3]	General Automotive	4.0 to 5.9	<0.02	<0.03
A-21 [3]	Brake Shop	3.7 to 5.0	<0.04	<0.03
A-29 [3]	Fleet	24 to 35	<0.05	<0.2
A-30 [3]	Fleet	3.1 to 10	<0.05	<0.06
A-31 [3]	General Automotive	11 to 16	<0.02	<0.08
A-32 [3]	General Automotive	0.6 to 0.9	<0.03	<0.01
A-35 [3]	Brake Shop	3.9 to 5.6	<0.2	<0.03
A-36 [3]	Dealership	22 to 31	<0.04	<0.2
A-50 [3]	General Automotive	5.8 to 8.4	<0.08	<0.05
A-51 [3]	General Automotive	4.7 to 5.2	<0.2	<0.03
A-54 [3]	General Automotive	8.9 to 13	<0.09	<0.07
A-73 [3]	General Automotive	14 to 16	<0.04	<0.08
A-84	General Automotive	23	<0.09	<0.2
A-87 [3]	Dealership	11 to 19	<0.02	<0.1

Table VI-3. Summary of the Specific Facility Near-Source Potential Health Impacts (continued)[1,2]

Facility (n=54)	Facility Type	Individual Cancer Risk (per million)	Acute Hazard Index	Chronic Hazard Index
Group A = Perc-Using Facilities Modeled with SCREEN3 (N=29) (continued)				
A-88 [3]	General Automotive	8.9 to 22	<0.2	<0.2
A-89 [3]	General Automotive	4.6 to 6.6	<0.01	<0.04
A-90 [3]	Service Station	6.0 to 8.7	<0.3	<0.05
A-93 [3]	General Automotive	10 to 15	<0.08	<0.08
A-94 [3]	Service Station	2.0 to 2.9	<0.04	<0.02
Group B = Multicomponent-Using Facilities Modeled with SCREEN3 [4] (N=12)				
D	Service Station	18	<0.09	<0.09
G	Fleet	22	<0.05	<0.2
M	Dealership	46	<0.1	<0.3
S	Brake Shop	12	<0.02	<0.06
A-20	General Automotive	27	<0.04	<0.2
A-39	General Automotive	9.7	<0.01	<0.04
A-49	General Automotive	11	<0.09	<0.06
A-63	General Automotive	1.0	<0.04	<0.01
A-71	General Automotive	1.5	<0.06	<0.01
A-72	General Automotive	2.9	<0.2	<0.02
A-82	General Automotive	20	<0.03	<0.1
A-85	General Automotive	43	<0.2	<0.3
Group C = Perc-Using Facilities Modeled with ISCST3 (N=13)				
A-07 [3]	General Automotive	13 to 19	<0.04	<0.1
A-08 [3]	General Automotive	29 to 41	<0.02	<0.3
A-09 [3]	General Automotive	41 to 60	<0.02	<0.3
A-28 [3]	Fleet	12 to 18	<0.03	<0.09
A-52 [3]	General Automotive	9.9 to 11	<0.05	<0.06

Table VI-3. Summary of the Specific Facility Near-Source Potential Health Impacts (continued) [1,2]

Facility (n=54)	Facility Type	Individual Cancer Risk (per million)	Acute Hazard Index	Chronic Hazard Index
Group C = Perc-Using Facilities Modeled with ISCST3 (N=13) (continued)				
A-83 [3]	General Automotive	12 to 18	<0.02	<0.09
A-86 [3]	Dealership	8.0 to 13	<0.01	<0.07
A-92 [3]	Service Station	3.2 to 4.7	<0.05	<0.03
I [3]	Fleet	11 to 16	<0.03	<0.08
O [3]	General Automotive	4.5 to 6.6	<0.2	<0.04
P [3]	Brake Shop	2.3 to 3.3	<0.01	<0.02
T	General Automotive	15	<0.02	<0.08
U [3]	General Automotive	19 to 28	<0.02	<0.2

1. Near-source is defined as the modeled minimum receptor distance of 20 to 51 meters from the building center, or ranging from 2 to 40 meters away from the outside edge of the building.
2. All numbers have been rounded.
3. These facilities use a Perc-containing automotive products which shows a Perc-content range on the Material Safety Data Sheet (MSDS); therefore, a range is presented for the potential cancer risk.
4. These facilities use products with multicomponent formulations of Perc/MeCl or Perc/TCE.

b. Potential Health Impacts at the MEIR for the Specific Facilities

Table VI-4 summarizes the potential cancer and non-cancer health impacts at the maximum exposed individual resident (MEIR). The MEIR is defined as the residential receptor location that receives the estimated maximum exposure from a facility's emissions relative to other residential locations. Overall, Table VI-4 shows the MEIR potential carcinogenic risk range from <0.01 to 60 chances per million. Non-cancer acute and chronic hazard indices are less than 0.3 at the MEIR location. Generally, hazard indices less than 1.0 are not considered to be a concern to public health. An example calculation is presented in Appendix C illustrating how a facility's potential health impacts were assessed. This example shows emission calculations, steps through the air dispersion modeling, and concludes with a calculation of potential health impacts.

A contributing factor to any decrease in potential risk at the MEIR is the increased "buffer" distance created by the facility fence line or the location of the nearest resident when compared to the near-source location. The distance to the MEIR at the specific facilities was estimated to range from approximately 6 to 2414 meters.

Table VI-4. Summary of the Potential Health Impacts at the Maximum Exposed Individual Resident (MEIR) from the Specific Facilities[1]

Facility (n=54)	Facility Type	Receptor Distance[2] (meters)	Individual Cancer Risk (per million)	Acute Hazard Index	Chronic Hazard Index
Group A = Perc-Using Facilities Modeled with SCREEN3 (N=29)					
E[3]	Service Station	801	0.01 to 0.02	<0.01	<0.01
H[3]	Fleet	802	<0.01 to 0.01	<0.01	<0.01
L[3]	Service Station	232	0.2 to 0.3	<0.01	<0.01
N	Dealership	400	0.07	<0.01	<0.01
Q[3]	General Automotive	76	7.9 to 11	<0.06	<0.06
R[3]	General Automotive	46	15 to 22	<0.02	<0.2
V[4]	Brake Shop	6	>0.5	<0.01[5]	<0.01[5]
A-13[3]	General Automotive	73	0.01 to 0.02	<0.01	<0.01
A-14[3]	General Automotive	107	<0.1	<0.01	<0.01
A-15[3]	General Automotive	76	0.4 to 0.5	<0.01	<0.01
A-16[3]	General Automotive	305	0.08 to 0.1	<0.01	<0.01
A-21[3]	Brake Shop	114	0.4 to 0.5	<0.01	<0.01
A-29[3]	Fleet	152	3.3 to 4.8	<0.01	<0.03
A-30[3]	Fleet	483	0.1 to 0.4	<0.01	<0.01
A-31[3]	General Automotive	229	0.3 to 0.5	<0.01	<0.01
A-32[3]	General Automotive	137	0.04 to 0.06	<0.01	<0.01
A-35[3]	Brake Shop	152	0.3 to 0.4	<0.02	<0.01
A-36[3]	Dealership	152	1.6 to 2.4	<0.01	<0.02
A-50[3]	General Automotive	15	5.8 to 8.4	<0.08	<0.05
A-51[3]	General Automotive	23	3.5 to 3.8	<0.2	<0.02
A-54[3]	General Automotive	38	3.7 to 5.4	<0.05	<0.03
A-73[3]	General Automotive	322	0.2 to 0.3	<0.01	<0.01
A-84	General Automotive	38	10	<0.05	<0.05

Table VI-4. Summary of the Potential Health Impacts at the Maximum Exposed Individual Resident (MEIR) from the Specific Facilities (continued)[1]

Facility (n=54)	Facility Type	Receptor Distance[2] (meters)	Individual Cancer Risk (per million)	Acute Hazard Index	Chronic Hazard Index
Group A = Perc-Using Facilities Modeled with SCREEN3 (N=29) (continued)					
A-87[3]	Dealership	152	0.9 to 1.5	<0.01	<0.01
A-88[3]	General Automotive	12	8.9 to 22	<0.2	<0.2
A-89[3]	General Automotive	76	0.7 to 1.1	<0.01	<0.01
A-90[3,4]	Service Station	14	>6.0 to >8.7	<0.3[5]	<0.05[5]
A-93[3,4]	General Automotive	8	>10 to >15	<0.08[5]	<0.08[5]
A-94[3]	Service Station	23	1.4 to 2.1	<0.04	<0.02
Group B = Multicomponent-Using Facilities Modeled with SCREEN3[6] (N=12)					
D	Service Station	152	1.6	<0.01	<0.01
G	Fleet	398	1.2	<0.01	<0.01
M	Dealership	20	35	<0.08	<0.2
S	Brake Shop	460	0.2	<0.01	<0.01
A-20	General Automotive	46	8.1	<0.02	<0.04
A-39	General Automotive	46	3.8	<0.01	<0.02
A-49	General Automotive	30	5.6	<0.06	<0.03
A-63	General Automotive	2414	<0.01	<0.01	<0.01
A-71	General Automotive	30	0.8	<0.04	<0.01
A-72	General Automotive	53	0.8	<0.05	<0.01
A-82	General Automotive	37	8.9	<0.02	<0.05
A-85	General Automotive	30	23	<0.08	<0.2
Group C = Perc-Using Facilities Modeled with ISCST3 (N=13)					
A-07[3]	General Automotive	27	13 to 19	<0.03	<0.1
A-08[3]	General Automotive	27	7.8 to 11	<0.02	<0.06
A-09[3]	General Automotive	25	41 to 60	<0.02	<0.3
A-28[3]	Fleet	83	0.9 to 1.4	<0.01	<0.01

Table VI-4. Summary of the Potential Health Impacts at the Maximum Exposed Individual Resident (MEIR) from the Specific Facilities (continued) [1]

Facility (n=54)	Facility Type	Receptor Distance [2] (meters)	Individual Cancer Risk (per million)	Acute Hazard Index	Chronic Hazard Index
Group C = Perc-Using Facilities Modeled with ISCST3 (N=13) (continued)					
A-52 [3]	General Automotive	42	2.8 to 3.0	<0.04	<0.02
A-83 [3]	General Automotive	30	9.7 to 14	<0.02	<0.07
A-86 [3]	Dealership	141	1.3 to 2.2	<0.01	<0.02
A-92 [3]	Service Station	54	0.3 to 0.5	<0.02	<0.01
I [3]	Fleet	146	1.8 to 2.6	<0.01	<0.02
O [3]	General Automotive	92	0.05 to 0.07	<0.04	<0.01
P [3]	Brake Shop	37	0.2 to 0.3	<0.01	<0.01
T	General Automotive	27	13	<0.01	<0.07
U [3]	General Automotive	27	19 to 28	<0.02	<0.2

1. All numbers have been rounded.
2. The distance listed here is the estimated distance away from the outside edge of the building to the MEIR.
3. These facilities use a Perc-containing brake cleaner which shows a Perc-content range on the Material Safety Data Sheet (MSDS); therefore, a range is presented for the potential cancer risk.
4. The MEIR is located closer than 20 meters to the center of the volume source, which is the minimum distance modeled; therefore, the potential health impacts are likely to be greater than those listed here. The impacts shown here are at the near-source location of 20 to 51 meters.
5. The MEIR is located within 20 to 30 meters of the center of the volume source, which is the minimum distance modeled; therefore, the potential health impacts are likely to be greater than those listed here. However, we do not anticipate the impacts to be higher than a hazard index of 1.
6. These facilities use products with multicomponent formulations of Perc/MeCl or Perc/TCE.

c. Potential Health Impacts at the MEIW for the Specific Facilities

Table VI-5 summarizes the potential cancer and non-cancer health impacts at the maximum exposed individual (off-site) worker (MEIW). The MEIW is defined as the off-site industrial or commercial location that receives the estimated maximum exposure from a facility's emissions relative to other industrial or commercial locations.

Overall, Table VI-5 shows the MEIW potential carcinogenic risk range is from 0.02 to 23 chances per million. Non-cancer acute and chronic hazard indices are less than 0.3 at near-source location. Generally, hazard indices less than 1.0 are not considered to be a concern

to public health. An example calculation is presented in Appendix C that illustrates how a facility's potential health impacts were assessed. This example shows emission calculations, steps through the air dispersion modeling, and concludes with a calculation of potential health impacts.

The distance to the MEIW at these facilities was estimated to range from 3 to 483 meters. Using guidance from OEHHA, the exposure period of an off-site worker was adjusted to allow for a shorter working lifetime and a shorter operating schedule. This first adjustment is made to allow for a shorter working lifetime, 46 years, rather than a 70-year exposure lifetime which is assumed for residential exposure. The second adjustment which allows for operating schedules is appropriate only when the operating schedule of the off-site facility does not coincide with, or is shorter than, that of the facility being assessed (OEHHA, 1997).

Table VI-5. Summary of the Potential Health Impacts at the Maximum Exposed Individual (Off-site) Worker (MEIW) from the Specific Facilities [1]

Facility (n=54)	Facility Type	Receptor Distance [2] (meters)	Individual Cancer Risk [3] (per million)	Acute Hazard Index	Chronic Hazard Index
Group A = Perc-Using Facilities Modeled with SCREEN3 (N=29)					
E [4]	Service Station	36	0.4 to 0.6	<0.03	<0.01
H [4]	Fleet	302	0.02 to 0.03	<0.01	<0.01
L [4]	Service Station	27	1.4 to 2.0	<0.08	<0.03
N	Dealership	110	0.3	<0.01	<0.01
Q [4]	General Automotive	61	5.3 to 7.7	<0.07	<0.07
R [4]	General Automotive	30	10 to 15	<0.03	<0.2
V [5]	Brake Shop	18	0.2	<0.01	<0.01
A-13 [4]	General Automotive	18	0.03 to 0.04	<0.01	<0.01
A-14 [4,5]	General Automotive	6	>0.3 to >0.5	<0.03 [6]	<0.01 [6]
A-15 [4]	General Automotive	30	0.5 to 0.7	<0.03	<0.01
A-16 [4]	General Automotive	30	0.8 to 1.2	<0.01	<0.02
A-21 [4]	Brake Shop	12	1.4 to 1.9	<0.03	<0.03
A-29 [4]	Fleet	322	0.3 to 0.4	<0.01	<0.01

Table VI-5. Summary of the Potential Health Impacts at the Maximum Exposed Individual (Off-site) Worker (MEIW) from the Specific Facilities (continued) [1]

Facility (n=54)	Facility Type	Receptor Distance [2] (meters)	Individual Cancer Risk [3] (per million)	Acute Hazard Index	Chronic Hazard Index
Group A = Perc-Using Facilities Modeled with SCREEN3 (N=29) (continued)					
A-30 [4]	Fleet	483	0.03 to 0.09	<0.01	<0.01
A-31 [4,5]	General Automotive	6	>4.9 to >7.1	<0.02 [6]	<0.08 [6]
A-32 [4]	General Automotive	17	0.3 to 0.5	<0.03	<0.01
A-35 [4]	Brake Shop	15	1.7 to 2.5	<0.2	<0.03
A-36 [4]	Dealership	76	2.2 to 3.1	<0.02	<0.04
A-50 [4]	General Automotive	15	2.9 to 4.1	<0.08	<0.05
A-51 [4,5]	General Automotive	6	>2.0 to >2.2	<0.2 [6]	<0.03 [6]
A-54 [4,5]	General Automotive	15	>4.3 to >6.2	<0.09 [6]	<0.07 [6]
A-73 [4]	General Automotive	15	7.7 to 8.8	<0.04	<0.08
A-84 [5]	General Automotive	9	>7.9	<0.09 [6]	<0.2 [6]
A-87 [4]	Dealership	46	2.1 to 3.5	<0.01	<0.04
A-88 [4]	General Automotive	23	2.9 to 7.2	<0.2	<0.08
A-89 [4]	General Automotive	24	1.4 to 2.0	<0.01	<0.02
A-90 [4,5]	Service Station	15	>3.1 to >4.4	<0.3 [6]	<0.05 [6]
A-93 [4]	General Automotive	30	2.3 to 3.3	<0.05	<0.04
A-94 [4,5]	Service Station	9	>1.1 to >1.6	<0.04 [6]	<0.02 [6]
Group B = Multicomponent-Using Facilities Modeled with SCREEN3 [7] (N=12)					
D	Service Station	32	3.7	<0.04	<0.04
G	Fleet	28	8.7	<0.03	<0.08
M	Dealership	15	23	<0.09	<0.2
S	Brake Shop	41	2.8	<0.01	<0.03
A-20	General Automotive	49	3.3	<0.02	<0.04
A-39	General Automotive	23	2.6	<0.01	<0.03
A-49 [5]	General Automotive	6	>5.8	<0.09 [6]	<0.06 [6]
A-63 [5]	General Automotive	3	>0.6	<0.04 [6]	<0.01 [6]

Table VI-5. Summary of the Potential Health Impacts at the Maximum Exposed Individual (Off-site) Worker (MEIW) from the Specific Facilities (continued)[1]

Facility (n=54)	Facility Type	Receptor Distance[2] (meters)	Individual Cancer Risk[3] (per million)	Acute Hazard Index	Chronic Hazard Index
Group B = Multicomponent-Using Facilities Modeled with SCREEN3[7] (N=12) (continued)					
A-71[5]	General Automotive	15	>0.8	<0.06[6]	<0.01[6]
A-72	General Automotive	21	1.1	<0.09	<0.01
A-82	General Automotive	37	3.7	<0.02	<0.05
A-85[5]	General Automotive	8	>21	<0.2[6]	<0.3[6]
Group C = Perc-Using Facilities Modeled with ISCST3 (N=13)					
A-07[4]	General Automotive	46	2.3 to 3.4	<0.02	<0.04
A-08[4]	General Automotive	27	7.9 to 11	<0.02	<0.2
A-09[4]	General Automotive	25	4.6 to 6.7	<0.02	<0.08
A-28[4]	Fleet	122	0.3 to 0.4	<0.01	<0.02
A-52[4]	General Automotive	28	4.5 to 4.9	<0.03	<0.06
A-83[4]	General Automotive	27	4.3 to 6.2	<0.02	<0.07
A-86[4]	Dealership	151	0.3 to 0.6	<0.01	<0.01
A-92[4]	Service Station	28	1.4 to 2.0	<0.05	<0.02
I[4]	Fleet	84	1.1 to 1.6	<0.02	<0.03
O[4]	General Automotive	24	2.3 to 3.3	<0.2	<0.03
P[4]	Brake Shop	27	0.7 to 1.0	<0.01	<0.02
T	General Automotive	27	5.7	<0.01	<0.07
U[4]	General Automotive	27	2.9 to 4.2	<0.01	<0.05

1. All numbers have been rounded.
2. The distance listed here is the estimated distance from the outside edge of the building to the MEIW.
3. Where appropriate, the potential risk estimates are adjusted for a working lifetime of 46 years and to allow for an operating schedule at an off-site facility that does not coincide with, or is shorter than, that of the facility being assessed.
4. These facilities use a Perc-containing brake cleaner which shows a Perc-content range on the Material Safety Data Sheet (MSDS); therefore, a range is presented for the potential cancer risk.
5. The MEIW is located closer than 20 to 51 meters to the center of the volume source, which is the minimum distance modeled; therefore, the potential health impacts are likely to be greater than those listed here. The impacts shown here are at the near-source location of 20 to 51 meters.
6. The MEIW is located within 20 to 30 meters of the center of the volume source, which is the minimum distance modeled; therefore, the potential health impacts are likely to be greater than those listed here. However, we do not anticipate the impacts to be higher than a hazard index of 1.
7. These facilities use products with multicomponent formulations of Perc/MeCl or Perc/TCE.

2. Regional Cancer Risk from Specific Facilities

For the 13 specific facilities that were modeled using representative off-site meteorological data and the ISCST3 model, ARB staff has also estimated the potential regional cancer risk on the population surrounding each facility. Regional population exposure to Perc, MeCl, and TCE concentrations from each of the 13 specific facilities was estimated by spatially matching regional population census data collected from the Department of Finance (DOF) and the ISCST3 modeling results. To deal with limitations in the population data resolution, estimates of the high and low ranges of concentration were utilized in this analysis. These concentration estimates result in high and low potential cancer risk estimates. See Appendix D for a detailed presentation of the regional concentrations from the 13 specific facilities. Appendix C provides a more detailed discussion of the methodology and an example calculation that converts the modeled regional concentrations found in Appendix D to cancer risk estimates.

Table VI-6 summarizes the data in Appendix D by providing, for each of the 13 specific facilities, the range of annual average concentrations anticipated over a one-kilometer grid-cell centered on each facility. This table also provides the range of corresponding potential cancer risk, the average one-kilometer grid-cell population, and the near source, MEIR, and MEIW individual potential cancer risk. The lower end of the concentration range at each facility provides an estimate of the average concentration that all of the receptors are exposed to within the one-kilometer grid-cell. The upper end of the concentration range illustrates the modeled maximum annual concentration that is anticipated near each facility where high concentration gradients may exist. Due to the resolution of the census data, we are unable to estimate the population exposed to the upper end of the concentration range; however, some of the populous are exposed at or near these concentrations due to the proximity of adjacent receptors as evidenced in the MEIR and MEIW analyses.

Overall, Table VI-6 shows that the populous around the 13 specific facilities are exposed to a range of potential cancer risk of 0.006 to 60 chances per million. The range of individual cancer risk estimates are also included in Table VI-6 to put the one-kilometer grid-cell concentrations and risk into perspective with the individual cancer risk shown in Tables VI-2 to VI-5. As stated above, the near source, MEIR, and MEIW locations are indicative of the upper range of the concentrations and potential cancer risk that is estimated within one-kilometer of each of the 13 facilities.

As mentioned prior, the spatial resolution of the population data is a limiting factor to this analysis. That is, model results indicate that ambient air concentrations rapidly decrease at distances farther than 100 meters from each facility or one-tenth of a grid-cell. Thus, the reported average concentration experienced within the central one-kilometer square grid-cell is lower that the average concentration experienced within a 100-meter radius of each facility. With the utilized population data and analysis tools, we are unable to quantify the populous living within 100 meters from each source, that will generally experience the higher concentrations. Use of more highly resolved population data, land-use data, and parcel maps

could refine such estimates. Improvements in the availability of digitized census information down to the block level (e.g., 70 to 100 persons) in a Geographic Information System (GIS) format is key to improving the estimation of regional or near field population exposure estimates. In addition to the digitized block level census data, digitized parcel or land use data and high resolution street maps in a GIS format are other key requirements for improving these estimates.

Table VI-6. Summary of the Potential Regional Population and Individual Cancer Risk for the Thirteen Specific Facilities Modeled with ISCST3 [1,2]

Facility (n=13)	Range Of Facility [3] Specific Annual Average Conc. In One-Kilometer Grid-Cell (ug/m3)	Range Of Cancer Risk In One-Kilometer Grid-Cell (chances per million)	1998 Average Population Within One-Kilometer Grid-Cell	Individual Cancer Risk (chances per million)		
				Near Source	Maximum Exposed Resident	Maximum Exposed Worker [4]
A-07	4.7 E-3 to 3.3	0.03 to 19	5,843	19	19	3.4
A-08	9.3 E-3 to 7.0	0.05 to 41	5,628	41	11	11
A-09	6.4 E-2 to 10.1	0.4 to 60	2,155	60	60	6.7
A-28	1.0 E-2 to 3.0	0.06 to 18	2,501	18	1.4	0.4
A-52	3.3 E-3 to 1.8	0.02 to 11	3,971	11	3.0	4.9
A-83	2.5 E-2 to 3.0	0.1 to 18	732	18	14	6.2
A-86	9.1 E-3 to 2.2	0.05 to 13	1,845	13	2.2	0.6
A-92	9.8 E-4 to 0.8	0.006 to 4.7	3,399	4.7	0.5	2.0
I	5.8 E-2 to 2.7	0.3 to 16	1,408	16	2.6	1.6
O	1.0 E-2 to 1.1	0.06 to 6.6	1,930	6.6	0.07	3.3
P	4.6 E-3 to 0.6	0.03 to 3.3	2,369	3.3	0.3	1.0
T	4.2 E-3 to 2.5	0.02 to 15	6,603	15	13	5.7
U	2.4 E-2 to 4.7	0.1 to 28	3,683	28	28	4.2

1. All numbers have been rounded.
2. The higher end of the Perc-content range was used for facilities that use Perc-containing automotive products that show a Perc-content range on the Material Safety Data Sheet (MSDS).
3. Column entries derived by multiplying the unit emission rate concentrations presented in Appendix C by the upper Perc-content range facility specific emissions rate presented in Table D-17 of Appendix D.
4. Where appropriate, the potential risk estimates are adjusted for a working lifetime of 46 years and to allow for an operating schedule at an off-site facility that does not coincide with, or is shorter than, that of the facility being assessed.

3. Potential Individual Health Impacts from Generic Facilities

In addition to assessing the potential health impacts at the 54 specific facilities, ARB staff also conducted an HRA for three representative generic facilities (G-01, G-02, and G-03). These generic facilities were established utilizing the information from the 137 site visits, discussions with industry representatives, and two surveys that targeted AMR facilities and products manufacturers. The characteristics of the generic facilities represent the range of characteristics exhibited by the research of actual facilities and allow for the reasonable approximation of health impacts statewide.

The generic facility assessments were run with the ISCST3 air dispersion model and the resulting concentrations were used to estimate individual receptor potential cancer and non-cancer health impacts. The three generic facilities are modeled using ten representative off-site meteorological data sets and also were evaluated with default meteorological conditions to simulate a location where regional meteorological data was not available. These ten meteorological data sets are the same as those used for 13 of the site-specific facilities (group c) in exercise one and all facilities in exercise two. See Appendix F for a discussion outlining how the generic facilities were defined and Appendix D for a list of the meteorologic data sets. Appendix C provides an example calculation illustrating how modeled concentrations are used to estimate potential cancer and non-cancer health impacts.

In addition to evaluating these generic facilities for the use of brake cleaning products, estimates of the potential health impacts from the use of engine degreasers, carburetor-choke cleaner, and general degreasers were also completed. Section four of Appendix D includes a detailed presentation of the modeled concentrations from the three generic facilities using all four types of automotive consumer products. Appendix F outlines the emissions, usage, and content assumptions that were used for the three other product categories. The inputs for the generic modeling are listed in Appendix D.

Tables VI-7 and VI-8 provide an overview of the potential health impacts from the three generic facility HRAs using Perc-containing brake cleaners. These tables show the range of cancer and non-cancer health impacts at the minimum modeled distance using representative off-site meteorological data and default conditions, respectively. We are summarizing the health impacts from Perc-only brake products in Tables VI-7 and VI-8, rather than other formulations, because the health impacts of this formulation exhibit the highest potential health impacts.

The purpose of showing these health impacts at these receptor distances is because receptors do reside in close proximity to AMR facilities. During the 137 site visits, ARB staff observed that receptors are present within 51 meters at 87 of the AMR facilities. For a breakdown of the number of facilities with residential and worker receptors within 20, 30, 50 and 100 meters that were observed during the site visits see Table V-12.

Table VI-7 shows that the potential carcinogenic risk for a near source, residential receptor over all ten representative off-site meteorological sets range from approximately 18 to 64 chances per million at the smallest facility (G-01). The middle facility (G-02) potential near-source, residential receptor cancer risk ranges from 28 to 110 chances per million and at the largest facility (G-03), the near-source, residential receptor cancer risk ranges from 15 to 50 chances per million. Note, however, that modeled concentrations and potential risk could be either higher or lower depending on the actual building orientation and regional location. See Appendix D for a sensitivity analysis discussion illustrating the effects of building orientation under default meteorological conditions.

Table VI-8 which presents the results using default meteorology, shows the facility G-01 near-source, residential receptor cancer risk ranges from 61 to 89 chances per million, facility G-02 near-source, residential receptor cancer risk ranges from 86 to 125 chances per million, and at facility G-03, the residential receptor cancer risk ranges from 38 to 56 chances per million.

Regarding non-cancer impacts from the generic facilities, the modeling results and hazard index estimates in Tables VI-7 and VI-8 show that it is unlikely for significant acute or chronic non-cancer health effects to result from the emissions of Perc-containing brake cleaners. Both the chronic and acute hazard indices are less than 0.6 at the minimum modeled distance. Generally, hazard indices less than 1.0 are not considered to be a concern to public health.

Table VI-7. Overview of the Potential Health Impacts for the Three Generic Facilities Using Off-site Representative Meteorology [1]

Generic Facilities	Rec. Type [2]	Distance From Building Center [3] (m)	Off-site Representative Meteorology [4]		
			Range of Cancer Risk [5] (x/million)	Range of Acute Hazard Indices	Range of Chronic Hazard Indices
G-01	Resident	20	18 to 64	<0.05 to <0.09	<0.09 to <0.4
	Worker		7.6 to 27		
G-02	Resident	20	28 to 110	<0.04 to <0.08	<0.2 to <0.6
	Worker		12 to 47		
G-03	Resident	30	15 to 50	<0.02 to <0.03	<0.08 to <0.3
	Worker		6.3 to 21		

1. All numbers have been rounded.
2. Where appropriate, the potential risk estimates are adjusted for a working lifetime of 46 years and to allow for an operating schedule at an off-site facility that does not coincide with, or is shorter than, that of the facility being assessed.
3. The distance listed is the estimated distance from the center of the facility to the receptor.
4. Annual average and maximum hourly concentrations for all ten meteorological sets are listed in Appendix D.
5. The range reflects two common Perc concentrations observed in specific facility modeling.

Table VI-8. Overview of the Potential Health Impacts for the Three Generic Facilities Using Default Meteorology [1]

Generic Facilities	Rec. Type [2]	Distance From Building Edge [3] (m)	Default Conditions [4]		
			Range of Cancer Risk [5] (x/million)	Range of Acute Hazard Indices	Range of Chronic Hazard Indices
G-01	Resident	20	61 to 89	<0.06 to <0.08	<0.3 to <0.5
	Worker		26 to 38		
G-02	Resident	20	86 to 125	<0.06 to <0.08	<0.5 to <0.6
	Worker		36 to 53		
G-03	Resident	30	38 to 56	<0.03 to <0.04	<0.3 to <0.4
	Worker		16 to 24		

1. All numbers have been rounded.
2. Where appropriate, the potential risk estimates are adjusted for a working lifetime of 46 years and to allow for an operating schedule at an off-site facility that does not coincide with, or is shorter than, that of the facility being assessed.
3. The distance listed is the estimated distance from the edge of the facility to the receptor.
4. Meteorological conditions were taken from the SCREEN3 model. See Appendix D for more modeling information.
5. The range reflects two common Perc concentrations observed in specific facility modeling.

Tables VI-9 to VI-11 present the individual cancer and non-cancer (acute and chronic) potential health impacts for the three generic facilities using three specific meteorological data sets that span the range of modeled concentrations. These three regional meteorological data sets are for Oakland, Burbank, and Anaheim. These three locations provide a lower, medium, and higher concentrations, respectively. To select these three meteorological data sets, we evaluated the annual concentrations from all ten meteorological data sets. All concentrations and resulting potential health impacts are provided for all ten meteorological data sets in Appendix D. Table VI-12 presents the potential health impacts for the three generic facilities using default meteorological conditions.

Tables VI-9 to VI-12 also summarize the maximum potential health impacts from the three generic facilities using all four categories of automotive consumer products under the four different meteorological data sets described above. As described above, and in more detail in Chapter 4, the four product categories are brake cleaners, carburetor-choke cleaners, engine degreasers, and general degreasers. In addition to including the total maximum potential health impacts from the four different product categories, we also are presenting four constituent

formulations of brake cleaning products. The four brake cleaner constituent formulations used for this HRA are a Perc-only product (94%), Perc/MeCl (55%/25%), Perc/MeCl/TCE (40%/30%/20%), and Perc/TCE (55%/43%). These are identified in Tables VI-9 to VI-12 as formulations A, B, C, and D. Formulations A', B', C', and D' include the brake cleaner that is identified by the same letter (e.g., A' corresponds to A) and include the three other product categories.

Overall, Tables VI-9 to VI-12 show that none of the generic facilities, regardless of the brake cleaner formulation or the inclusion of all four product categories, present hazard indices greater than 0.6. Generally, hazard indices less than 1.0 are not considered to be a concern to public health.

Table VI-9 lists the results from generic facilities using the Anaheim meteorological data, brake cleaners of various formulations, and include the results from the use of all four product categories. Table VI-9 shows potential carcinogenic risk for a potential near-source, residential receptor range from approximately 35 to 68 chances per million at the smallest facility (G-01). The middle facility (G-02) potential near-source, residential receptor cancer risk ranges from 61 to 112 chances per million and at the largest facility (G-03), the near source, residential receptor cancer risk ranges from 28 to 52 chances per million.

Table VI-10 lists the results from generic facilities using the Burbank meteorological data, brake cleaners of various formulations, and include the results from the use of all four product categories. Table VI-10 shows potential carcinogenic risk for a potential near-source, residential receptor range from approximately 26 to 52 chances per million at the smallest facility (G-01). The middle facility (G-02) potential near-source, residential receptor cancer risk ranges from 47 to 88 chances per million and at the largest facility (G-03), the near source, residential receptor cancer risk ranges from 19 to 38 chances per million.

Table VI-11 lists the results from generic facilities using the Oakland meteorological data, brake cleaners of various formulations, and include the results from the use of all four product categories. Table VI-11 shows potential carcinogenic risk for a potential near-source, residential receptor range from approximately 15 to 31 chances per million at the smallest facility (G-01). The middle facility (G-02) potential near-source, residential receptor cancer risk ranges from 23 to 45 chances per million and at the largest facility (G-03), the near source, residential receptor cancer risk ranges from 12 to 23 chances per million.

Table VI-12 lists the results from generic facilities using default meteorological data, brake cleaners of various formulations, and include the results from the use of all four product categories. Table VI-12 shows potential carcinogenic impacts for a potential near-source, residential receptor range from approximately 49 to 100 chances per million at the smallest facility (G-01). The middle facility (G-02) potential near-source, residential receptor cancer risk ranges from 69 to 130 chances per million and at the largest facility (G-03), the near source, residential receptor cancer risk ranges from 31 to 59 chances per million.

Tables VI-13 and VI-14 itemize the individual product and total potential risk contributions from carburetor-choke cleaners, engine degreasers, and general degreasers under an average meteorological data set and under default conditions, respectively. The average meteorological data set was derived by averaging the modeled concentrations at each receptor distance for all ten representative off-site meteorological sets listed in Appendix D. See Appendix D for a detailed presentation of all modeling results. The emissions, use, and formulation assumptions used for the three product categories are discussed in Appendix F.

Table VI-13 shows the individual product and total potential near-source, residential cancer risk for all three generic facilities using the average meteorological data for the three product categories (i.e., carburetor-choke cleaners, engine degreasers, and general degreasers) range from 1.2 to 4.4 chances per million. The non-cancer hazard indices for both acute and chronic impacts are less than 0.1. The results from Table VI-13 are used with all regional meteorological data sets and are included in Tables VI-9 to VI-11 for the A', B', C', and D' formulation potential health impacts.

Table VI-14 shows the individual product and total potential near-source, residential cancer risk at all three generic facilities using the default meteorological data for the three product categories (i.e., carburetor-choke cleaners, engine degreasers, and general degreasers) ranges from 2.3 to 11 chances per million. The non-cancer hazard indices for both acute and chronic impacts are less than 0.1. The results presented in Table VI-14 are used with default meteorological conditions; therefore, they are included in Table VI-12 for the A', B', C', and D' formulation potential health impacts.

Table VI-9. Summary of the Potential Health Impacts at Various Distances for Three Generic Facilities Using Four Different Brake Product Formulations and Four Product Categories at the Meteorological Site Yielding the Highest Concentrations (Anaheim) [1,2]

Fac. Type	Formulations	Potential Cancer Risk (chances per million) [3,4]								Hazard Index [5]	
		20 Meters [6]		30 Meters		40 Meters		100 Meters		20 Meters	20 Meters
		Resident	Worker	Resident	Worker	Resident	Worker	Resident	Worker	Acute	Chronic
G-01	A [7]	64	27	34	14	21	8.9	4.0	1.7	<0.09	<0.4
	A' [8]	68	29	36	15	22	9.5	4.3	1.8	<0.2	<0.4
	B [9]	40	17	21	9.1	13	5.6	2.5	1.1	<0.09	<0.2
	B' [8]	44	19	24	10	15	6.2	2.8	1.2	<0.2	<0.2
	C [10]	35	15	19	7.9	12	4.9	2.2	0.9	<0.08	<0.2
	C' [8]	40	17	21	8.9	13	5.5	2.5	1.1	<0.2	<0.2
	D [11]	47	20	25	11	15	6.6	3.0	1.3	<0.06	<0.2
	D' [8]	52	22	27	12	17	7.2	3.3	1.4	<0.1	<0.2
G-02	A [7]	110	47	84	36	54	23	11	4.8	<0.08	<0.6
	A' [8]	112	48	86	37	56	24	12	4.9	<0.1	<0.6
	B [9]	69	29	53	23	34	15	7.1	3.0	<0.08	<0.4
	B' [8]	72	31	55	24	36	15	7.4	3.2	<0.1	<0.4
	C [10]	61	26	47	20	30	13	6.2	2.7	<0.07	<0.3
	C' [8]	63	27	49	21	31	13	6.5	2.8	<0.09	<0.3
	D [11]	81	35	63	27	40	17	8.4	3.6	<0.05	<0.4
	D' [8]	84	36	65	27	42	18	8.6	3.7	<0.07	<0.4

Table VI-9. Summary of the Potential Health Impacts at Various Distances for Three Generic Facilities Using Four Different Brake Product Formulations and Four Product Categories at the Meteorological Site Yielding the Highest Concentrations (Anaheim) (continued) [1,2]

Fac. Type	Formulations	Potential Cancer Risk (chances per million) [3,4]								Hazard Index [5]	
		20 Meters [6]		30 Meters		40 Meters		100 Meters		30 Meters	30 Meters
		Resident	Worker	Resident	Worker	Resident	Worker	Resident	Worker	Acute	Chronic
G-03	A [7]	--	--	50	21	39	17	12	5.1	<0.03	<0.3
	A' [8]	--	--	52	22	40	17	12	5.2	<0.04	<0.3
	B [9]	--	--	32	14	25	11	7.5	3.2	<0.03	<0.2
	B' [8]	--	--	33	14	26	11	7.8	3.3	<0.04	<0.2
	C [10]	--	--	28	12	22	9.2	6.6	2.8	<0.03	<0.2
	C' [8]	--	--	29	12	23	9.6	6.8	2.9	<0.04	<0.2
	D [11]	--	--	37	16	29	12	8.8	3.7	<0.02	<0.2
	D' [8]	--	--	39	16	30	13	9.1	3.9	<0.03	<0.2

1. All numbers have been rounded.
2. Annual average concentrations for all ten meteorological sets listed in Appendix D were used to determine which meteorological site is presented in this table. The meteorological site that yields the smallest, medium, and largest concentrations may be different when evaluating acute rather than chronic concentrations. We selected meteorological sets based on chronic concentrations since these potentially provide the most significant health impacts.
3. The distance listed is the estimated distance from the center of the facility to the receptor.
4. Where appropriate, the potential risk estimates are adjusted for a working lifetime of 46 years and to allow for an operating schedule at an off-site facility that does not coincide with, or is shorter than, that of the facility being assessed.
5. Hazard index listed here are the highest found for this facility in this meteorological data set. Facility G-03 was at 30 meters.
6. Results are not available for G-03 facilities since the minimum modeled distance is 30 meters.
7. Formulation A is a Perc brake cleaner with 94% Perc by weight.
8. Formulations A', B' ,C', and D' include the brake cleaner used in the corresponding letter (e.g., A' corresponds to brake cleaner A) plus the use of carburetor-choke cleaner (CC), engine degreaser (ED), and general degreaser (GD) were modeled with average meteorological data. The health impacts for CC, ED, and GD were derived at each receptor distance using the average concentrations from all ten meteorological sites. See Table VI-12 for the potential health impacts from each individual product type and Appendix D for a detailed presentation of all modeling results.
9. Formulation B is a Perc/MeCl brake cleaner with a 55% and 25% by weight Perc and MeCl content, respectively.
10. Formulation C is a Perc/MeCl/TCE brake cleaner with a 40%, 30%, and 20% by weight Perc, MeCl, and TCE content, respectively.
11. Formulation D is a Perc/TCE brake cleaner with a 55% and 43% by weight Perc and TCE content, respectively.

Table VI-10. Summary of the Potential Health Impacts at Various Distances for Three Generic Facilities Using Four Different Brake Product Formulations and Four Product Categories at the Meteorological Site Yielding Middle Range Concentrations (Burbank) [1,2]

Fac. Type	Formulations	Potential Cancer Risk (chances per million) [3,4]								Hazard Index [5]	
		20 Meters [6]		30 Meters		40 Meters		100 Meters		20 Meters	20 Meters
		Resident	Worker	Resident	Worker	Resident	Worker	Resident	Worker	Acute	Chronic
G-01	A [7]	47	20	25	11	16	6.6	3.0	1.3	<0.09	<0.3
	A' [8]	52	22	28	12	17	7.3	3.3	1.4	<0.2	<0.3
	B [9]	30	13	16	6.8	9.8	4.2	1.9	0.8	<0.09	<0.2
	B' [8]	34	15	18	7.8	11	4.8	2.2	0.9	<0.2	<0.2
	C [10]	26	11	14	5.9	8.6	3.7	1.7	0.7	<0.08	<0.2
	C' [8]	31	13	16	6.9	10	4.3	2.0	0.8	<0.2	<0.2
	D [11]	35	15	19	7.9	12	4.9	2.3	1.0	<0.06	<0.2
	D' [8]	40	17	21	8.9	13	5.5	2.5	1.1	<0.1	<0.2
G-02	A [7]	86	36	63	27	41	17	8.5	3.6	<0.08	<0.5
	A' [8]	88	38	65	28	42	18	8.8	3.7	<0.1	<0.5
	B [9]	54	23	40	17	26	11	5.4	2.3	<0.08	<0.3
	B' [8]	57	24	42	18	27	11	5.6	2.4	<0.1	<0.3
	C [10]	47	20	35	15	22	9.5	4.7	2.0	<0.07	<0.2
	C' [8]	50	21	37	16	24	10	5.0	2.1	<0.09	<0.2
	D [11]	63	27	47	20	30	13	6.3	2.7	<0.05	<0.3
	D' [8]	66	28	49	21	31	13	6.6	2.8	<0.07	<0.3

Table VI-10. Summary of the Potential Health Impacts at Various Distances for Three Generic Facilities Using Four Different Brake Product Formulations and Four Product Categories at the Meteorological Site Yielding Middle Range Concentrations (Burbank) (continued)[1,2]

Fac. Type	Formulations	Potential Cancer Risk (chances per million)[3,4]								Hazard Index[5]	
		20 Meters[6]		30 Meters		40 Meters		100 Meters		30 Meters	30 Meters
		Resident	Worker	Resident	Worker	Resident	Worker	Resident	Worker	Acute	Chronic
G-03	A[7]	--	--	37	16	31	13	9.0	3.8	<0.03	<0.2
	A'[8]	--	--	38	16	32	14	9.3	3.9	<0.04	<0.2
	B[9]	--	--	23	9.9	20	8.4	5.7	2.4	<0.03	<0.2
	B'[8]	--	--	24	10	21	8.8	6.0	2.5	<0.04	<0.2
	C[10]	--	--	19	8.3	16	7.0	4.7	2.0	<0.03	<0.08
	C'[8]	--	--	21	8.7	17	7.4	5.0	2.1	<0.04	<0.09
	D[11]	--	--	27	12	23	9.9	6.7	2.8	<0.02	<0.2
	D'[8]	--	--	28	12	24	10	6.9	3.0	<0.03	<0.2

1. All numbers have been rounded.
2. Annual average concentrations for all ten meteorological sets listed in Appendix D were used to determine which meteorological site is presented in this table. The meteorological site that yields the smallest, medium, and largest concentrations may be different when evaluating acute rather than chronic concentrations. We selected meteorological sets based on chronic concentrations since these potentially provide the most significant health impacts.
3. The distance listed is the estimated distance from the center of the facility to the receptor.
4. Where appropriate, the potential risk estimates are adjusted for a working lifetime of 46 years and to allow for an operating schedule at an off-site facility that does not coincide with, or is shorter than, that of the facility being assessed.
5. Hazard index listed here are the highest found for this facility in this meteorological data set. Facility G-03 was at 30 meters.
6. Results are not available for G-03 facilities since the minimum modeled distance is 30 meters.
7. Formulation A is a Perc brake cleaner with 94% Perc by weight.
8. Formulations A', B' ,C', and D' include the brake cleaner used in the corresponding letter (e.g., A' corresponds to brake cleaner A) plus the use of carburetor-choke cleaner (CC), engine degreaser (ED), and general degreaser (GD) were modeled with average meteorological data. The health impacts for CC, ED, and GD were derived at each receptor distance using the average concentrations from all ten meteorological sites. See Table VI-12 for the potential health impacts from each individual product type and Appendix D for a detailed presentation of all modeling results.
9. Formulation B is a Perc/MeCl brake cleaner with a 55% and 25% by weight Perc and MeCl content, respectively.
10. Formulation C is a Perc/MeCl/TCE brake cleaner with a 40%, 30%, and 20% by weight Perc, MeCl, and TCE content, respectively.
11. Formulation D is a Perc/TCE brake cleaner with a 55% and 43% by weight Perc and TCE content, respectively.

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Table VI-11. Summary of the Potential Health Impacts at Various Distances for Three Generic Facilities Using Four Different Brake Product Formulations and Four Product Categories at the Meteorological Site Yielding the Lowest Concentrations (Oakland) [1,2]

Fac. Type	Formulations	Potential Cancer Risk (chances per million) [3,4]								Hazard Index [5]	
		20 Meters [6]		30 Meters		40 Meters		100 Meters		20 Meters	20 Meters
		Resident	Worker	Resident	Worker	Resident	Worker	Resident	Worker	Acute	Chronic
G-01	A [7]	27	11	14	6.1	8.9	3.8	1.8	0.75	<0.08	<0.2
	A' [8]	31	13	17	7.1	10	4.4	2.0	0.9	<0.2	<0.2
	B [9]	17	7.2	9.0	3.8	5.6	2.4	1.1	0.47	<0.08	<0.08
	B' [8]	21	9.0	11	4.9	7.0	3.0	1.4	0.6	<0.2	<0.09
	C [10]	15	6.3	7.9	3.4	4.9	2.1	1.0	0.4	<0.07	<0.06
	C' [8]	19	8.2	10	4.4	6.4	2.7	1.3	0.5	<0.2	<0.07
	D [11]	20	8.4	11	4.5	6.6	2.8	1.3	0.6	<0.05	<0.08
	D' [8]	24	10	13	5.5	8.0	3.4	1.6	0.7	<0.09	<0.09
G-02	A [7]	42	18	35	15	23	9.8	4.9	2.1	<0.07	<0.3
	A' [8]	45	19	37	16	24	10	5.2	2.2	<0.09	<0.3
	B [9]	27	11	22	9.5	15	6.2	3.1	1.3	<0.07	<0.2
	B' [8]	29	12	24	10	16	6.7	3.4	1.4	<0.09	<0.2
	C [10]	23	9.9	20	8.3	13	5.4	2.7	1.2	<0.06	<0.1
	C' [8]	26	11	21	9.1	14	6.0	3.0	1.3	<0.08	<0.1
	D [11]	31	13	26	11	17	7.3	3.6	1.6	<0.04	<0.2
	D' [8]	34	14	28	12	18	7.8	3.9	1.7	<0.06	<0.2

Table VI-11. Summary of the Potential Health Impacts at Various Distances for Three Generic Facilities Using Four Different Brake Product Formulations and Four Product Categories at the Meteorological Site Yielding the Lowest Concentrations (Oakland) (continued)[1,2]

Fac. Type	Formulations	Potential Cancer Risk (chances per million) [3,4]								Hazard Index [5]	
		20 Meters [6]		30 Meters		40 Meters		100 Meters		30 Meters	30 Meters
		Resident	Worker	Resident	Worker	Resident	Worker	Resident	Worker	Acute	Chronic
G-03	A [7]	--	--	22	9.2	16	6.8	5.2	2.2	<0.03	<0.2
	A' [8]	--	--	23	9.7	17	7.2	5.5	2.3	<0.03	<0.2
	B [9]	--	--	14	5.8	10	4.3	3.3	1.4	<0.02	<0.2
	B' [8]	--	--	15	6.3	11	4.7	3.6	1.5	<0.03	<0.2
	C [10]	--	--	12	5.1	8.8	3.8	2.9	1.2	<0.02	<0.05
	C' [8]	--	--	13	5.6	9.8	4.2	3.1	1.3	<0.03	<0.05
	D [11]	--	--	16	6.8	12	5.0	3.8	1.6	<0.02	<0.07
	D' [8]	--	--	17	7.3	13	5.5	4.1	1.8	<0.02	<0.07

1. All numbers have been rounded.
2. Annual average concentrations for all ten meteorological sets listed in Appendix D were used to determine which meteorological site is presented in this table. The meteorological site that yields the smallest, medium, and largest concentrations may be different when evaluating acute rather than chronic concentrations. We selected meteorological sets based on chronic concentrations since these potentially provide the most significant health impacts.
3. The distance listed is the estimated distance from the center of the facility to the receptor.
4. Where appropriate, the potential risk estimates are adjusted for a working lifetime of 46 years and to allow for an operating schedule at an off-site facility that does not coincide with, or is shorter than, that of the facility being assessed.
5. Hazard index listed here are the highest found for this facility in this meteorological data set. Facility G-03 was at 30 meters.
6. Results are not available for G-03 facilities since the minimum modeled distance is 30 meters.
7. Formulation A is a Perc brake cleaner with 94% Perc by weight.
8. Formulations A', B' ,C', and D' include the brake cleaner used in the corresponding letter (e.g., A' corresponds to brake cleaner A) plus the use of carburetor-choke cleaner (CC), engine degreaser (ED), and general degreaser (GD) were modeled with average meteorological data. The health impacts for CC, ED, and GD were derived at each receptor distance using the average concentrations from all ten meteorological sites. See Table VI-12 for the potential health impacts from each individual product type and Appendix D for a detailed presentation of all modeling results.
9. Formulation B is a Perc/MeCl brake cleaner with a 55% and 25% by weight Perc and MeCl content, respectively.
10. Formulation C is a Perc/MeCl/TCE brake cleaner with a 40%, 30%, and 20% by weight Perc, MeCl, and TCE content, respectively.
11. Formulation D is a Perc/TCE brake cleaner with a 55% and 43% by weight Perc and TCE content, respectively.

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Table VI-12. Summary of the Potential Health Impacts at Various Distances for Three Generic Facilities Using Four Different Brake Product Formulations and Four Product Categories based on Default Meteorological Data [1,2]

Fac. Type	Formulations	Potential Cancer Risk (chances per million) [3,4]								Hazard Index [5]	
		20 Meters [6]		30 Meters		40 Meters		100 Meters		20 Meters	20 Meters
		Resident	Worker	Resident	Worker	Resident	Worker	Resident	Worker	Acute	Chronic
G-01	A [7]	89	38	67	29	52	22	18	7.5	<0.08	<0.5
	A' [8]	100	43	75	32	58	25	20	8.4	<0.2	<0.5
	B [9]	56	24	42	18	33	14	11	4.7	<0.08	<0.3
	B' [8]	67	29	50	21	39	17	13	5.6	<0.2	<0.3
	C [10]	49	21	37	16	29	12	9.7	4.1	<0.08	<0.2
	C' [8]	60	26	45	19	35	15	12	5.0	<0.2	<0.3
	D [11]	66	28	50	21	38	16	13	5.5	<0.05	<0.3
	D' [8]	77	33	58	25	45	19	15	6.4	<0.1	<0.3
G-02	A [7]	125	53	103	44	86	37	38	16	<0.1	<0.7
	A' [8]	130	55	107	46	90	38	39	17	<0.1	<0.7
	B [9]	79	34	65	28	54	23	24	10	<0.08	<0.4
	B' [8]	84	36	69	29	58	25	25	11	<0.1	<0.4
	C [10]	69	29	57	24	48	20	21	8.8	<0.07	<0.3
	C' [8]	74	31	61	26	51	22	22	9.5	<0.09	<0.3
	D [11]	92	39	76	32	64	27	28	12	<0.05	<0.4
	D' [8]	97	41	80	34	67	29	29	12	<0.07	<0.4

Table VI-12. Summary of the Potential Health Impacts at Various Distances for Three Generic Facilities Using Four Different Brake Product Formulations and Four Product Categories based on Default Meteorological Data (continued)[1,2]

Fac. Type	Formulations	Potential Cancer Risk (chances per million)[3,4]								Hazard Index[5]	
		20 Meters[6]		30 Meters		40 Meters		100 Meters		30 Meters	30 Meters
		Resident	Worker	Resident	Worker	Resident	Worker	Resident	Worker	Acute	Chronic
G-03	A[7]	--	--	56	24	49	21	26	11	<0.04	<0.3
	A'[8]	--	--	59	25	51	22	27	11	<0.05	<0.3
	B[9]	--	--	36	15	31	13	16	6.9	<0.04	<0.2
	B'[8]	--	--	38	16	33	14	17	7.3	<0.05	<0.2
	C[10]	--	--	31	13	27	12	14	6.0	<0.03	<0.2
	C'[8]	--	--	33	14	29	12	15	6.5	<0.04	<0.2
	D[11]	--	--	42	18	37	16	19	8.1	<0.02	<0.2
	D'[8]	--	--	44	19	39	16	20	8.5	<0.03	<0.2

1. All numbers have been rounded.
2. Meteorological data conditions from the SCREEN3 dispersion model were used in the ISCST3 model to determine the potential health impacts listed in this table.
3. The distance listed is the estimated distance from the edge of the facility to the receptor. The distance listed for facility G-03 is 30 meters.
4. Where appropriate, the potential risk estimates are adjusted for a working lifetime of 46 years and to allow for an operating schedule at an off-site facility that does not coincide with, or is shorter than, that of the facility being assessed.
5. Hazard indices listed here are the highest found for this facility in this meteorological data set.
6. Results are not available for G-03 facilities since the minimum modeled distance is 30 meters.
7. Formulation A is a Perc brake cleaner with 94% Perc by weight.
8. Formulations A', B' ,C', and D' include the brake cleaner used in the corresponding letter (e.g., A' corresponds to brake cleaner A) plus the use of carburetor-choke cleaner (CC), engine degreaser (ED), and general degreaser (GD) were modeled with default meteorological data. The health impacts for CC, ED, and GD were derived at each receptor distance using the default meteorological data conditions from the SCREEN3 air dispersion model. See Table VI-13 for the potential health impacts from each individual product type and Appendix D for a detailed presentation of all modeling results.
9. Formulation B is a Perc/MeCl brake cleaner with a 55% and 25% by weight Perc and MeCl content, respectively.
10. Formulation C is a Perc/MeCl/TCE brake cleaner with a 40%, 30%, and 20% by weight Perc, MeCl, and TCE content, respectively.
11. Formulation D is a Perc/TCE brake cleaner with a 55% and 43% by weight Perc and TCE content, respectively.

Table VI-13. Summary of the Potential Health Impacts at Various Distances for Three Generic Facilities Using Carburetor Cleaner, Engine Degreaser, and General Degreaser based on Average Meteorological Data [1,2]

Fac. Type	Product Category	Potential Cancer Risk (chances per million) [3,4]								Hazard Index [5]	
		20 Meters [6]		30 Meters		40 Meters		100 Meters		20 Meters	20 Meters
		Resident	Worker	Resident	Worker	Resident	Worker	Resident	Worker	Acute	Chronic
G-01	CC [7]	0.7	0.3	0.4	0.2	0.2	0.1	0.05	0.02	<0.03	<0.01
	ED [7]	2.2	0.9	1.2	0.5	0.7	0.3	0.1	0.06	<0.02	<0.01
	GD [7]	1.5	0.7	0.8	0.3	0.5	0.2	0.1	0.04	<0.01	<0.01
	Total [9]	4.4	1.9	2.4	1.0	1.4	0.6	0.3	0.1	<0.05	<0.01
G-02	CC [7]	0.4	0.2	0.3	0.1	0.2	0.09	0.04	0.02	<0.02	<0.01
	ED [7]	1.3	0.5	1.0	0.4	0.6	0.3	0.1	0.06	<0.01	<0.01
	GD [7]	0.9	0.4	0.7	0.3	0.4	0.2	0.09	0.04	<0.01	<0.01
	Total [9]	2.6	1.1	2.0	0.8	1.2	0.6	0.2	0.1	<0.02	<0.01
G-03	CC [7]	--	--	0.2	0.08	0.2	0.07	0.05	0.02	<0.01 [8]	<0.01 [8]
	ED [7]	--	--	0.6	0.2	0.5	0.2	0.1	0.06	<0.01 [8]	<0.01 [8]
	GD [7]	--	--	0.4	0.2	0.3	0.1	0.1	0.04	<0.01 [8]	<0.01 [8]
	Total [9]	--	--	1.2	0.5	1.0	0.4	0.3	0.1	<0.01 [8]	<0.01 [8]

1. All numbers have been rounded.
2. The modeled concentrations for all ten meteorological sets listed in Appendix D were averaged at each receptor distance to determine the concentrations that would be used to estimate the potential health impacts listed in this table. See Appendix D for a detailed presentation of all modeling results. The potential health impacts in this table were derived from emissions and use information contained in Appendix F.
3. The distance listed is the estimated distance from the center of the facility to the receptor.
4. Where appropriate, the potential risk estimates are adjusted for a working lifetime of 46 years and to allow for an operating schedule at an off-site facility that does not coincide with, or is shorter than, that of the facility being assessed.
5. Hazard indices listed here are the highest found for this facility for the averaged meteorological data set.
6. Results are not available for G-03 facilities since the minimum modeled distance is 30 meters.
7. CC means carburetor-choke cleaner; ED means engine degreaser; GD means general degreaser.
8. Receptor distance of 30 meters
9. The total potential health impacts from carburetor-choke cleaner (CC), engine degreaser (ED), and general degreaser (GD) at each receptor distance are used in Tables VI-8 to VI-10.

Table VI-14. Summary of the Potential Health Impacts at Various Distances for Three Generic Facilities Using Carburetor Cleaner, Engine Degreaser, and General Degreaser based on Default Meteorological Data [1,2]

Fac. Type	Product Category	Potential Cancer Risk (chances per million) [3,4]								Hazard Index [5]	
		20 Meters [6]		30 Meters		40 Meters		100 Meters		20 Meters	20 Meters
		Resident	Worker	Resident	Worker	Resident	Worker	Resident	Worker	Acute	Chronic
G-01	CC [7]	1.8	0.8	1.3	0.6	1.0	0.4	0.4	0.2	<0.03	<0.01
	ED [7]	5.3	2.3	4.0	1.7	3.1	1.3	1.0	0.4	<0.02	<0.02
	GD [7]	3.7	1.6	2.8	1.2	2.1	0.9	0.7	0.3	<0.01	<0.01
	Total [9]	11	4.7	8.1	3.5	6.2	2.6	2.1	0.9	<0.05	<0.03
G-02	CC [7]	0.8	0.4	0.7	0.3	0.6	0.3	0.3	0.1	<0.02	<0.01
	ED [7]	2.5	1.1	2.0	0.9	1.7	0.7	0.7	0.3	<0.01	<0.01
	GD [7]	1.7	0.7	1.4	0.6	1.2	0.5	0.5	0.2	<0.01	<0.01
	Total [9]	5.0	2.2	4.1	1.8	3.5	1.5	1.5	0.6	<0.03	<0.02
G-03	CC [7]	--	--	0.4	0.2	0.3	0.1	0.2	0.07	<0.01 [8]	<0.01 [8]
	ED [7]	--	--	1.1	0.5	1.0	0.4	0.5	0.2	<0.01 [8]	<0.01 [8]
	GD [7]	--	--	0.8	0.3	0.7	0.3	0.4	0.2	<0.01 [8]	<0.01 [8]
	Total [9]	--	--	2.3	1.0	2.0	0.8	1.1	0.5	<0.01 [8]	<0.01 [8]

1. All numbers have been rounded
2. Meteorological data conditions from the SCREEN3 dispersion model were used in the ISCST3 model to determine the potential health impacts listed in this table. See Appendix D for a detailed presentation of all modeling results. The potential health impacts listed in this table are based on the emissions and use information contained in Appendix F.
3. The distance listed is the estimated distance from the edge of the facility to the receptor.
4. Where appropriate, the potential risk estimates are adjusted for a working lifetime of 46 years and to allow for an operating schedule at an off-site facility that does not coincide with, or is shorter than, that of the facility being assessed.
5. Hazard indices listed here are the highest found for this facility for the default meteorological data set.
6. Results are not available for G-03 facilities since the minimum modeled distance is 30 meters.
7. CC means carburetor-choke cleaner; ED means engine degreaser; GD means general degreaser.
8. Receptor distance of 30 meters
9. The total potential health impacts from carburetor-choke cleaner (CC), engine degreaser (ED), and general degreaser (GD) are used in Table VI-11.

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4. Statewide Exposure to Perc, MeCl, and TCE

a. Perchloroethylene Population-Weighted Exposure

ARB staff conducted an analysis of the estimated statewide population-weighted exposure to Perc. To do this, ARB staff used data from ARB's air toxics monitoring network and population data to obtain an estimated population-weighted Perc exposure. ARB staff chose Perc for this analysis because it is the highest contributor to ambient risk of the three compounds affected by this regulation.

The statewide population-weighted exposure is based on ambient data collected by the ARB and population figures from the Department of Finance (DOF). The ambient air monitoring network is designed to obtain outdoor ambient background, non-source-influenced, concentration levels of air toxics from 21 ambient air toxics monitoring stations located statewide.

The methodology used to complete the analysis of the population exposure estimate of Perc consists of two parts. The first part is an estimate of the Perc exposure in a given air basin, which yields an average exposure for each air basin that was analyzed. Due to data limitations, population exposure estimates were calculated differently for different air basins. Our analysis of the Perc exposure covers six air basins, and approximately 72 percent of the statewide population. The following Table VI-15 shows the estimated air basin population-weighted exposure for the six basins used in this analysis. For a complete discussion on the methodology used in this analysis see Appendix E.

As shown in Table VI-15, on average, Perc exposure in the listed air basins has decreased about 50 percent since 1990 levels. There is insufficient data to quantify how the ambient reductions in Perc correspond to reductions in commercial and industrial Perc use. However, reductions in ambient levels of Perc are likely the result of regulations or programs such as the Dry Cleaning ATCM and voluntary modifications to work practices from sources using Perc due to the AB 2588 Air Toxics "Hot Spots" Program.

Table VI-15. Air Basin Population-Weighted Perchloroethylene Exposure based on 1990 Census (ppb-year/person)[1]

Air Basin	1990	1991	1992	1993	1994	1995	1996	1997
South Coast	0.590	0.542	0.430	0.472	0.410	0.392	0.330	0.264
South Central Coast	0.181	0.160	0.124	0.095	0.110	0.100	0.104	0.081
San Diego	0.280	0.261	0.262	0.193	0.204	0.244	0.133	0.124
San Francisco	0.196	0.223	0.158	0.124	0.082	0.091	0.068	0.071
San Joaquin Valley	0.121	0.131	0.105	0.410	0.067	0.070	0.064	0.056
Sacramento Valley	0.070	0.075	0.058	0.051	0.181	0.053	0.054	0.053

1. Only air basins with Perchloroethylene monitoring are included in this table. Air basin population-weighted exposure is calculated using mean of monthly means for all sites within basin. Population exposure units are a concentration for a given duration per person. For this analysis, the units are ppb-year/person.

In the second part of the analysis, the overall statewide population-weighted exposure was calculated by multiplying the estimated annual average Perc exposure for a given air basin by its population, added across all basins, then divided by the total population of the State. Table VI-16 shows the estimated statewide population-weighted Perc exposure from 1990 to 1997.

Table VI-16. Estimated Statewide Population-Weighted Perchloroethylene Exposure (ppb-year/person)[1]

1990	1991	1992	1993	1994	1995	1996	1997
0.382	0.362	0.290	0.322	0.262	0.251	0.203	0.168

1. Population exposure units are a concentration for a given duration per person. For this analysis, the units are ppb-year/person

b. Statewide Exposure to MeCl and TCE

To determine ambient concentrations of MeCl and TCE, ARB staff used the statewide average concentrations from ARB's ambient toxics database. One limitation in using this data is that in many cases MeCl and TCE measurements are below the level of detection (LOD). In these cases, measured values are set to one-half the LOD. For example, over two-thirds of the MeCl measurements are below the LOD; therefore, the statewide average concentration is driven by one-half the LOD, rather than a true ambient mean. Table VI-17 shows the statewide average concentration for MeCl and TCE from 1990 to 1997.

Table VI-17. Statewide Average Concentration for MeCl and TCE (ppb)[1]

Compound	1990	1991	1992	1993	1994	1995	1996	1997
MeCl	1.09	1.27	0.75	0.93	0.79	0.77	0.66	0.66
TCE	0.115	0.086	0.061	0.036	0.047	0.035	0.034	0.033

1. Used statewide average of monthly average. Data from ARB's ambient toxics database.

5. Potential Reductions in Ambient Levels of Perc, MeCl, and TCE from the Proposed ATCM

In addition to the risk reduction benefits for on-site workers and near-source receptors, we would expect a reduction in overall ambient levels of Perc, MeCl, and TCE. By reducing ambient levels of these compounds, overall statewide risk reduction benefits can be achieved. The potential decrease in ambient levels of Perc, MeCl, and TCE emitted by the four product categories can be estimated if we know their contribution to ambient levels. By estimating emissions of Perc, MeCl, and TCE from the four product categories and dividing by total emissions respectively, we can estimate the percentage of Perc, MeCl, and TCE emissions attributed to the four product categories. Table V1-18 shows the reduction in ambient levels we would expect based on the proposed ATCM.

Table VI-18. Estimated Potential Reductions in Ambient Levels of Perc, MeCl, and TCE from the Proposed ATCM

Compound	Percent Reduction in Ambient Levels[1,2]
Perc	26
MeCl	5
TCE	37

1. Assumes emissions are proportional to ambient levels.
2. Inventory used to determine reduction in ambient levels does not include all sources of emissions; therefore, potential reduction may be slightly overestimated.

a. Potential Reduction in Ambient Levels of Perc

To estimate total statewide emissions of Perc we compiled data from ARB's 1996 Air Toxic "Hot Spots" Emission Inventory (Hot Spots Inventory), ARB's 1997 Consumer and Commercial Product Survey (Consumer Products Survey), ARB's 1997 Aerosol Coatings Inventory, and dry cleaning emissions estimates. To estimate statewide emissions from dry cleaners we used projected post-regulation emissions from the "Technical Support Document:

Proposed Airborne Toxic Control Measure and Proposed Environmental Training Program for Perchloroethylene Operations, August 27, 1993" (Perc Dry Cleaning TSD) (ARB, 1993a).

The Perc Dry Cleaning TSD estimated that dry cleaning emissions would be reduced by 78 percent from 1991 emissions to post-regulation emissions. The ATCM for Perc Dry Cleaning Operations required transfer and vented machines be phased out by October 1998; therefore, to represent 1997 emissions we assumed that approximately 75 percent of transfer and vented machines have been phased out and replaced by converted and closed loop machines. The assumptions used in Chapter 10 of the Perc Dry Cleaning TSD were used to determine that the 1991 estimate of 13.6 tons per day would be reduced to 4.7 tons per day for 1997.

We estimated that approximately 16.3 tons per day of Perc are emitted from the sources in the Hot Spots Inventory, Consumer Products Inventory, 1997 Aerosol Coatings Inventory, and estimated dry cleaning emissions. We recognize that these inventories listed above do not include all sources of Perc. For example, degreasing operations not accounted for in the Hot Spots Inventory, could account for a significant contribution to overall Perc emissions.

Therefore, this analysis may slightly underestimate total Perc emissions, thereby overestimating the potential ambient contribution from the four product categories. In the future, to allow us to better refine this analysis, ARB is currently in the process of completing an area source inventory for air toxics which will be available in 2000.

Based on the Consumer Products Inventory, we determined that Perc emissions from the four product categories account for approximately 4.2 tons per day. If we assume that Perc emissions are directly proportional to ambient levels, then we would expeet that ambient concentrations of Perc would be reduced by approximately 26 percent upon full implementation of the proposed ATCM.

b. Potential Reduction in Ambient Levels of MeCl and TCE.

To estimate total statewide emissions of MeCl and TCE we compiled data from the Hot Spots Inventory, the Consumer Products Inventory, and the 1997 Aerosol Coatings Inventory. We recognize that these inventories do not include all sources of emissions of MeCl and TCE. For example, there may be some facilities that emit these compounds which were not included in the Hot Spots Inventory. Therefore, this analysis may slightly underestimate the total emissions of MeCl and TCE, thereby overestimating the potential contribution from the four product categories. We estimated that approximately 13.5 tons per day of MeCl and 0.8 tons per day of TCE are emitted from the sources in these inventories. To better refine this analysis, ARB is in the process of completing an area source inventory for air toxics which will be available in 2000.

From the Consumer Products Inventory, we determined that MeCl emissions from the four product categories account for approximately 0.7 tons per day, while TCE accounts for approximately 0.3 tons per day. If we assume that MeCl emissions are directly proportional to

ambient levels, then we would expect that ambient concentrations of MeCl would be reduced by approximately 5 percent upon full implementation of the proposed ATCM. Additionally, if we assume that TCE emissions are directly proportional to ambient levels, then we would expect that ambient concentrations of TCE would be reduced by approximately 37 percent upon full implementation of the proposed ATCM.

F. Multipathway Health Risk Assessment

In evaluating the potential health effects of a pollutant, it is important to identify the different manners by which an individual could be exposed to the pollutant. The pathways that can be included in an HRA, depend on the toxic air pollutants that a person (receptor) may be exposed to, and can include inhalation, dermal exposure, and the ingestion of soil, water, crops, fish, meat, milk, and eggs. For this HRA, we are evaluating the impacts for Perc, MeCl, and TCE via the breathing or inhalation pathway only. We are not evaluating other pathways of exposure because at this time OEHHA does not routinely use methods for assessing exposure to volatile compounds such as Perc, MeCl, and TCE by exposure routes other than inhalation. Such multiple exposure pathway (multipathway) assessments are traditionally used for lipophilic (fat loving), semivolatile, or low volatility compounds such as dioxins, polycyclic organic compounds (PAHs), or polychlorinated biphenyls (PCBs) (CAPCOA, 1993).

VII. THE PROPOSED CONTROL MEASURE AND ALTERNATIVES

In the previous two chapters we assessed emissions and potential risk from the use of automotive consumer products containing the toxic air contaminants (TACs) Perc, MeCl, or TCE at automotive maintenance and repair (AMR) facilities. Statewide, we estimated that each day AMR activities emit more than five tons of Perc, MeCl, and TCE to the atmosphere.

This chapter describes and provides the basis for the proposed Airborne Toxic Control Measure for Emissions of Chlorinated Toxic Air Contaminants from Automotive Maintenance and Repair Activities. Included in the basis for the proposed control measure is a discussion of the options that staff evaluated to remove chlorinated compounds from automotive consumer products. This chapter also describes alternatives to, and the technical feasibility of, the proposed control measure.

A. The Proposed Control Measure

The proposed control measure would minimize emissions of Perc, MeCl, and TCE from automotive maintenance and repair activities by regulating automotive consumer product content and usage. Specifically, the proposed control measure requires that aerosol and liquid brake cleaners, carburetor or fuel-injection air intake cleaners (carburetor cleaners), engine degreasers, and general purpose degreasers sold or intended for sale in California not contain Perc, MeCl, or TCE. The proposed ATCM language provides for the detection limits of the prescribed test method by stating that a product is considered to contain Perc, MeCl, or TCE if it has one percent or more (by weight) of any of the three compounds Perc, MeCl, or TCE. This also addresses the issue of inadvertent contamination that may occur when manufacturers convert a production line from one product to another. The proposed ATCM also prohibits AMR facility owners and operators from using automotive consumer products that contain Perc, MeCl, or TCE in their facilities.

The first action ensures that we address residential and off-road use of aerosol and liquid automotive consumer products containing chlorinated compounds and labeled as brake cleaners, carburetor cleaners, engine degreasers, and general purpose degreasers as well as commercial use in AMR facilities. The second action ensures that facility operators do not purchase bulk liquid containers of Perc, MeCl, and TCE with the express intent of using it in a spray bottle or compressed air sprayer.

The proposed control measure would require the removal of Perc, MeCl, and TCE from any aerosol or liquid brake cleaner, carburetor cleaner, engine degreaser, or general purpose degreaser manufactured after December 31, 2002. Manufacturers would be provided an additional sell-through period of 18 months for chlorinated products manufactured prior to this date.

Facility owners and operators would be provided an additional year from the end of the sell-through period (June 30, 2004) to deplete their inventories of chlorinated products. The proposed control measure would prohibit facility owners and operators from using chlorinated automotive consumer products in their facilities after June 30, 2005.

To determine effective dates under the proposed ATCM, staff established dates consistent with some of the effective dates listed under the Consumer Products Regulation, as amended in October 1999 (ARB,1999b). For example, effective dates for brake cleaners and carburetor cleaners under the Consumer Products Regulation coincide with the December 31, 2002, effective date in the proposed ATCM. The effective date for aerosol general purpose degreasers is January 1, 2002, which is a year sooner that what is required by the proposed ATCM. For these categories, automotive consumer products manufactures would most likely conduct a one-time reformulation to comply with both the proposed ATCM and the Consumer Products Regulation. Although the December 31, 2002, effective dates in the proposed ATCM for engine degreasers and non-aerosol general purpose degreasers do not coincide with the Consumer Products Regulation, staff believes automotive consumer products manufactures will have sufficient time to reformulate to meet the December 31, 2002, effective date under the proposed ATCM. Additionally, most manufacturers already market products that comply with the proposed ATCM.

Additionally, the 18-month sell-through period under the proposed ATCM would provide sufficient time for businesses to sell automotive consumer products, based on data provided in the Proposed Amendments to the Statewide Regulation to Reduce Volatile Organic Compound Emissions from Consumer Products, Phase II, Technical Support Document, October 1991 (Phase II TSD). In surveys conducted under the Phase II TSD, the majority of businesses responded that most automotive consumer products are sold within one year (ARB, 1991b). Therefore, we have determined that an 18-month sell-through period is sufficient.

B. Basis For The Proposed Regulation

California Health and Safety Code (HSC) section 39665(b) requires the Board to address the technological feasibility of proposed ATCMs. HSC section 39665(b) also requires the Board to address the "availability, suitability and relative efficacy" of substitute products of a less hazardous nature when proposing an ATCM. To evaluate the technological feasibility and availability of the proposed ATCM, staff determined the market share of substitute or alternative products. Staff determined suitability and efficacy by reviewing product labels and interviewing users of both the products for which the limit is proposed and the alternative products.

1. Best Available Control Technology

In addition to the issues to be addressed under HSC section 39665(b), HSC section 39666 requires that any control measure for a TAC without a Board-specified threshold level be designed to reduce emissions to the lowest level achievable through the application of best

available control technology (BACT) or a more effective control method. To determine BACT for automotive maintenance and repair activities for each of the four product categories under the proposed regulation, staff identified whether alternatives existed for a given product category, and then evaluated the availability, suitability, and effectiveness of the alternatives.

In evaluating BACT, staff evaluated three options. The first scenario addressed removing Perc from brake cleaning products. In consideration of interchangeability of brake cleaning compounds, the second scenario would additionally remove MeCl and TCE from brake cleaners. Finally, in consideration of the interchangeability of automotive consumer products, the third scenario would remove Perc, MeCl, and TCE from not only brake cleaning products, but the three additional product categories: carburetor cleaners, engine degreasers, and general purpose degreasers. The following discussion addresses the HSC section 39665(b) requirements for each of the three scenarios.

2. Scenario 1 - Remove Perc from Brake Cleaning Products

Information from the Manufacturer and Facility Surveys indicates that approximately two-thirds of brake cleaning products do not contain Perc. Additionally, the Facility Survey indicates that more than 60 percent of the facilities that use brake cleaning products use non-chlorinated brake cleaning products (see Table VII-1). Thus, non-chlorinated products are considered to be technically feasible and available. We also found that, in almost all instances, manufacturers of Perc brake cleaning products also market a non-chlorinated product and make similar claims as to suitability on the product label (see Appendix H for examples of manufacturer efficacy claims). Finally, facility operators contacted during staff site visits and representatives of brake parts manufacturers (Raybestos and Federal-Mogul) indicated that non-chlorinated aerosols and water-based brake washers, respectively, were effective brake cleaning products (Raybestos, 1999; Federal-Mogul, 1999).

Table VII-1. Facility Survey Summary of Chlorinated and Non-chlorinated Product Usage

Product Category	Total Number of Shops Using Product Category	Number and (Percent) of Shops using Selected Products			
		Non-chlorinated	Other Chlorinated [1]	Perc Only	Unknown Formulations
Brake [2,3]	3676	2256 (61)	8 (~0)	1364 (37)	48 (<1)
Carb and Fuel Injection [4]	3508	3162 (90)	291 (8)	0 (0)	55 (<1)
Engine Degreaser [4]	496	443 (89)	8 (2)	27 (5)	18 (4)
General Purpose Degreaser [4]	171	163 (95)	0 (0)	0 (0)	8 (5)

1. These products contain Perc, MeCl, or TCE, either alone or in combination.
2. Information is compiled for both bulk and aerosol brake cleaner usage.
3. Number of shops that reported using a brake cleaner, whether they reported doing brakes or not.
4. The survey requested only aerosol product usage for these categories.
5. Numbers have been rounded and may not add to 100 percent.

We also learned through our survey that almost 25 percent of facilities performing brake work did not use automotive consumer products. Instead they used water or petroleum washers, or in some cases, nothing at all. Additionally, almost 50 percent of the Facility Survey respondents already use a water-based portable brake cleaning unit in conjunction with other products, and 12 percent use a water-based portable brake cleaning unit alone.

3. Scenario 2 - Remove Perc, MeCl and TCE from Brake Cleaning Products

Facility Survey respondents also reported using brake cleaning products which were determined to contain MeCl and TCE, usually in conjunction with Perc. Scenario 2 assumes that Perc is no longer available for brake cleaning product formulations and evaluates the effect of brake cleaning products reformulated to contain a large proportion of MeCl or TCE. Based on available formulation data, MeCl and TCE, when used alone would not likely exceed 60 and 45 percent, respectively, and in combination, would not likely exceed 90 percent of the content of a product.

The unit risk factor for MeCl is approximately one-sixth that of Perc. Thus, the potential health risk for a product containing 60 percent MeCl (formulations containing 60 percent MeCl were observed during the site visits) would be one-tenth that of a 94 percent Perc product. Similarly, TCE has a unit risk approximately one-third that of Perc, so the potential health risk for a product containing 45 percent TCE (TCE is a VOC and would be limited to 45 percent by the Midterm Measures II Consumer Products Regulation) would be about one-seventh that of a 94 percent Perc product. The potential health risk for a product composed of 45 percent MeCl and 45 percent TCE would be slightly less than one-fourth that of a 94 percent Perc product.

While the potential risk for a product containing MeCl, TCE, or both is lower than for Perc, it could still be significant in some instances. For example, generic facility G2 would still exceed a 10 in a million risk level at 20 meters for both the MeCl and TCE products. As such, and in recognition of the statutory requirement for BACT and the availability of suitable and effective alternatives, staff believe that brake cleaning products should not contain MeCl and TCE.

4. Scenario 3 - Also Remove Perc, MeCl and TCE from Carburetor Cleaners, Engine Degreasers, and General Purpose Degreasers

Information from the Facility Survey, as well as discussions with AMR facility operators and the Institute for Research and Technical Assistance (IRTA), indicate that many operators use various automotive consumer products interchangeably (IRTA, 1999). For example, a mechanic may use a brake cleaner for engine and/or tool degreasing, or may use an engine degreaser or carburetor cleaner for brake cleaning. While automotive consumer products manufacturers have adamantly stated that they do not condone this activity and believe that each product is best formulated for its intended purpose, many mechanics indicated that these products are used for, and work equally well in, a variety of tasks. Therefore, it is necessary to address the potential risk posed by product interchangeability.

The practice of mechanics substituting, on an equal basis, carburetor cleaner, engine degreaser, or general purpose degreaser reformulated to contain Perc, MeCl or TCE for brake cleaning products that would no longer contain Perc, MeCl or TCE would result in potential health risks to the public analogous to those identified in section B.3. above. Again, staff evaluated the availability, suitability, and effectiveness of alternatives in the three product categories.

Table VII-1 shows the relative proportion and percent of facilities using non-chlorinated carburetor cleaning, engine degreasing and general purpose degreasing products. From the table, it can be seen that the overwhelming majority of facilities (approximately 90 percent) use non-chlorinated carburetor cleaner, engine degreaser, and general purpose degreaser. Additionally, carburetor cleaners are subject to United States Environmental Protection Agency (U.S. EPA) regulations for fuel additives (ARB, 1999b). These regulations require manufacturers to register their formulations and collectively fund a literature search on the potential health effects of the use of their products. Currently, manufacturers can only register formulations with compounds containing five elements: carbon, hydrogen, oxygen, nitrogen, and sulfur. However, formulations containing other elements were registered prior to the 1990 Clean Air Act Amendments. These formulations have been essentially "grandfathered" from the requirement that they contain only compounds with the five elements mentioned (ARB, 1999b). Some of these grandfathered products contain MeCl and Perc. Since non-chlorinated products in the three categories of interest appear to predominate, staff concluded that alternative products are technically feasibility and available. Additionally, product label claims and discussions with facility operators indicate that the alternative products are both suitable and effective.

The number of products in the carburetor cleaner, engine degreaser, and general purpose degreaser categories that contain Perc, MeCl and TCE, either in combination or alone, is small and the products themselves generally only contain a small percentage of the chlorinated compounds. As such, staff conclude that the additional requirement to remove these three compounds from carburetor cleaner, engine degreaser, and general purpose degreaser would not be an overly burdensome requirement and would reduce exposure to these compounds.

Based on this evaluation, staff believes that it is appropriate to eliminate the use of Perc, MeCl and TCE in automotive consumer products used in AMR activities, and we established the limits presented in Table VII-2.

Table VII-2. BACT Product Content Limits

Evaluation Level	Product Categories and Compounds	Chlorinated Content Limit (percent)
Scenario 1	Perc-containing brake cleaning products	<1[1]
Scenario 2	Perc, MeCl, and TCE-containing brake cleaning products	<1[1]
Scenario 3	Perc, MeCl and TCE-containing brake cleaners, carburetor cleaners, engine degreasers, and general purpose degreasers	<1[1]

1. As previously mentioned, the language of the proposed ATCM provides that a product is considered to contain Perc, MeCl, or TCE if it contains one percent or more by weight of any one of the three compounds.

C. Alternatives to The Proposed Control Measure

Alternatives to the proposed control measure, other than taking no action, include workplace practices and two product modification options. We evaluated each of the three alternatives and determined that they would not be as effective at reducing emissions of Perc, MeCl, and TCE from AMR activities as the proposed control measure. We also determined that the three alternatives did not meet the objective of HSC section 39666 to reduce emissions to the lowest level achievable through the application of BACT or a more effective control method in consideration of cost, risk, and environmental impacts.

This section discusses each of the three alternatives and provides the reasons they were considered to be less effective than the proposed regulation. For each of the three alternatives evaluated, other than the "No Action" alternative, staff addressed four issues: applicability, effectiveness, enforceability, and cost/resource requirements.

1. Alternative One - No Action

The "no action" alternative would not address the potential risk posed by the use of automotive consumer products containing Perc, MeCl, and TCE in AMR activities. As evidenced by the potential health impacts discussed in Chapter VI, this alternative would not be protective of public health.

2. Alternative Two - Workplace Practices

The workplace practices alternative would require that AMR facility operators implement process controls including: (1) the use of a reservoir to capture any runoff from the use of brake cleaning products, and (2) the disposal of the runoff as a hazardous waste. This alternative would apply only to the brake cleaning product category.

a. Applicability

This alternative would not address the capture of brake cleaning products used for applications other than brake cleaning. It additionally would not address the capture of carburetor cleaner, engine degreaser, or general purpose degreaser unless they were being used for brake cleaning. Finally, it would not address the use of these products in other industrial, institutional, and residential settings.

b. Effectiveness

Information from the manufacturing industry indicates that workplace standards could achieve capture efficiencies of approximately 43 percent for disk brakes and 68 percent for drum brakes (CRC, 1998). Staff estimated that an average facility performs 25 percent of its brake jobs on drum brakes and 75 percent on disk brakes, and would therefore expect to observe an average capture efficiency of 50 percent. Thus, a facility (with a 50 percent capture efficiency) that currently exceeds a 22 chances in a million risk level from automotive maintenance and repair activities would still exceed the10 chances in a million "Hot Spots" notification level established by most air pollution control and air quality management districts (districts) after implementing the workplace standards outlined in this control alternative. Additionally, residual risk posed by these facilities would still have to be addressed. In light of the availability of alternative products that contain no chlorinated compounds, a measure that only addressed 50 percent of emissions would not be considered BACT.

c. Enforceability

As part of this alternative, the manufacturing industry indicated that they would participate in an education program by including workplace standard information in their labeling. We believe that, even with an education program, many facilities would not use capture reservoirs in the absence of district inspectors. Discussions with several operators indicate that they would not be inclined to capture runoff unless they were being watched. It is unlikely that this alternative could be adequately enforced by the State's districts and the Board.

d. Cost and Resource Requirements

Currently, many facility operators have either water washers or parts washers in their facilities. The trend in the automotive repair industry appears to be toward a mobile parts washer that could be wheeled under vehicles for performing brake services. The proposed concept would require facility operators to procure another reservoir specifically for brake service operations to avoid contamination of the fluids used in their water washers or parts washers. This is necessary because the hazardous waste companies that collect spent baths set strict limits on the level of contamination by chlorinated solvents. This separate waste stream would result in increased disposal costs and might require modifications to the facility's DTSC permit for on-site hazardous waste storage.

As enforcement would be conducted predominantly by the districts, the burden of enforcement costs would fall to them. However, several larger districts already inspect AMR facilities, generally in connection with degreasing rules, and the incremental cost of this alternative would likely be minimal. Cost estimates for district inspectors to enforce the proposed ATCM are addressed in Chapter IX.

3. Alternative Three - Product Modification / Risk-based Content Limits

This alternative falls into the product modification category and would require that automotive consumer products manufacturers establish chlorinated compound content limits that would result in the potential risk of a product falling below a prescribed risk level.

a. Applicability

This alternative could be applied to the brake cleaner product category alone, or to all four product categories. In either case, this alternative would address both institutional/industrial and residential use. In other words, it provides emissions reductions from both "hot spots" (AMR facilities) and non-"hot spot" area sources (residential usage). It additionally addresses use outside the automotive maintenance and repair activities arena.

b. Effectiveness

This alternative would require the establishment of a product content cap based on a corresponding acceptable risk level (an acceptable number of chances in a million), and ignores the requirement for best available control technology. In addition to not addressing the requirement for BACT, this alternative is dependent upon the meteorological data set chosen for modeling. Thus the product content cap necessary to avoid exceeding a set risk level in one geographic location in the State would not be sufficient to avoid exceeding the same risk level in another location.

If this alternative addressed Scenario 1, it could lead to increased MeCl and TCE use in brake cleaners. If this alternative addressed Scenario 2, it could lead to increased Perc, MeCl and TCE use in carburetor cleaners, engine degreasers, and general purpose degreasers.

Regardless of whether this alternative addressed Scenario 1, Scenario 2, or Scenario 3, it would likely result in increased VOC use and emissions. Each subsequent scenario would have greater potential VOC usage and emissions. If manufacturers could market chlorinated automotive consumer products meeting the risk-based content limits prescribed by this alternative, then the continued use of chlorinated compounds would be greater than with Alternative Four or the proposed control measure. Thus, this alternative would likely result in lower VOC use and emissions than Alternative Four or the proposed control measure.

c. Enforceability

Primary responsibility for enforcement of this alternative, as with all ATCMs, would be with the districts. However, HSC section 39669 also grants ARB enforcement authority. As many districts do not have the inherent capability to analyze consumer products, it is possible that the ARB might have to provide laboratory and compliance assistance. This alternative is more enforceable than Alternative Two (workplace standards) because it regulates fewer sources - manufacturers instead of facilities. There is also a clear cut test method for determining compliance versus having to observe facility operators using or not using capture reservoirs.

d. Cost and Resource Requirements

This alternative would have a fiscal impact on the State and air districts, as well as an economic impact on business. The impact on AMR facilities would be minimal. The impact on the districts would be dependent upon how heavily they had to rely upon the ARB's laboratory and compliance resources. If districts elected to establish a memorandum of understanding with the ARB authorizing the ARB's Compliance Division to enforce the ATCM, then enforcement could be conducted in conjunction with enforcement of the Consumer Products Regulations. In other words, the division of fiscal impacts between state and district entities would depend largely upon where the split in agreed upon enforcement responsibility lies.

4. Alternative Four - Product Modification / Chlorinated Compound Phase Out

This alternative also falls into the product modification category and would require that automotive consumer products manufacturers remove chlorinated compounds from the four product categories in discrete steps.

a. Applicability

This alternative could be applied to the brake cleaner product category alone, or to all four product categories. In either case, this alternative would address both institutional/industrial and residential use.

b. Effectiveness

This alternative would require the removal of one or more of the compounds Perc, MeCl, or TCE from up to four automotive consumer products categories depending upon the control scenario selected, but would accomplish the removal through a series of sequential reductions. As such, it would eventually represent BACT. However, it would not be as effective in reducing chlorinated emissions as the proposed control measure because it would not remove the chlorinated compounds as quickly.

If this alternative addressed Scenario 1, it could lead to increased MeCl and TCE use in brake cleaners. If this alternative addressed Scenario 2, it could lead to increased Perc, MeCl and TCE use in carburetor cleaners, engine degreasers, and general purpose degreasers.

Regardless of whether this alternative addressed Scenario 1, Scenario 2, or Scenario 3, it would likely result in increased VOC use and emissions. Each subsequent scenario would have greater potential VOC usage and emissions. This alternative, regardless of scenario, would result in lower VOC use and emissions than the proposed control measure because it would not remove the chlorinated compounds as quickly.

c. Enforceability

Primary responsibility for enforcement of this alternative, as with all ATCMs, would be with the districts. However, HSC section 39669 also grants ARB enforcement authority. As many districts do not have the inherent capability to analyze consumer products, it is possible that the ARB might have to provide laboratory and compliance assistance. This alternative is more enforceable than Alternative Two (workplace standards) because it regulates fewer sources - manufacturers instead of facilities. There is also a clear cut test method for determining compliance versus having to observe facility operators using or not using capture reservoirs. This alternative would be more difficult to enforce than the proposed control measure because there could be several intermediate content limits which could have an impact on laboratory testing and the need to re-educate compliance personnel as each new limit became effective.

d. Cost and Resource Requirements

This alternative would have a fiscal impact on the State and air districts, as well as an economic impact on business. The impact on AMR facilities would be minimal. The impact on the districts would be dependent upon how heavily they had to rely upon the ARB's laboratory and compliance resources. If districts elected to establish a memorandum of understanding with the ARB authorizing the ARB's Compliance Division to enforce the ATCM, then enforcement could be conducted in conjunction with Compliance Division enforcement of the Consumer Products Regulations. In other words, the division of fiscal impacts between state and district entities would depend largely upon where the split in agreed upon enforcement responsibility lies.

D. Evaluation of the Proposed Control Measure

In Part B., staff discussed selecting Scenario 3 as the basis for the proposed control measure. Staff addressed the same four issues of applicability, effectiveness, enforceability, and cost/resource requirements when considering the proposed control measure.

1. Applicability

The proposed control measure could be applied to the brake cleaner product category alone, or to all four product categories. In either case, this alternative would address both institutional/industrial and residential use.

2. Effectiveness

The proposed control measure would require the removal of Perc, MeCl, and TCE from all four automotive consumer products categories without the use of sequential reductions. As with Alternative Four (phase out), it would represent BACT; however, it would achieve greater emissions reductions because BACT would be achieved much sooner.

Again, the proposed control measure could lead to increased MeCl and TCE use in brake cleaners if it addressed Scenario 1. The proposed control measure could lead to increased Perc, MeCl and TCE use in carburetor cleaners, engine degreasers, and general purpose degreasers if it addressed Scenario 2. Thus, the proposed control measure addresses Scenario 3.

Regardless of whether the proposed control measure addressed Scenario 1, Scenario 2, or Scenario 3, it would likely result in increased VOC use and emissions. Each subsequent scenario would have greater potential VOC usage and emissions. The proposed control measure, regardless of scenario, would result in higher VOC use and emissions than Alternatives Three or Four because it requires that the chlorinated content not exceed one percent, and does not provide for sequential reductions.

3. Enforceability

Primary responsibility for enforcement of the proposed control measure, as with all ATCMs, would be with the districts. However, HSC section 39669 also grants ARB enforcement authority. As many districts do not have the inherent capability to analyze consumer products, it is possible that the ARB might have to provide laboratory and compliance assistance. The proposed control measure is more enforceable than Alternative Two (workplace standards) because it regulates fewer sources - manufacturers instead of facilities. There is also a clear cut test method for determining compliance versus having to observe facility operators using or not using capture reservoirs. The proposed control measure would be the easiest to enforce.

4. Cost and Resource Requirements

The proposed control measure would have a fiscal impact on the State and air districts, as well as an economic impact on business. The impact on AMR facilities would be minimal. The impact on the districts would be dependent upon how heavily they had to rely upon the ARB's laboratory and compliance resources. If districts elected to establish a memorandum of understanding with the ARB authorizing the ARB's Compliance Division to enforce the ATCM,

then enforcement could be conducted in conjunction with enforcement of the Consumer Products Regulations. In other words, the division of fiscal impacts between state and district entities would depend largely upon where the split in agreed upon enforcement responsibility lies.

VIII. POTENTIAL HEALTH IMPACTS OF THE PROPOSED AIRBORNE TOXIC CONTROL MEASURE

This chapter discusses the potential health impacts of this proposed Airborne Toxic Control Measure (ATCM). The topics addressed below include the benefits of the proposed ATCM toward statewide emissions and potential health impacts, a general assessment of the potential health impacts that could result from the remaining chemical ingredients used in the four product categories, and a general discussion of workplace exposure.

A. Statewide Emissions and Risk Reduction Benefits of the Airborne Toxic Control Measure

Since the proposed ATCM would result in the removal of Perc, MeCl, and TCE in the four product categories, the emission and health impact (i.e., potential cancer risk) reduction benefits are 100 percent. A total reduction of 5.17 tons per day of Perc, MeCl, and TCE could be achieved as a result of the proposed ATCM. As presented in Chapter VI, an additional benefit of the proposed ATCM is a reduction in ambient levels of Perc, MeCl, and TCE. Overall we estimated a reduction in ambient levels of Perc by 26 percent, MeCl by 5 percent, and TCE by 37 percent. By reducing ambient levels of these compounds, overall statewide risk reduction benefits can be achieved.

In determining the potential reduction in ambient levels from the proposed ATCM, we assumed that a proportionality of emissions can be used to calculate ambient levels of Perc, MeCl, and TCE. In addition, we compiled inventory data to determine the percentage of emissions from the four product categories. This percentage was then applied to the total ambient concentration to determine the percentage of each compound attributed to the four product categories. Note, however that some sources of Perc, MeCl, and TCE emissions may not be accounted for in the inventory data used and therefore the reduction in ambient levels may be slightly overestimated. See Chapter VI, Section 5 for a complete discussion on potential reduction in ambient levels of Perc, MeCl, and TCE.

B. Potential Adverse Health Effects from Use of Volatile Organic Compounds

The intent of this exercise was to determine what the potential health impacts could be from the remaining chemical constituents currently used in these four product categories if Perc, MeCl, and TCE are removed and secondly, if only Perc is removed. To perform this evaluation, Material Safety Data Sheets (MSDS) were used to obtain chemical ingredient information for products that AMR facilities reported using in the Facility Survey. The MSDS information was obtained by calling the manufacturers or distributers directly, or if available, from a manufacturer's web site. In addition, a list of ingredients for these four product categories was obtained from the 1997 Consumer and Commercial Products Survey. A complete list of the

chemical ingredients for the four product categories can be found in Appendix G. The listing of chemical ingredients in Appendix G identifies whether these compounds are regulatory defined as volatile organic compounds (VOCs), are identified or candidate toxic air contaminants (TACs) under California's Air Toxics Program, and whether the substance has approved cancer and non-cancer health effects values.

In addition to those currently used in the four automotive consumer product categories, staff intends to monitor the usage of other identified TACs and will propose amendments to the ATCM if appropriate. Additionally, product manufacturers will be advised to not use identified TACs in their product formulations.

For this exercise, we assumed that any of the chemical ingredients meeting this criteria could have a maximum content of 45 percent. The 45 percent VOC limit is used because that was the limit established for brake cleaners in the October 1999 Amendments to the Consumer Products Regulation approved by the ARB in October 1999. The VOC content limit for the four product categories range from 35 to 50 percent in the October 1999 amendments.

1. VOCs that are Candidate or Identified TACs

a. Scenario One: Removal of Perc, TCE, and MeCl

Under this scenario, we used the information in Appendix G to see what the potential individual health impacts could be for chemical ingredients that are regulatory defined as both volatile organic compounds (VOCs) and candidate or identified TACs if Perc, MeCl, and TCE are removed.

As a screen to determine the worst-case scenario, we identified the individual ingredients from Appendix G that have the highest cancer potency and/or lowest non-cancer chronic or acute reference exposure levels (RELs). Benzene is the only ingredient in Appendix G that has a cancer potency factor. Eight ingredients have acute and/or chronic RELs. Of those eight, naphthalene had the lowest chronic REL and benzene had the lowest acute REL.

No adverse health impacts from the compounds on this list (other than Perc, MeCl, and TCE) are expected. The apparent use of benzene (which is a TAC as well as a VOC) was a concern for staff; however, upon further investigation, staff learned that it was only used by one manufacturer (in one product) at concentrations less than two percent (a second manufacturer indicated they had one product in which benzene was a contaminant). Staff intends to monitor the usage of other TACs and will propose amendments to the ATCM if appropriate. Additionally, manufacturers will be advised to not use identified TACs in their product formulations.

b. Scenario Two: Removal of Perc

The removal of Perc from the four product categories leaves TCE, a TAC and VOC, as an ingredient with the potential for expanded use in these products. Additionally, MeCl may also be used to further increase the chlorinated content of a reformulated product. Looking specifically at aerosol brake cleaners as an example, TCE (a VOC) is subject to a 45 percent VOC limit as specified in the ARB's consumer product regulations. While there are no such restrictions for MeCl, however, the total chlorinated content for this exercise is being capped at 90 percent. A 90 percent cap allows for the inclusion of other compounds as well as propellants. Table VIII-1 summarizes the impact of Perc replacement in brake cleaners compared to current emissions.

Table VIII-1. Potential TCE and MeCl Emissions After Removal of Perc from Aerosol Brake Cleaners

Compound	Current Emissions from Brake Cleaners [lbs/yr][1]	Emissions With Replacement of Perc [lbs/yr]	
		45% TCE	45% TCE/45% MeCl
Perc	2,978,400	0	0
MeCl	211,700	0	1,340,280
TCE	58,400	1,340,280	1,340,280

1. Based on ARB surveys.

From a risk standpoint, the individual potential cancer risk would decrease by approximately 84 percent when compared to the potential individual health risk for AMR facilities using Perc-containing products. An 84 percent decrease would result in a potential cancer risk of approximately 21 chances per million at the near-source (20 meter) location for the generic facilities using default meteorological data. Regarding non-cancer health impacts, the chronic hazard indices for TCE at a 45 percent content level is less than 0.1 for the generic facilities using default meteorological data. Generally, hazard indices less than one are not considered to be a concern to public health.

The use of a TCE/MeCl product at a 90 percent combination content level (45 percent each) would result in approximately a 75 percent decrease in the individual potential cancer risk when compared to the potential individual health risk for AMR facilities using Perc-containing products. While this decrease may sound significant, this still could pose a potential cancer risk of approximately 31 chances per million at the near-source (20 meter) location for the generic facilities using default meteorological data. Regarding non-cancer health impacts, the chronic hazard indices for TCE/MeCl product at a 90 percent content level is less than 0.1 for the generic facilities using default meteorological data. Generally, hazard indices less than one are not considered to be a concern to public health.

2. VOCs that are Not Candidate or Identified TACs

The second group of ingredients that were evaluated included those that are VOCs but that are not a candidate or identified TAC. None of the ingredients in Appendix G that meet this criteria have cancer potency factors. One of the ingredients (2-butoxyethanol) listed in Appendix G has both an acute and chronic REL. The acute and chronic hazard indices for this ingredient at the 45 percent content level are less than 0.5 for the generic facilities using default meteorological data. Generally, hazard indices less than one are not considered to be a concern to public health.

C. Replacement With Other Toxic Air Contaminants that are Not Volatile Organic Compounds

1. Scenario One: Removal of Perc, TCE, and MeCl

For this portion of the evaluation, we reviewed the ingredients listed in Appendix G to determine if any are candidate or identified TACs that are not classified as VOCs. There are no ingredients which satisfy this criteria and have an approved cancer potency factor. Two ingredients, have an acute and/or chronic RELs. Of those, ammonia had both the lowest chronic and acute RELs. The acute and chronic hazard indices for this ingredient at the 45 percent content level are less than 0.2 for the generic facilities using default meteorological data. Generally, hazard indices less than one are not considered to be a concern to public health.

In addition to those currently used in the four automotive consumer product categories, staff intends to monitor the usage of other identified TACs and will propose amendments to the ATCM if appropriate. Additionally, product manufacturers will be advised to not use identified TACs in their product formulations.

2. Scenario Two: Removal of Perc

The removal of Perc from the four product categories leaves MeCl, a TAC that is not a VOC, as an ingredient with the potential for expanded use in these products. During the site visits, products were observed with MeCl content as high as 60 percent. Additionally, TCE may be used to further increase the chlorinated content of a reformulated product, subject to the 35 to 50 percent VOC limit specified in the ARB's consumer product regulations (TCE is a VOC). Again, in order allow for the inclusion of other compounds and propellants for aerosol products, the total chlorinated content for this exercise is being capped at 90 percent. Table VIII-2 summarizes the impact of Perc replacement compared to current emissions for aerosol brake cleaners as an example.

From a risk standpoint, the individual potential cancer risk would decrease by approximately 89 percent when compared to the potential individual health risk for AMR facilities using Perc-containing products. An 89 percent decrease would result in a potential

cancer risk of approximately 14 chances per million at the near-source (20 meter) location for the generic facilities using default meteorological data. Regarding non-cancer health impacts, the acute and chronic hazard indices for MeCl at a 60 percent content level are less than 0.1. Generally, hazard indices less than one are not considered to be a concern to public health.

Table VIII-2. Potential MeCl and TCE Emissions After Removal of Perc from Aerosol Brake Cleaners

Compound	Current Emissions from Brake Cleaners [lbs/yr][1]	Emissions With Replacement of Perc [lbs/yr]	
		60% MeCl	45% MeCl/45% TCE
Perc	2,978,400	0	0
MeCl	211,700	1,787,040	1,340,280
TCE	58,400	0	1,340,280

1. Based on ARB surveys.

As mentioned above, the use of a TCE/MeCl product at a 90 percent combination content level (45 percent each) would result in approximately 75 percent decrease in the individual potential cancer risk when compared to the potential individual health risk for AMR facilities using Perc-containing products. While this decrease may sound significant, this still could pose a potential cancer risk of approximately 31 chances per million at the near-source (20 meter) location for the generic facilities using default meteorological data. Regarding non-cancer health impacts, the chronic hazard indices for TCE/MeCl product at a 90 percent content level is less than 0.1 for the generic facilities using default meteorological data. Generally, hazard indices less than one are not considered to be a concern to public health.

D. Replacement With Compounds that are Not Toxic Air Contaminants or Volatile Organic Compounds

None of the compounds listed in Appendix G of the TSD meet this criteria.

E. Workplace Exposure

Perc, TCE and MeCl are probable human carcinogens. The California Department of Industrial Relations-Division of Occupational Safety and Health Administration (Cal/OSHA) regulates Perc, TCE and MeCl in the workplace environment. To protect worker safety, Cal/OSHA has established a permissible exposure limit (PEL) for the compounds. The PEL is the maximum, eight-hour, time-weighted average concentration for occupational exposure and is 25 ppmv for Perc, TCE and MeCl. Since the proposed ATCM will remove these compounds

from automotive consumer products, worker exposure to Perc, MeCl, and TCE from automotive consumer product use will be eliminated.

IX. ECONOMIC IMPACTS OF THE PROPOSED AIRBORNE TOXIC CONTROL MEASURE

A. Summary of Economic Impacts

No significant economic impacts are expected from the proposed Airborne Toxic Control Measure (ATCM). Automotive consumer products are manufactured or marketed by 60 companies nationwide, with ten based in California. Most manufacturers already have at least one non-chlorinated volatile organic compound (VOC) product on the market that meets the requirements of the proposed ATCM, and therefore, are not expected to incur additional costs. Those companies that do not currently have VOC products and choose to formulate one are expected to be able to absorb the cost of reformulation with no adverse impacts on their profitability.

The analysis showed that raw materials costs for chlorinated Toxic Air Contaminant (TAC) products are greater than the raw materials costs for VOC products. As a result, it should be less costly to manufacture non-chlorinated VOC products as opposed to products that contain perchloroethylene (Perc), methylene chloride (MeCl), or trichloroethylene (TCE). However, there are no noticeable differences between the market prices for chlorinated TAC and VOC products. Therefore, there should be no economic impact on the consumer.

The economic analysis focused on worse case assumptions. It was assumed that the costs to comply with this ATCM would be the same costs that a company would incur if they were reformulating a product to meet a new VOC limit under the Consumer Products Program. Essentially, each manufacturer and marketer is assumed to "reinvent the same wheel" and directly conduct all reformulation, and research and development efforts. By doing this, we were very conservative in an effort to estimate costs.

Overall, most affected businesses will be able to absorb the costs of the proposed ATCM with no significant adverse impacts on their profitability. This finding is indicated by the staff's analysis of the estimated change in "return on owner's equity" (ROE). The analysis found that the overall change in ROE ranges from negligible to a decline in ROE of about six percent, with an average decline in ROE of about two percent. However, the proposed ATCM may impose economic hardship on some businesses with small or no margin of profitability. If necessary, these businesses can seek relief under the variance provision of the proposed ATCM. A variance may provide sufficient time to minimize the cost impacts to these businesses. Because the proposed ATCM would not alter significantly the profitability of most businesses, we do not expect a noticeable change in employment; business creation, elimination, or expansion; and business competitiveness in California.

Our analysis shows that the cost-effectiveness of the proposed requirements is similar to the cost-effectiveness of previously approved ATCMs (Perc Dry Cleaning Operations ATCM, Ethylene Oxide ATCM, Non-Ferrous Metal Melting ATCM). The estimated cost-effectiveness of the proposed ATCM for reducing a pound of TAC, specifically Perc, MeCl, and TCE, range from no cost (net savings or no cost) to about $0.23 per pound of TAC reduced (in 1999 dollars). The cost-effectiveness that considers the emission and health impact reduction benefits ranges from approximately $1,400 to $111,000 per cancer case avoided. These ranges are significantly less than previously approved ATCMs, which generally have fallen within an overall range of $0.64 to $1.77 (adjusted to 1999 dollars) per pound of Perc reduced (1993 Perchloroethylene Dry Cleaning Operations ATCM) and $6,600 to $18.6 million (adjusted to 1999 dollars) per cancer case avoided (1992 Non-Ferrous Metal Melting ATCM).

While determining the maximum and minimum cost-effectiveness values is useful for establishing boundaries, it is also useful to determine the average cost-effectiveness of the proposed ATCM. To this end, an estimate of the average cost-effectiveness as an emissions reduction-weighted value provides more insight into the overall cost-effectiveness of the ATCM than a simple arithmetic mean of the calculated individual values. Unlike a simple arithmetic mean, a weighted average accounts for the relative efficiency as well as the relative magnitude of the emission reductions for the ATCM. Overall, the emission reductions-weighted average (ERWA) cost-effectiveness for the proposed ATCM is about $0.03 per pound of TAC reduced. That is, the average cost to reduce one pound of TAC averaged across all the categories subject to the proposed ATCM is less than five cents. This estimated average cost-effectiveness compares favorably with the cost-effectiveness of the ARB programs mentioned previously.

One way to project the potential change in product prices is to determine the potential change in raw materials costs, which generally have the biggest influence in product costs for most consumer product categories. Our analysis indicates that raw material costs for chlorinated TAC products are greater than for VOC products which comply with the proposed ATCM. Therefore, raw material cost changes should be negligible (net savings or no cost). Again, this compares favorably to the change in per unit cost projected for the existing consumer product regulations. The analysis assumed the present cost for raw materials. Depending on the formulations chosen by manufacturers and the future price of raw materials, this range may be lower or higher at the actual compliance dates. To the extent that the projected cost savings or increases are ultimately passed on to the consumer, the actual retail price of products after the proposed limits become effective may be higher or lower than suggested by this analysis.

Even if all annualized nonrecurring costs (research and development, capital equipment purchases, etc.) and recurring raw material cost increases are factored into the affected products manufacturing costs, the potential increase in production per-unit costs are comparable to existing ARB consumer product regulations. The estimated per-unit cost increases from both annualized nonrecurring and annual recurring costs range from negligible cost (net savings or no cost) to about $0.09 per unit. When averaged over the total number of unit sales in California of regulated products, the unit sales-weighted average cost increase is about $0.02 per unit. As

noted before, these per unit cost increases compare favorably to the change in per unit cost projected for existing ARB consumer product regulations.

B. Economic Impacts Analysis on California Businesses as Required by The California Administrative Procedure Act (APA)

1. Legal Requirements

Section 11346.3 of the Government Code requires State agencies to assess the potential for adverse economic impacts on California business enterprises and individuals when proposing to adopt or amend any administrative regulation. The assessment shall include a consideration of the impact of the proposed regulation on California jobs, business expansion, elimination or creation, and the ability of California business to compete with businesses in other states.

Also, State agencies are required to estimate the cost or savings to any state or local agency and school district in accordance with instructions adopted by the Department of Finance. The estimate shall include any nondiscretionary cost or savings to local agencies and the cost or savings in federal funding to the state.

Health and Safety Code section 57005 requires the ARB to perform an economic impact analysis of submitted alternatives to a proposed regulation before adopting any major regulation. A major regulation is defined as a regulation that will have a potential cost to California business enterprises in an amount exceeding ten million dollars in any single year. The proposed ATCM is not a major regulation.

2. Potential Impact on California Businesses

Overall, most affected businesses will be able to absorb the costs of the proposed ATCM with no significant adverse impacts on their profitability. However, the proposed measures may impose economic hardship on some businesses with small or no margin of profitability. If necessary, these businesses can seek relief under the variance provision of the proposed ATCM for extensions to their compliance dates. Such extensions may provide sufficient time to minimize the cost impacts to these businesses. Because the proposed ATCM would not alter significantly the profitability of most businesses, we do not expect a noticeable change in employment; business creation, elimination or expansion; and business competitiveness in California.

This portion of the economic impacts analysis is based on a comparison of the return on owners' equity (ROE) for affected businesses before and after inclusion of the cost to comply with the proposed requirements. The data used in this analysis are obtained from publicly available sources, the ARB's 1997 Consumer and Commercial Products Survey, and the staff's cost-effectiveness analysis discussed later in this chapter.

3. Affected Businesses

Any business which manufactures or markets chlorinated automotive consumer products would potentially be affected by the proposed ATCM. Also potentially affected are businesses which supply raw materials to these manufacturers or marketers, distribute or retail, and use chlorinated automotive consumer products. The focus of this analysis, however, is on manufacturers or marketers because these businesses are directly affected by the proposed ATCM.

Automotive consumer products are manufactured or marketed by 60 companies nationwide, of which ten (mostly medium- or small-sized firms) are based in California according to the ARB's Consumer Products Registration Database. These companies manufacture and market an estimated total of 186 VOC and 66 chlorinated TAC products. California companies accounted for nine percent of chlorinated TAC and VOC products manufactured or marketed in California as shown in Table IX-1.

Table IX-1. Number of Chlorinated TAC and VOC Products Marketed in California

Product Type	California Firms		Non-California Firms		Total	
Chlorinated TAC Products	6	9%	60	91%	66	100%
VOC Products	16	9%	170	91%	186	100%
Total	22		230		252	
Firms	10		50		60	

All affected products are classified under Standard Industrial Classification (SIC) 2842 or the new North American Industry Classification System (NAICS) 325612. A list of these products is provided in Table IX-2. The product category with the most chlorinated TAC products is automotive brake cleaners (2202), followed by general purpose degreasers (5203c), carburetor cleaners (2203), and engine degreasers (2204a).

Table IX-2. Affected Product Categories

Code	Category	Products	
		VOC	Chlorinated TAC
2202	Automotive Brake Cleaners	61	37
2203	Carburetor Cleaners	45	11
2204a	Engine Degreasers	56	6
5203c	General Purpose Degreasers (including aerosol Solvent Parts Cleaners)	24	12

a. Study Approach

This study covers one industry with 60 affected businesses. The approach used in evaluating the potential economic impact of the proposed ATCM on these businesses is outlined as follows:

- A sample of three representative businesses of different sizes was selected from the list of 60 affected businesses based on the size of their sales and number of noncompliant products they manufacture or market;
- Compliance cost was estimated for each of these businesses;
- Estimated cost was adjusted for federal and state taxes; and,
- The three-year average ROE was calculated, where data was available, for each of these businesses by averaging their ROEs for 1996 through 1998. ROE is calculated by dividing the net profit by the net worth. The adjusted cost was then subtracted from net profit data. The results were used to calculate an adjusted three-year average ROE. The adjusted ROE was then compared with the ROE before the subtraction of the adjusted cost to determine the potential impact on the profitability of the business. A reduction of more than 10 percent in profitability is considered to indicate a potential for significant adverse economic impacts.

The threshold value of 10 percent has been used consistently by the ARB staff to determine impact severity (ARB, 1990b; ARB, 1991b; ARB, 1995; ARB, 1999b). This threshold is consistent with the thresholds used by the United States Environmental Protection Agency and others.

b. Assumptions

The ROEs before and after the subtraction of the adjusted compliance costs were calculated for each size business using financial data for 1996 through 1998. The calculations were based on the following assumptions:

- Selected businesses are representative of affected businesses;
- All affected businesses were subject to the highest federal and state corporate tax rates of 35 percent and 8.8 percent respectively; and,
- Affected businesses are not able to increase the prices of their products, nor can they lower their costs of doing business through short-term cost-cutting measures.

Given the limitation of available data, staff believes these assumptions are reasonable for most businesses; however, they may not be applicable to all businesses.

c. Results

Typical California businesses are affected by the proposed ATCM to the extent that the additional costs imposed by the proposed requirements would change their profitability. A detailed analysis of these costs is provided in the cost-effectiveness section of this report. The cost analysis shows that the estimated annualized costs of reformulating a noncompliant product will range from $1,392 to $17,840, with an average of $9,616 (see Table IX-4).

Using ROE to measure profitability, we found that the average ROE of sample businesses in the automotive consumer products industry declined by about 2.04 percent as shown in Table IX-3. This represents a minor change in the average profitability of sample businesses.

Table IX-3. Changes in Return on Owner's Equity (ROEs) for Typical Businesses in Automotive Consumer Products Industry

Size	Change in ROE
Small	6.01%
Medium	0.07%
Large	0.04%
Average	**2.04%**

Note: all "change in ROEs" shown are negative (i.e., shows a decline in profitability)

The projected change in profitability of typical businesses in the automotive consumer products industry varied widely. The predicted decline in profitability of sample businesses ranged from a high of about 6.01 percent for a small business to a low of 0.04 percent for a large business, as shown in Table IX-3. This variation in the impact of the proposed ATCM can be attributed mainly to two factors. First, large businesses incur higher costs due to the number of noncompliant (chlorinated TAC) products they manufacture or market. For example, the estimated annualized costs for sample businesses ranged from a high of about $67,300 to a low of about $28,800. Second, the performance of businesses may differ from year to year. Hence,

the average 1996 through 1998 financial data used may not be representative of an average-year performance for some businesses.

The estimated changes to ROEs may be high for the following reasons. First, annualized costs of compliance are estimated using, in part, the current prices of raw materials. Raw material prices usually tend to fall as higher demand for these materials induces economy of scale production in the long run. Second, affected businesses probably would not absorb all of the increase in their costs of doing business. They might be able to either pass some of the cost on to consumers in the form of higher prices, reduce their costs, or do both.

4. Potential Impact on Consumers

The potential impact of the proposed ATCM on consumers depends upon how it would change the price and performance attributes of chlorinated TAC products. Currently, there are no noticeable differences between the market prices for chlorinated TAC and VOC products. These products are basically interchangeable. According to the industry sources, both chlorinated TAC and VOC products have basically the same performance attributes, except that many chlorinated TAC products are nonflammable while VOC products are typically flammable. (For a discussion of flammability, see Chapter X, Section F). Given the availability of good substitute products, it is unlikely that affected businesses will be able to pass on the cost increases to consumers. Thus, we estimated that the cost increase per unit will range from no change to $0.09, with an average of about $0.02.

The proposed ATCM, however, may limit the product choices available to consumers by requiring manufacturers not to sell chlorinated TAC products in California. This may not be a major problem because there is more demand for VOC products than for chlorinated TAC products in the market. According to the ARB 1997 Consumer Products Survey, there are three VOC products in the market for every one chlorinated TAC product. Presently, the market sales for these products is split approximately 60 and 40 percent between VOC and chlorinated TAC products. According to the industry sources, about 90% of these products are used for non-residential applications. Automotive repair facilities may have an incentive to reduce their uses of chlorinated TAC products because it would reduce the amount of hazardous waste generated, thus reducing their disposal costs.

5. Potential Impact on Employment

The proposed ATCM is not expected to cause a noticeable change in California employment and payroll because the contribution of the affected industry to the California economy is marginal. California accounts for a small share of manufacturing employment for automotive consumer products. According to the 1997 Economic Census, California employment in the industry (NAICS 325612/SIC 2842, which includes establishments engaged in manufacturing and packaging polishes and speciality cleaning preparations) was 1,669 in 1997, or about 7.6 percent of the national employment in the industry. This also represents only

about 0.09 percent of the total manufacturing jobs in California. These employees working in 83 establishments generated about $51 million in payroll, accounting for less than 0.02 percent of total California manufacturing payroll in 1997. Twenty-three establishments had over 20 employees; the rest had less than 20 employees each.

The employment in the speciality cleaning preparations industry is unlikely to change significantly as a result of the proposed ATCM. This is because, as shown above, affected manufacturers or marketers are able to absorb the reformulation costs with no significant impact on their profitability. The bulk of brake cleaning products, however, are used by brake repair shops. In 1997, California automotive speciality repair shops (SIC 7539), which included brake repair shops, employed 6,128 persons with a payroll of about $144 million. The employment in these shops is unlikely to be affected adversely by the proposed ATCM. This is because we do not expect a noticeable change in the prices of reformulated products. The availability of good substitute products in the market is likely to prevent affected manufacturers or marketers from passing along the reformulation costs to their consumers in the form of higher prices.

6. Potential Impact on Business Creation, Elimination or Expansion

The proposed ATCM would have no noticeable impact on the status of California businesses. This is because the reformulation costs are not expected to impose a significant impact on the profitability of businesses in California. However, some small businesses with little or no margin of profitability may lack the financial resources to reformulate their products in a timely manner. Should the proposed measures impose significant hardship on these businesses, temporary relief in the form of a compliance date extension under the variance provision of the proposed ATCM may be warranted.

While some individual businesses may be affected adversely, the proposed ATCM may provide business opportunities for existing California businesses or result in the creation of new businesses. California businesses which supply raw materials or provide consulting services to affected industries may benefit from increased industry spending on reformulation.

7. Potential Impact on Business Competitiveness

The proposed ATCM should have no significant impact on the ability of California businesses to compete with businesses in other states. Because the proposed ATCM would apply to all businesses that manufacture or market automotive consumer products for sale in California regardless of their location, the staff's proposal should not present any economic disadvantages specific to California businesses. Of a total of 60 companies involved in manufacturing or marketing automotive consumer products, ten were located in California. Only three of ten California companies manufactured or marketed chlorinated TAC products subject to the proposed ATCM. These companies manufactured or marketed only 6 out of 66 noncompliant TAC products.

Nonetheless, the proposed ATCM may have an adverse impact on the competitive position of some small, marginal businesses in California if these businesses lack resources to develop commercially acceptable products in a timely manner. As stated above, such impacts can be mitigated to a degree with a justifiable compliance extension under the variance provision of the proposed ATCM.

C. Analysis of Potential Impacts to California State or Local Agencies

The proposed ATCM should have no economic impact on State agencies. There are no State agencies that manufacture or market automotive consumer products which are subject to the proposed ATCM. However, the Air Resources Board (ARB or Board) may incur additional implementation or enforcement costs at some future time.

The proposed ATCM should have minimal economic impacts on the local air pollution control and air quality management districts (districts). Health and Safety Code section 39666 requires that after the adoption of the proposed ATCM by the Board, the districts must enforce the ATCM or adopt and enforce an equal or more stringent regulation. Beginning in 2005, the districts, during their normal course of business, will be responsible for determining if automotive maintenance and repair (AMR) facilities are using complying automotive consumer products as defined by the proposed ATCM. The inspection for complying automotive consumer products should add very little time to the total time it takes to conduct an inspection. Because AMR facilities are currently not required to be permitted by the districts, we are unable to estimate how many AMR facilities a district will visit during the course of a year. Therefore, the total economic impact on the districts cannot be quantified. However, the cost for a district inspector to perform an AMR facility inspection is estimated to range from $50 to $83 per hour (AQMD, 2000).

D. Analysis of the Cost-Effectiveness of the Proposed ATCM

This is the first ATCM to address consumer products. Therefore, to evaluate the cost-effectiveness for this ATCM, we used methods that have been used in the past for both the Toxic Air Contaminant Control Program and the Consumer Products Program. For a VOC or criteria pollutant regulation, the cost effectiveness is usually assessed on the basis of the cost per pound of pollutant controlled. This type of evaluation allows us to compare the efficiency of the proposed regulation in reducing a pound of pollutant relative to existing regulations. For an air toxics control regulation, we use a method that considers both the quantity and toxicity of the emissions reduced. This measure of cost-effectiveness is based on the calculation of the cost per potential cancer case avoided.

1. Methodology

The cost-effectiveness of a standard is generally defined as the ratio of total dollars to be spent to comply with the standard (as an annualized cost) to the mass reduction of the

pollutant(s) to be achieved by complying with that standard (in annual pounds). Annual costs include annualized non-recurring fixed costs (e.g., total research and development, product and consumer testing, equipment purchases/modifications, etc.) and annual recurring costs (e.g., raw materials, labeling, packaging, etc.).

As in the past Consumer Products regulations, ARB staff analyzed each product category independently of the others as if it was a separate regulation. By evaluating each product category separately, we can examine the impact that the proposed regulation may have on manufacturers in each category. This is a conservative assumption since we know there will be a sharing of technology between departments of a company that makes products for several product categories.

In this analysis, we annualized the non-recurring fixed costs using the Capital Recovery Method, as recommended under guidelines issued by the California Environmental Protection Agency (Cal/EPA). Using this method, we multiply the estimated total fixed costs to reformulate a product by the Capital Recovery Factor (CRF) to convert these costs into equal annual payments over a project horizon (i.e., the projected useful life of the investment) at a discount rate (Cal/EPA, 1996). We then sum the annualized fixed costs with the annual recurring costs and divide that sum by the annual emission reductions to calculate the cost-effectiveness for the estimated mass of pollutant(s) reduced. Equation 1 presents the methodology for calculating cost-effectiveness.

$$\text{(1)} \quad \text{Cost-Effectiveness} = \frac{(\text{Annualized Fixed Costs})_{ATCM}^{\text{Pre-Reg}} + (\text{Annual Recurring Costs})_{ATCM}^{\text{Pre-Reg}}}{(\text{Annual Mass Reduction in TAC})_{ATCM}^{\text{Pre-Reg}}}$$

where:

$$\text{(2)} \quad \text{Annualized Fixed Costs} = (\text{Fixed Costs}) \times \frac{i(1+i)^n}{(1+i)^n - 1}$$

$i(1+i)^n/((1+i)^n-1)$	=	Capital Recovery Factor (CRF)
i	=	discount interest rate over project horizon, in percent
n	=	number of years in project horizon
Fixed Costs	=	total nonrecurring cost per product category
	i.e.	(Nonrecurring Cost per Product) x (Total Noncompliant Products in the Category)

A convenient method for estimating the annual recurring cost component is to separate Equation 1 into two fractions, one for the nonrecurring costs and one for the recurring costs. It can then be shown that the cost-effectiveness fraction for recurring costs can be simplified and calculated as follows:

(3) Annual Recurring Costs (Emissions) = $\frac{\text{(Compliant Materials Cost) - (Baseline Materials Cost)}}{\text{(Baseline TAC Emissions) - (Compliant Emissions of TACs)}}$

where,

Baseline Materials Cost	=	cost of raw materials for each pound of product ($/lb), based on product formulations prior to ATCM implementation
Baseline TAC Emissions	=	Emission of TACs prior to ATCM implementation
Compliant Materials Cost	=	cost of raw materials for each pound of product ($/lb), based on product formulations that meet the proposed ATCM
Compliant TAC Emissions	=	Emission of TACs after full implementation of ATCM

To use Equation 3, we determined the sales-weighted average VOC and chlorinated TAC contents of products in each of the four product categories, based on sales data and the speciated formulations as reported by manufacturers in the ARB's 1997 Consumer and Commercial Products Survey. To the extent feasible, we then determined the detailed formulations which most closely reflect the "typical" (i.e., sales-weighted average) VOC and chlorinated TAC products. These formulations, in turn, were designated as compliant and baseline formulations, respectively.

For most ingredients, we used the most recent, distributor-level bulk prices from the *Chemical Market Reporter* (November 29, 1999), or from information gathered during the October 1999 Amendments to the Consumer Products Regulation, to calculate the baseline and compliant material costs based on these designated formulations. These analyses are shown in Table IX-5 (pages 17 & 18) and discussed in more detail in "Annual Recurring Cost (Impacts to Raw Materials Cost)" later in Section D-4.

2. Assumptions

In this analysis, we made an assumption that the costs to comply with this ATCM would be the same costs that a company would incur if they were reformulating a product to meet a new VOC limit under the Consumer Products Program. For fixed nonrecurring costs, we assumed that all manufacturers will conduct their own research and development, purchase their own equipment, and make all other expenditures and efforts necessary to reformulate their products. Essentially, each manufacturer and marketer is assumed to "reinvent the same wheel" and directly conduct all reformulation and research and development efforts. In reality, however, a large portion of the consumer products market is manufactured by contract fillers. These businesses, who usually conduct their own reformulation efforts in-house, fill products for a large number of consumer product marketers. Contract fillers are therefore able to avoid duplication of reformulation efforts by applying "technology transfer" between product lines of different companies. The full extent to which contract fillers make products for other companies

under each category is unknown. However, to the extent contract fillers are used by companies to make complying products, the actual cost to comply with the ATCM for the entire industry is likely to be less than predicted, resulting in more cost-effective emission reductions than indicated in this analysis.

We calculated the cost-effectiveness with an assumed project horizon of 10 years, a commonly cited period for an investment's useful lifetime in the chemical processing industry. We also assumed a fixed interest rate of 10 percent throughout the project horizon. These assumptions are conservative and constitute standard practice in cost-effectiveness analyses of air pollution regulations, including previous consumer product rulemakings. Based on these assumptions, the Capital Recovery Factor is 0.16274.

In the 1997 and 1999 amendments to the Consumer Products Regulation, the Consumer Products staff assumed products reformulated to meet the proposed limits would be marketed throughout the United States by national marketers. Except for the aerosol coatings regulation (title 17, CCR, sections 94520-94528), the Consumer Products staff found that businesses generally formulated products compliant with the Phase I (1990) and Phase II (1991) Consumer Products Regulations and antiperspirant/deodorant regulations for the entire nation, rather than incurring the additional cost of setting up a California versus 49-state product distribution system. We believe the same strategy will be employed by companies subject to the proposed ATCM. We therefore assumed that, for the annualized fixed cost portion of Equation 1 it is appropriate to either use the fixed cost for national production divided by the national emission reductions or, equivalently, use the California-apportioned (by population) annualized fixed cost divided by the California-apportioned emission reductions under the proposed ATCM (ARB, 1999b).

For the annual recurring costs, we assumed that to make compliant VOC reformulations would result in cost changes as a result of changes in a product's raw materials and their associated prices. Changes in packaging, labeling, distribution and other recurring costs were assumed to be negligible relative to baseline levels of these costs. This assumption is based on previous consumer product regulatory experiences. To illustrate, ARB staff conducted a comprehensive technical assessment of the 55 percent VOC hairspray limit, which required extensive reformulations and revolutionary changes to existing products. The hairspray limit is generally considered to be among the most challenging of the consumer product limits; it likely resulted in more changes to the regulated product, relative to pre-regulatory products, than any other VOC limit. However, the staff's assessment found that changes to recurring costs other than hairspray raw material costs were expected to be negligible (ARB, 1997d). Based on this finding and because there are compliant VOC products currently available, we believe our assumptions regarding the recurring costs are reasonable.

In the 1999 Consumer Products amendments, the definition for "general purpose degreaser" was modified to include products that are designed to clean miscellaneous metallic parts. These products are currently sold and labeled as "solvent parts cleaner" or "metallic parts

cleaner." These products have functions similar to general purpose degreasers in that they are designed to remove or dissolve grease, dirt, grime, and other contaminants (ARB, 1999b). In the 1997 Consumer and Commercial Products Survey the general purpose degreaser category was grouped under "household care products." For the cost analysis, the general purpose degreaser/solvent parts cleaner category was analyzed as a "household" product. For this ATCM, most of the products in the general purpose degreaser/solvent parts cleaner category are for automotive use and were therefore analyzed as automotive products. The difference in the analysis is that the initial "estimated annualized fixed cost to reformulate" is different for the household care and automotive categories.

3. Non-Recurring Fixed Costs

In the past, reviews of relevant technical literature and industry trade journals provided little information that could be used to estimate costs directly. This is not surprising, because the consumer products industry is very competitive, and production cost data specific to a company are closely-guarded trade secrets. In addition, ARB staff have had very limited success with cost surveys in the past and did not expect one to provide much useful information in this rulemaking (e.g., during the 1991 consumer products Phase II rulemaking, cost survey responses from only three manufacturers were received out of several hundred that were mailed; ARB, 1991b). Therefore, ARB staff developed estimates for nonrecurring cost based on analogous costs reported by ARB staff for the Phase II Consumer Products rulemaking (ARB,1991b; Appendix D1). The Phase II nonrecurring costs are applicable for this analysis since they were based on staff's detailed estimates of labor, research and development, equipment purchase, and other costs involved in product reformulations for four generic product categories which included automotive consumer products. This is the same approach that was used for the 1997 and 1999 consumer products amendments.

The Phase II nonrecurring investment costs, reported in 1991 dollars, were adjusted to 1999 dollars using a well-established method of ratioing chemical engineering plant cost indices as follows (Peters and Timmerhaus, 1980):

$$\textbf{(4)}\quad \text{Non - Recurring Costs (in 1999 dollars)} = \text{Non - Recurring Costs (in 1991 dollars)} \times \frac{\text{C.E. 1999 index}}{\text{C.E. 1991 index}}$$

where,

C.E. 1999 index = 1999 Chemical Engineering Plant Cost Index = 392.0
C.E. 1991 index = 1991 Chemical Engineering Plant Cost Index = 357.6
(*Chemical Engineering*, November 1999)

ARB Consumer Product staff believe the original Phase II cost estimates were beneficial at the time of rulemaking for predicting the costs to comply with those limits. However, in 1997, the ARB Consumer Products staff completed a detailed technical assessment of the hairspray second-tier limit. They believe those original cost estimates grossly overestimated true

nonrecurring costs for Phase II by about a factor of ten. The aforementioned hairspray technical assessment projects industry will spend on average, based on real-world expenditures to date, an estimated $100,000 per noncompliant hairspray product to meet the second-tier limit ($20 to $50 million total cost divided by an estimated 350 noncompliant hairspray products; ARB, 1997c). Because the hairspray category arguably represents a worst-case scenario, with its two-tier limits requiring extensive reformulations, research and development, and consumer/safety testing, they believe the $100,000 per product nonrecurring costs for hairsprays is a reasonable, order-of-magnitude upper boundary for average per-product reformulation costs under most of the proposed new limits. We therefore estimated the nonrecurring costs for the ATCM by adjusting the Phase II estimates to be consistent (same order of magnitude) as the $100,000 per product real-world average expenditures for hairsprays (ARB, 1999b).

The number of noncomplying products used for the calculations came from the 1997 Consumer and Commercial Products Survey. This survey was mailed to over 3,000 companies nationwide at the end of February 1998. The survey requested data on about 100 categories of consumer products. Extensive outreach efforts were made to maximize the market coverage of the survey. The Consumer Products staff found that the survey and extensive outreach resulted in an estimated 90 percent market coverage for most categories (ARB, 1999b). It is not possible for a survey of this magnitude to reach the entirety of the consumer products industry. Therefore, as a conservative estimate, the number of noncomplying products have been multiplied by a factor of 1.2 to adjust for 80% market coverage.

Table IX-4 shows our estimates for per-product and total annualized nonrecurring costs for each of the four product categories subject to the proposed ATCM. As shown, we project a per-product annualized nonrecurring cost ranging from a low of about $8,550 to a high of about $110,000. With approximately 80 noncompliant (chlorinated TAC) products that would need to be reformulated, the overall total annualized fixed cost to industry is projected to range from about $110,000 to $1.4 million dollars per year, with a general breakdown of this range as follows: automotive brake cleaners (56 percent), carburetor or fuel-injection air intake cleaners (17 percent), engine degreasers (9 percent), and general purpose degreasers/solvent parts cleaners (18 percent).

4. Annual Recurring Cost (Impacts to Raw Materials Cost)

In this analysis, we evaluated the anticipated cost impacts that the proposed ATCM may have on raw material costs. An evaluation of the impacts to raw material costs provides an indicator of possible impacts to the retail prices of the affected products (assuming the cost impacts are passed on partially or fully to consumers). Because of unpredictable factors such as the highly competitive nature of the consumer products market, it is not possible to accurately predict the final retail price of products that will comply with the proposed ATCM when it become effective. To the extent the cost impacts are passed on to consumers, the final retail prices may be lower or higher than suggested by this analysis.

Table IX-4. Estimated Total Annualized Non-Recurring Fixed Cost to Comply with Proposed ATCM

Code	Category		Estimated # of Chlorinated TAC Products	Estimated Total One-Time Cost to Reformulate Per Product (dollars)		Estimated Annualized Cost to Reformulate Per Product (dollars per year)		Estimated Annualized Fixed Cost to Reformulate All Chlorinated TAC Products (dollars per year)	
			(A)	Low B1	High B2	Low C1 = (B1 x CRF)	High C2 = (B2 x CRF)	Low D1 = (A x C1)	High D2 = (A x C2)
2202	Automotive Brake Cleaners		44	$8,550	$109,620	$1,392	$17,840	$61,784	$792,100
2203	Carburetor, Fuel-Injection Cleaners		13	$8,550	$109,620	$1,392	$17,840	$18,368	$235,489
2204a	Engine Degreasers		7	$8,550	$109,620	$1,392	$17,840	$10,019	$128,449
5203c	G.P. Degreaser/Solvent Parts Cleaner (Aerosol)		14	$8,550	$109,620	$1,392	$17,840	$20,038	$256,897
		SUM =	79						

1999 Chemical Engineering Plant Cost Index =	392.0 (Prelim 8/99)	Market Adjustment =	1.2
1991 Chemical Engineering Plant Cost Index =	357.6 (Final 1991)	(used to estimate total number of chlorinated TAC products in CA)	
		Discount Rate	10.00%
		Project Horizon, in years	10
		Capital Recovery Factor (CRF)	0.16275

Grand Annual Total (dollars per year)	$110,209	$1,412,936

Notes: (1) # Chorinated TAC Products = (Market Adj.) x (# Chlorinated TAC Products in Survey) (Survey is 1997 Consumer and Commerical Protlucts Survey)

(2) Estimated Total One-Time Cost to Reformulate from 1991 Consumer Products Report. (See Section IX-C.3)

a. Methodology

As discussed previously, we determined the detailed formulations which most closely reflect the "typical" (sales-weighted average) VOC and chlorinated TAC contents. These formulations, in turn, were designated as compliant and baseline formulations, respectively. The average unit size used for these calculations, are the same as the ones used for the VOC products in the 1999 Consumer Products cost calculations. These unit sizes differ from the ones used for the chlorinated TAC products in the risk assessment modeling.

As part of the analysis, we compared the chlorinated TAC formulations with both the complying and non-complying VOC formulations that were used for the 1999 Consumer Products cost calculations. The difference in cost was very small, and did not change the final results mentioned below. VOC formulations listed in the tables reflect the formulations that are compliant with the 1999 Consumer Products amendments.

Distributor-level ingredient prices from the *Chemical Market Reporter* (November 29, 1999) or from information gathered during the 1999 Consumer Products regulation were used to calculate the baseline and compliant material costs for these formulations. As noted previously, we assumed changes in packaging, labeling, distribution and other recurring costs to be negligible relative to baseline levels of these costs (ARB, 1997c).

The analyses and the detailed formulations evaluated (with individual weight fractions and unit prices per pound) are shown as cost spreadsheets in Table IX-5. While these formulations may not reflect the exact composition of existing noncompliant products and compliant products that will be marketed, we believe they are reasonably representative for the purposes of this analysis.

b. Results

As shown in Table IX-6, the raw materials cost for chlorinated TAC products are greater than for VOC products. Table IX-7 shows a comparison of the impacts to raw materials cost under the proposed ATCM relative to those of the ARB consumer product regulations. As shown, the raw materials cost impacts under the proposed limits are comparable to those of other ARB regulations.

5. Analysis of the Combined Impacts on Per-Unit Cost from Recurring and Nonrecurring Costs

In this analysis, we evaluated the combined impacts of both recurring (i.e., raw materials costs) and nonrecurring costs from the proposed ATCM on per-unit costs. Although the raw material costs usually constitute the major portion of the compliance costs, the nonrecurring (fixed) cost was the major contributor in this analysis. In performing this analysis, we used the fixed costs, raw material costs, assumptions, and other facts discussed previously.

Table IX-5. Annual Recurring Cost Calculations for Raw Materials

Formulation: 2202
Category: Automotive Brake Cleaners

Formulation and Cost Comparison

Component (A)	Unit Cost $/lb (B)	Typical Chlorinated TAC Formulation wt% (C)	Typical Chlorinated TAC Formulation Cost (B)x(C)/100	45.00% VOC Tier-1 Compliant wt% (D)	45.00% VOC Tier-1 Compliant Cost (B)x(D)/100
acetone	0.140			50.0	0.070
toluene	0.120			20.0	0.024
methanol	0.058			15.0	0.009
heptane	0.120			10.0	0.012
carbon dioxide	0.100	10.00	0.010	5.0	0.005
perchloroethylene	0.350	40.00	0.140		
methylene chloride	0.450	30.00	0.135		
trichloroethylene	0.650	20.00	0.130		
SUM		100.00%		100.00%	

Total Cost , $/Pound	0.415	0.120
% Cost Diff. Relative to Current Product		-71.2%
Total Cost , $/Unit	0.34	0.10
Annual Recurring Costs C.E., $/lb TAC Reduced		($0.00)

Assume: (1) 1997 Statewide Emissions of Perc, MeCl, & TCE from Automotive Brake Cleaners: 4.45 tons/day

(2) Average unit size = 13.00 ounce

(**) Cost-effectiveness values in "( )" are negative (i.e., indicates potential cost savings)

Formulation: 2203
Category: Carburetor, Fuel-Injection Cleaners

Formulation and Cost Comparison

Component (A)	Unit Cost $/lb (B)	Typical Chlorinated TAC Formulation wt% (C)	Typical Chlorinated TAC Formulation Cost (B)x(C)/100	45.00% VOC Tier-1 Compliant wt% (D)	45.00% VOC Tier-1 Compliant Cost (B)x(D)/100
acetone	0.140			50.0	0.070
toluene	0.120			20.0	0.024
methanol	0.058	10.0	0.006	5.0	0.003
xylene	0.140	30.0	0.042	20.0	0.028
carbon dioxide	0.100	3.0	0.003	5.0	0.005
methylene chloride	0.450	57.00	0.257		
SUM		100.00%		100.00%	

Total Cost , $/Pound	0.307	0.130
% Cost Diff. Relative to Current Product		-57.7%
Total Cost , $/Unit	0.25	0.11
Annual Recurring Costs C.E., $/lb TAC Reduced		($0.00)

Assume: (1) Statewide 1997 Emissions of Perc, MeCl, & TCE from Carburetor, Choke Cleaners: 0.31 tons/day

(2) Average unit size = 13.00 ounce

(**) Cost-effectiveness values in "( )" are negative (i.e., indicates potential cost savings)

Table IX-5 (continued). Annual Recurring Cost Calculations for Raw Materials

Formulation: 2204a
Category: Engine Degreasers

Formulation and Cost Comparison

Component (A)	Unit Cost $/lb (B)	Typical Chlorinated TAC Formulation wt% (C)	Typical Chlorinated TAC Formulation Cost (B)x(C)/100	35.00% VOC Tier-1 Compliant wt% (D)	35.00% VOC Tier-1 Compliant Cost (B)x(D)/100
HC propellant	0.250			10.0	0.025
d-limonene	1.100			10.0	0.110
glycol ether	0.460			5.0	0.023
LVP glycol ether	0.700			15.0	0.105
aromatic solvent	0.106			10.0	0.011
water	0.002			39.0	0.001
ammonia	0.098			1.0	0.001
surfactant	1.900			10.0	0.190
trichloroethylene	0.650	99.0	0.644		
carbon dioxide	0.100	1.0	0.001		
SUM		100.00%		100.00%	

Total Cost , $/Pound	0.645	0.465
% Cost Diff. Relative to Current Product		-27.8%
Total Cost , $/Unit	0.52	0.38
Annual Recurring Costs C.E., $/lb TAC Reduced		($0.00)

Assume: (1) 1997 Statewide Emissions of Perc, MeCl, & TCE from Engine Degreasers (Aerosols) 0.1 tons/day

(2) Average unit size = 13.00 ounce

(**) Cost-effectiveness values in "( )" are negative (i.e., indicates potential cost savings)

Formulation: 5203c
Category: G.P. Degreaser/Solvent Parts Cleaner (Aerosol)

Formulation and Cost Comparison

Component (A)	Unit Cost $/lb (B)	Typical Chlorinated TAC Formulation wt% (C)	Typical Chlorinated TAC Formulation Cost (B)x(C)/100	50.00% VOC Tier-1 Compliant wt% (D)	50.00% VOC Tier-1 Compliant Cost (B)x(D)/100
carbon dioxide	0.100			5.0	0.005
water	0.002			42.0	0.001
isopropanol	0.340			10.0	0.034
surfactant/emuls	1.900			3.0	0.057
glycol ether	0.700			20.0	0.140
d-limonene	1.100			20.0	0.220
perchloroethylene	0.350	24	0.084		
111-trichloroethane	1.030	72	0.742		
carbon dioxide	0.100	4	0.004		
SUM		100.00%		100.00%	

Total Cost , $/Pound	0.830	0.457
% Cost Diff. Relative to Current Product		-44.9%
Total Cost , $/Unit	0.78	0.43
Annual Recurring Costs C.E., $/lb TAC Reduced		($0.00)

Assume: (1) 1997 Statewide Emissions of Perc, MeCl, & TCE from G.P. Degreaser/Solvent Parts Cleaner (Aerosol) 0.31 tons/day

(2) Average unit size = 15.00 ounce

(**) Cost-effectiveness values in "( )" are negative (i.e., indicates potential cost savings)

Table IX-6. Estimated Impacts to Raw Materials Cost Per Unit

		Estimated Raw Materials costs, $/Unit of Product		
		Chlorinated TAC Formulation (Baseline)	VOC Formulation (Compliant)	Cost Difference Between Compliant and Baseline Formulations
Code	Category	(B1)	(A1)	(A1)-(B1)
2202	Automotive Brake Cleaners	$0.34	$0.10	$0.00
2203	Carburetor, Fuel-Injection Cleaners	$0.25	$0.11	$0.00
2204a	Engine Degreasers	$0.52	$0.38	$0.00
5203c	General-Purpose/Solvent Parts Cleaner (aerosol)	$0.78	$0.43	$0.00
			Max Increase	$0.00

Table IX-7. Comparison of Raw Materials Cost Impacts for the Proposed ATCM and ARB Consumer Product Regulations (unadjusted dollars)

Regulation	Cost Impacts (Dollars per Unit of Product)
Proposed Chlorinated TAC ATCM	$0.00
Mid-Term Measures II, 1999	$0.00 to $0.25
Phase III (Mid-Term Measures 1) Consumer Products Regulation, 1997	$0.00 to $0.60
Hairsprays, 1997[1]	($0.10) to $0.45
Phase II Consumer Products Regulation, 1991	<$0.01 to $0.60

1. $0.45/unit reported as a worst-case scenario using high-level of HFC-152a as propellant in "premium" products.

a. Methodology

This method differs from the raw materials cost-only analysis in the previous section in that the nonrecurring cost in this analysis is assumed to be "spread out" (i.e., recouped) through the entire California sales volume of each product category. Thus, the total annual recurring and annualized nonrecurring costs reported previously is divided by the number of units sold in California per year to estimate the per-unit cost increase. The California sales volume for a product category is estimated by dividing the total TAC emissions (pounds of TAC per year) for that category by the category's sales-weighted average TAC content (pounds of TAC per pound of product).

d. Results

As shown in Table IX-8, the combined fixed and raw material cost changes to per-unit production costs ranged from no cost increase (net savings or no cost for various categories) to about $0.09 per unit (engine degreaser). Averaged over the sales volume for each category, the unit sales-weighted average cost increase is about $0.02 per unit. For comparison purposes, this is the same unit sales-weighted average cost increase that was estimated for the 1999 Consumer Products amendments.

6. Cost-Effectiveness

a. Cost Per Pound of Emissions Reduced

Table IX-9 shows the overall results of our cost-effectiveness analysis, with separate cost-effectiveness fractions representing the annualized nonrecurring and annual recurring costs (see equations 1 and 3). In general, Table IX-9 shows that the annualized recurring costs (i.e., raw materials, labeling, packaging, etc.) have a small impact on overall cost-effectiveness for the affected categories. For the most part, the raw materials cost (i.e., annual recurring cost) for both VOC and chlorinated TAC products are relatively the same. The most significant impact on overall cost-effectiveness is from the annualized nonrecurring fixed costs (i.e., research and development, product testing, etc.). Table IX-9 shows that the estimated cost-effectiveness ranges from a low of $0.00 (net savings or no cost for several categories) to a high of about $0.23 per pound of TAC reduced for the general purpose degreaser/solvent parts cleaner category.

Another useful quantity to report is the emission reductions-weighted average (ERWA) cost-effectiveness. This value is the sum of the products of the emission reductions for each product category and its associated cost-effectiveness, divided by the sum of the total emission reductions for all the product categories. In contrast to a simple arithmetic mean of the reported cost-effectiveness values, the ERWA cost-effectiveness accounts for the relative magnitude of emission reductions and the relative efficiency of the proposed ATCM in achieving those reductions. Thus, the ERWA cost-effectiveness is, in theory, a better indicator of the true average cost-effectiveness for achieving a pound of reduction under the proposed ATCM. As shown in Table IX-9, the ERWA cost-effectiveness is about $0.03 per pound of TAC reduced.

Table IX-8. Estimated Per-Unit Cost Increases from Both Annualized Non-Recurring and Annual Recurring Costs

		Estimated Annualized Fixed Cost to Reformulate All Chlorinated TAC Products (dollars per year)		Sales-Wtd Average TAC Content	Estimated TAC Emissions,	Typical Unit Weight	Estimated Unit Sales per Day in Calif.	Estimated Per Unit Production Cost Increase					
								Annualized Nonrecurring Cost	Annualized Nonrecurring Cost	Annual Recurring Cost Difference	Total Cost Increase	Total Cost Increase	Total Cost Increase
Code	Category	Low (D1)	High (D2)	% (E)	tons/day (F)	Ounces (G)	(H)	Low Cost/Unit (I1=D1*CNF/H)	High Cost/Unit (I2=D2*CNF/H)	Cost/Unit (J)	Low/Unit K1=(I1+J)	High/Unit K2=(I2+J)	Mid/Unit (K1+K2)/2
2202	Automotive Brake Cleaners	$61,784	$792,100	90.0%	4.45	13	12,171	$0.00	$0.02	$0.00	$0.00	$0.02	$0.01
2203	Carburetor, Fuel-Injection Cleaners	$18,368	$235,489	57.0%	0.31	13	1,339	$0.00	$0.06	$0.00	$0.00	$0.06	$0.03
2204a	Engine Degreasers	$10,019	$128,449	47.0%	0.10	13	524	$0.01	$0.09	$0.00	$0.01	$0.09	$0.05
5203c	G.P. Degreaser/Solvent Parts Cleaner (Aerosol)	$20,038	$256,897	24.0%	0.31	15	2,756	$0.00	$0.03	$0.00	$0.00	$0.03	$0.02
	SUM	$110,209	$1,412,936		5.170		16,789				MIN UNIT COST INCREASE		$0.00
											MAX UNIT COST INCREASE		$0.09
											SWA-UNIT COST INCREASE		$0.02

Notes:

(1) (H) = (Estimated TAC Emissions/Sales-Wtd Ave TAC Content)*2000*16/Typical Unit Weight
(2) (I) = Total Annualized Non-recurring Cost / [(H) * 365]
(3) (J) = Raw material cost difference between compliant and baseline formulations from Table IX-6
(4) Figures in "( )" are negative (i.e., indicates potential cost savings)
(5) California-to-National Cost Adjustment Factor (CNF)= 0.13
(6) Annual Recurring Cost Difference from Table IX-3

Table IX-9. Estimated Cost-Effectiveness for Proposed ATCM (Cost per Pound of Pollutants Reduced)

		Estimated Annualized Fixed Cost to Reformulate All Chlorinated TAC Products (dollars per year)		1997 Emission Reduc. tons/day	Estimated Reformulation Costs (in 1999 dollars)			Estimated Cost-Effectiveness $/lb TAC reduced (in 1999 dollars)		
					Annualized Non-Recurring Cost $/lb TAC Reduced		Annual Recurring Cost $/lb TAC Reduced			
Code	Category	Low (D1)	High (D2)	(L)	Low M1 = D1*(CNF)/L	High M2 = D1*(CNF)/L	(N)	Low O1=(M1+N)	High O2=(M2+N)	Ave (O1+O2)/2
2202	Automotive Brake Cleaners	$61,784	$792,100	4.450	$0.00	$0.03	($0.00)	$0.00	$0.03	$0.02
2203	Carburetor, Fuel-Injection Cleaners	$18,368	$235,489	0.310	$0.01	$0.14	($0.00)	$0.01	$0.14	$0.07
2204a	Engine Degreasers	$10,019	$128,449	0.100	$0.02	$0.23	($0.00)	$0.02	$0.23	$0.12
5203c	G.P. Degreaser/Solvent Parts Cleaner (Aerosol)	$20,038	$256,897	0.310	$0.01	$0.15	($0.00)	$0.01	$0.15	$0.08
	Grand Total	$110,209	$1,412,936	5.170					MIN G(1)	$0.00
									MAX G(2)	$0.23
									ERWA-AVG	$0.03

Notes:

(1) Avg. Cost-Effectiveness shown as "$0.00" means the average of the low and high cost-effectiveness for the category was either 0 or negative.
(2) ERWA = emission reduction-weighted average
(3) Cost-effectiveness values in "( )" are negative (i.e., indicates potential cost savings)
(4) Non-recurring fixed costs annualized by multiplying with the Cost Recovery Factor (CRF)
(5) "Emission Reductions" (Column L) reflect 1997 Consumer and Commercial Products Survey results adjusted for market coverage of the survey.
(6) For non-recurring costs, "low" and "high" refer to range of estimated fixed costs discussed in Section IX-D.3.

Total industry-wide annual compliance costs = $99,003
[(ERWA-AVG)*(L)*(365 days/year)*(2000 lbs/ton)]

California-to-National Cost Adjustment Factor (CNF)= 0.13

Thus, the average cost to reduce one pound of chlorinated TACs under the proposed ATCM is less than five cents, indicating that total industry-wide annual compliance costs to achieve a reduction of 5.17 tons per day of chlorinated TACs statewide in 1997 should be approximately $99,000 per year.

Table IX-10 shows a comparison of the cost-effectiveness for the proposed ATCM relative to the Perchloroethylene Dry Cleaning Operations ATCM. Of the nine ATCMs adopted by the Board, this is the only one which controls one of the TACs addressed in the proposed ATCM.

Table IX-10. Comparison of Cost-Effectiveness (Pound of Pollutant Reduced)

Airborne Toxic Control Measure	Cost-Effectiveness
Proposed Chlorinated TAC ATCM	$0.00 to $0.23 ($0.03 avg.) (Cost per pound of Perc, MeCl, and TCE reduced)
Perchloroethylene Dry Cleaning Operations ATCM, 1993	$0.64-1.77 ($1.29 avg.) (Cost per pound of Perc reduced) (adjusted to 1999 dollars)[1]

1. Cost-effectiveness values for Dry Cleaning ATCM adjusted to 1999 dollars using the following Chemical Engineering Plant Cost indices: 359.2 (1993), 392.0 (Preliminary August 1999) from *Chemical Engineering, November 1999.*

b. Cost Per Potential Cancer Case Avoided

By removing Perc, MeCl, and TCE from the four automotive consumer product categories, the emission and health impact (i.e., potential cancer risk) reduction benefits are 100 percent. This correlates to a total of 5.17 tons per day emissions reduction of chlorinated TACs. Additionally, based on a 70 year exposure duration, a reduction of approximately 65 total potential excess cancer cases statewide could be achieved by removal of Perc, MeCl, and TCE from the four automotive product categories.

To determine the reduction of 65 potential excess cancer cases statewide, we used ambient concentrations and emissions data as presented in Chapter VI. We then determined the individual potential cancer risk for each compound based on its ambient concentration and multiplied this by the percentage of emissions from the four automotive product categories. Finally, we multiplied this number by California's 1997 population of 33 million. Of the 65 potential cancer cases avoided, approximately 57 are attributed to Perc, 4 to TCE, and 4 to MeCl.

To evaluate the relative impact and effectiveness of the proposed control measure, we calculated the cost per cancer case avoided. We again use Equation (1) to calculate cost effectiveness, but instead of using "annual mass reduction in TACs" in the denominator, we use

Table IX-11. Estimated Cost-Effectiveness for Proposed ATCM (Cost per Cancer Case Avoided)

Code	Category	Estimated Annualized Fixed Cost to Reformulate All Non-Compliant Products (dollars per year)		Total Annualized Recurring Cost (Raw Materials Cost) ($/Pound of Product)	Total Regulation Cost ($/year)		Estimated Cost-Effectiveness $/Cancer Cases Avoided		
		Low (D1)	High (D2)	(P)	(Q1=(D1*CNF)+P)	(Q2=(D2*CNF)+P)	Low R1=(Q1*70 yrs/cases)	High R2=(Q2*70 yrs/cases)	Ave (R1+R2)/2
2202	Automotive Brake Cleaners	$61,784	$792,100	$0.00	$8,032	$102,973	$8,676.43	$111,236.32	$59,956.38
2203	Carburetor, Fuel-Injection Cleaners	$18,368	$235,489	$0.00	$2,388	$30,614	$2,579.48	$33,070.26	$17,824.87
2204a	Engine Degreasers	$10,019	$128,449	$0.00	$1,302	$16,698	$1,406.99	$18,038.32	$9,722.66
5203c	G.P. Degreaser/Solvent Parts Cleaner (Aerosol)	$20,038	$256,897	$0.00	$2,605	$33,397	$2,813.98	$36,076.65	$19,445.31
	Grand Total	$110,209	$1,412,936	$0.00	$14,327	$183,682	$15,477	$198,422	$106,949
								MIN Q(1)	$1,406.99
								MAX Q(2)	$111,236.32
								AVERAGE	$25,927.08

Notes:
(1) Cost-effectiveness values in "( )" are negative (i.e., indicates potential cost savings)
(2) Non-recurring fixed costs annualized by multiplying with the Cost Recovery Factor (CRF)
(3) For non-recurring costs, "low" and "high" refer to range of estimated fixed costs discussed in Section IX-E.
(4) Total Annual Recurring Cost = [raw material cost difference ($/pound) multiplied by the number of non-complying products] multiplied by 10 years, which is the project horizon

California-to-National Cost Adjustment Factor (CNF)=	0.13
Total Potential Excess Cancer Cases Avoided (cases) =	64.8

the "number of cancer cases avoided." Table IX-11 shows the average cost per cancer case avoided is about $26,000 with a range of approximately $1,400 to $111,000.

Table IX-12 shows a comparison of the cost-effectiveness for the proposed ATCM relative to other ARB control measures. As shown, the staff's proposal is significantly less than previously approved ARB control measures.

Table IX-12. Comparison of Cost-Effectiveness (Cancer Case Avoided) for Proposed ATCM and other ARB Control Measures (adjusted to 1999 dollars)

Airborne Toxic Control Measure	Cost-Effectiveness[1,2] (Dollars per Cancer Case Avoided)
Proposed Chlorinated TAC ATCM	$1,400-111,000
Perchloroethylene Dry Cleaning Operations ATCM, 1993	$1.9-4.8 million
Ethylene Oxide ATCM for Sterilizers and Aerators, 1990	$2.1-3.2 million
Emissions of Toxic Metals from Non-Ferrous Metal Melting, 1992	$6,600-$18.6 million

1. Cost-effectiveness values for ATCMs are based on size of the facility, amount and type of equipment required to meet the control limits, and which control limit is to be met.
2. All cost-effectiveness values have been adjusted to 1999 dollars using the following Chemical Engineering Plant Cost indices: 357.6 (1990), 358.2 (1992), 359.2 (1993), 392.0 (Preliminary August 1999).

X. ENVIRONMENTAL IMPACTS OF THE PROPOSED AIRBORNE TOXIC CONTROL MEASURE

The intent of the proposed airborne toxic control measure (ATCM) is to protect the public health by reducing the public's exposure to potentially harmful emissions of TACs. An additional consideration is the impact that the proposed ATCM may have on other areas of the environment. Based on available information, the ARB has determined that no significant adverse environmental impacts should occur. This chapter describes the potential impacts that the proposed ATCM may have on waste water treatment, hazardous waste disposal, and air pollution.

A. Legal Requirements Applicable to the Analysis

The California Environmental Quality Act (CEQA) and ARB policy require an analysis to determine the potential adverse environmental impacts of proposed regulations. Since the ARB's program involving the adoption of regulations has been certified by the Secretary of Resources (see Public Resources Code section 21080.5), the CEQA environmental analysis requirements are allowed to be included in the Initial Statement of Reasons for a rulemaking in lieu of preparing an environmental impact report or negative declaration. In addition, the ARB will respond in writing to all significant environmental issues raised by the public during the public review period or at the Board hearing. These responses will be contained in the Final Statement of Reasons for the ATCM.

Public Resources Code section 21159 requires that the environmental impact analysis conducted by ARB include the following: (1) an analysis of the reasonably foreseeable environmental impacts of the methods of compliance; (2) an analysis of reasonably foreseeable feasible mitigation measures; and, (3) an analysis of reasonably foreseeable alternative means of compliance with the ATCM. Regarding reasonably foreseeable mitigation measures, CEQA requires an agency to identify and adopt feasible mitigation measures that would minimize any significant adverse environmental impacts described in the environmental analysis.

B. Potential Waste Water Impacts

Sanitation districts have been concerned about the amount of chlorinated compounds found in the waste effluent at treatment plants. Currently, many treatment plants do not have the equipment necessary to process industrial wastes such as chlorinated solvents and these solvents have been detected at elevated levels at some facilities. Over the last several years, increased influent concentrations of Perc were observed at four wastewater treatment plants (Pomona Water Reclamation Plant, City of Los Angeles' Donald C. Tillman Water Reclamation Plant, Joint Water Pollution Control Plant, and East Bay Municipal Utilities District). The influent concentrations of Perc have been high enough to potentially cause violations of the plants'

discharge limit of 5 micrograms per liter (µg/L). The data collected from the wastewater treatment plants for 1999 showed median influent levels of 17 µg/L, 78 µg/L, 8 µg/L, and 4 µg/L, respectively (CSDLA, 1999a; CSDLA 1999b).

The number of stationary and mobile parts washers being used in AMR facilities has increased over the years to meet federal, state, and local regulations adopted to address environmental and health concerns. Publicly-owned treatment works (POTWs) have been concerned about the disposal practices of the spent baths, which are usually classified as hazardous waste and cannot be disposed in the sewer system. In some cases, unused cleaners are also considered hazardous waste. A study conducted in Southern California showed that about three-quarters of spent water baths were classified as hazardous waste. None of these spent baths met discharge standards set by local POTWs or sanitary sewerage districts (DTSC, 1999a).

The removal of Perc, MeCl, and TCE from the four automotive consumer products categories should lead to a reduction in the amount of chlorinated solvents reaching the storm drains and the waste water treatment plants.

C. Potential Hazardous Waste Impacts

Hazardous waste is regulated in California by both federal and state programs. In California, all hazardous waste must be disposed of at a facility that is registered with the California Department of Toxic Substances Control (DTSC). Under these programs, chlorinated automotive consumer products are generally classified as hazardous waste because they contain substances which are listed as toxic substances.

An AMR facility will generate spent chlorinated solvent from stationary and portable parts washers and from liquid solvent that is used to wash parts over a collection drum. A hazardous waste hauler is usually contracted to remove the spent solvent from the facility. For a monthly fee, waste haulers will pick-up the spent solvent, clean and maintain the solvent cleaning unit, and refill the unit with clean solvent. Depending on the arrangement, solvent cleaning units may be owned by the shop or leased from a solvent service company. The waste hauler will then recycle the spent solvent to reclaim the chlorinated substances which can then be resold. Based on information collected during site visits, spent baths (as well as other waste disposal containers) contaminated with chlorinated compounds are typically more costly to have removed from the facility.

It is expected that the proposed ATCM may increase the usage of stationary and portable parts washers. The removal of Perc, MeCl, and TCE from automotive consumer products will minimize the possibility of chlorinated solvents contaminating aqueous baths, waste oil containers, and hazardous waste disposal drums thereby significantly reducing hazardous waste contamination and disposal costs.

D. Potential Air Pollution Impacts

1. Potential Increase in VOC Emissions

The Consumer Products Regulation reduces the formation of tropospheric, or ground-level, ozone by reducing VOC emissions from consumer products. Tropospheric ozone formation requires a mix of VOCs, nitrogen oxides, oxygen, and sunlight. Therefore, a reduction in VOC emissions is expected to provide a beneficial environmental impact on air quality and public health by reducing tropospheric ozone formation. Based on the results of the 1997 Consumer and Commercial Products Survey, the products from the four automotive consumer product categories emitted approximately 14.6 tons per day (tpd) of VOCs in California (ARB, 1999b).

The October 1999 amendments to the Consumer Products Regulation are expected to obtain a reduction of 3.3 tpd in VOC emissions from automotive consumer products (ARB, 1999b). However, the removal of Perc, MeCl, and TCE as formulation options in the proposed ATCM will adversely impact the reduction in VOC emissions that otherwise would have been realized. Chlorinated automotive consumer products account for approximately 38 percent of the market and their removal will reduce emissions of Perc, MeCl, and TCE by approximately 5.2 tpd (approximately 3.8 million pounds per year) as shown in Table X-1.

Table X-1. Statewide Emissions of Perc, MeCl, and TCE from Automotive Consumer Products

Perc Emissions [tons/day]	MeCl Emissions [tons/day]	TCE Emissions [tons/day]	Total Chlorinated [tons/day]
4.2	0.7	0.3	5.2

If we assume a worse case scenario where all current users of chlorinated products switch to non-chlorinated, VOC-based products with Perc, MeCl, and TCE replaced with VOC compounds (irrespective of any current VOC-based formulation limits), then the theoretical increase in statewide VOC emissions would be approximately 5.2 tpd. However, beginning January 1, 2002, the VOC-content of automotive consumer products is subject to VOC-content limits as specified in the October 1999 amendments to the Consumer Products Regulation. As a result of these technically-feasible limits, post-ATCM VOC emissions would increase by no more than 2.3 tpd statewide. Table X-2 summarizes the potential increase in VOC emissions.

Table X-2. Potential Maximum Increase in VOC Emissions from a Switch to VOC-Based Non-Chlorinated Products

Product Category	VOC Limit [%]	Potential VOC Emissions [tons/day]
Brake Cleaners	45	2.00
Carburetor Cleaners	45	0.14
Engine Degreasers	35	0.04
General Purpose Degreasers	50	0.16
	Total (approx.)	2.3

ARB staff expects, however, that some users of chlorinated automotive consumer products will choose to consider other non-chlorinated alternatives (such as aqueous-based portable brake cleaning units and parts washers) and not switch exclusively to non-chlorinated VOC products. If this occurs, the increase in VOC emissions related to the proposed ATCM would be less than 2.3 tpd statewide. When total VOC emission reductions from both the October 1999 amendments to the Consumer Products Regulation and the proposed ATCM are considered, statewide VOC emissions from the four automotive consumer products categories are reduced by at least one ton per day. These reductions are summarized in Table X-3.

Table X-3. Approximate Emission Reductions from Proposed ATCM and October 1999 Consumer Products Amendments[1]

Chlorinated TAC Reductions [tons/day]	VOC Reductions [tons/day]
5.2	1.0

1. Total combined emission reductions from the October 1999 Consumer Products Amendments and the proposed ATCM.

2. Impacts on the State Implementation Plan for Ozone

The Federal Clean Air Act amendments of 1990 require an ozone attainment plan from every state unable to meet the national ambient air quality standard for ozone. California's 1994 State Implementation Plan (SIP) for ozone fulfills this requirement (ARB, 1994). State law provides the legal authority to ARB to develop regulations affecting a variety of mobile sources, fuels, and consumer products. The regulations that have already been adopted, and measures proposed for adoption constitute the ARB's portion of the SIP. The SIP serves as a road map to guide California to attain and maintain the national ambient air quality standard for ozone. The

SIP was submitted to the U.S. EPA on November 15, 1994, and the consumer products element was formally approved on August 21, 1995.

As previously mentioned, the proposed ATCM decreases the potential VOC reductions that will be obtained by the October 1999 amendments to the Consumer Products Regulation while achieving substantial reductions in emissions of chlorinated TACs. Perc was considered a VOC in the 1994 ozone SIP inventory; therefore, substituting non-chlorinated VOC-based products to replace Perc will have no impact on the 1994 SIP (which covers Ventura County, the Sacramento Metropolitan area, the San Joaquin Valley, San Diego County, and the Southeast Desert). In the context of the 1994 SIP, substituting VOC-based products for MeCl will increase VOC emissions by approximately 0.1 tpd in all the 1994 SIP areas combined.

The South Coast Air Quality Management District (SCAQMD) revised their federal ozone plan in 1999, and the U.S. EPA has proposed to approve this plan. In the 1999 revision, Perc is not considered a VOC. In the context of the 1999 revision, if VOC-based products are substituted for all the Perc and MeCl currently used in chlorinated products, we expect an increase of approximately one ton per day of VOC in the South Coast Air Basin. The ARB and the SCAQMD will address this shortfall in the next comprehensive revision of the South Coast ozone SIP.

3. Potential Environmental Impacts on Global Warming and Stratospheric Ozone Depletion

Greenhouse gases, which alter the amount of heat, or infrared radiation, that can escape the Earth's surface, have been linked to a gradual warming of the Earth's surface and lower atmosphere. While carbon dioxide (CO_2) has been the traditional focus of greenhouse gas concerns, other greenhouse gases include methane, nitrous oxide, and chlorofluorocarbons (U.S. EPA, 1998a). In the United States, the largest source of greenhouse gas emissions is from fossil fuel combustion, which accounted for approximately 81 percent of greenhouse gas emissions in 1996 (U.S. EPA, 1998a).

Carbon dioxide is used as a propellant in both chlorinated and non-chlorinated aerosol automotive consumer products. Based on data from the 1997 Consumer and Commercial Products Survey, non-chlorinated products typically contain a greater amount of carbon dioxide than their chlorinated counterparts. Since the proposed ATCM does not require a reduction of the amount of aerosol products sold, many users of chlorinated products may switch to non-chlorinated products thereby increasing the amount of carbon dioxide released. However, the use of carbon dioxide as a propellant in automotive consumer products typically results from a recycled by-product of existing processes and, therefore, does not contribute to global warming (ARB, 1995a). Additionally, non-chlorinated aerosols account for nearly 62 percent of the market. As a result, the proposed ATCM is expected to have a negligible impact on global warming.

4. South Coast Air Quality Management District Air Toxics Control Plan

The South Coast Air Quality Management District (South Coast AQMD) is currently in the process of developing a comprehensive control plan designed to obtain significant reduction of toxic emissions in the South Coast Air Basin (SCAB). The plan will address current air toxic levels, control strategies, and projected future air toxic emission levels. The removal of Perc, MeCl, and TCE from automotive consumer products will greatly assist the efforts of the South Coast AQMD in their efforts to reduce toxic emissions. It is expected that the proposed ATCM will reduce toxic emissions in the SCAB by approximately 2.6 tpd. Additionally, combined with the October 1999 amendments to the Consumer Products Regulation, VOC emissions should be reduced by almost 0.5 tpd.

5. Workplace Exposure

The California Department of Industrial Relations-Division of Occupational Safety and Health Administration (Cal/OSHA) regulates the concentration of many TACs and VOCs in the workplace environment. To protect worker safety, Cal/OSHA has established a permissible exposure limit (PEL) for many of these compounds (the PEL is the maximum, eight-hour, time-weighted average concentration for occupational exposure). The combined effect of both the proposed ATCM and the October 1999 amendments to the Consumer Products Regulation is a reduction in VOC emissions. As a result, an increase in workplace exposure from TAC emissions and VOC emissions is not expected.

E. Formation of Phosgene

Phosgene is a toxic, colorless, gas or volatile liquid with a suffocating odor that is similar to decaying fruit or moldy hay. It is slightly soluble in water and freely soluble in benzene, toluene, glacial acetic acid, chloroform, and most liquid hydrocarbons. Phosgene is noncombustible but can decompose into hydrochloric acid (HCl) and CO_2 when wetted. As a result, wet phosgene is corrosive and poses an additional hazard from pressure buildup in closed containers. The density of phosgene is more than three times that of air, which means that its concentrated emission plumes tend to settle to the ground and collect in low areas (ARB, 1997b). Phosgene is listed as a TAC and a federal HAP.

Phosgene, also known as carbonyl chloride, is not a normal component of welding gases, can be formed by the thermal decomposition of chlorinated hydrocarbons (e.g., Perc, TCE, and TCA) when welding is carried out in the presence of solvent vapors. These solvent vapors may be escaping from a nearby degreasing tank, a recently expelled aerosol product, or when solvent is left behind after degreasing (NOHSC, 1999a). Phosgene formation is promoted by ultraviolet radiation, hot metal surfaces, flame, and cigarette smoking (NOHSC, 1999a). The gas-shielded arc welding processes and plasma processes provide greater ultraviolet light intensity than the flux-shielded arc welding processes. Additionally, heat and ultraviolet radiation from the welding arc may react with solvent vapor to produce irritant gases such as acetylchloride and

acetylchloride derivatives such as dichloroacetylchloride. There is also evidence of phosgene formation from the photooxidation of chloroethylenes in air such as Perc and TCE (U.S. EPA, 1985).

Acute non-cancer affects are of the most concern. Phosgene is extremely irritating to the lungs, and can cause severe respiratory effects, including pulmonary edema. Symptoms of acute exposure include choking, chest constriction, coughing, painful breathing, and bloody sputum. Acute phosgene poisoning may affect the heart, brain, and blood. Symptoms may be delayed up to 24 hours after exposure. Chronic inhalation exposure has been shown to result in some tolerance to acute effects noted in humans, but irreversible emphysema and pulmonary fibrosis may occur (ARB, 1997b). The National Institute for Occupational Safety and Health (NIOSH) lists a recommended exposure limit of 0.1 parts per million for phosgene. The U.S. Occupational Safety and Health Administration (OSHA) also lists a PEL of 0.1 parts per million (NIOSH, 1994).

Recognizing these health and safety concerns, both OSHA and Cal/OSHA have taken steps to limit worker exposure to phosgene. OSHA Regulations state that degreasing and cleaning operations that involve chlorinated hydrocarbons shall be located so that vapors from these operations will not reach or be drawn into the area that surrounds any welding operation (Standards-29 CFR, General requirements, Section 1910.252). In addition, compounds such as Perc and TCE should be kept out of areas penetrated by ultraviolet radiation of gas-shielded welding operations. Cal/OSHA regulations for electric welding state that chlorinated solvents shall not be used within 200 feet (61 meters) of the exposed arc. Furthermore, surfaces prepared with chlorinated solvents should be thoroughly dry before welding is performed on them (California Code of Regulations, Subchapter 7, Group 11, Article 90, Section 4853).

The removal of Perc, MeCl, and TCE from automotive consumer products in the proposed ATCM will minimize the potential for phosgene formation in the presence of flame or heat sources thereby extending a greater level of worker and public health protection and safety.

F. Potential Flammability of Products that Contain VOCs

The June 1997 Status Report, based on the limited data available at the time, considered the flammability of many non-chlorinated aerosols to be a disadvantage when compared to chlorinated aerosols which are typically non-flammable (ARB, 1997a). Industry groups representing product manufacturers have also underscored this concern stating their belief that AMR facilities need to continue their usage of the more toxic chlorinated aerosols, especially in areas where use may occur near flame, heat, or other ignition sources. Since the release of the Status Report, however, more data regarding flammability has become available. A search of statewide and national databases as well as inquiries to fire departments and associations across the state were unable to locate any reports of fires, injuries, or other incidents related to the use of non-chlorinated products in AMR facilities. Additionally, the California State Fire Marshal's

office indicated that the combustion of gasoline, such as from a leaking fuel line, poses a significantly greater flammability concern than the use of aerosols.

During the 137 site visits, ARB staff observed brake service operations at one facility using a flammable, non-chlorinated aerosol product occurring in one service bay and welding operations occurring in another service bay. ARB staff also observed chlorinated products that were listed as flammable on the product label, which indicates that chlorinated products can also be flammable.

Sixteen additional site visits were conducted to specifically investigate flammability issues. Of these facilities, all 16 used flammable products (non-chlorinated and chlorinated) but only 14 had an ignition source. The types of ignition sources observed included: welding (e.g. arc) equipment, torch (e.g. acetylene) equipment, cigarettes, and space heaters (natural gas and propane, portable, and overhead). Usage of flammable products occurred from approximately 20 to 30 feet from the ignition source with most usage occurring in adjacent service bays. Only one facility reported an incident (non-injury) associated with the use of a flammable product. This facility, however, attributed the incident to a vehicle malfunction and continues to use flammable products almost exclusively. Additionally, none of the facilities visited indicated that flammability concerns were a factor when making decisions on which products to buy (cost was the major factor). Instead, discussions with facility operators indicated that most facilities consider all aerosol products flammable and use common safety precautions when using these products Therefore, flammability is sufficiently addressed by the use of good operating practices on the part of facility owners, mechanics, and technicians. This belief is supported by the fact that most facilities already use a host of flammable products and that non-flammable alternatives such as aqueous-based portable brake cleaning units and water-based aerosol products are readily available and in use.

G. Reasonably Foreseeable Feasible Mitigation Measures

As previously discussed, ARB is required to do an analysis of reasonably foreseeable feasible mitigation measures. ARB staff has concluded that no significant adverse environmental impacts should occur from implementation of the proposed ATCM. As a result, no mitigation measures would be necessary.

H. Reasonably Foreseeable Alternative Means of Compliance with the ATCM

The ARB is required to do an analysis of reasonably foreseeable alternative means of compliance with the ATCM. Alternatives to the proposed ATCM are discussed in Chapter VII. Based on the discussion in Chapter VII, ARB staff has concluded that the removal of MeCl and TCE from automotive consumer products is appropriate and necessary because of the potential increased use and, therefore, potential increased risk if the use of these two compounds was not so limited. For the same reasons, staff has concluded that the removal of Perc, MeCl, and TCE

from carburetor cleaners, engine degreasers, and general purpose degreasers, as well as from brake cleaners, is appropriate and necessary.

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Appendix A

Proposed Regulation Order
Airborne Toxic Control Measure
for Emissions of Chlorinated Toxic Air Contaminants
from Automotive Maintenance and Repair Activities

PROPOSED REGULATION ORDER
AIRBORNE TOXIC CONTROL MEASURE
FOR EMISSIONS OF CHLORINATED TOXIC AIR CONTAMINANTS
FROM AUTOMOTIVE MAINTENANCE AND REPAIR ACTIVITIES

Adopt new section 93111, title 17, California Code of Regulations, to read as follows:

17 CCR, section 93111. Chlorinated Toxic Air Contaminants Airborne Toxic Control Measure--Automotive Maintenance and Repair Activities.

(a) **Applicability**

(1) Except as provided in subdivision (b), this section applies to any person who sells, supplies, offers for sale, or manufactures automotive consumer products for use in automotive maintenance or repair activities in California.

(2) This section also applies to the owner or operator of any automotive maintenance facility or automotive repair facility that uses automotive consumer products in California.

(b) **Exemptions**

(1) This section does not apply to any automotive consumer product manufactured in California for shipment and use outside of California.

(2) This section does not apply to a manufacturer or distributor who sells, supplies or offers for sale in California an automotive consumer product that does not comply with the standards specified in subdivision (d) if the manufacturer or distributor can demonstrate to the satisfaction of the Executive Officer both of the following: (A) the automotive consumer product is intended for shipment and use outside of California, and (B) the manufacturer or distributor has taken reasonable prudent precautions to assure that the automotive consumer product is not sold, offered for sale, or distributed in California. This subdivision (2) does not apply to manufacturers or distributors of automotive consumer products if the products are sold, supplied, or offered for sale by any person to retail outlets in California.

(c) **Definitions**. For the purposes of this section, the following definitions apply:

(1) "Aerosol Product" means a pressurized spray system that dispenses product ingredients by means of a propellant or mechanically induced force. Any user-pressurized system that uses compressed air as a propellant is considered to be an "Aerosol Product". "Aerosol Product" does not include pump sprayers.

(2) "ASTM" means the American Society for Testing and Materials.

(3) "Automotive Consumer Product" for the purposes of this section, means any of the following chemically formulated aerosol products or liquid products used in automotive maintenance or repair activities: (A) brake cleaners, (B) carburetor or fuel-injection air intake cleaners, (C) engine degreasers, and (D) general purpose degreasers intended for use in automotive maintenance or repair activities.

(4) "Automotive Maintenance Facility or Automotive Repair Facility (Facility)" means any establishment at which a person repairs, rebuilds, reconditions, services, or maintains in any way, motor vehicles. "Facility" includes entities required to be registered by the California Department of Consumer Affairs, Bureau of Automotive Repair, and entities that service or repair a fleet of ten or more motor vehicles. "Facility" does not include private residences or entities that are involved only in motor vehicle body work or painting.

(5) "Automotive Maintenance or Repair Activities" means any service, repair, restoration, or modification activity to a motor vehicle in which cleaning or degreasing products could be used including, but not limited to, brake work, engine work, machining operations, and general degreasing of engines, motor vehicles, parts, or tools.

(6) "Brake Cleaner" means a cleaning product designed, labeled, promoted or advertised (expressed or implied) to remove oil, grease, brake fluid, brake pad material or dirt from motor vehicle brake mechanisms and parts.

(7) "Carburetor or Fuel-Injection Air Intake Cleaner" means a product designed, labeled, promoted or advertised (expressed or implied) to remove fuel deposits, dirt, or other contaminants from a carburetor, choke, throttle body of a fuel-injection system, or associated linkages. "Carburetor or fuel-injection air intake cleaner" does not include products designed exclusively to be introduced directly into the fuel lines or fuel storage tank prior to introduction into the carburetor or fuel injectors.

(8) "CAS Registry Number" is a unique accession number assigned by the Chemical Abstracts Service, a division of the American Chemical Society.

(9) "Chlorinated Toxic Air Contaminant" for the purposes of this section, means methylene chloride, perchloroethylene, or trichloroethylene.

(10) "Consumer" means any person who seeks, purchases, or acquires any automotive consumer product for use in automotive maintenance and repair activities. Persons acquiring an automotive consumer product for resale are not "consumers" for that product.

(11) "Distributor" means any person to whom an automotive consumer product is sold or supplied for the purposes of resale or distribution in commerce, except that manufacturers, retailers, and consumers are not distributors.

(12) "Engine Degreaser" means a cleaning product designed, labeled, promoted or advertised (expressed or implied) to remove grease, grime, oil or other contaminants from the external surfaces of engines and other mechanical parts.

(13) "Executive Officer" means the Executive Officer of the California Air Resources Board, or his or her delegate.

(14) "General Purpose Cleaner" means a product designed for general all-purpose cleaning, in contrast to cleaning products designed to clean specific substrates in certain situations. "General Purpose Cleaner" includes products designed for general floor cleaning, kitchen or counter top cleaning, and cleaners designed to be used on a variety of hard surfaces.

(15) "General Purpose Degreaser" means any product designed, labeled, promoted or advertised (expressed or implied) to remove or dissolve grease, grime, oil and other oil-based contaminants from a variety of motor vehicle substrates or surfaces or miscellaneous metallic parts. "General Purpose Degreaser" does not include "Engine Degreaser"or "General Purpose Cleaner".

(16) "Liquid" means a substance or mixture of substances which is capable of a visually detectable flow as determined under ASTM D-4359-90 which is incorporated by reference. "Liquid" does not include powders or other materials that are composed entirely of solid particles.

(17) "Liquid Product" means any product that is packaged and sold as a bulk liquid including liquid delivered by pump sprayers.

(18) "Manufacturer" means any person who imports, manufactures, assembles, produces, packages, repackages, or relabels an automotive consumer product.

(19) "Methylene Chloride" (CAS Registry Number 75-09-2) means the compound with the chemical formula 'CH_2Cl_2', also known by the name 'dichloromethane', which has been identified by the Air Resources Board and listed as a toxic air contaminant in section 93000, and which is a hazardous air pollutant designated as a toxic air contaminant in section 93001.

(20) "Motor Vehicle" means a self-propelled device by which any person or property may be propelled, moved, or drawn upon a highway, excepting a device moved exclusively by human power or used exclusively upon stationary rails or tracks. "Motor vehicle" does not include a self-propelled wheelchair, invalid tricycle, or motorized quadricycle when

operated by a person who, by reason of physical disability, is otherwise unable to move about as a pedestrian.

(21) "Owner or Operator" means a person who is the owner or the operator of an automotive maintenance facility or an automotive repair facility.

(22) "Perchloroethylene (Perc)" (CAS Registry Number 127-18-4) means the compound with the chemical formula 'C_2Cl_4', also known by the name 'tetrachloroethylene', which has been identified by the Air Resources Board and listed as a toxic air contaminant in section 93000, and which is a hazardous air pollutant designated as a toxic air contaminant in section 93001.

(23) "Person" means "person" as defined in Health and Safety Code section 39047.

(24) "Pump Sprayer" means a packaging system in which the product ingredients within the container are not under pressure and in which the product is expelled only while a pumping action is applied to a button, trigger or other actuator.

(25) "Retailer" means any person who sells, supplies, or offers for sale automotive consumer products directly to consumers.

(26) "Retail Outlet" means any establishment at which automotive consumer products are sold, supplied, or offered for sale directly to consumers.

(27) "Trichloroethylene" (CAS Registry Number 79-01-6) means the compound with the chemical formula 'C_2HCl_3', also known by the name 'TCE', which has been identified by the Air Resources Board and listed as a toxic air contaminant in section 93000, and which is a hazardous air pollutant designated as a toxic air contaminant in section 93001.

(d) **Standards for Automotive Consumer Products**

(1) Except as provided in subdivision (b), subdivision (e) and subdivision (g), after the effective dates specified in the following Table of Standards no person shall sell, supply, offer for sale, or manufacture for sale in California any automotive consumer product that, at the time of sale or manufacture, contains methylene chloride, perchloroethylene or trichloroethylene.

Table of Standards

Product Category	Effective Date
Brake Cleaner	December 31, 2002
Carburetor or Fuel-injection Air Intake Cleaners	December 31, 2002
Engine Degreaser	December 31, 2002
General Purpose Degreaser	December 31, 2002

(2) For the purposes of subdivision (d)(1), a product "contains methylene chloride, perchloroethylene or trichloroethylene" if the product contains 1.0 percent or more by weight (exclusive of the container or packaging) of any one of the compounds methylene chloride, perchloroethylene, or trichloroethylene as determined by the test method specified in subdivision (h).

(3) No owner or operator of an automotive maintenance facility or automotive repair facility shall use an automotive consumer product prohibited under subdivision (d)(1) after June 30, 2005.

(e) **Sell-through of products**

(1) Notwithstanding the provisions of subdivisions (d)(1) and (d)(2), an automotive consumer product manufactured prior to the effective date specified for that product category in the Table of Standards may be sold, supplied, or offered for sale for up to 18 months after the specified effective date.

(2) This subdivision (e) does not apply to any automotive consumer product if that product does not display, on the product container or package, the date on which the product was manufactured or a code indicating such date.

(f) **Administrative Requirements - Code-Dating**

(1) Each manufacturer of an automotive consumer product subject to this section shall clearly display on each automotive consumer product container or package, the day, month, and year on which the product was manufactured, or a code indicating the day, month, and year of manufacture. This date or code-date shall be displayed on each automotive consumer product container or package manufactured on or after the date no later than twelve months prior to the effective date of the applicable standard specified in subsection (d). No person shall erase, alter, deface or otherwise remove or make illegible

any date or code-date from any regulated product container or package without the express authorization of the manufacturer.

(2) If a manufacturer uses a code indicating the date of manufacture for any automotive consumer product subject to this section, the manufacturer shall file an explanation of the code with the Executive Officer of the ARB no later than twelve months prior to the effective date of the applicable standard specified in subdivision (d).

(g) **Variances**

(1) Applications for variances. Any person who cannot comply with the requirements set forth in subdivision (d) because of extraordinary reasons beyond the person's reasonable control may apply in writing to the Executive Officer for a variance. The variance application shall set forth:

(A) the specific grounds upon which the variance is sought;

(B) the proposed date(s) by which compliance with the provisions of subdivision (d) will be achieved; and

(C) a compliance report reasonably detailing the method(s) by which compliance will be achieved.

(2) Notices and public hearings for variances. Upon receipt of a variance application containing the information required in subdivision (g)(1), the Executive Officer will hold a public hearing to determine whether, under what conditions, and to what extent, a variance from the requirements in subdivision (d) is necessary and will be permitted. The Executive Officer will initiate a hearing no later than 75 days after receipt of a variance application. The Executive Officer will send notice of the time and place of the hearing to the applicant by certified mail not less than 30 days prior to the hearing. The Executive Officer will submit notice of the hearing for publication in the California Regulatory Notice Register, and not less than 30 days prior to the hearing, the Executive Officer will send a notice to every person who requests such notice. The notice will state that the parties may, but need not, be represented by counsel at the hearing. At least 30 days prior to the hearing, the Executive Officer will make the variance application available to the public for inspection. The Executive Officer will allow interested members of the public a reasonable opportunity to testify at the hearing and will consider their testimony.

(3) Treatment of confidential information. Information submitted to the Executive Officer by a variance applicant may be claimed as confidential, and such information will be handled in accordance with the procedures specified in sections 91000-91022. The Executive Officer may consider such confidential information in reaching a decision on a variance application.

(4) Necessary findings for granting variances. The Executive Officer will not grant a variance unless the Executive Officer finds that:

(A) because of reasons beyond the reasonable control of the applicant, requiring compliance with subdivision (d) would result in extraordinary economic hardship to the applicant; and

(B) the public interest in mitigating the extraordinary hardship to the applicant by issuing the variance outweighs the public interest in avoiding any increased emissions of toxic air contaminants that would result from issuing the variance; and

(C) the compliance report proposed by the applicant can reasonably be implemented and will achieve compliance as expeditiously as possible.

(5) Variance orders. Any variance order will specify a final compliance date by which the requirements of subdivision (d) will be achieved. Any variance order will contain a condition that specifies increments of progress necessary to assure timely compliance, and such other conditions that the Executive Officer, in consideration of the testimony received at the hearing, finds necessary to carry out the purposes of Division 26 of the Health and Safety Code.

(6) Situations in which variances will cease to be effective. A variance will cease to be effective upon failure of the party to whom the variance was granted to comply with any term or condition of the variance.

(7) Modification and revocation of variances. Upon the application of any person, the Executive Officer may review, and for good cause, modify or revoke a variance from requirements of subdivision (d) after holding a public hearing in accordance with the provisions of subdivision (g)(2).

(h) **Test Methods**

(1) Air Resources Board Method 310, Determination of Volatile Organic Compounds (VOC) in Consumer Products, adopted September 25, 1997, and as last amended on November 16, 1999, is incorporated herein by reference. Sections 3.5 and 3.7 will be used to perform the testing to determine compliance with the requirements of this section.

(2) References to "VOC" in Method 310 mean "chlorinated toxic air contaminants" when Method 310 is used to determine compliance with this section.

(3) Alternative methods which are shown to accurately determine the concentration of methylene chloride, perchloroethylene, or trichloroethylene in a subject product or its emissions may be used upon written approval of the Executive Officer.

Authority cited: Sections 39600, 39601, 39650, 39655, 39656, 39658, 39659, 39665, and 39666, Health and Safety Code.

Reference: Sections 39002, 39600, 39650, 39655, 39656, 39658, 39659, 39665, 39666, and 40000, Health and Safety Code.

Appendix B

Surveys

Survey 1. Brake Cleaner and Perc-Containing Automotive Products Survey

INSTRUCTIONS FOR COMPLETING THE BRAKE CLEANER AND PERC-CONTAINING AUTOMOTIVE PRODUCTS SURVEY

GENERAL INSTRUCTIONS

- Please type or print legibly in ink when filling out the survey form.
- Please review the instructions and the survey form prior to filling out the form.
- We suggest that you make extra copies of the form.
- If you have any questions on the survey or the information we have requested, please contact Mark Williams of the Air Resources Board (ARB) staff at (916) 327-5633.
- In order to get accurate data from this survey, we would appreciate it if you would consult your actual sales records for determining California sales.
- In filling out the survey form if you encounter any questions which do not apply in your situation, please enter "N/A" in the appropriate blanks.
- If you wish to clarify the information supplied by your company or would like to make additional comments, please use Section V to enter your comments. In clarifying the information your company has supplied, please refer to the appropriate table, column, and row or product name.

SECTION I. COMPANY INFORMATION

Company Name:	Enter the entire company name.
Division Name:	If the respondent to the survey is representing a division of the company please enter the division name. If the respondent to the survey is representing several divisions being reported under one company, please enter the additional division names in Section IV: Other Information at the end of the survey.
Contact Person:	Enter the name of the person to be contacted by the ARB if clarifications are needed.
Address:	Enter the mailing address of the company or division responsible for completing the survey.
Manufacturer/ Distributor:	Check the corresponding box to indicate whether you are a manufacturer or a distributor or both.
Phone/Fax Number:	Enter the phone and fax numbers of the contact person.
Confidential Information:	If you would like us to treat this information and data in a confidential manner, please check the box at the bottom of Section I.
E-mail Address:	Enter the E-mail address of the contact person, if available.

SECTION II. BRAKE CLEANER PRODUCT INFORMATION

Column	Instructions
• 1, 8:	List all of the products that your company either makes, formulates, fills for another company, or distributes. After having listed all the applicable products in column 1 of Section II., copy the product names in column 8 of the continuation section (Section II.) at the foot of the page. Be sure to list them in the same order.
• 2:	For those products which you either fill for another company, or distribute, please list the manufacturer's name in Section V, Other Comments.
• 3:	Enter the product form as either (A)erosol, (L)iquid, (P)ump spray, (G)el, (S)olid, or (O)ther. If the product falls into the "Other" category, please specify the form in Section V, Other Comments.
• 4:	What is the weight (ounces) of the product in the container or dispenser? If the product comes in more than one size, list the different sizes as separate entries. It is permissible to report the product size in fluid ounces or gallons, but we request that you enter either the product density in grams per milliliter (g/ml) or its specific gravity (see Section III.).
• 5-7:	What is the number of units of product sold or distributed in California (column 5)? If there are multiple sizes, list the number of units sold or distributed for each size. We are also interested in who the end users are. What percentage of the units are sold for industrial use in shops which do automotive brake repair and servicing (column 6)? What percentage of the units are sold through a retail store for individual or home use (column 7)?
• 9:	Write in the percentage of Perc by weight contained in the product. If this is a non-chlorinated product, please list the main ingredients in Section V, Other Comments.
• 10:	Does the product meet the Volatile Organic Compound (VOC) limit of 50 percent content by weight as required by Article 2 of the Consumer Products Regulation? (Title 17, California Code of Regulations, Section 94509)
• 11-13:	These columns deal with product reformulation. In column 11, please enter whether your company intends to reformulate the product by simply answering "yes" or "no". In column 12 we would like you to enter an estimated date when the product will be reformulated, if applicable. This date would be when the product is estimated to be sold as a commercial product. If the product is to be reformulated, please enter whether the Perc content will increase as a result of the reformulation along with an estimate of what the new Perc content (percent weight) will be (column 13).

SECTION III. LIQUID BRAKE CLEANERS

Column	Instructions
• 1:	Enter any products from Section II. which come in liquid form. These products would be those where "L" is entered in column 3 of Section II.
• 2:	What is the volume (fluid ounces or gallons) of the product in the container or dispenser? If the product comes in more than one size, list the different sizes as separate entries. Please note that we are asking for the amount of product measured by volume, and not by weight as was requested in column 4 of Section II.
• 3:	Please enter either the product density in grams per milliliter (g/ml) or its specific gravity.
• 4:	After product purchase for industrial or home use, does the product need to be diluted prior to its use or application?
• 5,6:	If the producted is diluted, what is the recommended amount of product (column 5) for the given amount of diluent (column 6) per the container instructions? Please specify whether the amounts are given in terms of volume or weight and the units.
• 7:	If the product is diluted, what is the recommended diluent per the instructions?

SECTION IV. OTHER AUTOMOTIVE PRODUCTS CONTAINING PERC

Column	Instructions
• 1:	This column lists other products which could contain Perc.
• 2:	Please answer "Yes" or "No" in the blank by each product category whether your company manufactures, formulates, fills, or distributes that type of product. For those products which you either fill for another company, or distribute, please list the manufacturer's name in Section V, Other Comments.
• 3:	If you answered yes in column 2 to any of the product categories, please answer whether the product(s) contain Perc?
• 4-6:	These columns deal with product reformulation. In column 4, please enter whether your company intends to reformulate the product by simply answering "yes" or "no". In column 5 we would like you to enter an estimated date when the product will be reformulated, if applicable. This date would be when the product is estimated to be sold as a commercial product. If the product is to be reformulated, please enter whether the Perc content will increase as a result of the reformulation along with an estimate of what the new Perc content (percent weight) will be (column 6).

SECTION V. OTHER COMMENTS

If you wish to clarify the information you have supplied or make additional miscellaneous comments on the survey, please enter the comments in this box. In clarifying the information your company has supplied, please refer to the appropriate table, column and row or product name.

California Environmental Protection Agency

Air Resources Board

BRAKE CLEANER AND PERC-CONTAINING AUTOMOTIVE PRODUCTS SURVEY

(Please use extra sheets if necessary)

SECTION I. COMPANY INFORMATION

COMPANY NAME		ADDRESS		
DIVISION NAME				
CONTACT PERSON		CITY	STATE	ZIP
MANUFACTURER? ☐	DISTRIBUTOR? ☐	PHONE ( )	FAX ( )	
CHECK THE BOX IF THIS INFORMATION IS CONFIDENTIAL? ☐		E-MAIL ADDRESS		

SECTION II. BRAKE CLEANER PRODUCT INFORMATION (Please see attached instructions)

COLUMN 1	2	3	4	5	6	7
PRODUCT NAME	OWN PRODUCT LINE?	FORM	NET SIZE (Weight in ounces)	UNITS SOLD IN CALIFORNIA	INSTITUTIONAL/ INDUSTRIAL SALES (%)	RETAIL/ HOUSEHOLD SALES (%)

SECTION II. BRAKE CLEANER PRODUCT INFORMATION (Continued)

COLUMN 8	9	10	11	12	13
PRODUCT NAME	PERC CONTENT (Weight percent)	MEETS 50% VOC LIMIT?	WILL PRODUCT BE REFORMULATED	ESTIMATED REFORMULATION DATE	WILL PERC CONTENT INCREASE WITH REFORMULATION?

SECTION III. BRAKE CLEANER PRODUCT INFORMATION (For liquids only)

COLUMN 1	2	3	4	5	6	7
PRODUCT NAME	NET SIZE (Fluid oz. or gallons)	DENSITY(g/ml)/ SPECIFIC GRAVITY	IS THE PRODUCT DILUTED?	AMOUNT OF PRODUCT	AMOUNT OF DILUENT	TYPE OF DILUENT

SECTION IV. OTHER AUTOMOTIVE PRODUCTS CONTAINING PERC

COLUMN 1	2	3	4	5	6
PRODUCT CATEGORY	DO YOU MANUFACTURE A PRODUCT IN THIS CATEGORY?	DOES IT CONTAIN PERC?	WILL THE PRODUCT BE REFORMULATED?	ESTIMATED REFORMULATION DATE	WILL PERC CONTENT INCREASE WITH REFORMULATION?
Brake Anti-squeal compounds					
Bug and tar removers					
Carburetor and choke cleaners					
Engine Degreasers					
Lubricants (excluding engine oil)					
Penetrants					
Undercoatings					
Upholstery fabric cleaners					

SECTION V. OTHER COMMENTS

If you wish to designate any information contained in your survey data as **CONFIDENTIAL INFORMATION**, please provide the data requested below and return it with your completed survey form.

In accordance with Title 17, California Code of Regulations (CCR), Section 91000 to 91022, and the California Public Records Act (Government Code Section 6250 et seq.), the information that a company provides to the Air Resources Board (ARB) may be released (1) to the public upon request, except trade secrets which are not emissions data or other information which is exempt from disclosure or the disclosure of which is prohibited by law, and (2) to the Federal Environmental Protection Agency (EPA), which protects trade secrets as provided in Section 114(c) of the Clean Air Act and amendments thereto (42 USC 7401 et seq.) and in federal regulation, and (3) to other public agencies provided that those agencies preserve the protections afforded information which is identified as a trade secret, or otherwise exempt from disclosure by law (Section 39660(e)).

Trade secrets as defined in Government Code Section 6254.7 are not public records and therefore will not be released to the public. However, the California Public Records Act provides that air pollution emission data are always public records, even if the data comes within the definition of trade secrets. On the other hand, the information used to calculate information is a trade secret.

If any company believes that any of the information it may provide is a trade secret or otherwise exempt from disclosure under any other provision of law, **it must identify the confidential information as such at the time of submission to the ARB and must provide the name address, and telephone number of the individual to be consulted**, if the ARB receives a request for disclosure or seeks to disclose the data claimed to be confidential. The ARB may ask the company to provide documentation of its claim of trade secret or exemption at a later date. Data identified as confidential will not be disclosed unless the ARB determines, in accordance with the above referenced regulations, that the data do not qualify for a legal exemption from disclosure. The regulations establish substantial safeguards before any such disclosure.

In accordance with the provisions of Title 17, California Code of Regulations, Section 91000 to 91022, and the California Public Records Act (Government Code Sections 6250 et seq.),

Company Name: _____ declares that all the information submitted in response to the California Air Resources Board's information request on the brake cleaner and perc-containing automotive products survey is confidential "trade secret" information, and request that it be protected as such from public disclosure. All inquiries pertaining to the confidentiality of this information should be directed to the following person:

Date:_____ Mailing Address:

_____ (Signature) _____

_____ (Printed Name) _____

_____ (Title) _____

_____ (Telephone Number) _____

Survey 2. Brake/Automotive Repair Shop Survey

California Environmental Protection Agency

Air Resources Board

BRAKE/AUTOMOTIVE REPAIR SHOP SURVEY

Date:_____

Facility:_____

Address: _____

_____

Cross Street:_____

Contact:_____ Title:_____

Phone #:_____

SHOP DESCRIPTION

The approximate dimensions of the entire shop area, include units (m. or ft.). Interior dimensions include storage and other areas not partitioned off as separate rooms. Exterior dimensions include all connecting structures.:

Interior Height_____, Width_____, Length_____

Exterior Height_____, Width_____, Length_____

UTM from 1 corner:_____

Type(s) of ventilation used:

Wall fan ☐ Ceiling or exhaust fan ☐ open doors ☐ other_____

If fan is used give fan specifications (i.e. CFM, or horsepower & size)_____

Nominal Dimensions (include units)

Number and ave. size of servicing bays:_____ L_____ W_____

Number of normally open doors:_____ H_____ W_____

Number of normally open windows:_____ H_____ W_____

Number of normally open servicing bay doors:_____ H_____ W_____

Nearest offsite receptor distance (incl. units):

Business_____ UTM _____ Direction from facility (in degrees) _____

Residential_____UTM _____ Direction from facility (in degrees) _____

Distance from the facility building to the facility fence line_____

Provide a sketch of the facility, any adjoining structures (for example: if facility is attached to a strip mall or similar), orientation of the nearest receptor, and indicate the direction North):

SHOP DESCRIPTION (continued)

Normal business operating schedule (e.g. M-F 7am-7pm, Sat-Sun 10am-4pm):

_____

How many bays are used for brake services?_____

Are ventilation practices different between mild and inclement weather? Explain:

_____

_____

OPERATION DESCRIPTION

Number of employees:_____

Average number of employees in service area each day:_____

Number of people performing brake services each day:_____

Number of automotive services performed per week:_____

Number of automobiles requiring brake work per week:_____

Number of axles serviced per week:_____

Amount of time to perform a brake job (1 or 2 axles) _____

Are there Proposition 65 warnings posted?_____

Comments:_____

_____

PRODUCT INFORMATION

Number of different brake cleaning product(s) used:_____

Has the shop used any other type of brake cleaner? If so, what type of product was used? What was the outcome? Is there a preference of the type of product used?_____

_____

_____

If an aqueous type product is used, please list shop's reasons for using product (i.e. product cheaper, etc.)

_____

_____

_____

If an aqueous product is used, has drying time been a concern in the brake repairs? (Explain)

_____

_____

If an aerosol product is used, list the reasons or situations why the product is used instead of an aqueous product_____

_____

Are the brakes wiped with rags after using the aerosol spray?_____

If yes, how are the rags stored and disposed of?_____

If used, what is the approximate fate of all Perc usage (e.g. 50% air, 40% reclaimed for proper disposal, 9% sewer, 1% storm drain)_____

PRODUCT INFORMATION (continued)

Ask for a unit of the product(s) used to inspect the label; copy the following information:

1. Product name:_____

Manufacturer:_____

Address:_____ Phone #:_____

e-mail:_____

Part Number:_____ UPC Code: _____

size:_____ (fl oz., wt oz, gal.) Code date:_____

Product form: Aerosol ☐ Liquid ☐ Pump Spray ☐ Other_____

Active ingredients:_____

_____

% Perc:_____

Usage (application) information:_____

_____

_____

_____

_____

_____

_____

_____

Does the product require dilution ____ (Y / N)

Dilute _____ _____ of product into _____ _____ of
(amount product) **(units)** **(amount diluent)** **(units)**

_____ Apply with _____
(diluent used) **(application equipment used, wipe, spray bottle, etc.)**

Number of product units used per week by facility_____

Volume of diluted product used in a week_____

Number of cans aerosol used per brake job _____

Is the product used for any other application other than brakes? If so what other applications is it used for (i.e. general degreasing, etc.):_____

How often and how much of the product used for other purposes:_____

_____ (give time frame and amount used)

Did you see a demonstration of the product in use?_____

PRODUCT INFORMATION (continued)

Ask for a unit of the product(s) used to inspect the label; copy the following information:

2. Product name:_____

Manufacturer:_____

Address:_____ Phone #:_____

e-mail:_____

Part Number:_____ UPC Code: _____

size:_____ (fl oz., wt oz, gal.) Code date:_____

Product form: Aerosol ☐ Liquid ☐ Pump Spray ☐ Other_____

Active ingredients:_____

_____

% Perc:_____

Usage (application) information:_____

_____

_____

_____

_____

_____

_____

_____

Does the product require dilution ____ (Y / N)

Dilute _____ _____ of product into _____ _____ of
(amount product) **(units)** **(amount diluent)** **(units)**

_____ Apply with _____
(diluent used) **(application equipment used, wipe, spray bottle, etc.)**

Number of product units used per week by facility_____

Volume of diluted product used in a week_____

Number of cans aerosol used per brake job _____

Is the product used for any other application other than brakes? If so what other applications is it used for (i.e. general degreasing, etc.):_____

How often and how much of the product used for other purposes:_____

_____ (give time frame and amount used)

Did you see a demonstration of the product in use?_____

PRODUCT INFORMATION (continued)

Ask for a unit of the product(s) used to inspect the label; copy the following information:

3. Product name:_____

Manufacturer:_____

Address:_____ Phone #:_____

e-mail:_____

Part Number:_____ UPC Code: _____

size:_____ (fl oz., wt oz, gal.) Code date:_____

Product form: Aerosol ☐ Liquid ☐ Pump Spray ☐ Other_____

Active ingredients:_____

_____

% Perc:_____

Usage (application) information:_____

_____

_____

_____

_____

_____

_____

_____

Does the product require dilution ____ (Y / N)

Dilute _____ _____ of product into _____ _____ of
(amount product) **(units)** **(amount diluent)** **(units)**

_____ Apply with _____
(diluent used) **(application equipment used, wipe, spray bottle, etc.)**

Number of product units used per week by facility_____

Volume of diluted product used in a week_____

Number of cans aerosol used per brake job _____

Is the product used for any other application other than brakes? If so what other applications is it used for (i.e. general degreasing, etc.):_____

How often and how much of the product used for other purposes:_____

_____ (give time frame and amount used)

Did you see a demonstration of the product in use?_____

General comments/observations:

Survey 3. Automotive Service Facility Questionaire

California Environmental Protection Agency

Air Resources Board

AUTOMOTIVE SERVICE FACILITY QUESTIONNAIRE

(Please type or print legibly in ink)

I. LABEL AND CONTACT INFORMATION

The peel-off label on your envelope is designed to speed questionnaire processing. Please cross out any errors in your facility name or address, print the correct information on the label, and affix it to Section I. where indicated. If the label has been damaged, you may print or type the information requested. Additionally, please enter your phone number and a contact person in the space provided.

Affix the ARB label provided on the envelope here.

FACILITY NAME:	
ADDRESS:	
CITY:	ZIP:

CONTACT PERSON:
PHONE ( )

II. SOLVENT USAGE INFORMATION

Do you use brake cleaners, engine degreasers, carburetor cleaners, or multi-purpose lubricants in your facility?

NO ☐ **STOP**; Ensure Section I. is complete and return the survey package to us in the enclosed envelope.

YES ☐ **CONTINUE**; Proceed to Section III.

III. GENERAL PRODUCT INFORMATION

Indicate the average number of brake jobs your facility performs each week and the amount of product used for each brake job. For aerosols, usage will be in cans per job; for bulk liquids, usage will be in ounces per job. Also indicate whether you use a water-based brake washer for brake parts cleaning (e.g., Safety-Kleen, Ammco, Bird Bath, etc.) The sections below ask more specific questions about the products you use.

Approximately how many brake jobs does your facility perform each week? _____

If aerosol cans are used, approximately how many cans are used per brake job? _____

If bulk liquid brake cleaners are used, approximately how many ounces are used per brake job? _____

Do you use a water-based brake washer? Yes ☐ No ☐

IV. AEROSOL BRAKE CLEANER INFORMATION

- For each aerosol brake cleaning product your facility uses, list the product name, manufacturer (for example: Berryman, CRC, Radiator Specialty Corp., etc.) and product size (in ounces) as listed on the product label.

  Enter the 12 digit number located at the bottom of the bar code (the numbers circled in the example to the right). Be sure to include the single digits to the left and right of the bars. ***If the product label does not have a bar code, please enter the part number, if available.***

Bar Code Example:

232

IV. AEROSOL BRAKE CLEANER INFORMATION (continued)

- Estimate how many cans of product the facility uses each week. ***Your estimate should include all product used, even if the product is used for other purposes such as general purpose cleaning.***

PRODUCT NAME	MANUFACTURER	PRODUCT SIZE (oz.)	12 DIGIT BAR CODE NUMBER OR PART NUMBER	NUMBER OF CANS USED PER WEEK

V. BULK LIQUID BRAKE CLEANER INFORMATION

Complete this section for bulk liquid brake cleaners. Fill out the information the same way as for Section IV., but in column 3 - PRODUCT SIZE, list the volume of the product in **gallons** and in column 5 - AMOUNT USED PER MONTH, list the average amount of product used in **gallons** per month.

PRODUCT NAME	MANUFACTURER	PRODUCT SIZE (gal.)	12 DIGIT BAR CODE NUMBER OR PART NUMBER	AMOUNT USED PER MONTH

VI. AEROSOL AUTOMOTIVE PRODUCTS

Complete this section for engine degreasers, carburetor cleaners, and multi-purpose lubricants used by your facility and not listed in Section IV. Fill out the information the same way as for Section IV. Please make additional copies of the survey form if more space is needed.

PRODUCT NAME	MANUFACTURER	PRODUCT SIZE (oz.)	12 DIGIT BAR CODE NUMBER OR PART NUMBER	NUMBER OF CANS USED PER WEEK

Do you wish to be notified of upcoming workshops/meetings? **YES** ☐ **NO** ☐

Please mail your questionnaire back to us in the enclosed business reply envelope by January 27, 1998. If have any questions on the questionnaire or the information we have requested, please contact Mark Willi f the Air Resources Board staff at (916) 327-5633.

(12/97)

Survey 4. Vehicle Maintenance and Repair Facility Flammability Survey

California Environmental Protection Agency

Air Resources Board

VEHICLE MAINTENANCE AND REPAIR FACILITY FLAMMABILITY SURVEY

Date:_____

Facility:_____

Address: _____

_____

Contact:_____ Title:_____

Phone #:_____

GENERAL INFORMATION

Do any of the employees smoke while performing vehicle maintenance or repair? Yes ☐ No ☐

Types of ignition sources (flame or heat) within facility:

Welding ☐ Torch ☐ Propane space heater ☐ Lit cigarettes ☐ AC Leak sensor w/ flame ☐

Fan-forced portable space heater ☐ other_____

Specific ventilation practices associated with use of ignition (flame or heat) sources:
Wall fan ☐ Ceiling or exhaust fan ☐ open doors ☐ other_____

If an ignition source is present (flame or heat), what is the general proximity of the source to where automotive consumer products are being used? (feet, next bay, etc.) _____

_____

Number of different automotive cleaning product(s) used:_____

Have there been any accidents or incidents related to the use of flammable products?
Yes ☐ No ☐
If yes, state number and explain incident(s):_____

_____

_____

For the different type of automotive products used in the facility, has product flammability ever been a factor in choosing one product over another? Yes ☐ No ☐
If yes, why?:_____

_____

_____

PRODUCT INFORMATION

Ask for a unit of the product(s) used to inspect the label; copy the following information:

1. Product Type:
   ☐ Brake Cleaner ☐ Carburetor Cleaner ☐ Engine Degreaser ☐ General Degreaser
   ☐ Other:_____
   Product name:_____
   Manufacturer:_____
   Part # or UPC code:_____
   Product form: Aerosol ☐ Liquid ☐ Pump Spray ☐ Other_____
   Listed on label as Flammable? Yes ☐ No ☐
   Chlorinated? Yes ☐ No ☐
   Notes:_____
   _____

2. Product Type:
   ☐ Brake Cleaner ☐ Carburetor Cleaner ☐ Engine Degreaser ☐ General Degreaser
   ☐ Other:_____
   Product name:_____
   Manufacturer:_____
   Part # or UPC code:_____
   Product form: Aerosol ☐ Liquid ☐ Pump Spray ☐ Other_____
   Listed on label as Flammable? Yes ☐ No ☐
   Chlorinated? Yes ☐ No ☐
   Notes:_____
   _____

3. Product Type:
   ☐ Brake Cleaner ☐ Carburetor Cleaner ☐ Engine Degreaser ☐ General Degreaser
   ☐ Other:_____
   Product name:_____
   Manufacturer:_____
   Part # or UPC code:_____
   Product form: Aerosol ☐ Liquid ☐ Pump Spray ☐ Other_____
   Listed on label as Flammable? Yes ☐ No ☐
   Chlorinated? Yes ☐ No ☐
   Notes:_____
   _____

4. Product Type:

☐ Brake Cleaner ☐ Carburetor Cleaner ☐ Engine Degreaser ☐ General Degreaser
☐ Other:_____
Product name:_____
Manufacturer:_____
Part # or UPC code:_____
Product form: Aerosol ☐ Liquid ☐ Pump Spray ☐ Other_____
Listed on label as Flammable? Yes ☐ No ☐
Chlorinated? Yes ☐ No ☐
Notes:_____

5. Product Type:

☐ Brake Cleaner ☐ Carburetor Cleaner ☐ Engine Degreaser ☐ General Degreaser
☐ Other:_____
Product name:_____
Manufacturer:_____
Part # or UPC code:_____
Product form: Aerosol ☐ Liquid ☐ Pump Spray ☐ Other_____
Listed on label as Flammable? Yes ☐ No ☐
Chlorinated? Yes ☐ No ☐
Notes:_____

General comments/observations:_____

Appendix C

Methodology for Estimating the Potential Health Impacts from Automotive Maintenance and Repair Facilities

Appendix C. Methodology for Estimating the Potential Health Impacts from Automotive Maintenance and Repair Facilities

This appendix steps through an example calculation to illustrate the procedures that ARB staff used to estimate the potential health impacts from Perchloroethylene (Perc), Methylene Chloride (MeCl), and Trichloroethylene (TCE) usage in aerosol brake cleaning products at automotive maintenance and repair (AMR) facilities. In order to estimate the impacts, product usage information, physical descriptions of the source, and emission release parameters were collected during site visits. This information is used to estimate the facility's Perc, MeCl, and TCE emission rates and to model the facility's emissions using the SCREEN3 and ISCST3 air dispersion models. The modeling results are then used to determine the potential health impacts. The information in this appendix should not be used to compare in any way the SCREEN3 and ISCST3 air dispersion models or their results.

ARB staff used the Brake/Automotive Repair Shop survey form in Appendix B to collect the necessary information to model each facility's potential health impacts. The more pertinent information collected includes the facility's building dimensions, distance to the nearest residential and business receptors, the operating schedule of the service area, and information about the products and their use in brake cleaning. This example calculation uses data collected from one of the site visits and focuses only on Perc emissions to illustrate the methodology.

A. Chronic and Acute Calculations

The calculation begins with the determination of the facility's Perc usage and Perc emission rate, steps through the modeling inputs, and concludes with the calculation of potential health impacts. For our example, we have selected a minimum receptor distance of 32 meters from the center of the volume source (the building) to define a near-source location. For ease of illustration, we assume that both the maximum exposed individual resident (MEIR) and the maximum exposed individual (offsite) worker (MEIW) occur at this location.

1. Determining a Facility's Perc Usage

In order to determine a facility's Perc usage, the following information is needed: the weight percent of Perc in the brake cleaning product, the approximate number of product units used per week, and the weight of the product unit itself. Our example facility was using 19 ounce cans of aerosol product with a 94 percent Perc content by weight and they reported using an average of 624 cans of product each year. The weight percent is obtained either directly from the product label or from the material safety data sheet (MSDS) for the product. The Perc usage in terms of grams per year is given by Equation 1.

$$(1) \quad \left(19 \begin{matrix} ounces\ of \\ product\ per \\ can \end{matrix}\right)\left(\frac{624\ cans}{year}\right)\left(\frac{28.35\ grams}{ounce}\right)\left(94\% \begin{matrix} Perc \\ Content \end{matrix}\right) = 315{,}951\ grams/year$$

It should be noted that MeCl and TCE usage can be calculated by substituting in their corresponding percent content by weight in place of Perc in Equation 1.

2. Determining the Perc Emission Rate

With the Perc usage calculated, we now estimate the acute and annualized emission rates in terms of grams per second. These conversions are necessary because they are required input parameters for the SCREEN3 and ISCST3 models. The acute emission rate is determined by calculating the emissions from the number of brake jobs that are performed each hour by the facility. Based on information collected from the site visits, the facilities visited did not perform more than one brake service (job) in any given hour (usually limited by available manpower, tools, and equipment). Our example facility reported that they performed approximately 624 brake services per year (12 services per week). Using this information, Equation 2 calculates the acute emission rate.

$$(2) \quad \begin{matrix} Emission\ Rate \\ (Acute) \end{matrix} = \left(\frac{315{,}951\ grams}{year}\right)\left(\frac{year}{624\ jobs}\right)\left(\frac{1\ job}{hour}\right)\left(\frac{1\ hour}{3600\ secs}\right) = 0.1407\ grams/\text{sec}$$

The annualized Perc emission rate is determined by dividing the Perc usage calculated by Equation 1 by the facility's reported operating schedule. Our example facility reported that their service area operated 3016 hours per year. Using this information, Equation 3 gives the annualized emission rate uniformly distributed over the operating schedule.

$$(3) \quad \begin{matrix} Emission\ Rate \\ (Annualized) \end{matrix} = \left(\frac{315{,}951\ grams}{year}\right)\left(\frac{year}{3016\ hours}\right)\left(\frac{1\ hour}{3600\ secs}\right) = 0.0291\ grams/\text{sec}$$

3. Air Dispersion Modeling

a. Running the SCREEN3 Air Dispersion Model

Now that we know the facility's acute and annualized Perc emission rates, physical descriptions of the source, and emission release parameters, we can run the SCREEN3 air dispersion model. Table C-1 summarizes the modeling input parameters for this example. For the AMR facilities, we assumed that the single-story source release height is one-half of the building height. The initial lateral dimension of volume is assumed to be the shortest side of the building exterior divided by the factor 4.3 and the initial vertical dimension of volume is assumed to be the exterior building height divided by the factor 2.15 (U.S. EPA, 1995a). These particular dimension assumptions were selected to represent a modeling scenario that can be generally applied to various sized (e.g., rectangular) AMR facilities. Our example facility is located in an urban area.

Table C-1. SCREEN3 Modeling Input Parameters for Example Facility

Perc Emission Rate (acute) [grams/s]	0.1407
Perc Emission Rate (annualized) [grams/s]	0.0291
Receptor Height [meters][1]	0
Source Release Height [meters][2]	2.3
Initial Lateral Dimension of Volume (σ_{yo}) [meters][3]	2.5
Initial Vertical Dimension of Volume (σ_{zo}) [meters][4]	2.1
Meteorology Option	Full (Acute)/Class 4 (Annual)
Land Type (Urban or Rural)	Urban
Receptor Distance (from center of source)	32
Operating Schedule [hrs/yr]	3016

1. Selected by convention as a ground-level receptor.
2. One-half of building height (15 feet, 4.6 meters)
3. Exterior building width (35 feet, 10.7 meters) divided by factor 4.3 per SCREEN3 User's Guide
4. Exterior building height (15 feet, 2.1 meters) divided by factor 2.15 per SCREEN3 User's Guide

The SCREEN3 model uses these inputs to estimate the downwind, ground-level, maximum 1-hour concentrations for designated distances from the center of the volume source. The estimated acute maximum 1-hour concentration at 32 meters from the center of the facility is 1463 $\mu g/m^3$ and the estimated annualized (chronic) 1-hour concentration is 176 $\mu g/m^3$. It should be noted that the SCREEN3 model must be run twice; once using the acute emission rate and once using the annualized emission rate.

Since potential cancer risks and non-cancer chronic health impacts require an assessment of the annual average concentration of Perc, the U.S. EPA conversion factor of 0.08 (U.S. EPA, 1992) is used to estimate the maximum annual average concentration from the annualized maximum 1-hour concentration. In addition, the maximum annual average concentration is discounted by the operating schedule for the hours the facility does not emit. The maximum annual average concentration is calculated by using Equation 4.

$$\text{(4)} \qquad \begin{matrix} \textit{Max Ann. Avg.} \\ \textit{Concentration} \end{matrix} = \begin{pmatrix} \textit{Maximum 1-hr} \\ \textit{Concentration} \\ \textit{(annualized)} \end{pmatrix} \begin{pmatrix} \textit{Operating} \\ \textit{Schedule} \\ \textit{[hours/year]} \end{pmatrix} \left(\frac{\textit{year}}{8760\ \textit{hours}} \right) 0.08$$

Substituting in the example data, Equation 5 gives the maximum annual average concentration of 4.848 $\mu g/m^3$.

$$\text{(5)} \qquad \begin{matrix} \textit{Max Ann. Avg.} \\ \textit{Concentration} \end{matrix} = \left(176\ \frac{\mu g}{m^3} \right) \left(3016\ \frac{\textit{hours}}{\textit{year}} \right) \left(\frac{1\ \textit{year}}{8760\ \textit{hours}} \right) 0.08 = 4.848\ \mu g/m^3$$

A summary of the output from the SCREEN3 modeling is shown in Appendix D (Modeling Results). For more information on the SCREEN3 model, please refer to the SCREEN3 model user's guide (U.S. EPA, 1995).

b. Running the ISCST3 Air Dispersion Model Using Regional-Specific Meteorology

Where regional-specific meteorology information is available, the ISCST3 air dispersion model can be used to provide a more refined analysis of a facility's emissions. Table C-2 summarizes the modeling input parameters for this example using the same example facility and source characteristic assumptions made for SCREEN3.

With ISCST3, you have the option of using a meteorological data set that represents the meteorology in the region the facility is located in. As a result, SCREEN3 and ISCST3 may not necessarily yield the same results for a given facility. In order to estimate what the difference would be, both models would need to be run and compared bearing in mind that each models treats the volume source differently. It should be noted that the ISCST3 model must also be run twice if discrete annual and acute emission rates are being used. While this approach is convenient with the SCREEN3 model, the ISCST3 model is considerably more resource intensive and time consuming to execute. Modeling scenarios under ISCST3 can be greatly simplified if an emission rate of 1 gram per second is used (commonly referred to as an unit emission rate).

Table C-2. ISCST3 Modeling Input Parameters for Example Facility Using Regional-Specific Meteorology

Perc Emission Rate (acute) [grams/s]	0.1407
Perc Emission Rate (annual) [grams/s]	0.0291
Modeled Unit Emission Rate [grams/s]	1.0
Receptor Height [meters][1]	0
Source Release Height [meters][2]	2.3
Initial Lateral Dimension of Volume (σ_{yo}) [meters][3]	4.7
Initial Vertical Dimension of Volume (σ_{zo}) [meters][3]	2.1
Averaging Period	Hourly and Annual
Meteorology	Representative Regional
Land Type (Urban or Rural)	Urban
Receptor Locations	Cartesian Grid Network[4]
Receptor Distance (from center of source)	32
Operating Schedule [hrs/yr]	3016

1. Selected by convention as a ground-level receptor.
2. One-half of building height (15 feet, 4.6 meters)
3. Calculated per ISCST3 User's Guide
4. See Appendix D, Section X., Table 2.

With the unit emission rate, the estimated annual and acute unit concentrations are 113 $\mu g/m^3$ and 5027 $\mu g/m^3$, respectively. Equation 6 is then used to calculate the concentrations for the discrete emission rate scenarios given in Equations 2 and 3.

(6)
$$\begin{matrix}\textit{Scenario}\\ \textit{Concentration}\\ (\textit{Annual/Acute})\end{matrix} = \begin{pmatrix}\textit{Unit}\\ \textit{Concentration}\\ (1.0\ g/s)\end{pmatrix}\begin{pmatrix}\textit{Scenario}\\ \textit{Emission Rate}\\ (\textit{Annual/Acute})\end{pmatrix}$$

Substituting in the emission rates from Equation 2 and 3, Equations 7 and 8 give the maximum annual concentration of 3.288 $\mu g/m^3$ and the maximum 1-hour (acute) concentration of 707 $\mu g/m^3$.

(7)
$$\begin{matrix}\textit{Maximum}\\ \textit{Concentration}\\ (\textit{Annual})\end{matrix} = \left(113\ \frac{\mu g}{m^3}\right)\left(\frac{\sec}{1.0\ gram}\right)\left(0.0291\ \frac{grams}{\sec}\right) = 3.288\ \mu g/m^3$$

(8) $$\begin{matrix} Maximum \\ Concentration \\ (Acute) \end{matrix} = \left(5027\ \frac{\mu g}{m^3}\right)\left(\frac{\sec}{1.0\ gram}\right)\left(0.1407\ \frac{grams}{\sec}\right) = 707\ \mu g/m^3$$

Since ISCST3 directly calculates the maximum annual and acute concentrations using the facility's operating schedule when using regional-specific meteorology, neither the 0.08 conversion factor adjustment nor the operating schedule adjustment is required.

c. Running the ISCST3 Air Dispersion Model Using Default Meteorology

If regional-specific meteorological data is not available, the ISCST3 model can be run using default meteorological data. The model inputs are substantially similar to those required for regional meteorological data and are summarized in Table C-3.

Table C-3. ISCST3 Modeling Input Parameters for Example Facility Using Default Meteorology

Perc Emission Rate (acute) [grams/s]	0.1407
Perc Emission Rate (annual) [grams/s]	0.0291
Receptor Height [meters][1]	0
Source Release Height [meters][2]	2.3
Initial Lateral Dimension of Volume (σ_{yo}) [meters][3]	4.7
Initial Vertical Dimension of Volume (σ_{zo}) [meters][3]	2.1
Meteorology	Default
Land Type (Urban or Rural)	Urban
Receptor Locations	Cartesian Grid Network
Receptor Distance (from center of source)	32
Operating Schedule [hrs/yr]	3016

1. Selected by convention as a ground-level receptor.
2. One-half of building height (15 feet; 4.6 meters)
3. Calculated per ISCST3 User's Guide

When using default meteorological data, ISCST3 calculates only a maximum 1-hr (acute) concentration instead of both acute and annual concentrations. Under this scenario, again using a unit emission rate, the estimated acute unit concentration is 7845 $\mu g/m^3$ at 32 meters from the

center of the facility. Equation 6 is again used to calculate the concentrations for the acute emission rate given in Equation 2. Substituting in the acute emission rate from Equation 2, Equation 9 gives the maximum 1-hour (acute) concentration of 1104 μg/m³.

(9) $$\begin{matrix}\textit{Maximum}\\ \textit{Concentration}\\ (\textit{Acute})\end{matrix} = \left(7845\ \frac{\mu g}{m^3}\right)\left(\frac{\text{sec}}{1.0\ gram}\right)\left(0.1407\ \frac{grams}{\text{sec}}\right) = 1104\ \mu g/m^3$$

The maximum annual concentration is calculated by using U.S. EPA conversion factor 0.08 (U.S. EPA, 1992) and adjusting the operating schedule for the hours the facility does not emit, as described by Equation 4. However, the annualized maximum 1-hour concentration must first be calculated as shown in Equation 10. Using Equation 4 with the result from Equation 10, Equation 11 gives the maximum annual average concentration of 6.280 μg/m³.

(10) $$\begin{matrix}\textit{Maximum 1-hr}\\ \textit{Concentration}\\ (\textit{Annulized})\end{matrix} = \left(7845\ \frac{\mu g}{m^3}\right)\left(\frac{\text{sec}}{1.0\ gram}\right)\left(0.0291\ \frac{grams}{\text{sec}}\right) = 228\ \mu g/m^3$$

(11) $$\begin{matrix}\textit{Maximum}\\ \textit{Concentration}\\ (\textit{Annual})\end{matrix} = \left(228\ \frac{\mu g}{m^3}\right)\left(3016\ \frac{hours}{year}\right)\left(\frac{1\ year}{8760\ hours}\right)\ 0.08 = 6.280\ \mu g/m^3$$

A summary of the output from the ISCST3 modeling is shown in Appendix D (Modeling Results). For more information on the ISCST3 model, please refer to the ISCST3 model user's guide (U.S. EPA, 1995b).

4. Calculation of Potential Cancer Risk and Non-Cancer Acute and Chronic Hazard Indices

In this example, SCREEN3 and the two ISCST3 calculations predicted slightly different maximum concentrations. While either of the three can be used to calculate the potential health impacts, the example calculation will continue with the estimated concentrations from the ISCST3 model using regional-specific meteorological data. We can combine the modeling output with the unit risk factor (cancer effects) or the reference exposure level (non-cancer effects) to determine the potential cancer risk and corresponding acute and chronic hazard indices. The risk assessments are conducted using guidance from the California Air Pollution Control Officers Association (CAPCOA), Revised 1992, Air Toxic "Hot Spots" Program Risk Assessment Guidelines (CAPCOA, 1993). For this example, we calculated the potential cancer

and non-cancer health impacts at a near-source location of 32 meters from the center of the volume source (five meters away from the edge of the building). We also assumed that a MEIR (resident) and a MEIW (worker) are exposed to the same concentration. The inhalation unit risk factor (URF) for Perc is $5.9 \times 10^{-6}\,(\mu g/m^3)^{-1}$; the acute non-cancer reference exposure level (REL) is $20.0 \times 10^3\ \mu g/m^3$ and the chronic REL is $35\ \mu g/m^3$ (CAPCOA, 1993). Equation 12 shows the basic algorithm for determining the potential cancer risk, in chances per million, for a residential location (MEIR).

(12)
$$\begin{matrix}\textit{Cancer Risk}\\ \textit{(Resident)}\end{matrix} = \left(\begin{matrix}\textit{Max. Ann. Avg.}\\ \textit{Concentration}\end{matrix}\right)(URF)\left(\frac{10^6}{\textit{million}}\right)$$

The factor 10^6/million is used to convert the result into the standard reporting unit, chances per million. Substituting in the maximum annual average concentration from Equation 7 and the Perc URF, Equation 13 gives us the potential cancer risk for a residential receptor 32 meters away from the center of the building.

(13)
$$\begin{matrix}\textit{Cancer Risk}\\ \textit{(Resident)}\end{matrix} = \left(3.288\ \frac{\mu g}{m^3}\right)\left(5.9\ x\ 10^{-6}\frac{m^3}{\mu g}\right)\left(\frac{10^6}{\textit{million}}\right) = 19.4\ \textit{chances per million}$$

Equation 14 gives the formula for calculating the potential risk for an off-site worker (MEIW). Using guidance from OEHHA, the exposure period of an off-site worker is adjusted to allow for a shorter working lifetime and a shorter operating schedule. This first adjustment is made to allow for a shorter working lifetime, 46 years, rather than a 70-year exposure lifetime which is assumed for residential exposure. The second adjustment is appropriate only when the offsite worker schedule does not coincide with or is shorter than that of the facility being assessed (OEHHA, 1997). It is assumed that a nearby worker would be exposed 8 hours a day, 240 days a year (1920 hours/year) for 46 years (CAPCOA, 1993).

(14)
$$\begin{matrix}\textit{Cancer Risk}\\ \textit{(Worker)}\end{matrix} = \left(\begin{matrix}\textit{Max Ann. Avg.}\\ \textit{Concentration}\end{matrix}\right)(URF)\left(\frac{\begin{matrix}\textit{Offsite Worker Coincident}\\ \textit{Operating Schedule [hr/yr]}\end{matrix}}{\begin{matrix}\textit{Facility Operating}\\ \textit{Schedule [hr/yr]}\end{matrix}}\right)\left(\frac{\begin{matrix}\textit{46-year}\\ \textit{Working Lifetime}\end{matrix}}{\begin{matrix}\textit{70-year}\\ \textit{Residential Lifetime}\end{matrix}}\right)\left(\frac{10^6}{\textit{million}}\right)$$

Substituting in the maximum annual average concentration from Equation 7, the URF, and the operating schedule (3016 hours per year, for this example), Equation 15 gives the risk for an offsite worker.

(15)
$$\begin{matrix}\textit{Cancer Risk}\\ \textit{(Worker)}\end{matrix} = \left(3.288\ \frac{\mu g}{m^3}\right)\left(5.9x10^{-6}\ \frac{m^3}{\mu g}\right)\left(\frac{1920\ \textit{hrs/yr}}{3016\ \textit{hrs/yr}}\right)\left(\frac{46}{70}\ \frac{\textit{years}}{\textit{years}}\right)\left(\frac{10^6}{\textit{million}}\right) = 8.1\ \begin{matrix}\textit{chances}\\ \textit{per million}\end{matrix}$$

Equations 16 and 17 give the formulas for calculating the non-cancer acute and chronic hazard indices, respectively. The acute hazard index is determined by taking the acute maximum 1-hour concentration (acute exposure) and dividing by the acute REL of 20,000 μg/m³.

(16) $$\text{Acute Hazard Index} = \frac{\left(\text{Maximum 1-hr. Concentration (Acute)}\right)}{\left(\text{Acute REL}\right)}$$

(17) $$\text{Chronic Hazard Index} = \frac{\left(\text{Max. Ann. Avg. Concentration}\right)}{\left(\text{Chronic REL}\right)}$$

Similarly, the chronic hazard index is determined by taking the maximum annual average concentration (chronic exposure) and dividing by the chronic REL of 35 μg/m³. Finally, Equations 18 and 19 solve for the acute and chronic hazard indices, respectively.

(18) $$\text{Acute Hazard Index} = \frac{\left(707\ \frac{\mu g}{m^3}\right)}{\left(20000\ \frac{\mu g}{m^3}\right)} = 0.035$$

(19) $$\text{Chronic Hazard Index} = \frac{\left(3.288\ \frac{\mu g}{m^3}\right)}{\left(35\ \frac{\mu g}{m^3}\right)} = 0.094$$

Tables C-3 summarizes the results that have been calculated in this example for ISCST3 using regional-specific meteorology.

Table C-3. Summary of ISCST3 Results from Example Calculation

Parameter	Result	Reference
Perc Emission Rate (acute), [grams/s]	0.1407	Equation 2
Perc Emission Rate (annualized) [grams/s]	0.0291	Equation 3
Maximum Concentration (unit annual), [μg/m³]	113	ISCST3 Model Output
Maximum Concentration (unit acute), [μg/m³]	5027	ISCST3 Model Output
Maximum Concentration (annual) , [μg/m³]	3.288	Equation 7
Maximum Concentration (acute), [μg/m³]	707	Equation 8
Cancer Risk (Resident) [chances per million]	19.4	Equation 13
Cancer Risk (Worker) [chances per million]	8.1	Equation 15
Non-Cancer Acute Hazard Index	0.035	Equation 18
Non-Cancer Chronic Hazard Index	0.094	Equation 19

As previously mentioned, this methodology can be extended to MeCl and TCE (or any other pollutant of interest) by using Equation 1 to calculate MeCl and TCE emission rates. Additionally, the URF and acute and chronic RELs for these toxic pollutants will also be needed. Table C-4 summarizes the necessary health values. A summary of results from the modeling performed on each of the facilities visited, as well as the generic facilities, is presented in Appendix D.

Table C-4. Pollutant-Specific Health Values

Pollutant	Unit Risk Factor (URF)	Acute Reference Exposure Level	Chronic Reference Exposure Level
Perchloroethylene (Perc)	5.9×10^{-6} $(\mu g/m^3)^{-1}$	20,000 $\mu g/m^3$	35 $\mu g/m^3$
Methylene Chloride (MeCl)	1.0×10^{-6} $(\mu g/m^3)^{-1}$	14,000 $\mu g/m^3$	3000 $\mu g/m^3$
Trichloroethylene (TCE)	2.0×10^{-6} $(\mu g/m^3)^{-1}$	none	640 $\mu g/m^3$

B. Calculation of the Regional Cancer Risk from Specific Facilities

To perform an assessment of the potential regional cancer risk at the thirteen specific facilities an assessor would start by running a refined air dispersion model. For this analysis, concentration estimates were produced using ISCST3 and multiple years of meteorological data. An example of the input for the ISCST3 model is provided in Table C-2.

The output from the ISCST3 model consists of concentrations at specified locations around a facility that can be referred to as a grid of receptor points. Based on the spatial resolution of the available population data and existing software tools, a 31-kilometer by 31-kilometer system of one-kilometer, square grid-cells was established for each facility as a spatial basis of analysis. Each grid system is centered on the represented facility.

After the modeling is complete, further post processing is performed to produce one concentration estimate per grid-cell. Two receptor networks were used for estimating concentrations with ISCST3 (at each receptor a concentration, exclusive to each facility's emissions, is estimated). One network consists of receptors spaced one-kilometer apart, coincident with the center of each of the one-kilometer, square grid-cells in the 31-kilometer by 31-kilometer grid system. These sparsely spaced receptors are used to represent the homogeneous, low grid-cell concentrations experienced outside of the 9 most central grid-cells where concentrations tend to be less uniform. However, because a large concentration gradient is experienced close to the source (i.e., inhomogeneous emissions), a network consisting of many receptors per grid-cell (100 meters apart) was used. Concentrations estimated at these receptors were averaged, per grid-cell, to produce average concentrations for the nine most central cells.

Census tract population data were acquired from the State Department of Finance. Spatially, this data represents California census tract population estimates for 1998, grown from 1990 Census data. A census tract, generally, represents an area larger than one square kilometer. Data processing of population data took into consideration that grid-cell boundaries overlap with census tract boundaries. Where multiple grid-cells split a census block population estimate, the population data for the single census tract is allocated based on the relative area of the census tract falling in each grid-cell. This is consistent with past population exposure analyses and assumes a homogeneous distribution of population within the tract.

Population data and modeled concentration results were processed to represent the average population and average concentration within each of the one-kilometer square grid-cells in the 31-kilometer by 31-kilometer grid system. The averaged population and concentration data for each grid-cell were overlaid. The concentration and population estimates were then merged based on the represented grid-cell and frequency distributions of the regional population exposure to each of the annual modeling results were created, based on a uniform range of receptor concentrations. See Appendix D, Section E for a complete listing of all thirteen facilities population exposure estimates and Table C-5 for an example.

In Table C-5, the left column presents the modeled annual concentration estimate based on a unit emission rate of one gram per second and the next 6 columns present the estimated population exposed to that concentration per meteorology year. In this example, the five columns right of the concentration are for Oakland 1960 to 1964. The last column is the average population surrounding this facility in Oakland over the years 1960 to 1964.

For example, the results from Table C-5 indicate that within one-kilometer of this facility, on average, 5,843 persons are estimated to be exposed to concentrations of 0.163 $\mu g/m^3$ up to 6.28 $\mu g/m^3$ (based on a one gram per second emissions rate) using Oakland meteorological data for years 1960 through 1964.

To make this table more meaningful, the unit emission rates can be converted to potential cancer risk estimates. To perform this calculation the additional information that is needed is actual emission rate for the facility being evaluated and the pollutant-specific unit risk factor (URF). From Table C-3, the annual emission rate for this facility is 0.0291 grams per second. See Appendix D for a listing of the emission rates used for each modeled facility. The URF for Perc is 5.9×10^{-6} (microgram per cubic meter)$^{-1}$ or $(\mu g/m^3)^{-1}$. Equation 20 shows the algorithm for converting a unit emission rate into an estimate of the potential cancer risk reported in chances per million.

$$\text{(20)} \qquad \textit{Cancer Risk} = \begin{pmatrix} \textit{Facility-Specific} \\ \textit{Annual Emissions} \\ \textit{Rate} \end{pmatrix} \begin{pmatrix} \textit{Modeled Annual} \\ \textit{Average} \\ \textit{Concentration} \end{pmatrix} (URF) \left(\frac{10^6}{\textit{million}} \right)$$

Table C-5. Example Table of Population Exposure Estimates

µg/m³ >=	OAK60	OAK61	OAK62	OAK63	OAK64	AVG
0.000	1,300,824	1,300,824	1,300,824	1,300,824	1,300,824	1,300,824
0.001	593,781	610,692	638,801	610,352	618,981	614,521
0.003	377,141	385,071	401,672	391,357	423,603	395,769
0.004	268,996	281,562	283,035	268,881	312,438	282,982
0.006	192,742	203,315	220,437	216,063	234,450	213,401
0.007	176,510	174,360	181,645	165,209	194,184	178,382
0.009	132,661	143,847	149,503	143,106	142,784	142,380
0.010	112,796	115,642	119,774	119,184	131,794	119,838
0.011	103,975	106,927	105,949	105,949	119,588	108,478
0.013	95,571	90,808	99,529	100,217	95,886	96,402
0.014	87,623	86,550	91,753	78,587	87,623	86,427
0.016	80,258	69,719	87,623	70,114	79,699	77,483
0.017	59,443	61,804	61,804	66,517	67,676	63,449
0.020	56,185	58,546	54,494	63,259	55,002	57,497
0.024	52,133	52,133	52,133	56,185	44,033	51,323
0.031	38,289	42,785	38,289	42,785	38,289	40,087
0.041	29,615	33,907	33,907	33,907	29,615	32,190
0.047	25,101	25,101	25,101	25,101	25,101	25,101
0.054	12,008	12,008	20,702	16,407	20,702	16,365
0.163	4,302	4,302	12,008	4,302	4,302	5,843

The factor 10^6/million in Equation 20 is used to convert the result into the standard reporting unit, chances per million. Substituting in the facility's actual emission rate from Table C-3, the maximum annual average concentration from the left hand column of Table C-5, and the Perc URF, Equation 21 gives us the potential cancer risk for the population estimates listed in the right six columns.

(21) $$Cancer\ Risk = (0.0291)(0.163)\left(5.9 \times 10^{-6}\frac{m^3}{\mu g}\right)\left(\frac{10^6}{million}\right) = 0.03\ chances\ per\ million$$

Returning to the earlier example from Table C-5, where the results indicate that within one-kilometer of this facility, on average, 5,843 persons are estimated to be exposed to concentrations of 0.163 $\mu g/m^3$ to 6.28 $\mu g/m^3$, we now see that this unit-emissions-based concentration translates to an estimated cancer risk of 0.03 chances per million to 19 chances per million. See Table VI-6 in Chapter VI for a list of the estimated regional cancer risks for the one-kilometer grid-cell concentrations at all thirteen specific facilities.

Although the potential cancer risk from the one-kilometer grid-cell concentration is not very large, this does not mean that higher potential cancer risks are not present within the one-kilometer grid-cell. High concentration gradients have been shown to exist within 100 meters of a facility. Examples of higher potential cancer risks within the one-kilometer grid-cell at the thirteen specific facilities have been estimated at the near source, MEIR, and MEIW locations and are presented in Table VI-6 in Chapter VI.

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Appendix D

Specific and Generic Facility Modeling Results

Appendix D. Specific and Generic Facility Modeling Results

This appendix presents the modeling input parameters and results summary for the 54 specific facilities and three generic facilities that were modeled. The modeling utilized both the SCREEN3 and ISCST3 air dispersion models. The ISCST3 model was used for 13 specific facilities and the generic facilities. All other facilities were modeled using SCREEN3.

A. Perchloroethylene-Using Facilities Modeled with SCREEN3

This section summarizes the results from our modeling of the 29 facilities that used perchloroethylene (Perc) brake cleaning products which did not contain either methylene chloride (MeCl) or trichloroethylene (TCE). Tables D-1 thru D-5 present the modeling input parameters for each facility modeled using SCREEN3 . Tables D-6 thru D-11 summarize the modeling results.

Table D-1. Modeling Input Parameters for Facilities E, H, L, N, Q, R, and V

Parameter	Value[1]						
	Facility E	Facility H	Facility L	Facility N	Facility Q	Facility R	Facility V
Source Type	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Facility Type	Service Station	Fleet	Service Station	Dealership	General Auto	General Auto	Brake Shop
Perc Content [%]	65 to 94	65 to 94	65 to 94	99	65 to 94	65 to 94	90
Perc Emission Rate - Annual [grams/s]	0.0007 to 0.0010	0.0010 to 0.0014	0.0025 to 0.0036	0.00231	0.0260 to 0.0375	0.0227 to 0.0328	0.0002
Perc Emission Rate - Acute [grams/s]	0.0490 to 0.0704	0.0075 to 0.0108	0.1350 to 0.1944	0.0076	0.2925 to 0.4219	0.5562 to 0.0804	0.0052
Receptor Height [m]	0	0	0	0	0	0	0
Source Release Height [m]	2.896	4.572	2.286	2.286	3.048	2.438	2.286
Initial Lateral Dimension of Volume [m]	1.949	12.995	3.573	3.190	4.749	4.253	2.127
Initial Vertical Dimension of Volume [m]	2.694	4.253	2.127	2.127	2.835	2.268	2.127
Met Option - Acute/Annual	Full	Full	Full	Full	Full	Full	Full
Land Type (Urban or Rural)	Urban	Urban	Urban	Urban	Urban	Urban	Urban
Operating Schedule [hrs/wk]	69	47.5	54	42.5	45	51.5	45

1. These facilities use a brake cleaning product which shows a Perc content range on the MSDS; therefore a range is presented for the Perc emission rate.

Table D-2. Modeling Input Parameters for Facilities A-13, A-14, A-15, A-16, A-21, and A-29

Parameter	Value[1]					
	Facility A-13	Facility A-14	Facility A-15	Facility A-16	Facility A-21	Facility A-29
Source Type	Volume	Volume	Volume	Volume	Volume	Volume
Facility Type	General Automotive	General Automotive	General Automotive	General Automotive	Brake Shop	Fleet
Perc Content [%]	65 to 94	65 to 94	70 to 94	65 to 94	70 to 94	65 to 94
Perc Emission Rate - Annual [grams/s]	0.00006 to 0.00009	0.0005 to 0.0007	0.0023 to 0.0033	0.0030 to 0.0044	0.0037 to 0.0050	0.0130 to 0.0188
Perc Emission Rate - Acute [grams/s]	0.0006 to 0.0009	0.0225 to 0.0325	0.0524 to 0.0704	0.0162 to 0.0234	0.0524 to 0.0703	0.0898 to 0.1299
Receptor Height [m]	0	0	0	0	0	0
Source Release Height [m]	2.743	2.438	2.286	2.743	2.438	3.810
Initial Lateral Dimension of Volume [m]	3.332	2.481	5.316	3.899	5.671	4.253
Initial Vertical Dimension of Volume [m]	2.552	2.268	2.127	2.552	2.268	3.544
Met Option - Annual	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4
Met Option - Acute	Full	Full	Full	Full	Full	Full
Land Type (Urban or Rural)	Urban	Urban	Urban	Urban	Urban	Urban
Operating Schedule [hrs/wk]	60.5	47.5	45	64	56.5	90

1. These facilities use a brake cleaning product which shows a Perc content range on the MSDS; therefore a range is presented for the Perc emission rate.

Table D-3. Modeling Input Parameters for Facilities A-30, A-31, A-32, A-35, A-36, and A-50

Parameter	Value[1]					
	Facility A-30	Facility A-31	Facility A-32	Facility A-35	Facility A-36	Facility A-50
Source Type	Volume	Volume	Volume	Volume	Volume	Volume
Facility Type	Fleet	General Automotive	General Automotive	Brake Shop	Dealership	General Automotive
Perc Content [%]	25 to 85	65 to 94	65 to 94	65 to 94	65 to 94	65 to 94
Perc Emission Rate - Annual [grams/s]	0.0023 to 0.0078	0.0088 to 0.0127	0.0006 to 0.0009	0.0055 to 0.0079	0.0273 to 0.0394	0.0040 to 0.0057
Perc Emission Rate - Acute [grams/s]	0.0531 to 0.1806	0.0122 to 0.0176	0.0244 to 0.0353	0.2547 to 0.3681	0.0717 to 0.1037	0.0649 to 0.0938
Receptor Height [m]	0	0	0	0	0	0
Source Release Height [m]	4.572	2.743	2.591	3.810	3.810	2.438
Initial Lateral Dimension of Volume [m]	5.671	3.190	2.835	4.607	4.253	2.127
Initial Vertical Dimension of Volume [m]	4.253	2.552	2.410	3.544	3.544	2.268
Met Option - Annual	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4
Met Option - Acute	Full	Full	Full	Full	Full	Full
Land Type (Urban or Rural)	Urban	Urban	Urban	Urban	Urban	Urban
Operating Schedule [hrs/wk]	92.5	55.5	40	46.5	50	49

1. These facilities use a brake cleaning product which shows a Perc content range on the MSDS; therefore a range is presented for the Perc emission rate.

Table D-4. Modeling Input Parameters for Facilities A-51, A-54, A-73, A-84, and A-87

Parameter	Value[1]				
	Facility A-51	Facility A-54	Facility A-73	Facility A-84	Facility A-87
Source Type	Volume	Volume	Volume	Volume	Volume
Facility Type	General Automotive	General Automotive	General Automotive	General Automotive	Dealership
Perc Content [%]	90 to 99	65 to 94	65 to 75	89	60 to 99
Perc Emission Rate - Annual [grams/s]	0.0025 to 0.0027	0.0057 to 0.0083	0.0130 to 0.0150	0.0142	0.0187 to 0.0308
Perc Emission Rate - Acute [grams/s]	0.1417 to 0.1558	0.0730 to 0.1056	0.0487 to 0.0562	0.1441	0.0280 to 0.0462
Receptor Height [m]	0	0	0	0	0
Source Release Height [m]	2.438	2.591	3.048	3.353	3.048
Initial Lateral Dimension of Volume [m]	1.559	1.772	2.481	2.481	7.088
Initial Vertical Dimension of Volume [m]	2.268	2.410	2.835	3.119	2.835
Met Option - Annual	Class 4	Class 4	Class 4	Class 4	Class 4
Met Option - Acute	Full	Full	Full	Full	Full
Land Type (Urban or Rural)	Urban	Urban	Urban	Urban	Urban
Operating Schedule [hrs/wk]	57	51	45	71	45

1. These facilities use a brake cleaning product which shows a Perc content range on the MSDS; therefore a range is presented for the Perc emission rate.

Table D-5. Modeling Input Parameters for Facilities A-88, A-89, A-90, A-93, and A-94

Parameter	Value[1]				
	Facility A-88	**Facility A-89**	**Facility A-90**	**Facility A-93**	**Facility A-94**
Source Type	Volume	Volume	Volume	Volume	Volume
Facility Type	General Automotive	General Automotive	Service Station	General Automotive	Service Station
Perc Content [%]	20 to 50	65 to 94	65 to 94	65 to 94	65 to 94
Perc Emission Rate - Annual [grams/s]	0.0090 to 0.0224	0.0039 to 0.0056	0.0041 to 0.0059	0.0088 to 0.0128	0.0015 to 0.0022
Perc Emission Rate - Acute [grams/s]	0.1495 to 0.3739	0.0097 to 0.0141	0.1947 to 0.2814	0.0973 to 0.1407	0.0340 to 0.0493
Receptor Height [m]	0	0	0	0	0
Source Release Height [m]	3.200	2.438	2.591	2.438	2.743
Initial Lateral Dimension of Volume [m]	3.544	3.544	1.772	4.253	1.772
Initial Vertical Dimension of Volume [m]	2.977	2.268	2.410	2.268	2.552
Met Option - Annual	Class 4	Class 4	Class 4	Class 4	Class 4
Met Option - Acute	Full	Full	Full	Full	Full
Land Type (Urban or Rural)	Urban	Urban	Urban	Urban	Urban
Operating Schedule [hrs/wk]	50	50	48	55	45

1. These facilities use a brake cleaning product which shows a Perc content range on the MSDS; therefore a range is presented for the Perc emission rate.

Table D-6. Summary of Modeling Results for Facilities E, H, L, N, and Q

FACILITY	RECEPTOR TYPE	Receptor Distance [meters]		Maximum 1-hour Conc. (acute) [μg/m³]	Maximum 1-hour Conc. (annualized) [μg/m³]	Maximum Annual Avg. Conc. [μg/m³]	Potential Cancer Risk [chances per million]		Hazard Index	
		Center[1]	Env.[2]				Resident	Worker	Acute	Chronic
E[3]	Near-Source	20	16	710.0 to 1026	10.29 to 14.87	0.3372 to 0.4872	1.99 to 2.87	0.70 to 1.01	0.0355 to 0.0513	0.0096 to 0.0139
	MEIW	40	36	384.9 to 556.2	5.578 to 8.061	0.1828 to 0.2641	1.08 to 1.56	0.38 to 0.55	0.0192 to 0.0278	0.0052 to 0.0075
	MEIR	805	801	4.44 to 6.41	0.0642 to 0.0929	0.0021 to 0.0030	0.01 to 0.02	0.00 to 0.01	0.0002 to 0.0003	0.0001 to 0.0001
H[3]	Near-Source	30	2	17.89 to 25.81	2.265 to 3.267	0.0511 to 0.0737	0.30 to 0.43	0.15 to 0.22	0.0009 to 0.0013	0.0015 to 0.0021
	MEIW	330	302	2.10 to 3.02	0.2652 to 0.3825	0.0060 to 0.0086	0.04 to 0.05	0.02 to 0.03	0.0001 to 0.0002	0.0002 to 0.0002
	MEIR	830	802	0.58 to 0.83	0.0728 to 0.105	0.0016 to 0.0024	< 0.01 to 0.01	< 0.01 to 0.01	<0.0001	0.0000 to 0.0001
L[3]	Near-Source	20	12	1689 to 2439	31.27 to 45.16	0.8019 to 1.1581	4.73 to 6.83	2.13 to 3.07	0.0844 to 0.1219	0.0229 to 0.0331
	MEIW	35	27	1096 to 1583	20.3 to 29.31	0.5206 to 0.7516	3.07 to 4.43	1.38 to 1.99	0.0548 to 0.0791	0.0149 to 0.0215
	MEIR	240	232	82.89 to 119.7	1.535 to 2.216	0.0394 to 0.0568	0.23 to 0.34	0.10 to 0.15	0.0041 to 0.0060	0.0011 to 0.0016
N	Near-Source	20	13	101.8	30.95	0.6247	3.69	2.10	0.0051	0.0178
	MEIW	117	110	14.46	4.394	0.0887	0.52	0.30	0.0007	0.0025
	MEIR	407	400	2.01	0.6123	0.0124	0.07	0.04	0.0001	0.0004
Q[3]	Near-Source	20	10	2427 to 3509	215.7 to 311.9	4.6095 to 6.6653	27.20 to 39.33	14.66 to 21.20	0.1213 to 0.1754	0.1317 to 0.1904
	MEIW	71	61	879.3 to 1271	78.16 to 113	1.6703 to 2.4148	9.85 to 14.25	5.31 to 7.68	0.0440 to 0.0636	0.0477 to 0.0690
	MEIR	86	76	701.7 to 1015	62.37 to 90.21	1.3328 to 1.9278	7.86 to 11.37	4.24 to 6.13	0.0351 to 0.0507	0.0381 to 0.0551

1. Distance to receptor measured from the center of the volume source.
2. Distance to receptor measured from the building exterior (envelope).
3. These facilities use a Perc-containing brake cleaner which shows a Perc content range on the Material Safety Data Sheet; therefore, a range is presented for the results.

Table D-7. Summary of Modeling Results for Facilities R, V, A-13, A-14, and A-15

FACILITY	RECEPTOR TYPE	Receptor Distance [meters]		Maximum 1-hour Conc. (acute) [μg/m³]	Maximum 1-hour Conc. (annualized) [μg/m³]	Maximum Annual Avg. Conc. [μg/m³]	Potential Cancer Risk [chances per million]		Hazard Index	
		Center[1]	Env.[2]				Resident	Worker	Acute	Chronic
R[3]	Near-Source	20	11	592.9 to 857.0	242 to 349.8	5.9185 to 8.5549	34.92 to 50.47	16.45 to 23.78	0.0296 to 0.0429	0.1691 to 0.2444
	MEIW	39	30	361.9 to 523.3	147.7 to 213.6	3.6122 to 5.2239	21.31 to 30.82	10.04 to 14.52	0.0181 to 0.0262	0.1032 to 0.1493
	MEIR	55	46	255.8 to 369.7	104.4 to 150.9	2.5533 to 3.6905	15.06 to 21.77	7.10 to 10.26	0.0128 to 0.0185	0.0730 to 0.1054
V[3]	Near-Source	20	15	86.41	3.837	0.0820	0.48	0.26	0.0043	0.0023
	MEIW	23	18	77.38	3.436	0.0734	0.43	0.23	0.0039	0.0021
	MEIR[4]	11	6	>86.41	>3.837	>0.0820	>0.48	>0.26	>0.0043	>0.0023
A-13[3]	Near-Source	20	13	6.81 to 10.22	0.4835 to 0.7253	0.0139 to 0.0208	0.08 to 0.12	0.03 to 0.05	0.0003 to 0.0005	0.0004 to 0.0006
	MEIW	25	18	5.90 to 8.85	0.3928 to 0.5893	0.0113 to 0.0169	0.07 to 0.10	0.03 to 0.04	0.0003 to 0.0004	0.0003 to 0.0005
	MEIR	83	73	1.74 to 2.61	0.0823 to 0.1235	0.0024 to 0.0035	0.01 to 0.02	0.01 to 0.01	0.0001 to 0.0001	0.0001 to 0.0001
A-14[3]	Near-Source	20	15	331 to 478	4.67 to 6.76	0.105 to 0.152	0.62 to 0.90	0.32 to 0.46	0.017 to 0.024	0.003 to 0.004
	MEIW[4]	11	6	>331 to >478	>4.67 to >6.76	>0.105 to >0.152	>0.62 to >0.90	>0.32 to >0.46	>0.017 to >0.024	>0.003 to >0.004
	MEIR	112	107	47.10 to 68.03	0.4225 to 0.6113	0.0095 to 0.0138	0.06 to 0.08	0.03 to 0.04	0.0024 to 0.0034	0.0003 to 0.0004
A-15[3]	Near-Source	20	9	503.7 to 676.7	16.03 to 21.53	0.3426 to 0.4601	2.02 to 2.71	1.09 to 1.46	0.0252 to 0.0338	0.0098 to 0.0131
	MEIW	41	30	300.5 to 403.7	7.754 to 10.42	0.1657 to 0.2227	0.98 to 1.31	0.53 to 0.71	0.0150 to 0.0202	0.0047 to 0.0064
	MEIR	87	76	131 to 176	2.758 to 3.706	0.0589 to 0.0792	0.35 to 0.47	0.19 to 0.25	0.0066 to 0.0088	0.0017 to 0.0023

1. Distance to receptor measured from the center of the volume source.
2. Distance to receptor measured from the building exterior (envelope).
3. These facilities use a Perc-containing brake cleaner which shows a Perc content range on the Material Safety Data Sheet; therefore, a range is presented for the results.
4. The receptor is located closer than 20 meters to the center of the volume source, which is the minimum distance modeled; therefore, the potential health impacts are likely to be greater than those listed here. However, we do not anticipate that the potential health impacts will be significant. The impacts shown here are at the near-source location of 20 meters.

Table D-8. Summary of Modeling Results for Facilities A-16, A-21, A-29, A-30, and A-31

FACILITY	RECEPTOR TYPE	Receptor Distance [meters]		Maximum 1-hour Conc. (acute) [μg/m³]	Maximum 1-hour Conc. (annualized) [μg/m³]	Maximum Annual Avg. Conc. [μg/m³]	Potential Cancer Risk [chances per million]		Hazard Index	
		Center[1]	Env.[2]				Resident	Worker	Acute	Chronic
A-16[3]	Near-Source	20	12	166.9 to 241.1	22.54 to 32.63	0.6851 to 0.9917	4.04 to 5.85	1.53 to 2.22	0.0083 to 0.0121	0.0196 to 0.0283
	MEIW	38	30	105.4 to 152.2	11.79 to 17.07	0.3583 to 0.5188	2.11 to 3.06	0.80 to 1.16	0.0053 to 0.0076	0.0102 to 0.0148
	MEIR	313	305	6.35 to 9.17	0.4308 to 0.6235	0.0131 to 0.0189	0.08 to 0.11	0.03 to 0.04	0.0003 to 0.0005	0.0004 to 0.0005
A-21[3]	Near-Source	20	8	458.4 to 615	23.63 to 31.72	0.6340 to 0.8511	3.74 to 5.02	1.61 to 2.16	0.0229 to 0.0308	0.0181 to 0.0243
	MEIW	24	12	414.9 to 556.9	20.32 to 27.28	0.5452 to 0.7320	3.22 to 4.32	1.38 to 1.85	0.0207 to 0.0278	0.0156 to 0.0209
	MEIR	126	114	77.06 to 103.4	2.396 to 3.217	0.0643 to 0.0863	0.38 to 0.51	0.16 to 0.22	0.0039 to 0.0052	0.0018 to 0.0025
A-29[3]	Near-Source	20	11	665.8 to 963.1	96.39 to 139.4	4.1197 to 5.9579	24.31 to 35.15	6.55 to 9.48	0.0333 to 0.0482	0.1177 to 0.1702
	MEIW	331	322	30.85 to 44.62	4.465 to 6.458	0.1908 to 0.2760	1.13 to 1.63	0.30 to 0.44	0.0015 to 0.0022	0.0055 to 0.0079
	MEIR	161	152	90.25 to 130.5	13.06 to 18.89	0.5582 to 0.8074	3.29 to 4.76	0.89 to 1.28	0.0045 to 0.0065	0.0159 to 0.0231
A-30[3]	Near-Source	20	8	274.8 to 934.5	11.9 to 40.41	0.5227 to 1.7751	3.08 to 10.47	0.81 to 2.75	0.0137 to 0.0467	0.0149 to 0.0507
	MEIW	495	483	9.42 to 32.05	0.4081 to 1.386	0.0179 to 0.0609	0.11 to 0.36	0.03 to 0.09	0.0005 to 0.0016	0.0005 to 0.0017
	MEIR	495	483	9.42 to 32.05	0.4081 to 1.386	0.0179 to 0.0609	0.11 to 0.36	0.03 to 0.09	0.0005 to 0.0016	0.0005 to 0.0017
A-31[3]	Near-Source	20	13	142 to 205	72.24 to 105	1.904 to 2.757	11.23 to 16.3	4.9 to 7.1	0.0071 to 0.0103	0.0544 to 0.0788
	MEIW[4]	13	6	>142 to >205	>72.24 to >105	>1.904 to >2.757	>11.2 to >16.3	>4.9 to >7.1	>0.0071 to >0.0103	>0.0544 to >0.0788
	MEIR	226	229	7.63 to 11.01	2.079 to 3.01	0.0548 to 0.0793	0.32 to 0.47	0.14 to 0.02	0.0004 to 0.0006	0.0016 to 0.0023

1. Distance to receptor measured from the center of the volume source.
2. Distance to receptor measured from the building exterior (envelope).
3. These facilities use a Perc-containing brake cleaner which shows a Perc content range on the Material Safety Data Sheet; therefore, a range is presented for the results.
4. The receptor is located closer than 20 meters to the center of the volume source, which is the minimum distance modeled; therefore, the potential health impacts are likely to be greater than those listed here. However, we do not anticipate that the potential health impacts will be significant. The impacts shown here are at the near-source location of 20 meters.

Table D-9. Summary of Modeling Results for Facilities A-32, A-35, A-36, A-50, and A-51

FACILITY	RECEPTOR TYPE	Receptor Distance [meters]		Maximum 1-hour Conc. (acute) [μg/m³]	Maximum 1-hour Conc. (annualized) [μg/m³]	Maximum Annual Avg. Conc. [μg/m³]	Potential Cancer Risk [chances per million]		Hazard Index	
		Center[1]	Env.[2]				Resident	Worker	Acute	Chronic
A-32[3]	Near-Source	20	14	318.3 to 460.5	5.507 to 7.945	0.1046 to 0.1509	0.62 to 0.89	0.37 to 0.54	0.0159 to 0.0230	0.0030 to 0.0043
	MEIW	23	17	289.4 to 418.7	4.812 to 6.941	0.0914 to 0.1318	0.54 to 0.78	0.33 to 0.47	0.0145 to 0.0209	0.0026 to 0.0038
	MEIR	143	137	34.12 to 49.36	0.3528 to 0.509	0.0067 to 0.0097	0.04 to 0.06	0.02 to 0.03	0.0017 to 0.0025	0.0002 to 0.0003
A-35[3]	Near-Source	20	10	1790 to 2588	29.68 to 42.9	0.6554 to 0.9473	3.87 to 5.59	2.02 to 2.92	0.0895 to 0.1294	0.0187 to 0.0271
	MEIW	25	15	1606 to 2321	25.14 to 36.34	0.5551 to 0.8025	3.28 to 4.73	1.71 to 2.47	0.0803 to 0.1161	0.0159 to 0.0229
	MEIR	162	152	249.8 to 361.1	2.294 to 3.316	0.0507 to 0.0732	0.30 to 0.43	0.16 to 0.23	0.0125 to 0.0181	0.0014 to 0.0021
A-36[3]	Near-Source	20	11	531.6 to 768.9	154.9 to 223.5	3.678 to 5.307	21.7 to 31.31	10.53 to 15.19	0.0266 to 0.0384	0.1051 to 0.1516
	MEIW	85	76	165.6 to 239.5	31.6 to 45.7	0.7517 to 1.085	4.44 to 6.4	2.15 to 3.11	0.0083 to 0.0120	0.0215 to 0.0310
	MEIR	161	152	72.06 to 104.2	11.68 to 16.86	0.2773 to 0.4003	1.64 to 2.36	0.79 to 1.15	0.0036 to 0.0052	0.0079 to 0.0114
A-50[3]	Near-Source	20	15	1032 to 1491	42.07 to 60.82	0.9789 to 1.415	5.78 to 8.35	2.86 to 4.13	0.0516 to 0.0746	0.0280 to 0.0404
	MEIW	20	15	1032 to 1491	42.07 to 60.82	0.9789 to 1.415	5.78 to 8.35	2.86 to 4.13	0.0516 to 0.0746	0.0280 to 0.0404
	MEIR	20	15	1032 to 1491	42.07 to 60.82	0.9789 to 1.415	5.78 to 8.35	2.86 to 4.13	0.0516 to 0.0746	0.0280 to 0.0404
A-51[3]	Near-Source	20	17	2593 to 2851	29.5 to 32.4	0.799 to 0.876	4.71 to 5.17	2.01 to 2.2	0.1297 to 0.143	0.0228 to 0.0250
	MEIW[4]	9	6	>2593 to >2851	>29.5 to >32.4	>0.799 to >0.876	>4.71 to >5.17	>2.01 to >2.2	>0.1297 to >0.143	>0.0228 to >0.0250
	MEIR	26	23	2059 to 2264	21.78 to 23.88	0.5896 to 0.6464	3.48 to 3.81	1.48 to 1.62	0.1030 to 0.1132	0.0168 to 0.0185

1. Distance to receptor measured from the center of the volume source.
2. Distance to receptor measured from the building exterior (envelope).
3. These facilities use a Perc-containing brake cleaner which shows a Perc content range on the Material Safety Data Sheet; therefore, a range is presented for the results.
4. The receptor is located closer than 20 meters to the center of the volume source, which is the minimum distance modeled; therefore, the potential health impacts are likely to be greater than those listed here. However, we do not anticipate that the potential health impacts will be significant. The impacts shown here are at the near-source location of 20 meters.

Table D-10. Summary of Modeling Results for Facilities A-54, A-73, A-84, A-87, and A-88

FACILITY	RECEPTOR TYPE	Receptor Distance [meters]		Maximum 1-hour Conc. (acute) [μg/m³]	Maximum 1-hour Conc. (annualized) [μg/m³]	Maximum Annual Avg. Conc. [μg/m³]	Potential Cancer Risk [chances per million]		Hazard Index	
		Center[1]	Env.[2]				Resident	Worker	Acute	Chronic
A-54[3]	Near-Source	20	17	1207 to 1746	62.7 to 90.7	1.517 to 2.195	8.9 to 12.96	4.3 to 6.2	0.0604 to 0.087	0.0434 to 0.0628
	MEIW[4]	18	15	>1207 to >1746	>62.7 to >90.7	>1.517 to >2.195	>8.9 to >12.96	>4.3 to >6.2	>0.0604 to >0.087	>0.0434 to >0.0628
	MEIR	41	38	611.8 to 885	25.93 to 37.53	0.6280 to 0.9089	3.71 to 5.36	1.76 to 2.55	0.0306 to 0.0443	0.0179 to 0.0260
A-73[3]	Near-Source	20	15	600.5 to 692.9	112.7 to 130	2.408 to 2.778	14.21 to 16.39	7.66 to 8.84	0.0300 to 0.0346	0.0688 to 0.0794
	MEIW	20	15	600.5 to 692.9	112.7 to 130	2.408 to 2.778	14.21 to 16.39	7.66 to 8.84	0.0300 to 0.0346	0.0688 to 0.0794
	MEIR	327	322	18.24 to 21.05	1.736 to 2.003	0.0371 to 0.0428	0.22 to 0.25	0.12 to 0.14	0.0009 to 0.0011	0.0011 to 0.0012
A-84[3]	Near-Source	20	15	1642	115.5	3.894	22.98	7.85	0.0821	0.1113
	MEIW	14	9	>1642	>115.5	>3.894	>22.98	>7.85	>0.0821	>0.1113
	MEIR	43	38	889.2	50.3	1.696	10.01	3.42	0.0445	0.0485
A-87[3]	Near-Source	20	5	174.1 to 287.3	89.58 to 147.5	1.9143 to 3.1521	11.29 to 18.60	6.09 to 10.03	0.0087 to 0.0144	0.0547 to 0.0901
	MEIW	61	46	82.78 to 136.6	30.8 to 50.73	0.6582 to 1.084	3.88 to 6.40	2.09 to 3.45	0.0041 to 0.0068	0.0188 to 0.0310
	MEIR	167	152	25.02 to 41.29	7.122 to 11.73	0.1522 to 0.2507	0.90 to 1.48	0.48 to 0.80	0.0013 to 0.0021	0.0043 to 0.0072
A-88[3]	Near-Source	20	12	1444 to 3611	63.65 to 158.4	1.511 to 3.761	8.92 to 22.19	4.33 to 10.77	0.0722 to 0.1806	0.0432 to 0.1075
	MEIW	31	23	1089 to 2725	42.43 to 105.6	1.008 to 2.507	5.94 to 14.79	2.88 to 7.18	0.0545 to 0.1363	0.0288 to 0.0716
	MEIR	20	12	1444 to 3611	63.65 to 158.4	1.511 to 3.761	8.92 to 22.19	4.33 to 10.77	0.0722 to 0.1806	0.0432 to 0.1075

1. Distance to receptor measured from the center of the volume source.
2. Distance to receptor measured from the building exterior (envelope).
3. These facilities use a Perc-containing brake cleaner which shows a Perc content range on the Material Safety Data Sheet; therefore, a range is presented for the results.
4. The receptor is located closer than 20 meters to the center of the volume source, which is the minimum distance modeled; therefore, the potential health impacts are likely to be greater than those listed here. However, we do not anticipate that the potential health impacts will be significant. The impacts shown here are at the near-source location of 20 meters.

Table D-11. Summary of Modeling Results for Facilities A-89, A-90, A-93, and A-94

FACILITY	RECEPTOR TYPE	Receptor Distance [meters]		Maximum 1-hour Conc. (acute) [μg/m³]	Maximum 1-hour Conc. (annualized) [μg/m³]	Maximum Annual Avg. Conc. [μg/m³]	Potential Cancer Risk [chances per million]		Hazard Index	
		Center[1]	Env.[2]				Resident	Worker	Acute	Chronic
A-89[3]	Near-Source	20	12	116.2 to 169	32.66 to 46.89	0.7755 to 1.113	4.58 to 6.57	2.22 to 3.19	0.0058 to 0.0085	0.0222 to 0.0318
	MEIW	32	24	82.48 to 119.9	20.18 to 28.98	0.4792 to 0.6881	2.83 to 4.06	1.37 to 1.97	0.0041 to 0.0060	0.0137 to 0.0197
	MEIR	84	76	28.28 to 41.12	5.309 to 7.623	0.1261 to 0.1810	0.74 to 1.07	0.36 to 0.52	0.0014 to 0.0021	0.0036 to 0.0052
A-90[3]	Near-Source	20	16	3218 to 4652	44.91 to 64.62	1.024 to 1.473	6.04 to 8.69	3.1 to 4.4	0.1609 to 0.2326	0.0292 to 0.0421
	MEIW[4]	19	15	>3218 to >4652	>44.91 to >64.62	>1.024 to >1.473	>6.04 to >8.69	>3.1 to >4.4	>0.1609 to >0.2326	>0.0292 to >0.0421
	MEIR[4]	18	14	>3218 to >4652	>44.91 to >64.62	>1.024 to >1.473	>6.04 to >8.69	>3.1 to >4.4	>0.1609 to >0.2326	>0.0292 to >0.0421
A-93[3]	Near-Source	20	11	1035 to 1497	66.51 to 96.74	1.737 to 2.527	10.3 to 14.9	4.5 to 6.6	0.0518 to 0.0749	0.0496 to 0.0722
	MEIW	39	30	632.2 to 914.2	33.38 to 48.55	0.8718 to 1.268	5.14 to 7.48	2.27 to 3.30	0.0316 to 0.0457	0.0249 to 0.0362
	MEIR[4]	17	8	>1035 to >1497	>66.51 to >96.74	>1.737 to >2.527	>10.3 to >14.9	>4.5 to >6.6	>0.0518 to >0.0749	>0.0496 to >0.0722
A-94[3]	Near-Source	20	16	538 to 779	15.87 to 23.28	0.339 to 0.498	2.00 to 2.94	1.1 to 1.6	0.0269 to 0.0390	0.0097 to 0.0142
	MEIW[4]	13	9	>538 to >779	>15.87 to >23.28	>0.339 to >0.498	>2.00 to >2.94	>1.1 to >1.6	>0.0269 to >0.0390	>0.0097 to >0.0142
	MEIR	27	23	420 to 608.9	11.4 to 16.72	0.2436 to 0.3573	1.44 to 2.11	0.78 to 1.14	0.0210 to 0.0304	0.0070 to 0.0102

1. Distance to receptor measured from the center of the volume source.
2. Distance to receptor measured from the building exterior (envelope).
3. These facilities use a Perc-containing brake cleaner which shows a Perc content range on the Material Safety Data Sheet; therefore, a range is presented for the results.
4. The receptor is located closer than 20 meters to the center of the volume source, which is the minimum distance modeled; therefore, the potential health impacts are likely to be greater than those listed here. However, we do not anticipate that the potential health impacts will be significant. The impacts shown here are at the near-source location of 20 meters.

B. Multicomponent-Using Facilities Modeled with SCREEN3

This section summarizes the results from our modeling for the 12 facilities that used products that contained either Perc (P), MeCl (M), or TCE (T) or some combination of the three. Tables D-12 and D-13 present the modeling input parameters and tables D-14 thru D-16 summarize the results.

Table D-12. Modeling Input Parameters for Facilities D, G, M, S, A-20, and A-39

Parameter	Value					
	Facility D	Facility G[1]		Facility M	Facility S	Facility A-20	Facility A-39
Source Type	Volume	Volume		Volume	Volume	Volume	Volume
Facility Type	Srvc. Sta.	Fleet		Dealership	Brake Shop	Gen Auto	Gen Auto
Chlorinated Content [%]	P:55, M:25	P:55, M:25		P:55, M:25	P:55, M:25	P:85, T:10	P:55, M:43
Perc Emission Rate - Ann. [grams/s]	0.0096	0.0408		0.0408	0.0062	0.0146	0.0101
Perc Emission Rate - Acute [grams/s]	0.0859	0.0408		0.1334	0.0124	0.0446	0.0303
MeCl Emission Rate - Ann. [grams/s]	0.0044	0.0185		0.0185	0.0028	N/A	0.0079
MeCl Emission Rate - Acute [grams/s]	0.0394	0.0185		0.0605	0.0056	N/A	0.0237
TCE Emission Rate - Ann. [grams/s]	N/A	N/A		N/A	N/A	0.0017	N/A
TCE Emission Rate - Acute [grams/s]	N/A	N/A		N/A	N/A	0.0052	N/A
Receptor Height [m]	0	0		0	0	0	0
Source Release Height [m]	2.286	1.829	3.658	2.591	2.743	2.438	4.572
Initial Lateral Dimension of Volume [m]	3.246	2.761	10.07	5.316	2.835	1.772	4.962
Initial Vertical Dimension of Volume [m]	2.127	1.701	2.127	2.410	2.552	2.268	4.253
Met Option - Annual/Acute	Full	Full		Full	Full	Class 4/Full	Class 4/Full
Land Type (Urban or Rural)	Urban	Urban		Urban	Urban	Urban	Urban
Operating Schedule [hrs/wk]	54	42.5		42.5	50	55	60

1. Due to the relationship between the exterior building dimensions to the location of the actual service area, two SCREEN3 runs were completed. The data in the left-hand column is used to calculate the non-cancer acute hazard index and the data in the right-hand column is used to calculate overall cancer risk and chronic non-cancer hazard index.

Table D-13. Modeling Input Parameters for Facilities A-49, A-63, A-71, A-72, A-82, and A-85

Parameter	Value					
	Facility A-49	Facility A-63	Facility A-71	Facility A-72	Facility A-82	Facility A-85
Source Type	Volume	Volume	Volume	Volume	Volume	Volume
Facility Type	General Automotive	General Automotive	General Automotive	General Automotive	General Automotive	General Automotive
Chlorinated Content [%]	P:55, M:25	P:55, M:25	P:55, M:25	P:55, M:25	P:98, M:0.5	P:98, M:0.5
Perc Emission Rate - Ann. [grams/s]	0.0091	0.0010	0.0010	0.0027	0.0144	0.0283
Perc Emission Rate - Acute [grams/s]	0.0867	0.0434	0.0434	0.1198	0.0417	0.1388
MeCl Emission Rate - Ann. [grams/s]	0.0042	0.0005	0.0004	0.0012	0.0001	0.0001
MeCl Emission Rate - Acute [grams/s]	0.0394	0.0197	0.0197	0.0544	0.0002	0.0007
TCE Emission Rate - Ann. [grams/s]	N/A	N/A	N/A	N/A	N/A	N/A
TCE Emission Rate - Acute [grams/s]	N/A	N/A	N/A	N/A	N/A	N/A
Receptor Height [m]	0	0	0	0	0	0
Source Release Height [m]	2.286	3.810	2.438	2.743	3.048	2.591
Initial Lateral Dimension of Volume [m]	3.544	2.127	1.914	3.544	2.481	1.772
Initial Vertical Dimension of Volume [m]	2.127	3.544	2.268	2.552	2.835	2.410
Met Option - Annual	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4
Met Option - Acute	Full	Full	Full	Full	Full	Full
Land Type (Urban or Rural)	Urban	Urban	Urban	Urban	Urban	Urban
Operating Schedule [hrs/wk]	47.5	42.5	45	45	58	49

Table D-14. Summary of Modeling Results for Facilities D, G, M, and S

FACILITY	RECEPTOR TYPE	Receptor Distance [meters]		Potential Cancer Risk [chances per million]		Hazard Index	
		Center[1]	Env.[2]	Resident	Worker	Acute	Chronic
D	Near-Source	25	2	17.77	7.99	0.0807	0.0831
	MEIW	55	32	8.31	3.73	0.0375	0.0388
	MEIR	175	152	1.63	0.73	0.0074	0.0076
G	Near-Source	25	3	21.54	12.30	0.0421	0.1007
	MEIW	50	28	15.26	8.71	0.0201	0.0713
	MEIR	420	398	1.15	0.66	0.0008	0.0054
M	Near-Source	20	9	45.66	26.07	0.0960	0.2135
	MEIW	26	15	39.50	22.55	0.0831	0.1847
	MEIR	31	20	35.01	19.99	0.0736	0.1637
S	Near-Source	20	14	11.76	5.71	0.0128	0.0550
	MEIW	47	41	5.73	2.78	0.0062	0.0268
	MEIR	466	460	0.20	0.10	0.0002	0.0009

1. Distance to receptor measured from the center of the volume source.
2. Distance to receptor measured from the building exterior (envelope).

Table D-15. Summary of Modeling Results for Facilities A-20, A-39, A-49, and A-63

FACILITY	RECEPTOR TYPE	Receptor Distance [meters]		Potential Cancer Risk [chances per million]		Hazard Index	
		Center[1]	Env.[2]	Resident	Worker	Acute	Chronic
A-20	Near-Source	20	16	26.58	11.73	0.0386	0.1245
	MEIW	53	49	7.42	3.27	0.0141	0.0348
	MEIR	50	46	8.10	3.57	0.0152	0.0380
A-39	Near-Source	20	9	9.73	3.94	0.0086	0.0389
	MEIW	34	23	6.52	2.63	0.0066	0.0261
	MEIR	57	46	3.80	1.54	0.0045	0.0152
A-49	Near-Source	20	12	11.33	5.79	0.0899	0.0529
	MEIW[3]	14	6	>11.33	>5.79	>0.0899	>0.0529
	MEIR	38	30	5.60	2.86	0.0539	0.0262
A-63	Near-Source	20	15	1.03	0.59	0.0395	0.0048
	MEIW[3]	8	3	>1.03	>0.59	>0.0395	>0.0048
	MEIR	2419	2414	<0.01	<0.01	<0.0001	<0.0001

1. Distance to receptor measured from the center of the volume source.
2. Distance to receptor measured from the building exterior (envelope).
3. The receptor is located closer than 20 meters to the center of the volume source, which is the minimum distance modeled; therefore, the potential health impacts are likely to be greater than those listed here. However, we do not anticipate that the potential health impacts will be significant. The impacts shown here are at the near-source location of 20 meters.

Table D-16. Summary of Modeling Results for Facilities A-71, A-72, A-82, and A-85

FACILITY	RECEPTOR TYPE	Receptor Distance [meters]		Potential Cancer Risk [chances per million]		Hazard Index	
		Center[1]	Env.[2]	Resident	Worker	Acute	Chronic
A-71	Near-Source	20	16	1.45	0.78	0.0598	0.0068
	MEIW[3]	19	15	>1.45	>0.78	>0.0598	>0.0068
	MEIR	34	30	0.77	0.42	0.0371	0.0036
A-72	Near-Source	20	12	2.85	1.54	0.1080	0.0133
	MEIW	29	21	2.03	1.10	0.0842	0.0095
	MEIR	61	53	0.77	0.42	0.0407	0.0036
A-82	Near-Source	20	15	20.30	8.49	0.0276	0.0983
	MEIW	42	37	8.90	3.72	0.0150	0.0431
	MEIR	42	37	8.90	3.72	0.0150	0.0431
A-85	Near-Source	20	16	42.60	21.09	0.1231	0.2062
	MEIW[3]	12	8	>42.60	>21.09	>0.1231	>0.2062
	MEIR	34	30	22.74	11.26	0.0765	0.1101

1. Distance to receptor measured from the center of the volume source.
2. Distance to receptor measured from the building exterior (envelope).
3. The receptor is located closer than 20 meters to the center of the volume source, which is the minimum distance modeled; therefore, the potential health impacts are likely to be greater than those listed here. However, we do not anticipate that the potential health impacts will be significant. The impacts shown here are at the near-source location of 20 meters.

C. Perchloroethylene-Using Facilities Modeled with ISCST3

This section summarizes the results from our modeling of the 13 facilities that used Perc-containing brake cleaning products which did not contain either MeCl or TCE using regional-specific meteorological (met) data and ISCST3. Tables D-17 thru D-19 present the modeling input parameters and tables D-20 thru D-22 summarize the modeling results.

Table D-17. ISCST3 Modeling Parameters - 13 Specific Facilities[1]

Facility	Facility Type	Emission Rate [g/s]		Perc Content [%]	Release Height [m]	Approx. Length [m]	Approx. Width [m]	Approx. Height [m]	Dispersion Coefficient	Number of L x L Volumes
		Acute	Annual							
A-07	Gen Auto	0.0973 to 0.1407	0.0201 to 0.0291	65 to 94	2.3	30.5	10.7	4.6	Urban	3
A-08	Gen Auto	0.0487 to 0.0704	0.0330 to 0.0477	65 to 94	2.3	22.9	9.1	4.6	Urban	3
A-09	Gen Auto	0.0604 to 0.0874	0.0594 to 0.0859	65 to 94	3.8	21.3	13.7	7.6	Urban	2
A-28	Fleet	0.0608 to 0.0880	0.0080 to 0.0115	65 to 94	4.5	15.2	15.2	9.1	Urban	1
A-52	Gen Auto	0.1701 to 0.1871	0.0167 to 0.0183	90 to 99	2.3	15.2	7.6	4.6	Urban	2
A-83	Gen Auto	0.0389 to 0.0563	0.0220 to 0.0319	65 to 94	3.0	24.4	9.1	6.1	Urban	3
A-86	Dealership	0.0747 to 0.1232	0.0367 to 0.0606	60 to 99	5.0	53.3	33.5	10.0	Urban	2
A-92	Svc Sta	0.0973 to 0.1407	0.0062 to 0.0090	65 to 94	2.6	15.2	7.6	5.2	Urban	2
I	Fleet	0.1817 to 0.2633	0.0236 to 0.0342	65 to 94	4.7	62.8	22.3	9.5	Urban	3
O	Gen Auto	0.1946 to 0.2815	0.0087 to 0.0125	65 to 94	3.0	18.3	15.2	6.1	Urban	1
P	Brake Shop	0.0182 to 0.0263	0.0043 to 0.0061	65 to 94	3.0	18.3	10.7	6.1	Urban	2
T	Gen Auto	0.0374	0.0166	99	3.0	21.3	9.1	6.1	Urban	2
U	Gen Auto	0.0389 to 0.0562	0.0097 to 0.0141	65 to 94	3.0	18.3	9.1	6.1	Urban	2

1. All facilities modeled as a volume source with receptor height set to zero. All facilities, except Facility T, use a Perc-containing brake cleaner which shows a Perc content range on the Material Safety Data Sheet; therefore, a range is presented for the results

Table D-18. ISCST3 Modeling Parameters - 13 Specific Facilities (cont.)

Facility	Operating Schedule [hrs/wk]	Open Hours	Open Days	Meteorology Data Set
A-07	58	8:00 am - 6:00 pm 8:00 am - 4:00 pm	Mon - Fri Sat	Oakland 1960-64
A-08	59	8:00 am - 6:00 pm 8:00 am - 5:00 pm	Mon - Fri Sat	Oakland 1960-64
A-09	59	8:00 am - 6:00 pm 8:00 am - 5:00 pm	Mon - Fri Sat	Oakland 1960-64
A-28	122.5	5:00 am - 10:30 pm	Mon - Sun	McClellan AFB 1953-57
A-52	51	8:00 am - 5:00 pm 8:00 am - 2:00 pm	Mon - Fri Sat	LAX 1985-89
A-83	53	8:00 am - 6:00 pm 8:00 am - 4:00 pm	Mon - Fri Sat	Redding 1987-89
A-86	60	7:00 am - 6:00 pm 9:00 am - 2:00 pm	Mon - Fri Sat	Fresno 1985-89
A-92	47	7:30 am - 4:00 pm 7:30 am - 12:00 pm	Mon - Fri Sat	Fresno 1985-89
I	92.5	6:30 am - 1:00 am	Mon - Fri	Sac Exec 1987, 1989-92
O	45	9:00 am - 6:00 pm	Mon - Fri	Concord 1991-96
P	60	8:00 am - 6:00 pm	Mon - Sat	Mather AFB 1953-57
T	56.5	8:00 am - 5:30 pm 8:00 am - 5:00 pm	Mon - Fri Sat	Burbank 1958-62
U	60	8:00 am - 6:00 pm	Mon - Sat	Anaheim 1981

Table D-19. ISCST3 Modeling Parameters - 13 Specific Facilities (cont.)

ISCST3 Receptor Networks Used			
Grid Name (Type)	Cell Size	Number of Cells	Location
COARSE (Cartesian)	1000 m x 1000 m	31 x 31 = 961	Centered on Source Centroid
FINE (Cartesian)	100 m x 100 m	31 x 31 = 961	Centered on Source Centroid
VFINE (Cartesian)	20 m x 20 m	26 x 26 = 676	Centered on Source Centroid

Table D-20. Detailed Listing of ISCST3 Modeling Results - 13 Specific Facilities

FACILITY	RECEPTOR TYPE	Receptor Distance [meters]		Approximate Direction From Facility [Deg][3]	Maximum Annual Concentration [μg/m³]	Maximum Hourly Concentration [μg/m³]	Potential Cancer Risk [chances per million]		Hazard Index	
		Center[1]	Env.[2]				Resident	Worker	Acute	Chronic
A-07[4]	Near-Source	32	27	108	2.271 to 3.288	489.1 to 707.3	13.4 to 19.4	5.61 to 8.12	0.0245 to 0.0354	0.0649 to 0.0940
	MEIW	51	46	79	0.945 to 1.368	191.1 to 276.3	5.57 to 8.07	2.33 to 3.38	0.0096 to 0.0138	0.0270 to 0.0391
	MEIR	32	27	108	2.271 to 3.288	310.9 to 449.7	13.4 to 19.4	5.61 to 8.12	0.0155 to 0.0225	0.0649 to 0.0940
A-08[4]	Near-Source	32	27	108	4.851 to 7.012	272.6 to 394.0	28.62 to 41.37	11.77 to 17.01	0.0136 to 0.0197	0.1386 to 0.2003
	MEIW	32	27	132	3.234 to 4.675	264.4 to 382.3	19.08 to 27.58	7.85 to 11.34	0.0132 to 0.0191	0.0924 to 0.1336
	MEIR	32	27	0	1.320 to 1.908	149.8 to 216.6	7.79 to 11.26	3.20 to 4.63	0.0075 to 0.0108	0.0377 to 0.0545
A-09[4]	Near-Source	32	25	108	7.009 to 10.14	207.9 to 300.8	41.35 to 59.80	17.01 to 24.59	0.0104 to 0.0150	0.2003 to 0.2896
	MEIW	32	25	0	1.901 to 2.749	140.9 to 203.9	11.21 to 16.22	4.61 to 6.67	0.0070 to 0.0102	0.0543 to 0.0785
	MEIR	32	25	108	7.009 to 10.14	186.6 to 270.0	41.35 to 59.80	17.01 to 24.59	0.0093 to 0.0135	0.2003 to 0.2896
A-28[4]	Near-Source	32	24	342	2.075 to 3.002	326.5 to 472.6	12.24 to 17.71	2.42 to 3.51	0.0163 to 0.0236	0.0593 to 0.0858
	MEIW	130	122	0	0.254 to 0.368	74.72 to 108.2	1.50 to 2.17	0.30 to 0.43	0.0037 to 0.0054	0.0073 to 0.0105
	MEIR	91	83	174	0.159 to 0.230	122.8 to 177.7	0.94 to 1.36	0.19 to 0.27	0.0061 to 0.0089	0.0045 to 0.0066
A-52[4]	Near-Source	32	28	72 to 108	1.670 to 1.830	866.8 to 953.5	9.85 to 10.80	4.69 to 5.14	0.0433 to 0.0477	0.0477 to 0.0523
	MEIW	32	28	108	1.603 to 1.757	477.8 to 525.6	9.46 to 10.37	4.50 to 4.93	0.0239 to 0.0263	0.0458 to 0.0502
	MEIR	46	42	311	0.468 to 0.512	697.1 to 766.7	2.76 to 3.02	1.31 to 1.44	0.0349 to 0.0383	0.0134 to 0.0146

1. Distance to receptor measured from the center of the volume source.
2. Distance to receptor measured from the short side of the building exterior (envelope).
3. For near-source, not applicable for acute values.
4. These facilities use a Perc-containing brake cleaner which shows a Perc content range on the Material Safety Data Sheet; therefore, a range is presented for the results.

Table D-21. Summary of ISCST3 Modeling Results - 13 Specific Facilities (cont.)

FACILITY	RECEPTOR TYPE	Receptor Distance [meters]		Approximate direction From Facility [Deg]	Maximum Annual Concentration [μg/m³]	Maximum Hourly Concentration [μg/m³]	Potential Cancer Risk [chances per million]		Hazard Index	
		Center[1]	Env.[2]				Resident	Worker	Acute	Chronic
A-83[4]	Near-Source	32	27	162	2.090 to 3.031	247.6 to 358.3	12.33 to 17.88	5.65 to 8.19	0.0124 to 0.0179	0.0597 to 0.0866
	MEIW	32	27	342	1.584 to 2.297	138.1 to 199.9	9.35 to 13.55	4.28 to 6.20	0.0069 to 0.0100	0.0453 to 0.0656
	MEIR	35	30	180	1.650 to 2.393	154.5 to 223.6	9.74 to 14.12	4.46 to 6.46	0.0077 to 0.0112	0.0471 to 0.0684
A-86[4]	Near-Source	51	34	101 - 135	1.358 to 2.242	119.1 to 196.4	8.01 to 13.23	3.19 to 5.26	0.0060 to 0.0098	0.0388 to 0.0641
	MEIW	168	151	287	0.147 to 0.242	44.60 to 73.55	0.87 to 1.43	0.34 to 0.57	0.0022 to 0.0037	0.0042 to 0.0069
	MEIR	158	141	108	0.220 to 0.364	31.75 to 52.36	1.30 to 2.15	0.52 to 0.85	0.0016 to 0.0026	0.0063 to 0.0104
A-92[4]	Near-Source	32	28	108	0.546 to 0.792	582.8 to 842.8	3.22 to 4.67	1.66 to 2.41	0.0291 to 0.0421	0.0156 to 0.0226
	MEIW	32	28	288	0.452 to 0.657	574.4 to 830.6	2.67 to 3.88	1.38 to 2.00	0.0287 to 0.0415	0.0129 to 0.0188
	MEIR	58	54	229	0.056 to 0.081	175.9 to 254.4	0.33 to 0.48	0.17 to 0.25	0.0088 to 0.0127	0.0016 to 0.0023
I[4]	Near-Source	51	40	349 - 11	1.864 to 2.702	405.4 to 587.5	11.00 to 15.94	2.89 to 4.18	0.0203 to 0.0294	0.0533 to 0.0772
	MEIW	95	84	18	0.708 to 1.026	174.5 to 252.8	4.18 to 6.05	1.10 to 1.59	0.0087 to 0.0126	0.0202 to 0.0293
	MEIR	157	146	27	0.307 to 0.445	120.8 to 175.1	1.81 to 2.62	0.47 to 0.69	0.0060 to 0.0088	0.0088 to 0.0127
O[4]	Near-Source	32	24	162	0.770 to 1.113	1428 to 2065	4.54 to 6.57	2.45 to 3.54	0.0714 to 0.1032	0.0220 to 0.0318
	MEIW	32	24	180	0.709 to 1.026	1413 to 2043	4.18 to 6.05	2.26 to 3.26	0.0706 to 0.1021	0.0203 to 0.0293
	MEIR	100	92	270	0.009 to 0.013	416.3 to 602.1	0.05 to 0.07	0.03 to 0.04	0.0208 to 0.0301	0.0002 to 0.0004

1. Distance to receptor measured from the center of the volume source.
2. Distance to receptor measured from the short side of the building exterior (envelope).
3. For near-source, not applicable for acute values.
4. These facilities use a Perc-containing brake cleaner which shows a Perc content range on the Material Safety Data Sheet; therefore, a range is presented for the results.

Table D-22. Summary of ISCST3 Modeling Results - 13 Specific Facilities (cont.)

FACILITY	RECEPTOR TYPE	Receptor Distance [meters]		Approximate direction From Facility [Deg]	Maximum Annual Concentration [μg/m³]	Maximum Hourly Concentration [μg/m³]	Potential Cancer Risk [chances per million]		Hazard Index	
		Center[1]	Env.[2]				Resident	Worker	Acute	Chronic
P[4]	Near-Source	32	27	342 - 72	0.387 to 0.559	59.83 to 86.43	2.28 to 3.30	0.92 to 1.33	0.0030 to 0.0043	0.0111 to 0.0160
	MEIW	32	27	0	0.298 to 0.430	39.65 to 57.29	1.76 to 2.54	0.71 to 1.03	0.0020 to 0.0029	0.0085 to 0.0123
	MEIR	42	37	225	0.034 to 0.049	46.15 to 66.67	0.20 to 0.29	0.08 to 0.12	0.0023 to 0.0033	0.0010 to 0.0014
T[4]	Near-Source	32	27	288 - 342	2.517	218.6	14.85	6.38	0.0109	0.0719
	MEIW	32	27	0	2.236	117.8	13.19	5.66	0.0059	0.0639
	MEIR	32	27	0	2.236	117.8	13.19	5.66	0.0059	0.0639
U[4]	Near-Source	32	27	72	3.279 to 4.738	237.8 to 343.7	19.35 to 27.96	7.82 to 11.31	0.0108 to 0.0156	0.0937 to 0.1354
	MEIW	32	27	342	1.207 to 1.743	134.4 to 194.2	7.12 to 10.29	2.88 to 4.16	0.0067 to 0.0097	0.0345 to 0.0498
	MEIR	32	27	72	3.279 to 4.738	179.0 to 258.7	19.35 to 27.96	7.82 to 11.31	0.0090 to 0.0129	0.0937 to 0.1354

1. Distance to receptor measured from the center of the volume source.
2. Distance to receptor measured from the short side of the building exterior (envelope).
3. For near-source, not applicable for acute values.
4. These facilities use a Perc-containing brake cleaner which shows a Perc content range on the Material Safety Data Sheet; therefore, a range is presented for the results.

D. Generic Facilities

This section summarizes the input parameters and results for the three generic facilities that were developed. All generic facility modeling were done using ISCST3 and consider Perc, MeCl, and TCE usage from brake cleaning products, carburetor cleaners, engine degreasers, and general degreasers. Tables D-23 thru D-26 present the modeling input parameters. The modeling results are summarized on pages D-25 thru D-204. For more information on how the generic facilities were developed, please see Appendix F.

Table D-23. ISCST3 Modeling Parameters - 3 Generic Facilities

Facility	Applicable Facility Types	Release Height [m]	Approx. Length [m]	Approx. Width [m]	Approx. Height [m]	Number of L x L Volumes
G-01	General Automotive, Brake Shop, Service Station, Dealership	2.5	12.2	7.6	4.9	2
G-02	General Automotive, Brake Shop, Service Station., Dealership, Fleet	3.8	21.3	13.7	7.6	2
G-03	General Automotive, Dealership, Fleet	3.8	62.5	21.3	7.6	3

Table D-24. ISCST3 Modeling Parameters - 3 Generic Facilities (cont.)

Facility	Operating Schedule [hrs/wk]	Open Hours	Open Days	Meteorology Data Sets
G-01 G-02 G-03	57	8:00 am - 5:00 pm 8:00 am - 2:00 pm	Mon - Fri Sat	Oakland 1960-64 McClellan AFB 1953-57 LAX 1985-89 Redding 1987-89 Fresno 1985-89 Sac Exec 1987, 1989-92 Concord 1991-96 Mather AFB 1953-57 Burbank 1958-62 Anaheim 1981

Table D-25. ISCST3 Modeling Parameters - 3 Generic Facilities (cont.)

Facility	Base Emission Rates [g/s][1]			
	Acute (65%)	Annualized (65%)	Acute (94%)	Annualized (94%)
G-01	0.0973	0.0341	0.1407	0.0494
G-02	0.1946	0.1024	0.2815	0.1481
G-03	0.1946	0.1024	0.2815	0.1481

1. The model is run using a unit emission rate of 1 gram per second. Calculation of base emission rates at 65% and 94% chlorinated content (by weight) simplifies the consideration of the variety of modeling scenarios summarized on pages D-25 through D-204.

Table D-26. ISCST3 Modeling Parameters - General Assumptions

General Assumptions

In conducting the ISCST3 modeling for the generic facilities, the following general assumptions were used:

- All facilities modeled as volume sources.
- Dispersion coefficient set to URBAN, receptor height set to ZERO
- Twenty brake jobs per week (1040 per year) for facility G-01, 60 per week (3120 per year) for facility G-02 and G-03. This estimate is based on data collected from the Brake Cleaner and Perc-Containing Automotive Products (Manufacturers) Survey, the Automotive Service Facility Questionnaire (Facility Survey), and facility site visits (see Appendix B) and is designed such that product usage on other activities is automatically included (see Appendix F).
- One 19-oz can (539 grams) at 65% and 94% component content per brake job, which is the average chlorinated can size and usage rate supported by the site visits, the Facility Survey, and the Norton Study.
- Facility operating schedule of 2964 hours per year (57 hours per week), which is the average operating schedule reported during the site visits.
- No more than one brake job per hour for facility G-01; no more than 2 brake jobs per hour for facilities G-02 and G-03. Based on the operating hours at a facility, the estimated number of service bays, and the reported jobs per week, multiple brake jobs can occur simultaneously at the G-02 and G-03 facilities. This estimate affects acute health impacts.
- Polar receptor network, centered on source centroid, with 2160 receptors (polar network consists of 60 radials separated by angular distances of 6 degrees and having receptors at the following radial distances: 20, 30, 40, 50, 60, 70, 80, 90, 100, 120, 140, 150, 160, 180, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000, 2000, 3000, 4000, 5000, 6000, 7000, 8000, 9000, 10000, and 23000 meters).

The generic facilities considered a number of scenarios. Table D-27 summarizes the modeling scenarios that were considered under generic facility modeling.

Table D-27. Representative Product Formulations Used in Generic Facility Modeling

Product Category			
Brake Cleaners	**Carburetor Cleaners**	**Engine Degreasers**	**General Degreasers**
All met locations: ➜ 94% Perc ➜ 65% Perc Four met locations[1]: ➜ 55% Perc, 25% MeCl ➜ 40% Perc, 30% MeCl, 20% TCE ➜ 55% Perc, 43% TCE	Single composite based on[2]: ➜ 68% Perc ➜ 57% MeCl	Single composite based on[2]: ➜ 47% Perc ➜ 99% TCE	Single composite based on[2]: ➜ 24% Perc ➜ 10% Perc, 86% TCE ➜ 51% MeCl ➜ 98% TCE

1. Burbank, Anaheim, Oakland and default met for chronic effects; Fresno, Concord, Mather, and default met for acute effects.
2. Composite is based on average of 10 met sets. Default met is considered independently.

For more information on how composite formulations were derived, please see Appendix F.

Due to the volume of data, the multicomponent products were calculated for the met data sets that gave the lowest, mid-range, and highest potential health impacts for acute and chronic emissions. For chronic emissions (cancer and chronic impacts), the met data sets presented are Oakland (low), Burbank (mid-range), and Anaheim (high). For acute emissions, the met data sets presented are Mather (low), Fresno (mid-range), and Concord (high). Additionally, default meteorology was considered for each of the multicomponent scenarios and composite formulations. Any representative formulation listed within this Appendix does not necessarily represent a specific product from a specific manufacturer. Generic facility modeling results are summarized on pages D-25 through D-204.

Risk Asse ent Summary - 3 Generic Facilities
Brake Cleaners

Facility G-01 - 65% Perc

Met Set: Burbank

op hrs/wk: 57

Acu Rate [g/s]: 0.0973
Ann Rate [g/s]: 0.0341

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	162.66	32.73	13.93	0.1585	12417.79	0.0604
30	86.38	17.38	7.40	0.0842	9254.67	0.0450
40	53.51	10.77	4.58	0.0521	7114.91	0.0346
50	36.43	7.33	3.12	0.0355	5625.45	0.0274
60	26.41	5.31	2.26	0.0257	4555.43	0.0222
80	15.71	3.16	1.35	0.0153	3163.52	0.0154
100	10.41	2.09	0.89	0.0101	2329.1	0.0113
150	4.86	0.98	0.42	0.0047	1281.78	0.0062
200	2.81	0.57	0.24	0.0027	820.22	0.0040
250	1.83	0.37	0.16	0.0018	575.61	0.0028
500	0.48	0.10	0.04	0.0005	189.47	0.0009
1000	0.12	0.02	0.01	0.0001	64.58	0.0003

Met Set: Concord

op hrs/wk: 57

Acu Rate [g/s]: 0.0973
Ann Rate [g/s]: 0.0341

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	161.57	32.51	13.84	0.1574	12417.79	0.0604
30	86.18	17.34	7.38	0.0840	9254.67	0.0450
40	53.59	10.78	4.59	0.0522	7114.91	0.0346
50	36.58	7.36	3.13	0.0356	5625.45	0.0274
60	26.58	5.35	2.28	0.0259	4555.43	0.0222
80	15.87	3.19	1.36	0.0155	3163.52	0.0154
100	10.55	2.12	0.90	0.0103	2329.1	0.0113
150	4.95	1.00	0.42	0.0048	1281.78	0.0062
200	2.86	0.58	0.24	0.0028	820.22	0.0040
250	1.87	0.38	0.16	0.0018	575.61	0.0028
500	0.49	0.10	0.04	0.0005	189.47	0.0009
1000	0.14	0.03	0.01	0.0001	64.58	0.0003

Met Set: Fresno

op hrs/wk: 57

Acu Rate [g/s]: 0.0973
Ann Rate [g/s]: 0.0341

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	130.29	26.21	11.16	0.1269	11155.5	0.0543
30	68.87	13.86	5.90	0.0671	8402.65	0.0409
40	42.46	8.54	3.64	0.0414	6521.95	0.0317
50	28.78	5.79	2.46	0.0280	5186.31	0.0252
60	20.79	4.18	1.78	0.0203	4214.74	0.0205
80	12.29	2.47	1.05	0.0120	2937.5	0.0143
100	8.11	1.63	0.69	0.0079	2165.55	0.0105
150	3.76	0.76	0.32	0.0037	1191.61	0.0058
200	2.16	0.43	0.18	0.0021	761.38	0.0037
250	1.40	0.28	0.12	0.0014	533.41	0.0026
500	0.36	0.07	0.03	0.0004	174.25	0.0008
1000	0.09	0.02	0.01	0.0001	58.67	0.0003

Met Set: LAX

op hrs/wk: 57

Acu Rate [g/s]: 0.0973
Ann Rate [g/s]: 0.0341

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	94.40	18.99	8.08	0.0920	8382.67	0.0408
30	50.61	10.18	4.33	0.0493	5996.68	0.0292
40	31.53	6.34	2.70	0.0307	4610.19	0.0224
50	21.53	4.33	1.84	0.0210	3645.08	0.0177
60	15.65	3.15	1.34	0.0152	2951.75	0.0144
80	9.34	1.88	0.80	0.0091	2049.84	0.0100
100	6.20	1.25	0.53	0.0060	1509.17	0.0073
150	2.91	0.59	0.25	0.0028	953.49	0.0046
200	1.68	0.34	0.14	0.0016	744.04	0.0036
250	1.10	0.22	0.09	0.0011	611.79	0.0030
500	0.29	0.06	0.02	0.0003	331.07	0.0016
1000	0.08	0.02	0.01	0.0001	181.35	0.0009

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Facility G-01 - 65% Perc (cont.)

Met Set: McClellan

op hrs/wk: 57

Acu Rate [g/s]: 0.0973
Ann Rate [g/s]: 0.0341

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	101.05	20.33	8.65	0.0985	11007.62	0.0536
30	53.37	10.74	4.57	0.0520	8490.17	0.0413
40	32.93	6.63	2.82	0.0321	6665.94	0.0324
50	22.34	4.49	1.91	0.0218	5343.61	0.0260
60	16.15	3.25	1.38	0.0157	4368.46	0.0213
80	9.57	1.93	0.82	0.0093	3069.77	0.0149
100	6.32	1.27	0.54	0.0062	2275.44	0.0111
150	2.93	0.59	0.25	0.0029	1262.34	0.0061
200	1.69	0.34	0.14	0.0016	810.41	0.0039
250	1.09	0.22	0.09	0.0011	569.61	0.0028
500	0.28	0.06	0.02	0.0003	187.81	0.0009
1000	0.07	0.01	0.01	0.0001	63.95	0.0003

Met Set: Mather

op hrs/wk: 57

Acu Rate [g/s]: 0.0973
Ann Rate [g/s]: 0.0341

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	96.52	19.42	8.27	0.0940	8470.5	0.0412
30	50.95	10.25	4.36	0.0496	5762.29	0.0280
40	31.40	6.32	2.69	0.0306	4464.6	0.0217
50	21.29	4.28	1.82	0.0207	3545.55	0.0172
60	15.38	3.09	1.32	0.0150	2878.6	0.0140
80	9.10	1.83	0.78	0.0089	2004.05	0.0097
100	6.00	1.21	0.51	0.0058	1477.56	0.0072
150	2.78	0.56	0.24	0.0027	819.7	0.0040
200	1.60	0.32	0.14	0.0016	527.32	0.0026
250	1.03	0.21	0.09	0.0010	371.22	0.0018
500	0.27	0.05	0.02	0.0003	122.78	0.0006
1000	0.07	0.01	0.01	0.0001	41.91	0.0002

Met Set: Oakland

op hrs/wk: 57

Acu Rate [g/s]: 0.0973
Ann Rate [g/s]: 0.0341

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	91.71	18.45	7.85	0.0894	10519.95	0.0512
30	49.17	9.89	4.21	0.0479	8021.08	0.0390
40	30.65	6.17	2.62	0.0299	6281.76	0.0306
50	20.94	4.21	1.79	0.0204	5029.68	0.0245
60	15.22	3.06	1.30	0.0148	4106.19	0.0200
80	9.09	1.83	0.78	0.0089	2877.44	0.0140
100	6.04	1.22	0.52	0.0059	2127.42	0.0103
150	2.83	0.57	0.24	0.0028	1174.14	0.0057
200	1.64	0.33	0.14	0.0016	750.86	0.0037
250	1.07	0.22	0.09	0.0010	526.14	0.0026
500	0.28	0.06	0.02	0.0003	171.69	0.0008
1000	0.07	0.01	0.01	0.0001	57.64	0.0003

Met Set: Redding

op hrs/wk: 57

Acu Rate [g/s]: 0.0973
Ann Rate [g/s]: 0.0341

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	112.58	22.65	9.64	0.1097	11399.88	0.0555
30	59.73	12.02	5.12	0.0582	8620.94	0.0419
40	36.97	7.44	3.17	0.0360	6686.72	0.0325
50	25.14	5.06	2.15	0.0245	5317.3	0.0259
60	18.21	3.66	1.56	0.0177	4322.64	0.0210
80	10.81	2.17	0.93	0.0105	3016	0.0147
100	7.16	1.44	0.61	0.0070	2226.16	0.0108
150	3.33	0.67	0.29	0.0032	1228.45	0.0060
200	1.92	0.39	0.16	0.0019	789.26	0.0038
250	1.25	0.25	0.11	0.0012	555.62	0.0027
500	0.32	0.06	0.03	0.0003	183.77	0.0009
1000	0.08	0.02	0.01	0.0001	62.72	0.0003

Facility G-01 % Perc (cont.)

Met Set: Sacramento

op hrs/wk: 57

Acu Rate [g/s]: 0.0973
Ann Rate [g/s]: 0.0341

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	105.61	21.25	9.04	0.1029	11198.97	0.0545
30	55.98	11.26	4.79	0.0545	8535.41	0.0415
40	34.62	6.97	2.96	0.0337	6652.15	0.0324
50	23.52	4.73	2.01	0.0229	5306.72	0.0258
60	17.03	3.43	1.46	0.0166	4323.84	0.0210
80	10.10	2.03	0.86	0.0098	3025.89	0.0147
100	6.68	1.34	0.57	0.0065	2237.71	0.0109
150	3.11	0.63	0.27	0.0030	1238.17	0.0060
200	1.79	0.36	0.15	0.0017	794.14	0.0039
250	1.16	0.23	0.10	0.0011	557.98	0.0027
500	0.30	0.06	0.03	0.0003	184.01	0.0009
1000	0.08	0.02	0.01	0.0001	62.75	0.0003

Met Set: Anaheim

op hrs/wk: 57

Acu Rate [g/s]: 0.0973
Ann Rate [g/s]: 0.0341

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	219.02	44.06	18.76	0.2134	12413.44	0.0604
30	115.95	23.33	9.93	0.1130	9249.49	0.0450
40	71.59	14.40	6.13	0.0697	7109.62	0.0346
50	48.59	9.78	4.16	0.0473	5620.4	0.0273
60	35.13	7.07	3.01	0.0342	4550.74	0.0221
80	20.81	4.19	1.78	0.0203	3159.6	0.0154
100	13.75	2.77	1.18	0.0134	2325.83	0.0113
150	6.38	1.28	0.55	0.0062	1279.62	0.0062
200	3.67	0.74	0.31	0.0036	818.68	0.0040
250	2.38	0.48	0.20	0.0023	574.45	0.0028
500	0.61	0.12	0.05	0.0006	189.33	0.0009
1000	0.16	0.03	0.01	0.0002	64.55	0.0003

Met Set: Default - 0

op hrs/wk: 57

Acu Rate [g/s]: 0.0973
Ann Rate [g/s]: 0.0341

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Envelope	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	307.03	61.77	26.29	0.2991	11342.73	0.0552
30	229.98	46.27	19.70	0.2241	8496.33	0.0413
40	178.09	35.83	15.25	0.1735	6579.11	0.0320
50	141.80	28.53	12.14	0.1382	5238.72	0.0255
60	115.56	23.25	9.90	0.1126	4269.33	0.0208
80	81.09	16.32	6.95	0.0790	2995.85	0.0146
100	60.18	12.11	5.15	0.0586	2223.11	0.0108
150	33.55	6.75	2.87	0.0327	1239.31	0.0060
200	21.63	4.35	1.85	0.0211	799.09	0.0039
250	15.25	3.07	1.31	0.0149	563.57	0.0027
500	5.08	1.02	0.43	0.0049	187.51	0.0009
1000	1.74	0.35	0.15	0.0017	64.26	0.0003

Risk Assessment Summary - 3 Generic Facilities
Brake Cleaners

Facility G-01 - 94% Perc

Met Set: Burbank

op hrs/wk: 57

Acu Rate [g/s]: 0.1407
Ann Rate [g/s]: 0.0494

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	162.66	47.41	20.18	0.2296	12417.79	0.0874
30	86.38	25.18	10.72	0.1219	9254.67	0.0651
40	53.51	15.60	6.64	0.0755	7114.91	0.0501
50	36.43	10.62	4.52	0.0514	5625.45	0.0396
60	26.41	7.70	3.28	0.0373	4555.43	0.0320
80	15.71	4.58	1.95	0.0222	3163.52	0.0223
100	10.41	3.03	1.29	0.0147	2329.1	0.0164
150	4.86	1.42	0.60	0.0069	1281.78	0.0090
200	2.81	0.82	0.35	0.0040	820.22	0.0058
250	1.83	0.53	0.23	0.0026	575.61	0.0040
500	0.48	0.14	0.06	0.0007	189.47	0.0013
1000	0.12	0.03	0.01	0.0002	64.58	0.0005

Met Set: Concord

op hrs/wk: 57

Acu Rate [g/s]: 0.1407
Ann Rate [g/s]: 0.0494

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	161.57	47.09	20.05	0.2280	12417.79	0.0874
30	86.18	25.12	10.69	0.1216	9254.67	0.0651
40	53.59	15.62	6.65	0.0756	7114.91	0.0501
50	36.58	10.66	4.54	0.0516	5625.45	0.0396
60	26.58	7.75	3.30	0.0375	4555.43	0.0320
80	15.87	4.63	1.97	0.0224	3163.52	0.0223
100	10.55	3.07	1.31	0.0149	2329.1	0.0164
150	4.95	1.44	0.61	0.0070	1281.78	0.0090
200	2.86	0.83	0.35	0.0040	820.22	0.0058
250	1.87	0.55	0.23	0.0026	575.61	0.0040
500	0.49	0.14	0.06	0.0007	189.47	0.0013
1000	0.14	0.04	0.02	0.0002	64.58	0.0005

Met Set: Fresno

op hrs/wk: 57

Acu Rate [g/s]: 0.1407
Ann Rate [g/s]: 0.0494

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	130.29	37.97	16.16	0.1839	11155.5	0.0785
30	68.87	20.07	8.54	0.0972	8402.65	0.0591
40	42.46	12.38	5.27	0.0599	6521.95	0.0459
50	28.78	8.39	3.57	0.0406	5186.31	0.0365
60	20.79	6.06	2.58	0.0293	4214.74	0.0297
80	12.29	3.58	1.52	0.0173	2937.5	0.0207
100	8.11	2.36	1.01	0.0114	2165.55	0.0152
150	3.76	1.10	0.47	0.0053	1191.61	0.0084
200	2.16	0.63	0.27	0.0030	761.38	0.0054
250	1.40	0.41	0.17	0.0020	533.41	0.0038
500	0.36	0.10	0.04	0.0005	174.25	0.0012
1000		0.03	0.01	0.0001	58.67	0.0004

Met Set: LAX

op hrs/wk: 57

Acu Rate [g/s]: 0.1407
Ann Rate [g/s]: 0.0494

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	94.40	27.51	11.71	0.1332	8382.67	0.0590
30	50.61	14.75	6.28	0.0714	5996.68	0.0422
40	31.53	9.19	3.91	0.0445	4610.19	0.0324
50	21.53	6.28	2.67	0.0304	3645.08	0.0256
60	15.65	4.56	1.94	0.0221	2951.75	0.0208
80	9.34	2.72	1.16	0.0132	2049.84	0.0144
100	6.20	1.81	0.77	0.0088	1509.17	0.0106
150	2.91	0.85	0.36	0.0041	953.49	0.0067
200	1.68	0.49	0.21	0.0024	744.04	0.0052
250	1.10	0.32	0.14	0.0016	611.79	0.0043
500	0.29	0.08	0.04	0.0004	331.07	0.0023
1000	00	0.08	0.02	0.0001	181.35	0.0013

Facility G-01 % Perc (cont.)

Met Set: McClellan

op hrs/wk: 57

Acu Rate [g/s]: 0.1407
Ann Rate [g/s]: 0.0494

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	101.05	29.45	12.54	0.1426	11007.62	0.0774
30	53.37	15.56	6.62	0.0753	8490.17	0.0597
40	32.93	9.60	4.09	0.0465	6665.94	0.0469
50	22.34	6.51	2.77	0.0315	5343.61	0.0376
60	16.15	4.71	2.00	0.0228	4368.46	0.0307
80	9.57	2.79	1.19	0.0135	3069.77	0.0216
100	6.32	1.84	0.78	0.0089	2275.44	0.0160
150	2.93	0.85	0.36	0.0041	1262.34	0.0089
200	1.69	0.49	0.21	0.0024	810.41	0.0057
250	1.09	0.32	0.14	0.0015	569.61	0.0040
500	0.28	0.08	0.03	0.0004	187.81	0.0013
1000	0.07	0.02	0.01	0.0001	63.95	0.0004

Met Set: Mather

op hrs/wk: 57

Acu Rate [g/s]: 0.1407
Ann Rate [g/s]: 0.0494

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	96.52	28.13	11.98	0.1362	8470.5	0.0596
30	50.95	14.85	6.32	0.0719	5762.29	0.0405
40	31.40	9.15	3.90	0.0443	4464.6	0.0314
50	21.29	6.21	2.64	0.0300	3545.55	0.0249
60	15.38	4.48	1.91	0.0217	2878.6	0.0203
80	9.10	2.65	1.13	0.0128	2004.05	0.0141
100	6.00	1.75	0.74	0.0085	1477.56	0.0104
150	2.78	0.81	0.34	0.0039	819.7	0.0058
200	1.60	0.47	0.20	0.0023	527.32	0.0037
250	1.03	0.30	0.13	0.0015	371.22	0.0026
500	0.27	0.08	0.03	0.0004	122.78	0.0009
1000	0.07	0.02	0.01	0.0001	41.91	0.0003

Met Set: Oakland

op hrs/wk: 57

Acu Rate [g/s]: 0.1407
Ann Rate [g/s]: 0.0494

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	91.71	26.73	11.38	0.1294	10519.95	0.0740
30	49.17	14.33	6.10	0.0694	8021.08	0.0564
40	30.65	8.93	3.80	0.0433	6281.76	0.0442
50	20.94	6.10	2.60	0.0296	5029.68	0.0354
60	15.22	4.44	1.89	0.0215	4106.19	0.0289
80	9.09	2.65	1.13	0.0128	2877.44	0.0202
100	6.04	1.76	0.75	0.0085	2127.42	0.0150
150	2.83	0.82	0.35	0.0040	1174.14	0.0083
200	1.64	0.48	0.20	0.0023	750.86	0.0053
250	1.07	0.31	0.13	0.0015	526.14	0.0037
500	0.28	0.08	0.03	0.0004	171.69	0.0012
1000	0.07	0.02	0.01	0.0001	57.64	0.0004

Met Set: Redding

op hrs/wk: 57

Acu Rate [g/s]: 0.1407
Ann Rate [g/s]: 0.0494

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	112.58	32.81	13.97	0.1589	11399.88	0.0802
30	59.73	17.41	7.41	0.0843	8620.94	0.0606
40	36.97	10.78	4.59	0.0522	6686.72	0.0470
50	25.14	7.33	3.12	0.0355	5317.3	0.0374
60	18.21	5.31	2.26	0.0257	4322.64	0.0304
80	10.81	3.15	1.34	0.0153	3016	0.0212
100	7.16	2.09	0.89	0.0101	2226.16	0.0157
150	3.33	0.97	0.41	0.0047	1228.45	0.0086
200	1.92	0.56	0.24	0.0027	789.26	0.0056
250	1.25	0.36	0.16	0.0018	555.62	0.0039
500	0.32	0.09	0.04	0.0005	183.77	0.0013
1000	0.08	0.02	0.01	0.0001	62.72	0.0004

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Facility G-01 - 94% Perc (cont.)

Met Set: Sacramento

op hrs/wk: 57

Acu Rate [g/s]: 0.1407
Ann Rate [g/s]: 0.0494

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	105.61	30.78	13.10	0.1491	11198.97	0.0788
30	55.98	16.32	6.95	0.0790	8535.41	0.0600
40	34.62	10.09	4.30	0.0489	6652.15	0.0468
50	23.52	6.86	2.92	0.0332	5306.72	0.0373
60	17.03	4.96	2.11	0.0240	4323.84	0.0304
80	10.10	2.94	1.25	0.0143	3025.89	0.0213
100	6.68	1.95	0.83	0.0094	2237.71	0.0157
150	3.11	0.91	0.39	0.0044	1238.17	0.0087
200	1.79	0.52	0.22	0.0025	794.14	0.0056
250	1.16	0.34	0.14	0.0016	557.98	0.0039
500	0.30	0.09	0.04	0.0004	184.01	0.0013
1000	0.08	0.02	0.01	0.0001	62.75	0.0004

Met Set: Anaheim

op hrs/wk: 57

Acu Rate [g/s]: 0.1407
Ann Rate [g/s]: 0.0494

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	219.02	63.84	27.17	0.3091	12413.44	0.0873
30	115.95	33.79	14.39	0.1637	9249.49	0.0651
40	71.59	20.87	8.88	0.1010	7109.62	0.0500
50	48.59	14.16	6.03	0.0686	5620.4	0.0395
60	35.13	10.24	4.36	0.0496	4550.74	0.0320
80	20.81	6.07	2.58	0.0294	3159.6	0.0222
100	13.75	4.01	1.71	0.0194	2325.83	0.0164
150	6.38	1.86	0.79	0.0090	1279.62	0.0090
200	3.67	1.07	0.46	0.0052	818.68	0.0058
250	2.38	0.69	0.30	0.0034	574.45	0.0040
500	0.61	0.18	0.08	0.0009	189.33	0.0013
1000	0.16	0.05	0.02	0.0002	64.55	0.0005

Met Set: Default - 0

op hrs/wk: 57

Acu Rate [g/s]: 0.1407
Ann Rate [g/s]: 0.0494

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Envelope	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	307.03	89.49	38.09	0.4334	11342.73	0.0798
30	229.98	67.03	28.53	0.3246	8496.33	0.0598
40	178.09	51.91	22.09	0.2514	6579.11	0.0463
50	141.80	41.33	17.59	0.2001	5238.72	0.0369
60	115.56	33.68	14.34	0.1631	4269.33	0.0300
80	81.09	23.64	10.06	0.1145	2995.85	0.0211
100	60.18	17.54	7.47	0.0849	2223.11	0.0156
150	33.55	9.78	4.16	0.0473	1239.31	0.0087
200	21.63	6.30	2.68	0.0305	799.09	0.0056
250	15.25	4.45	1.89	0.0215	563.57	0.0040
500	5.08	1.48	0.63	0.0072	187.51	0.0013
1000	1.74	0.51	0.22	0.0025	64.26	0.0005

Risk Asses ent Summary - 3 Generic Facilities
Brake Cleaners

Facility G-02 - 65% Perc

Met Set: Burbank

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.87	59.13	25.17	0.2863	5528.38	0.0538
30	71.96	43.48	18.51	0.2105	4845.41	0.0471
40	46.45	28.06	11.95	0.1359	4048.28	0.0394
50	32.37	19.56	8.32	0.0947	3418.07	0.0333
60	23.83	14.40	6.13	0.0697	2918.05	0.0284
80	14.48	8.75	3.72	0.0424	2193.5	0.0213
100	9.73	5.88	2.50	0.0285	1708.42	0.0166
150	4.64	2.80	1.19	0.0136	1026.4	0.0100
200	2.71	1.64	0.70	0.0079	690.62	0.0067
250	1.77	1.07	0.46	0.0052	500.6	0.0049
500	0.47	0.28	0.12	0.0014	176.69	0.0017
1000	0.12	0.07	0.03	0.0004	62.47	0.0006

Met Set: Concord

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.28	58.77	25.02	0.2846	5532.86	0.0538
30	71.32	43.09	18.34	0.2087	4845.41	0.0471
40	46.19	27.91	11.88	0.1351	4048.28	0.0394
50	32.27	19.50	8.30	0.0944	3418.07	0.0333
60	23.83	14.40	6.13	0.0697	2918.05	0.0284
80	14.54	8.78	3.74	0.0425	2193.5	0.0213
100	9.80	5.92	2.52	0.0287	1708.42	0.0166
150	4.70	2.84	1.21	0.0138	1026.4	0.0100
200	2.75	1.66	0.71	0.0080	690.62	0.0067
250	1.81	1.09	0.47	0.0053	500.6	0.0049
500	0.48	0.29	0.12	0.0014	176.69	0.0017
1000	0.14	0.08	0.04	0.0004	62.47	0.0006

Met Set: Fresno

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	72.47	43.78	18.64	0.2120	5150.55	0.0501
30	57.46	34.72	14.78	0.1681	4329.74	0.0421
40	37.02	22.37	9.52	0.1083	3636.07	0.0354
50	25.71	15.53	6.61	0.0752	3085.18	0.0300
60	18.87	11.40	4.85	0.0552	2652.23	0.0258
80	11.40	6.89	2.93	0.0334	2011.93	0.0196
100	7.62	4.60	1.96	0.0223	1575.29	0.0153
150	3.60	2.17	0.93	0.0105	951.66	0.0093
200	2.09	1.26	0.54	0.0061	641.05	0.0062
250	1.36	0.82	0.35	0.0040	464.48	0.0045
500	0.35	0.21	0.09	0.0010	162.91	0.0016
1000	0.09	0.05	0.02	0.0003	56.88	0.0006

Met Set: LAX

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	46.21	27.92	11.88	0.1352	4438.48	0.0432
30	41.73	25.21	10.73	0.1221	3329.4	0.0324
40	27.17	16.42	6.99	0.0795	2623.13	0.0255
50	19.02	11.49	4.89	0.0556	2214.78	0.0215
60	14.06	8.49	3.62	0.0411	1890.78	0.0184
80	8.58	5.18	2.21	0.0251	1421.31	0.0138
100	5.79	3.50	1.49	0.0169	1161.72	0.0113
150	2.77	1.67	0.71	0.0081	864.8	0.0084
200	1.62	0.98	0.42	0.0047	690.47	0.0067
250	1.07	0.65	0.28	0.0031	576.01	0.0056
500	0.29	0.18	0.07	0.0008	321.35	0.0031
1000	0.08	0.05	0.02	0.0002	178.82	0.0017

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Facility G-02 - 65% Perc (cont.)

Met Set: McClellan

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	64.21	38.79	16.51	0.1879	4940.31	0.0481
30	44.73	27.02	11.50	0.1309	4201.41	0.0409
40	28.75	17.37	7.39	0.0841	3602.76	0.0351
50	19.97	12.07	5.14	0.0584	3101.33	0.0302
60	14.66	8.86	3.77	0.0429	2686.93	0.0261
80	8.86	5.35	2.28	0.0259	2061.66	0.0201
100	5.94	3.59	1.53	0.0174	1627.16	0.0158
150	2.81	1.70	0.72	0.0082	995.28	0.0097
200	1.63	0.98	0.42	0.0048	675.35	0.0066
250	1.06	0.64	0.27	0.0031	491.77	0.0048
500	0.28	0.17	0.07	0.0008	174.75	0.0017
1000	0.07	0.04	0.02	0.0002	61.83	0.0006

Met Set: Mather

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	57.90	34.98	14.89	0.1694	3794.23	0.0369
30	42.67	25.78	10.97	0.1248	3373.6	0.0328
40	27.44	16.58	7.06	0.0803	2579.42	0.0251
50	19.05	11.51	4.90	0.0557	2118.71	0.0206
60	13.97	8.44	3.59	0.0409	1819.33	0.0177
80	8.44	5.10	2.17	0.0247	1377.52	0.0134
100	5.64	3.41	1.45	0.0165	1077.14	0.0105
150	2.66	1.61	0.68	0.0078	649.65	0.0063
200	1.55	0.94	0.40	0.0045	438.54	0.0043
250	1.01	0.61	0.26	0.0030	319.33	0.0031
500	0.26	0.16	0.07	0.0008	113.98	0.0011
1000	0.07	0.04	0.02	0.0002	40.48	0.0004

Met Set: Oakland

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	48.31	29.19	12.42	0.1413	4685.59	0.0456
30	40.60	24.53	10.44	0.1188	4028.18	0.0392
40	26.41	15.96	6.79	0.0773	3439.11	0.0335
50	18.50	11.18	4.76	0.0541	2941.66	0.0286
60	13.67	8.26	3.52	0.0400	2531.88	0.0246
80	8.35	5.04	2.15	0.0244	1940.79	0.0189
100	5.63	3.40	1.45	0.0165	1529.51	0.0149
150	2.70	1.63	0.69	0.0079	931.7	0.0091
200	1.58	0.95	0.41	0.0046	629.79	0.0061
250	1.04	0.63	0.27	0.0030	457.07	0.0044
500	0.28	0.17	0.07	0.0008	160.49	0.0016
1000	0.07	0.04	0.02	0.0002	55.89	0.0005

Met Set: Redding

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	68.47	41.37	17.61	0.2003	5262.77	0.0512
30	49.83	30.11	12.82	0.1458	4405.79	0.0429
40	32.16	19.43	8.27	0.0941	3722.07	0.0362
50	22.38	13.52	5.76	0.0655	3168.63	0.0308
60	16.46	9.94	4.23	0.0482	2722.05	0.0265
80	9.99	6.04	2.57	0.0292	2063.9	0.0201
100	6.70	4.05	1.72	0.0196	1616.3	0.0157
150	3.18	1.92	0.82	0.0093	978.01	0.0095
200	1.86	1.12	0.48	0.0054	660.08	0.0064
250	1.21	0.73	0.31	0.0035	479.17	0.0047
500	0.32	0.19	0.08	0.0009	170.6	0.0017
1000	0.08	0.05	0.02	0.0002	60.59	0.0006

Facility G-02 % Perc (cont.)

Met Set: Sacramento

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	63.33	38.26	16.29	0.1853	5079.25	0.0494
30	46.73	28.23	12.02	0.1367	4307.48	0.0419
40	30.14	18.21	7.75	0.0882	3660.84	0.0356
50	20.96	12.66	5.39	0.0613	3130.22	0.0305
60	15.41	9.31	3.96	0.0451	2698.02	0.0263
80	9.34	5.64	2.40	0.0273	2055.28	0.0200
100	6.27	3.79	1.61	0.0183	1614.56	0.0157
150	2.97	1.79	0.76	0.0087	981.41	0.0095
200	1.73	1.05	0.44	0.0051	664.04	0.0065
250	1.13	0.68	0.29	0.0033	482.83	0.0047
500	0.30	0.18	0.08	0.0009	171.3	0.0017
1000	0.08	0.05	0.02	0.0002	60.66	0.0006

Met Set: Anaheim

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	125.69	75.94	32.32	0.3677	5444.38	0.0530
30	96.66	58.40	24.86	0.2828	4844.11	0.0471
40	62.33	37.66	16.03	0.1824	4046.7	0.0394
50	43.33	26.18	11.14	0.1268	3416.34	0.0332
60	31.84	19.24	8.19	0.0932	2916.25	0.0284
80	19.26	11.64	4.95	0.0563	2191.72	0.0213
100	12.90	7.79	3.32	0.0377	1706.75	0.0166
150	6.11	3.69	1.57	0.0179	1025.07	0.0100
200	3.55	2.14	0.91	0.0104	689.56	0.0067
250	2.32	1.40	0.60	0.0068	499.75	0.0049
500	0.60	0.36	0.15	0.0018	176.33	0.0017
1000	0.16	0.10	0.04	0.0005	62.42	0.0006

Met Set: Default - 0

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Envelope	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	142.83	86.29	36.73	0.4179	5276.51	0.0513
30	117.98	71.28	30.34	0.3452	4358.64	0.0424
40	98.78	59.68	25.40	0.2890	3649.09	0.0355
50	83.77	50.61	21.54	0.2451	3094.79	0.0301
60	71.89	43.44	18.49	0.2103	2656.01	0.0258
80	54.62	33.00	14.05	0.1598	2017.70	0.0196
100	42.94	25.94	11.04	0.1256	1586.22	0.0154
150	26.25	15.86	6.75	0.0768	969.72	0.0094
200	17.86	10.79	4.59	0.0523	659.99	0.0064
250	13.05	7.89	3.36	0.0382	482.19	0.0047
500	4.69	2.83	1.21	0.0137	173.33	0.0017
1000	1.68	1.01	0.43	0.0049	61.90	0.0006

Risk Assessment Summary - 3 Generic Facilities
Brake Cleaners

Facility G-02 - 94% Perc

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Met Set: Burbank

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.87	85.52	36.40	0.4141	5528.38	0.0778
30	71.96	62.88	26.77	0.3045	4845.41	0.0682
40	46.45	40.59	17.28	0.1965	4048.28	0.0570
50	32.37	28.28	12.04	0.1370	3418.07	0.0481
60	23.83	20.82	8.86	0.1008	2918.05	0.0411
80	14.48	12.65	5.39	0.0613	2193.5	0.0309
100	9.73	8.50	3.62	0.0412	1708.42	0.0240
150	4.64	4.05	1.73	0.0196	1026.4	0.0144
200	2.71	2.37	1.01	0.0115	690.62	0.0097
250	1.77	1.55	0.66	0.0075	500.6	0.0070
500	0.47	0.41	0.17	0.0020	176.69	0.0025
1000	0.12	0.10	0.04	0.0005	62.47	0.0009

Met Set: Concord

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.28	85.00	36.18	0.4116	5532.86	0.0779
30	71.32	62.32	26.53	0.3018	4845.41	0.0682
40	46.19	40.36	17.18	0.1954	4048.28	0.0570
50	32.27	28.20	12.00	0.1365	3418.07	0.0481
60	23.83	20.82	8.86	0.1008	2918.05	0.0411
80	14.54	12.70	5.41	0.0615	2193.5	0.0309
100	9.80	8.56	3.65	0.0415	1708.42	0.0240
150	4.70	4.11	1.75	0.0199	1026.4	0.0144
200	2.75	2.40	1.02	0.0116	690.62	0.0097
250	1.81	1.58	0.67	0.0077	500.6	0.0070
500	0.48	0.42	0.18	0.0020	176.69	0.0025
1000	0.14	0.12	0.05	0.0006	62.47	0.0009

Met Set: Fresno

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	72.47	63.32	26.96	0.3067	5150.55	0.0725
30	57.46	50.21	21.37	0.2431	4329.74	0.0609
40	37.02	32.35	13.77	0.1566	3636.07	0.0512
50	25.71	22.47	9.56	0.1088	3085.18	0.0434
60	18.87	16.49	7.02	0.0798	2652.23	0.0373
80	11.40	9.96	4.24	0.0482	2011.93	0.0283
100	7.62	6.66	2.83	0.0322	1575.29	0.0222
150	3.60	3.15	1.34	0.0152	951.66	0.0134
200	2.09	1.83	0.78	0.0088	641.05	0.0090
250	1.36	1.19	0.51	0.0058	464.48	0.0065
500	0.35	0.31	0.13	0.0015	162.91	0.0023
1000		0.08	0.03	0.0004	56.88	0.0008

Met Set: LAX

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	46.21	40.38	17.19	0.1955	4438.48	0.0625
30	41.73	36.46	15.52	0.1766	3329.4	0.0469
40	27.17	23.74	10.11	0.1150	2623.13	0.0369
50	19.02	16.62	7.07	0.0805	2214.78	0.0312
60	14.06	12.29	5.23	0.0595	1890.78	0.0266
80	8.58	7.50	3.19	0.0363	1421.31	0.0200
100	5.79	5.06	2.15	0.0245	1161.72	0.0164
150	2.77	2.42	1.03	0.0117	864.8	0.0122
200	1.62	1.42	0.60	0.0069	690.47	0.0097
250	1.07	0.93	0.40	0.0045	576.01	0.0081
500	0.29	0.25	0.11	0.0012	321.35	0.0045
1000	0.08	0.07	0.03	0.0003	178.82	0.0025

Facility G-02 % Perc (cont.)

Met Set: McClellan

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	64.21	56.11	23.88	0.2717	4940.31	0.0695
30	44.73	39.08	16.64	0.1893	4201.41	0.0591
40	28.75	25.12	10.69	0.1217	3602.76	0.0507
50	19.97	17.45	7.43	0.0845	3101.33	0.0437
60	14.66	12.81	5.45	0.0620	2686.93	0.0378
80	8.86	7.74	3.30	0.0375	2061.66	0.0290
100	5.94	5.19	2.21	0.0251	1627.16	0.0229
150	2.81	2.46	1.05	0.0119	995.28	0.0140
200	1.63	1.42	0.61	0.0069	675.35	0.0095
250	1.06	0.93	0.39	0.0045	491.77	0.0069
500	0.28	0.24	0.10	0.0012	174.75	0.0025
1000	0.07	0.06	0.03	0.0003	61.83	0.0009

Met Set: Mather

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	57.90	50.59	21.54	0.2450	3794.23	0.0534
30	42.67	37.28	15.87	0.1806	3373.6	0.0475
40	27.44	23.98	10.21	0.1161	2579.42	0.0363
50	19.05	16.65	7.09	0.0806	2118.71	0.0298
60	13.97	12.21	5.20	0.0591	1819.33	0.0256
80	8.44	7.37	3.14	0.0357	1377.52	0.0194
100	5.64	4.93	2.10	0.0239	1077.14	0.0152
150	2.66	2.32	0.99	0.0113	649.65	0.0091
200	1.55	1.35	0.58	0.0066	438.54	0.0062
250	1.01	0.88	0.38	0.0043	319.33	0.0045
500	0.26	0.23	0.10	0.0011	113.98	0.0016
1000	0.07	0.06	0.03	0.0003	40.48	0.0006

Met Set: Oakland

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	48.31	42.21	17.97	0.2044	4685.59	0.0659
30	40.60	35.48	15.10	0.1718	4028.18	0.0567
40	26.41	23.08	9.82	0.1118	3439.11	0.0484
50	18.50	16.17	6.88	0.0783	2941.66	0.0414
60	13.67	11.94	5.08	0.0578	2531.88	0.0356
80	8.35	7.30	3.11	0.0353	1940.79	0.0273
100	5.63	4.92	2.09	0.0238	1529.51	0.0215
150	2.70	2.36	1.00	0.0114	931.7	0.0131
200	1.58	1.38	0.59	0.0067	629.79	0.0089
250	1.04	0.91	0.39	0.0044	457.07	0.0064
500	0.28	0.24	0.10	0.0012	160.49	0.0023
1000	0.07	0.06	0.03	0.0003	55.89	0.0008

Met Set: Redding

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	68.47	59.83	25.47	0.2897	5262.77	0.0741
30	49.83	43.54	18.53	0.2109	4405.79	0.0620
40	32.16	28.10	11.96	0.1361	3722.07	0.0524
50	22.38	19.56	8.32	0.0947	3168.63	0.0446
60	16.46	14.38	6.12	0.0696	2722.05	0.0383
80	9.99	8.73	3.72	0.0423	2063.9	0.0290
100	6.70	5.85	2.49	0.0284	1616.3	0.0227
150	3.18	2.78	1.18	0.0135	978.01	0.0138
200	1.86	1.63	0.69	0.0079	660.08	0.0093
250	1.21	1.06	0.45	0.0051	479.17	0.0067
500	0.32	0.28	0.12	0.0014	170.6	0.0024
1000	0.08	0.07	0.03	0.0003	60.59	0.0009

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Facility G-02 - 94% Perc (cont.)

Met Set: Sacramento

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	63.33	55.34	23.56	0.2680	5079.25	0.0715
30	46.73	40.83	17.38	0.1977	4307.48	0.0606
40	30.14	26.34	11.21	0.1275	3660.84	0.0515
50	20.96	18.31	7.80	0.0887	3130.22	0.0441
60	15.41	13.47	5.73	0.0652	2698.02	0.0380
80	9.34	8.16	3.47	0.0395	2055.28	0.0289
100	6.27	5.48	2.33	0.0265	1614.56	0.0227
150	2.97	2.60	1.10	0.0126	981.41	0.0138
200	1.73	1.51	0.64	0.0073	664.04	0.0093
250	1.13	0.99	0.42	0.0048	482.83	0.0068
500	0.30	0.26	0.11	0.0013	171.3	0.0024
1000	0.08	0.07	0.03	0.0003	60.66	0.0009

Met Set: Anaheim

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	125.69	109.83	46.75	0.5318	5444.38	0.0766
30	96.66	84.46	35.95	0.4090	4844.11	0.0682
40	62.33	54.46	23.18	0.2637	4046.7	0.0570
50	43.33	37.86	16.12	0.1833	3416.34	0.0481
60	31.84	27.82	11.84	0.1347	2916.25	0.0410
80	19.26	16.83	7.16	0.0815	2191.72	0.0308
100	12.90	11.27	4.80	0.0546	1706.75	0.0240
150	6.11	5.34	2.27	0.0259	1025.07	0.0144
200	3.55	3.10	1.32	0.0150	689.56	0.0097
250	2.32	2.03	0.86	0.0098	499.75	0.0070
500	0.60	0.52	0.22	0.0025	176.33	0.0025
1000	0.16	0.14	0.06	0.0007	62.42	0.0009

Met Set: Default - 0

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	124.80	53.13	0.6044	5276.51	0.0743
30	117.98	103.09	43.88	0.4992	4358.64	0.0613
40	98.78	86.31	36.74	0.4180	3649.09	0.0514
50	83.77	73.20	31.16	0.3545	3094.79	0.0436
60	71.89	62.82	26.74	0.3042	2656.01	0.0374
80	54.62	47.72	20.31	0.2311	2017.70	0.0284
100	42.94	37.52	15.97	0.1817	1586.22	0.0223
150	26.25	22.94	9.76	0.1111	969.72	0.0136
200	17.86	15.61	6.64	0.0756	659.99	0.0093
250	13.05	11.40	4.85	0.0552	482.19	0.0068
500	4.69	4.10	1.75	0.0199	173.33	0.0024
1000	1.68	1.46	0.62	0.0071	61.90	0.0009

Risk Assessment Summary - 3 Generic Facilities
Brake Cleaners

Facility G-03 - 65% Perc

Met Set: Burbank

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	17.91	10.82	4.61	0.0524	1344.25	0.0131
30	42.20	25.50	10.85	0.1235	1964.95	0.0191
40	35.87	21.67	9.22	0.1049	1702.1	0.0166
50	33.01	19.94	8.49	0.0966	2640.9	0.0257
60	26.91	16.26	6.92	0.0787	2498.24	0.0243
80	15.68	9.47	4.03	0.0459	1915.64	0.0186
100	10.28	6.21	2.64	0.0301	1511.07	0.0147
150	4.76	2.88	1.22	0.0139	927.46	0.0090
200	2.75	1.66	0.71	0.0080	633.44	0.0062
250	1.79	1.08	0.46	0.0052	464.37	0.0045
500	0.47	0.28	0.12	0.0014	169	0.0016
1000	0.12	0.07	0.03	0.0004	61	0.0006

Met Set: Concord

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	18.28	11.04	4.70	0.0535	1344.83	0.0131
30	41.78	25.24	10.74	0.1222	1964.95	0.0191
40	35.45	21.42	9.12	0.1037	1702.1	0.0166
50	32.92	19.89	8.47	0.0963	2643.95	0.0257
60	26.78	16.18	6.89	0.0784	2498.24	0.0243
80	15.70	9.49	4.04	0.0459	1915.64	0.0186
100	10.33	6.24	2.66	0.0302	1511.07	0.0147
150	4.82	2.91	1.24	0.0141	927.46	0.0090
200	2.79	1.69	0.72	0.0082	633.44	0.0062
250	1.83	1.11	0.47	0.0054	464.37	0.0045
500	0.48	0.29	0.12	0.0014	169	0.0016
1000	0.14	0.08	0.04	0.0004	61	0.0006

Met Set: Fresno

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	20.09	12.14	5.17	0.0588	1266.24	0.0123
30	34.50	20.84	8.87	0.1009	1668.13	0.0162
40	26.10	15.77	6.71	0.0764	1472.59	0.0143
50	24.31	14.69	6.25	0.0711	1934.45	0.0188
60	20.92	12.64	5.38	0.0612	1746.52	0.0170
80	12.26	7.41	3.15	0.0359	1403.39	0.0137
100	8.02	4.85	2.06	0.0235	1167.81	0.0114
150	3.69	2.23	0.95	0.0108	760.67	0.0074
200	2.12	1.28	0.55	0.0062	527.81	0.0051
250	1.37	0.83	0.35	0.0040	395.54	0.0038
500	0.35	0.21	0.09	0.0010	151.49	0.0015
1000	0.09	0.05	0.02	0.0003	55.11	0.0005

Met Set: LAX

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	18.48	11.16	4.75	0.0541	993.39	0.0097
30	25.65	15.50	6.60	0.0750	1273.21	0.0124
40	17.83	10.77	4.59	0.0522	1102.9	0.0107
50	16.29	9.84	4.19	0.0477	1712.71	0.0167
60	15.31	9.25	3.94	0.0448	1618.76	0.0158
80	9.15	5.53	2.35	0.0268	1241.26	0.0121
100	6.06	3.66	1.56	0.0177	979.11	0.0095
150	2.84	1.72	0.73	0.0083	728.7	0.0071
200	1.65	1.00	0.42	0.0048	601.14	0.0058
250	1.08	0.65	0.28	0.0032	517.17	0.0050
500	0.29	0.18	0.07	0.0008	306.22	0.0030
1000	0.08	0.05	0.02	0.0002	175.03	0.0017

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Facility G-03 - 65% Perc (cont.)

Met Set: McClellan

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	8.95	5.41	2.30	0.0262	1324.96	0.0129
30	25.93	15.67	6.67	0.0759	1554.15	0.0151
40	23.06	13.93	5.93	0.0675	1492.44	0.0145
50	21.36	12.90	5.49	0.0625	1764.81	0.0172
60	16.75	10.12	4.31	0.0490	1581.78	0.0154
80	9.65	5.83	2.48	0.0282	1214.97	0.0118
100	6.29	3.80	1.62	0.0184	1033.69	0.0101
150	2.89	1.75	0.74	0.0085	699.04	0.0068
200	1.66	1.00	0.43	0.0049	517.13	0.0050
250	1.08	0.65	0.28	0.0032	398.9	0.0039
500	0.28	0.17	0.07	0.0008	159.29	0.0015
1000	0.07	0.04	0.02	0.0002	59.42	0.0006

Met Set: Mather

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	11.46	6.92	2.95	0.0335	958.09	0.0093
30	25.06	15.14	6.44	0.0733	1290.22	0.0126
40	20.77	12.55	5.34	0.0608	1240.56	0.0121
50	19.28	11.65	4.96	0.0564	1734.69	0.0169
60	15.76	9.52	4.05	0.0461	1546.97	0.0151
80	9.15	5.53	2.35	0.0268	1057.88	0.0103
100	5.97	3.61	1.54	0.0175	790.98	0.0077
150	2.74	1.66	0.70	0.0080	526.98	0.0051
200	1.57	0.95	0.40	0.0046	374.12	0.0036
250	1.02	0.62	0.26	0.0030	280.03	0.0027
500	0.26	0.16	0.07	0.0008	105.06	0.0010
1000	0.07	0.04	0.02	0.0002	38.59	0.0004

Met Set: Oakland

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	15.58	9.41	4.01	0.0456	1242.49	0.0121
30	24.65	14.89	6.34	0.0721	1456.6	0.0142
40	18.32	11.07	4.71	0.0536	1455.87	0.0142
50	16.79	10.14	4.32	0.0491	1716.38	0.0167
60	15.06	9.10	3.87	0.0441	1622.23	0.0158
80	8.95	5.41	2.30	0.0262	1243.92	0.0121
100	5.91	3.57	1.52	0.0173	981.21	0.0095
150	2.76	1.67	0.71	0.0081	669.93	0.0065
200	1.60	0.97	0.41	0.0047	487.14	0.0047
250	1.05	0.63	0.27	0.0031	367.88	0.0036
500	0.28	0.17	0.07	0.0008	145.98	0.0014
1000	0.07	0.04	0.02	0.0002	53.8	0.0005

Met Set: Redding

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	11.91	7.20	3.06	0.0348	1203.97	0.0117
30	29.23	17.66	7.52	0.0855	1727.12	0.0168
40	25.02	15.12	6.43	0.0732	1517.85	0.0148
50	23.12	13.97	5.95	0.0676	2116.06	0.0206
60	18.67	11.28	4.80	0.0546	1858.14	0.0181
80	10.84	6.55	2.79	0.0317	1510.93	0.0147
100	7.09	4.28	1.82	0.0207	1227.09	0.0119
150	3.27	1.98	0.84	0.0096	776.75	0.0076
200	1.88	1.14	0.48	0.0055	553.96	0.0054
250	1.23	0.74	0.32	0.0036	416.48	0.0041
500	0.32	0.19	0.08	0.0009	158.33	0.0015
1000	0.08	0.05	0.02	0.0002	57.91	0.0006

Facility G-03 % Perc (cont.)

Met Set: Sacramento

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	12.95	7.82	3.33	0.0379	1295.57	0.0126
30	27.76	16.77	7.14	0.0812	1644.39	0.0160
40	22.81	13.78	5.87	0.0667	1452.28	0.0141
50	21.26	12.84	5.47	0.0622	1884.88	0.0183
60	17.37	10.49	4.47	0.0508	1690.83	0.0165
80	10.12	6.11	2.60	0.0296	1379.12	0.0134
100	6.62	4.00	1.70	0.0194	1135.35	0.0110
150	3.05	1.84	0.78	0.0089	749.73	0.0073
200	1.76	1.06	0.45	0.0051	542.55	0.0053
250	1.14	0.69	0.29	0.0033	411.47	0.0040
500	0.30	0.18	0.08	0.0009	159.01	0.0015
1000	0.08	0.05	0.02	0.0002	58.65	0.0006

Met Set: Anaheim

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	31.15	18.82	8.01	0.0911	1343.62	0.0131
30	57.73	34.88	14.85	0.1689	1964.47	0.0191
40	44.96	27.16	11.56	0.1315	1701.54	0.0166
50	41.98	25.36	10.80	0.1228	2643.73	0.0257
60	35.48	21.44	9.12	0.1038	2497.42	0.0243
80	20.76	12.54	5.34	0.0607	1914.71	0.0186
100	13.59	8.21	3.50	0.0398	1510.1	0.0147
150	6.26	3.78	1.61	0.0183	926.57	0.0090
200	3.60	2.17	0.93	0.0105	632.67	0.0062
250	2.34	1.41	0.60	0.0068	463.72	0.0045
500	0.61	0.37	0.16	0.0018	168.65	0.0016
1000	0.16	0.10	0.04	0.0005	60.83	0.0006

Met Set: Default - 0

op hrs/wk: 57

Acu Rate [g/s]: 0.1946
Ann Rate [g/s]: 0.1024

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Envelope	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	74.30	44.89	19.11	0.2174	2744.96	0.0267
30	64.57	39.01	16.61	0.1889	2385.45	0.0232
40	56.52	34.15	14.54	0.1654	2088.05	0.0203
50	49.84	30.11	12.82	0.1458	1841.40	0.0179
60	44.27	26.75	11.39	0.1295	1635.59	0.0159
80	35.62	21.52	9.16	0.1042	1315.96	0.0128
100	29.32	17.71	7.54	0.0858	1083.10	0.0105
150	19.45	11.75	5.00	0.0569	718.69	0.0070
200	13.97	8.44	3.59	0.0409	516.25	0.0050
250	10.61	6.41	2.73	0.0310	391.81	0.0038
500	4.18	2.53	1.08	0.0122	154.56	0.0015
1000	1.58	0.96	0.41	0.0046	58.40	0.0006

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Risk Assessment Summary - 3 Generic Facilities
Brake Cleaners

Facility G-03 - 94% Perc

296

Met Set: Burbank

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	17.91	15.65	6.66	0.0758	1344.25	0.0189
30	42.20	36.87	15.70	0.1786	1964.95	0.0277
40	35.87	31.34	13.34	0.1518	1702.1	0.0240
50	33.01	28.84	12.28	0.1397	2640.9	0.0372
60	26.91	23.51	10.01	0.1139	2498.24	0.0352
80	15.68	13.70	5.83	0.0663	1915.64	0.0270
100	10.28	8.98	3.82	0.0435	1511.07	0.0213
150	4.76	4.16	1.77	0.0201	927.46	0.0131
200	2.75	2.40	1.02	0.0116	633.44	0.0089
250	1.79	1.56	0.67	0.0076	464.37	0.0065
500	0.47	0.41	0.17	0.0020	169	0.0024
1000	0.12	0.10	0.04	0.0005	61	0.0009

Met Set: Concord

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	18.28	15.97	6.80	0.0774	1344.83	0.0189
30	41.78	36.51	15.54	0.1768	1964.95	0.0277
40	35.45	30.98	13.19	0.1500	1702.1	0.0240
50	32.92	28.77	12.24	0.1393	2643.95	0.0372
60	26.78	23.40	9.96	0.1133	2498.24	0.0352
80	15.70	13.72	5.84	0.0664	1915.64	0.0270
100	10.33	9.03	3.84	0.0437	1511.07	0.0213
150	4.82	4.21	1.79	0.0204	927.46	0.0131
200	2.79	2.44	1.04	0.0118	633.44	0.0089
250	1.83	1.60	0.68	0.0077	464.37	0.0065
500	0.48	0.42	0.18	0.0020	169	0.0024
1000	0.14	0.12	0.05	0.0006	61	0.0009

Met Set: Fresno

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	20.09	17.55	7.47	0.0850	1266.24	0.0178
30	34.50	30.15	12.83	0.1460	1668.13	0.0235
40	26.10	22.81	9.71	0.1104	1472.59	0.0207
50	24.31	21.24	9.04	0.1029	1934.45	0.0272
60	20.92	18.28	7.78	0.0885	1746.52	0.0246
80	12.26	10.71	4.56	0.0519	1403.39	0.0198
100	8.02	7.01	2.98	0.0339	1167.81	0.0164
150	3.69	3.22	1.37	0.0156	760.67	0.0107
200	2.12	1.85	0.79	0.0090	527.81	0.0074
250	1.37	1.20	0.51	0.0058	395.54	0.0056
500	0.35	0.31	0.13	0.0015	151.49	0.0021
1000	[illegible]	0.08	0.03	0.0004	55.11	0.0008

Met Set: LAX

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	18.48	16.15	6.87	0.0782	993.39	0.0140
30	25.65	22.41	9.54	0.1085	1273.21	0.0179
40	17.83	15.58	6.63	0.0754	1102.9	0.0155
50	16.29	14.23	6.06	0.0689	1712.71	0.0241
60	15.31	13.38	5.69	0.0648	1618.76	0.0228
80	9.15	8.00	3.40	0.0387	1241.26	0.0175
100	6.06	5.30	2.25	0.0256	979.11	0.0138
150	2.84	2.48	1.06	0.0120	728.7	0.0103
200	1.65	1.44	0.61	0.0070	601.14	0.0085
250	1.08	0.94	0.40	0.0046	517.17	0.0073
500	0.29	0.25	0.11	0.0012	306.22	0.0043
1000	[illegible]	0.08	0.07	0.03	0.0003	175.03	0.0025

Facility G-03 % Perc (cont.)

Met Set: McClellan

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	8.95	7.82	3.33	0.0379	1324.96	0.0186
30	25.93	22.66	9.64	0.1097	1554.15	0.0219
40	23.06	20.15	8.58	0.0976	1492.44	0.0210
50	21.36	18.66	7.94	0.0904	1764.81	0.0248
60	16.75	14.64	6.23	0.0709	1581.78	0.0223
80	9.65	8.43	3.59	0.0408	1214.97	0.0171
100	6.29	5.50	2.34	0.0266	1033.69	0.0145
150	2.89	2.53	1.07	0.0122	699.04	0.0098
200	1.66	1.45	0.62	0.0070	517.13	0.0073
250	1.08	0.94	0.40	0.0046	398.9	0.0056
500	0.28	0.24	0.10	0.0012	159.29	0.0022
1000	0.07	0.06	0.03	0.0003	59.42	0.0008

Met Set: Mather

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	11.46	10.01	4.26	0.0485	958.09	0.0135
30	25.06	21.90	9.32	0.1060	1290.22	0.0182
40	20.77	18.15	7.73	0.0879	1240.56	0.0175
50	19.28	16.85	7.17	0.0816	1734.69	0.0244
60	15.76	13.77	5.86	0.0667	1546.97	0.0218
80	9.15	8.00	3.40	0.0387	1057.88	0.0149
100	5.97	5.22	2.22	0.0253	790.98	0.0111
150	2.74	2.39	1.02	0.0116	526.98	0.0074
200	1.57	1.37	0.58	0.0066	374.12	0.0053
250	1.02	0.89	0.38	0.0043	280.03	0.0039
500	0.26	0.23	0.10	0.0011	105.06	0.0015
1000	0.07	0.06	0.03	0.0003	38.59	0.0005

Met Set: Oakland

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	15.58	13.61	5.80	0.0659	1242.49	0.0175
30	24.65	21.54	9.17	0.1043	1456.6	0.0205
40	18.32	16.01	6.81	0.0775	1455.87	0.0205
50	16.79	14.67	6.25	0.0710	1716.38	0.0242
60	15.06	13.16	5.60	0.0637	1622.23	0.0228
80	8.95	7.82	3.33	0.0379	1243.92	0.0175
100	5.91	5.16	2.20	0.0250	981.21	0.0138
150	2.76	2.41	1.03	0.0117	669.93	0.0094
200	1.60	1.40	0.60	0.0068	487.14	0.0069
250	1.05	0.92	0.39	0.0044	367.88	0.0052
500	0.28	0.24	0.10	0.0012	145.98	0.0021
1000	0.07	0.06	0.03	0.0003	53.8	0.0008

Met Set: Redding

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	11.91	10.41	4.43	0.0504	1203.97	0.0169
30	29.23	25.54	10.87	0.1237	1727.12	0.0243
40	25.02	21.86	9.31	0.1059	1517.85	0.0214
50	23.12	20.20	8.60	0.0978	2116.06	0.0298
60	18.67	16.31	6.94	0.0790	1858.14	0.0262
80	10.84	9.47	4.03	0.0459	1510.93	0.0213
100	7.09	6.20	2.64	0.0300	1227.09	0.0173
150	3.27	2.86	1.22	0.0138	776.75	0.0109
200	1.88	1.64	0.70	0.0080	553.96	0.0078
250	1.23	1.07	0.46	0.0052	416.48	0.0059
500	0.32	0.28	0.12	0.0014	158.33	0.0022
1000	0.08	0.07	0.03	0.0003	57.91	0.0008

297

Facility G-03 - 94% Perc (cont.)

Met Set: Sacramento

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	12.95	11.32	4.82	0.0548	1295.57	0.0182
30	27.76	24.26	10.33	0.1175	1644.39	0.0231
40	22.81	19.93	8.48	0.0965	1452.28	0.0204
50	21.26	18.58	7.91	0.0900	1884.88	0.0265
60	17.37	15.18	6.46	0.0735	1690.83	0.0238
80	10.12	8.84	3.76	0.0428	1379.12	0.0194
100	6.62	5.78	2.46	0.0280	1135.35	0.0160
150	3.05	2.67	1.13	0.0129	749.73	0.0106
200	1.76	1.54	0.65	0.0074	542.55	0.0076
250	1.14	1.00	0.42	0.0048	411.47	0.0058
500	0.30	0.26	0.11	0.0013	159.01	0.0022
1000	0.08	0.07	0.03	0.0003	58.65	0.0008

Met Set: Anaheim

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	31.15	27.22	11.59	0.1318	1343.62	0.0189
30	57.73	50.44	21.47	0.2443	1964.47	0.0276
40	44.96	39.29	16.72	0.1902	1701.54	0.0239
50	41.98	36.68	15.61	0.1776	2643.73	0.0372
60	35.48	31.00	13.20	0.1501	2497.42	0.0352
80	20.76	18.14	7.72	0.0878	1914.71	0.0269
100	13.59	11.87	5.05	0.0575	1510.1	0.0213
150	6.26	5.47	2.33	0.0265	926.57	0.0130
200	3.60	3.15	1.34	0.0152	632.67	0.0089
250	2.34	2.04	0.87	0.0099	463.72	0.0065
500	0.61	0.53	0.23	0.0026	168.65	0.0024
1000	0.16	0.14	0.06	0.0007	60.83	0.0009

Met Set: Default - 0

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Envelope	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	74.30	64.92	27.64	0.3144	2744.96	0.0386
30	64.57	56.42	24.02	0.2732	2385.45	0.0336
40	56.52	49.39	21.02	0.2392	2088.05	0.0294
50	49.84	43.55	18.54	0.2109	1841.40	0.0259
60	44.27	38.69	16.47	0.1873	1635.59	0.0230
80	35.62	31.13	13.25	0.1507	1315.96	0.0185
100	29.32	25.62	10.90	0.1241	1083.10	0.0152
150	19.45	17.00	7.24	0.0823	718.69	0.0101
200	13.97	12.21	5.20	0.0591	516.25	0.0073
250	10.61	9.27	3.94	0.0449	391.81	0.0055
500	4.18	3.66	1.56	0.0177	154.56	0.0022
1000	1.58	1.38	0.59	0.0067	58.40	0.0008

Risk Asse ent Summary - 3 Generic Facilities
Multicomponent Impacts - Brake Cleaners - Chronic/Cancer

Facility G-01 - 94% Perc

Met Set: Burbank
94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1407
Ann Rate [g/s]: 0.0494

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	162.66	47.41	20.18	0.2296	12417.79	0.0874
30	86.38	25.18	10.72	0.1219	9254.67	0.0651
40	53.51	15.60	6.64	0.0755	7114.91	0.0501
50	36.43	10.62	4.52	0.0514	5625.45	0.0396
60	26.41	7.70	3.28	0.0373	4555.43	0.0320
80	15.71	4.58	1.95	0.0222	3163.52	0.0223
100	10.41	3.03	1.29	0.0147	2329.10	0.0164
150	4.86	1.42	0.60	0.0069	1281.78	0.0090
200	2.81	0.82	0.35	0.0040	820.22	0.0058
250	1.83	0.53	0.23	0.0026	575.61	0.0040
500	0.48	0.14	0.06	0.0007	189.47	0.0013
1000	0.12	0.03	0.01	0.0002	64.58	0.0005

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	162.66	0.00	0.00	0.0000	12417.79	0.0000
30	86.38	0.00	0.00	0.0000	9254.67	0.0000
40	53.51	0.00	0.00	0.0000	7114.91	0.0000
50	36.43	0.00	0.00	0.0000	5625.45	0.0000
60	26.41	0.00	0.00	0.0000	4555.43	0.0000
80	15.71	0.00	0.00	0.0000	3163.52	0.0000
100	10.41	0.00	0.00	0.0000	2329.10	0.0000
150	4.86	0.00	0.00	0.0000	1281.78	0.0000
200	2.81	0.00	0.00	0.0000	820.22	0.0000
250	1.83	0.00	0.00	0.0000	575.61	0.0000
500	0.48	0.00	0.00	0.0000	189.47	0.0000
1000	0.12	0.00	0.00	0.0000	64.58	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	162.66	0.00	0.00	0.0000	12417.79	0.0000
30	86.38	0.00	0.00	0.0000	9254.67	0.0000
40	53.51	0.00	0.00	0.0000	7114.91	0.0000
50	36.43	0.00	0.00	0.0000	5625.45	0.0000
60	26.41	0.00	0.00	0.0000	4555.43	0.0000
80	15.71	0.00	0.00	0.0000	3163.52	0.0000
100	10.41	0.00	0.00	0.0000	2329.10	0.0000
150	4.86	0.00	0.00	0.0000	1281.78	0.0000
200	2.81	0.00	0.00	0.0000	820.22	0.0000
250	1.83	0.00	0.00	0.0000	575.61	0.0000
500	0.48	0.00	0.00	0.0000	189.47	0.0000
1000	0.12	0.00	0.00	0.0000	64.58	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	47.41	20.18	0.2296	0.0874
30	25.18	10.72	0.1219	0.0651
40	15.60	6.64	0.0755	0.0501
50	10.62	4.52	0.0514	0.0396
60	7.70	3.28	0.0373	0.0320
80	4.58	1.95	0.0222	0.0223
100	3.03	1.29	0.0147	0.0164
150	1.42	0.60	0.0069	0.0090
200	0.82	0.35	0.0040	0.0058
250	0.53	0.23	0.0026	0.0040
500	0.14	0.06	0.0007	0.0013
1000	0.03	0.01	0.0002	0.0005

Facility G-01 - 55% Perc, 25% MeCl

Met Set: Burbank

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0823

Ann Rate [g/s]: 0.0289

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	162.66	27.74	11.81	0.1343	12417.79	0.0511
30	86.38	14.73	6.27	0.0713	9254.67	0.0381
40	53.51	9.12	3.88	0.0442	7114.91	0.0293
50	36.43	6.21	2.64	0.0301	5625.45	0.0231
60	26.41	4.50	1.92	0.0218	4555.43	0.0187
80	15.71	2.68	1.14	0.0130	3163.52	0.0130
100	10.41	1.78	0.76	0.0086	2329.10	0.0096
150	4.86	0.83	0.35	0.0040	1281.78	0.0053
200	2.81	0.48	0.20	0.0023	820.22	0.0034
250	1.83	0.31	0.13	0.0015	575.61	0.0024
500	0.48	0.08	0.03	0.0004	189.47	0.0008
1000	0.12	0.02	0.01	0.0001	64.58	0.0003

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0374

Ann Rate [g/s]: 0.0131

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	162.66	2.13	0.91	0.0007	12417.79	0.0332
30	86.38	1.13	0.48	0.0004	9254.67	0.0247
40	53.51	0.70	0.30	0.0002	7114.91	0.0190
50	36.43	0.48	0.20	0.0002	5625.45	0.0150
60	26.41	0.35	0.15	0.0001	4555.43	0.0122
80	15.71	0.21	0.09	0.0001	3163.52	0.0085
100	10.41	0.14	0.06	4.5E-05	2329.10	0.0062
150	4.86	0.06	0.03	2.1E-05	1281.78	0.0034
200	2.81	0.04	0.02	1.2E-05	820.22	0.0022
250	1.83	0.02	0.01	8.0E-06	575.61	0.0015
500	0.48	0.01	0.00	2.1E-06	189.47	0.0005
1000	0.12	0.00	0.00	5.2E-07	64.58	0.0002

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	162.66	0.00	0.00	0.0000	12417.79	0.0000
30	86.38	0.00	0.00	0.0000	9254.67	0.0000
40	53.51	0.00	0.00	0.0000	7114.91	0.0000
50	36.43	0.00	0.00	0.0000	5625.45	0.0000
60	26.41	0.00	0.00	0.0000	4555.43	0.0000
80	15.71	0.00	0.00	0.0000	3163.52	0.0000
100	10.41	0.00	0.00	0.0000	2329.10	0.0000
150	4.86	0.00	0.00	0.0000	1281.78	0.0000
200	2.81	0.00	0.00	0.0000	820.22	0.0000
250	1.83	0.00	0.00	0.0000	575.61	0.0000
500	0.48	0.00	0.00	0.0000	189.47	0.0000
1000	0.12	0.00	0.00	0.0000	64.58	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	29.87	12.71	0.1350	0.0843
30	15.86	6.75	0.0717	0.0628
40	9.82	4.18	0.0444	0.0483
50	6.69	2.85	0.0302	0.0382
60	4.85	2.06	0.0219	0.0309
80	2.88	1.23	0.0130	0.0215
100	1.91	0.81	0.0086	0.0158
150	0.89	0.38	0.0040	0.0087
200	0.52	0.22	0.0023	0.0056
250	0.34	0.14	0.0015	0.0039
500	0.09	0.04	0.0004	0.0013
1000	0.02	0.01	0.0001	0.0004

Facility G-01 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Burbank

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0210

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	162.66	20.15	8.58	0.0976	12417.79	0.0372
30	86.38	10.70	4.56	0.0518	9254.67	0.0277
40	53.51	6.63	2.82	0.0321	7114.91	0.0213
50	36.43	4.51	1.92	0.0219	5625.45	0.0168
60	26.41	3.27	1.39	0.0158	4555.43	0.0136
80	15.71	1.95	0.83	0.0094	3163.52	0.0095
100	10.41	1.29	0.55	0.0062	2329.10	0.0070
150	4.86	0.60	0.26	0.0029	1281.78	0.0038
200	2.81	0.35	0.15	0.0017	820.22	0.0025
250	1.83	0.23	0.10	0.0011	575.61	0.0017
500	0.48	0.06	0.03	0.0003	189.47	0.0006
1000	0.12	0.01	0.01	0.0001	64.58	0.0002

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0449
Ann Rate [g/s]: 0.0158

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	162.66	2.57	1.09	0.0009	12417.79	0.0398
30	86.38	1.36	0.58	0.0005	9254.67	0.0297
40	53.51	0.85	0.36	0.0003	7114.91	0.0228
50	36.43	0.58	0.25	0.0002	5625.45	0.0180
60	26.41	0.42	0.18	0.0001	4555.43	0.0146
80	15.71	0.25	0.11	0.0001	3163.52	0.0101
100	10.41	0.16	0.07	0.0001	2329.10	0.0075
150	4.86	0.08	0.03	2.6E-05	1281.78	0.0041
200	2.81	0.04	0.02	1.5E-05	820.22	0.0026
250	1.83	0.03	0.01	9.6E-06	575.61	0.0018
500	0.48	0.01	0.00	2.5E-06	189.47	0.0006
1000	0.12	0.00	0.00	6.3E-07	64.58	0.0002

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0299
Ann Rate [g/s]: 0.0105

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	162.66	3.42	1.45	0.0027	12417.79	0.0000
30	86.38	1.81	0.77	0.0014	9254.67	0.0000
40	53.51	1.12	0.48	0.0009	7114.91	0.0000
50	36.43	0.77	0.33	0.0006	5625.45	0.0000
60	26.41	0.55	0.24	0.0004	4555.43	0.0000
80	15.71	0.33	0.14	0.0003	3163.52	0.0000
100	10.41	0.22	0.09	0.0002	2329.10	0.0000
150	4.86	0.10	0.04	0.0001	1281.78	0.0000
200	2.81	0.06	0.03	4.6E-05	820.22	0.0000
250	1.83	0.04	0.02	3.0E-05	575.61	0.0000
500	0.48	0.01	0.00	7.9E-06	189.47	0.0000
1000	0.12	0.00	0.00	2.0E-06	64.58	0.0000

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Center	Resident	Worker	Chronic	Acute
20	26.14	11.13	0.1011	0.0770
30	13.88	5.91	0.0537	0.0574
40	8.60	3.66	0.0333	0.0441
50	5.85	2.49	0.0226	0.0349
60	4.24	1.81	0.0164	0.0283
80	2.52	1.07	0.0098	0.0196
100	1.67	0.71	0.0065	0.0144
150	0.78	0.33	0.0030	0.0079
200	0.45	0.19	0.0017	0.0051
250	0.29	0.13	0.0011	0.0036
500	0.08	0.03	0.0003	0.0012
1000	0.02	0.01	0.0001	0.0004

301

Facility G-01 - 55% Perc, 43% TCE

Met Set: Burbank

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0823
Ann Rate [g/s]: 0.0289

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	162.66	27.74	11.81	0.1343	12417.79	0.0511
30	86.38	14.73	6.27	0.0713	9254.67	0.0381
40	53.51	9.12	3.88	0.0442	7114.91	0.0293
50	36.43	6.21	2.64	0.0301	5625.45	0.0231
60	26.41	4.50	1.92	0.0218	4555.43	0.0187
80	15.71	2.68	1.14	0.0130	3163.52	0.0130
100	10.41	1.78	0.76	0.0086	2329.10	0.0096
150	4.86	0.83	0.35	0.0040	1281.78	0.0053
200	2.81	0.48	0.20	0.0023	820.22	0.0034
250	1.83	0.31	0.13	0.0015	575.61	0.0024
500	0.48	0.08	0.03	0.0004	189.47	0.0008
1000	0.12	0.02	0.01	0.0001	64.58	0.0003

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	162.66	0.00	0.00	0.0000	12417.79	0.0000
30	86.38	0.00	0.00	0.0000	9254.67	0.0000
40	53.51	0.00	0.00	0.0000	7114.91	0.0000
50	36.43	0.00	0.00	0.0000	5625.45	0.0000
60	26.41	0.00	0.00	0.0000	4555.43	0.0000
80	15.71	0.00	0.00	0.0000	3163.52	0.0000
100	10.41	0.00	0.00	0.0000	2329.10	0.0000
150	4.86	0.00	0.00	0.0000	1281.78	0.0000
200	2.81	0.00	0.00	0.0000	820.22	0.0000
250	1.83	0.00	0.00	0.0000	575.61	0.0000
500	0.48	0.00	0.00	0.0000	189.47	0.0000
1000	0.12	0.00	0.00	0.0000	64.58	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0644
Ann Rate [g/s]: 0.0226

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	162.66	7.35	3.13	0.0057	12417.79	0.0000
30	86.38	3.90	1.66	0.0031	9254.67	0.0000
40	53.51	2.42	1.03	0.0019	7114.91	0.0000
50	36.43	1.65	0.70	0.0013	5625.45	0.0000
60	26.41	1.19	0.51	0.0009	4555.43	0.0000
80	15.71	0.71	0.30	0.0006	3163.52	0.0000
100	10.41	0.47	0.20	0.0004	2329.10	0.0000
150	4.86	0.22	0.09	0.0002	1281.78	0.0000
200	2.81	0.13	0.05	0.0001	820.22	0.0000
250	1.83	0.08	0.04	0.0001	575.61	0.0000
500	0.48	0.02	0.01	1.7E-05	189.47	0.0000
1000	0.12	0.01	0.00	4.2E-06	64.58	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	35.09	14.94	0.1401	0.0511
30	18.63	7.93	0.0744	0.0381
40	11.54	4.91	0.0461	0.0293
50	7.86	3.35	0.0314	0.0231
60	5.70	2.43	0.0227	0.0187
80	3.39	1.44	0.0135	0.0130
100	2.25	0.96	0.0090	0.0096
150	1.05	0.45	0.0042	0.0053
200	0.61	0.26	0.0024	0.0034
250	0.39	0.17	0.0016	0.0024
500	0.10	0.04	0.0004	0.0008
1000	0.03	0.01	0.0001	0.0003

Facility G-01 - 94% Perc

Met Set: Anaheim

94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1407

Ann Rate [g/s]: 0.0494

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	219.02	63.84	27.17	0.3091	12413.44	0.0873
30	115.95	33.79	14.39	0.1637	9249.49	0.0651
40	71.59	20.87	8.88	0.1010	7109.62	0.0500
50	48.59	14.16	6.03	0.0686	5620.40	0.0395
60	35.13	10.24	4.36	0.0496	4550.74	0.0320
80	20.81	6.07	2.58	0.0294	3159.60	0.0222
100	13.75	4.01	1.71	0.0194	2325.83	0.0164
150	6.38	1.86	0.79	0.0090	1279.62	0.0090
200	3.67	1.07	0.46	0.0052	818.68	0.0058
250	2.38	0.69	0.30	0.0034	574.45	0.0040
500	0.61	0.18	0.08	0.0009	189.33	0.0013
1000	0.16	0.05	0.02	0.0002	64.55	0.0005

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	219.02	0.00	0.00	0.0000	12413.44	0.0000
30	115.95	0.00	0.00	0.0000	9249.49	0.0000
40	71.59	0.00	0.00	0.0000	7109.62	0.0000
50	48.59	0.00	0.00	0.0000	5620.40	0.0000
60	35.13	0.00	0.00	0.0000	4550.74	0.0000
80	20.81	0.00	0.00	0.0000	3159.60	0.0000
100	13.75	0.00	0.00	0.0000	2325.83	0.0000
150	6.38	0.00	0.00	0.0000	1279.62	0.0000
200	3.67	0.00	0.00	0.0000	818.68	0.0000
250	2.38	0.00	0.00	0.0000	574.45	0.0000
500	0.61	0.00	0.00	0.0000	189.33	0.0000
1000	0.16	0.00	0.00	0.0000	64.55	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	219.02	0.00	0.00	0.0000	12413.44	0.0000
30	115.95	0.00	0.00	0.0000	9249.49	0.0000
40	71.59	0.00	0.00	0.0000	7109.62	0.0000
50	48.59	0.00	0.00	0.0000	5620.40	0.0000
60	35.13	0.00	0.00	0.0000	4550.74	0.0000
80	20.81	0.00	0.00	0.0000	3159.60	0.0000
100	13.75	0.00	0.00	0.0000	2325.83	0.0000
150	6.38	0.00	0.00	0.0000	1279.62	0.0000
200	3.67	0.00	0.00	0.0000	818.68	0.0000
250	2.38	0.00	0.00	0.0000	574.45	0.0000
500	0.61	0.00	0.00	0.0000	189.33	0.0000
1000	0.16	0.00	0.00	0.0000	64.55	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	63.84	27.17	0.3091	0.0873
30	33.79	14.39	0.1637	0.0651
40	20.87	8.88	0.1010	0.0500
50	14.16	6.03	0.0686	0.0395
60	10.24	4.36	0.0496	0.0320
80	6.07	2.58	0.0294	0.0222
100	4.01	1.71	0.0194	0.0164
150	1.86	0.79	0.0090	0.0090
200	1.07	0.46	0.0052	0.0058
250	0.69	0.30	0.0034	0.0040
500	0.18	0.08	0.0009	0.0013
1000	0.05	0.02	0.0002	0.0005

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Facility G-01 - 55% Perc, 25% MeCl

Met Set: Anaheim

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0823

Ann Rate [g/s]: 0.0289

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	219.02	37.35	15.90	0.1808	12413.44	0.0511
30	115.95	19.77	8 42	0.0957	9249.49	0.0381
40	71.59	12.21	5.20	0.0591	7109.62	0.0293
50	48.59	8.29	3.53	0.0401	5620.40	0.0231
60	35.13	5.99	2.55	0.0290	4550.74	0.0187
80	20.81	3.55	1.51	0.0172	3159.60	0.0130
100	13.75	2.34	1.00	0.0114	2325.83	0.0096
150	6.38	1.09	0.46	0.0053	1279.62	0.0053
200	3.67	0.63	0.27	0.0030	818.68	0.0034
250	2.38	0.41	0.17	0.0020	574.45	0.0024
500	0.61	0.10	0.04	0.0005	189.33	0.0008
1000	0.16	0.03	0.01	0.0001	64.55	0.0003

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0374

Ann Rate [g/s]: 0.0131

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	219.02	2.87	1.22	0.0010	12413.44	0.0332
30	115.95	1.52	0.65	0.0005	9249.49	0.0247
40	71.59	0.94	0.40	0.0003	7109.62	0.0190
50	48.59	0.64	0.27	0.0002	5620.40	0.0150
60	35.13	0.46	0.20	0.0002	4550.74	0.0122
80	20.81	0.27	0.12	0.0001	3159.60	0.0084
100	13.75	0.18	0.08	0.0001	2325.83	0.0062
150	6.38	0.08	0.04	2.8E-05	1279.62	0.0034
200	3.67	0.05	0.02	1.6E-05	818.68	0.0022
250	2.38	0.03	0.01	1.0E-05	574.45	0.0015
500	0.61	0.01	0.00	2.7E-06	189.33	0.0005
1000	0.16	0.00	0.00	7.0E-07	64.55	0.0002

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	219.02	0.00	0.00	0.0000	12413.44	0.0000
30	115.95	0.00	0.00	0.0000	9249.49	0.0000
40	71.59	0.00	0.00	0.0000	7109.62	0.0000
50	48.59	0.00	0.00	0.0000	5620.40	0.0000
60	35.13	0.00	0.00	0.0000	4550.74	0.0000
80	20.81	0.00	0.00	0.0000	3159 60	0 0000
100	13.75	0.00	0.00	0 0000	2325 83	0 0000
150	6.38	0.00	0.00	0 0000	1279 62	0 0000
200	3.67	0.00	0.00	0 0000	818 68	0 0000
250	2.38	0.00	0.00	0 0000	574 45	0.0000
500	0.61	0.00	0.00	0.0000	189.33	0.0000
1000	0.16	0.00	0.00	0.0000	64.55	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	40.21	17.12	0.1818	0.0842
30	21.29	9.06	0.0962	0.0628
40	13.14	5.60	0.0594	0.0482
50	8.92	3.80	0.0403	0.0381
60	6.45	2.75	0.0292	0.0309
80	3.82	1.63	0.0173	0.0214
100	2 52	1 07	0 0114	0.0158
150	1 17	0 50	0 0053	0.0087
200	0 67	0 29	0 0030	0.0056
250	0.44	0.19	0 0020	0.0039
500	0.11	0.05	0.0005	0.0013
1000	0.03	0.01	0.0001	0.0004

Facility G-01 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Anaheim

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0210

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	219.02	27.14	11.55	0.1314	12413.44	0.0372
30	115.95	14.37	6.12	0.0696	9249.49	0.0277
40	71.59	8.87	3.78	0.0430	7109.62	0.0213
50	48.59	6.02	2.56	0.0292	5620.40	0.0168
60	35.13	4.35	1.85	0.0211	4550.74	0.0136
80	20.81	2.58	1.10	0.0125	3159.60	0.0095
100	13.75	1.70	0.73	0.0083	2325.83	0.0070
150	6.38	0.79	0.34	0.0038	1279.62	0.0038
200	3.67	0.45	0.19	0.0022	818.68	0.0025
250	2.38	0.29	0.13	0.0014	574.45	0.0017
500	0.61	0.08	0.03	0.0004	189.33	0.0006
1000	0.16	0.02	0.01	0.0001	64.55	0.0002

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0449
Ann Rate [g/s]: 0.0158

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	219.02	3.46	1.47	0.0012	12413.44	0.0398
30	115.95	1.83	0.78	0.0006	9249.49	0.0297
40	71.59	1.13	0.48	0.0004	7109.62	0.0228
50	48.59	0.77	0.33	0.0003	5620.40	0.0180
60	35.13	0.56	0.24	0.0002	4550.74	0.0146
80	20.81	0.33	0.14	0.0001	3159.60	0.0101
100	13.75	0.22	0.09	0.0001	2325.83	0.0075
150	6.38	0.10	0.04	3.4E-05	1279.62	0.0041
200	3.67	0.06	0.02	1.9E-05	818.68	0.0026
250	2.38	0.04	0.02	1.3E-05	574.45	0.0018
500	0.61	0.01	0.00	3.2E-06	189.33	0.0006
1000	0.16	0.00	0.00	8.4E-07	64.55	0.0002

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0299
Ann Rate [g/s]: 0.0105

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	219.02	4.60	1.96	0.0036	12413.44	0.0000
30	115.95	2.43	1.04	0.0019	9249.49	0.0000
40	71.59	1.50	0.64	0.0012	7109.62	0.0000
50	48.59	1.02	0.43	0.0008	5620.40	0.0000
60	35.13	0.74	0.31	0.0006	4550.74	0.0000
80	20.81	0.44	0.19	0.0003	3159.60	0.0000
100	13.75	0.29	0.12	0.0002	2325.83	0.0000
150	6.38	0.13	0.06	0.0001	1279.62	0.0000
200	3.67	0.08	0.03	0.0001	818.68	0.0000
250	2.38	0.05	0.02	3.9E-05	574.45	0.0000
500	0.61	0.01	0.01	1.0E-05	189.33	0.0000
1000	0.16	0.00	0.00	2.6E-06	64.55	0.0000

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Center	Resident	Worker	Chronic	Acute
20	35.20	14.98	0.1362	0.0770
30	18.63	7.93	0.0721	0.0574
40	11.50	4.90	0.0445	0.0441
50	7.81	3.32	0.0302	0.0349
60	5.65	2.40	0.0218	0.0282
80	3.34	1.42	0.0129	0.0196
100	2.21	0.94	0.0085	0.0144
150	1.03	0.44	0.0040	0.0079
200	0.59	0.25	0.0023	0.0051
250	0.38	0.16	0.0015	0.0036
500	0.10	0.04	0.0004	0.0012
1000	0.03	0.01	0.0001	0.0004

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Facility G-01 - 55% Perc, 43% TCE

Met Set: Anaheim

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0823
Ann Rate [g/s]: 0.0289

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	219.02	37.35	15.90	0.1808	12413.44	0.0511
30	115.95	19.77	8.42	0.0957	9249.49	0.0381
40	71.59	12.21	5.20	0.0591	7109.62	0.0293
50	48.59	8.29	3.53	0.0401	5620.40	0.0231
60	35.13	5.99	2.55	0.0290	4550.74	0.0187
80	20.81	3.55	1.51	0.0172	3159.60	0.0130
100	13.75	2.34	1.00	0.0114	2325.83	0.0096
150	6.38	1.09	0.46	0.0053	1279.62	0.0053
200	3.67	0.63	0.27	0.0030	818.68	0.0034
250	2.38	0.41	0.17	0.0020	574.45	0.0024
500	0.61	0.10	0.04	0.0005	189.33	0.0008
1000	0.16	0.03	0.01	0.0001	64.55	0.0003

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	219.02	0.00	0.00	0.0000	12413.44	0.0000
30	115.95	0.00	0.00	0.0000	9249.49	0.0000
40	71.59	0.00	0.00	0.0000	7109.62	0.0000
50	48.59	0.00	0.00	0.0000	5620.40	0.0000
60	35.13	0.00	0.00	0.0000	4550.74	0.0000
80	20.81	0.00	0.00	0.0000	3159.60	0.0000
100	13.75	0.00	0.00	0.0000	2325.83	0.0000
150	6.38	0.00	0.00	0.0000	1279.62	0.0000
200	3.67	0.00	0.00	0.0000	818.68	0.0000
250	2.38	0.00	0.00	0.0000	574.45	0.0000
500	0.61	0.00	0.00	0.0000	189.33	0.0000
1000	0.16	0.00	0.00	0.0000	64.55	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0644
Ann Rate [g/s]: 0.0226

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	219.02	9.90	4.21	0.0077	12413.44	0.0000
30	115.95	5.24	2.23	0.0041	9249.49	0.0000
40	71.59	3.24	1.38	0.0025	7109.62	0.0000
50	48.59	2.20	0.93	0.0017	5620.40	0.0000
60	35.13	1.59	0.68	0.0012	4550.74	0.0000
80	20.81	0.94	0.40	0.0007	3159.60	0.0000
100	13.75	0.62	0.26	0.0005	2325.83	0.0000
150	6.38	0.29	0.12	0.0002	1279.62	0.0000
200	3.67	0.17	0.07	0.0001	818.68	0.0000
250	2.38	0.11	0.05	0.0001	574.45	0.0000
500	0.61	0.03	0.01	2.2E-05	189.33	0.0000
1000	0.16	0.01	0.00	5.7E-06	64.55	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	47.24	20.11	0.1886	0.0511
30	25.01	10.65	0.0998	0.0381
40	15.44	6.57	0.0616	0.0293
50	10.48	4.46	0.0418	0.0231
60	7.58	3.23	0.0302	0.0187
80	4.49	1.91	0.0179	0.0130
100	2.97	1.26	0.0118	0.0096
150	1.38	0.59	0.0055	0.0053
200	0.79	0.34	0.0032	0.0034
250	0.51	0.22	0.0020	0.0024
500	0.13	0.06	0.0005	0.0008
1000	0.03	0.01	0.0001	0.0003

Facility G-01 - 94% Perc

Met Set: Oakland

94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1407
Ann Rate [g/s]: 0.0494

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	91.71	26.73	11.38	0.1294	10519.95	0.0740
30	49.17	14.33	6.10	0.0694	8021.08	0.0564
40	30.65	8.93	3.80	0.0433	6281.76	0.0442
50	20.94	6.10	2.60	0.0296	5029.68	0.0354
60	15.22	4.44	1.89	0.0215	4106.19	0.0289
80	9.09	2.65	1.13	0.0128	2877.44	0.0202
100	6.04	1.76	0.75	0.0085	2127.42	0.0150
150	2.83	0.82	0.35	0.0040	1174.14	0.0083
200	1.64	0.48	0.20	0.0023	750.86	0.0053
250	1.07	0.31	0.13	0.0015	526.14	0.0037
500	0.28	0.08	0.03	0.0004	171.69	0.0012
1000	0.07	0.02	0.01	0.0001	57.64	0.0004

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	91.71	0.00	0.00	0.0000	10519.95	0.0000
30	49.17	0.00	0.00	0.0000	8021.08	0.0000
40	30.65	0.00	0.00	0.0000	6281.76	0.0000
50	20.94	0.00	0.00	0.0000	5029.68	0.0000
60	15.22	0.00	0.00	0.0000	4106.19	0.0000
80	9.09	0.00	0.00	0.0000	2877.44	0.0000
100	6.04	0.00	0.00	0.0000	2127.42	0.0000
150	2.83	0.00	0.00	0.0000	1174.14	0.0000
200	1.64	0.00	0.00	0.0000	750.86	0.0000
250	1.07	0.00	0.00	0.0000	526.14	0.0000
500	0.28	0.00	0.00	0.0000	171.69	0.0000
1000	0.07	0.00	0.00	0.0000	57.64	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	91.71	0.00	0.00	0.0000	10519.95	0.0000
30	49.17	0.00	0.00	0.0000	8021.08	0.0000
40	30.65	0.00	0.00	0.0000	6281.76	0.0000
50	20.94	0.00	0.00	0.0000	5029.68	0.0000
60	15.22	0.00	0.00	0.0000	4106.19	0.0000
80	9.09	0.00	0.00	0.0000	2877.44	0.0000
100	6.04	0.00	0.00	0.0000	2127.42	0.0000
150	2.83	0.00	0.00	0.0000	1174.14	0.0000
200	1.64	0.00	0.00	0.0000	750.86	0.0000
250	1.07	0.00	0.00	0.0000	526.14	0.0000
500	0.28	0.00	0.00	0.0000	171.69	0.0000
1000	0.07	0.00	0.00	0.0000	57.64	0.0000

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Center	Resident	Worker	Chronic	Acute
20	26.73	11.38	0.1294	0.0740
30	14.33	6.10	0.0694	0.0564
40	8.93	3.80	0.0433	0.0442
50	6.10	2.60	0.0296	0.0354
60	4.44	1.89	0.0215	0.0289
80	2.65	1.13	0.0128	0.0202
100	1.76	0.75	0.0085	0.0150
150	0.82	0.35	0.0040	0.0083
200	0.48	0.20	0.0023	0.0053
250	0.31	0.13	0.0015	0.0037
500	0.08	0.03	0.0004	0.0012
1000	0.02	0.01	0.0001	0.0004

307

Facility G-01 - 55% Perc, 25% MeCl

Met Set: Oakland

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0823
Ann Rate [g/s]: 0.0289

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	91.71	15.64	6.66	0.0757	10519.95	0.0433
30	49.17	8.38	3.57	0.0406	8021.08	0.0330
40	30.65	5.23	2.22	0.0253	6281.76	0.0258
50	20.94	3.57	1.52	0.0173	5029.68	0.0207
60	15.22	2.60	1.10	0.0126	4106.19	0.0169
80	9.09	1.55	0.66	0.0075	2877.44	0.0118
100	6.04	1.03	0.44	0.0050	2127.42	0.0088
150	2.83	0.48	0.21	0.0023	1174.14	0.0048
200	1.64	0.28	0.12	0.0014	750.86	0.0031
250	1.07	0.18	0.08	0.0009	526.14	0.0022
500	0.28	0.05	0.02	0.0002	171.69	0.0007
1000	0.07	0.01	0.01	0.0001	57.64	0.0002

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0374
Ann Rate [g/s]: 0.0131

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	91.71	1.20	0.51	0.0004	10519.95	0.0281
30	49.17	0.64	0.27	0.0002	8021.08	0.0214
40	30.65	0.40	0.17	0.0001	6281.76	0.0168
50	20.94	0.27	0.12	0.0001	5029.68	0.0134
60	15.22	0.20	0.08	0.0001	4106.19	0.0110
80	9.09	0.12	0.05	4.0E-05	2877.44	0.0077
100	6.04	0.08	0.03	2.6E-05	2127.42	0.0057
150	2.83	0.04	0.02	1.2E-05	1174.14	0.0031
200	1.64	0.02	0.01	7.2E-06	750.86	0.0020
250	1.07	0.01	0.01	4.7E-06	526.14	0.0014
500	0.28	0.00	0.00	1.2E-06	171.69	0.0005
1000	0.07	0.00	0.00	3.1E-07	57.64	0.0002

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	91.71	0.00	0.00	0.0000	10519.95	0.0000
30	49.17	0.00	0.00	0.0000	8021.08	0.0000
40	30.65	0.00	0.00	0.0000	6281.76	0.0000
50	20.94	0.00	0.00	0.0000	5029.68	0.0000
60	15.22	0.00	0.00	0.0000	4106.19	0.0000
80	9.09	0.00	0.00	0.0000	2877.44	0.0000
100	6.04	0.00	0.00	0.0000	2127.42	0.0000
150	2.83	0.00	0.00	0.0000	1174.14	0.0000
200	1.64	0.00	0.00	0.0000	750.86	0.0000
250	1.07	0.00	0.00	0.0000	526.14	0.0000
500	0.28	0.00	0.00	0.0000	171.69	0.0000
1000	0.07	0.00	0.00	0.0000	57.64	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	16.84	7.17	0.0761	0.0714
30	9.03	3.84	0.0408	0.0544
40	5.63	2.40	0.0254	0.0426
50	3.84	1.64	0.0174	0.0341
60	2.79	1.19	0.0126	0.0279
80	1.67	0.71	0.0075	0.0195
100	1.11	0.47	0.0050	0.0144
150	0.52	0.22	0.0023	0.0080
200	0.30	0.13	0.0014	0.0051
250	0.20	0.08	0.0009	0.0036
500	0.05	0.02	0.0002	0.0012
1000	0.01	0.01	0.0001	0.0004

Facility G-01 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Oakland

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0210

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	91.71	11.36	4.84	0.0550	10519.95	0.0315
30	49.17	6.09	2.59	0.0295	8021.08	0.0240
40	30.65	3.80	1.62	0.0184	6281.76	0.0188
50	20.94	2.59	1.10	0.0126	5029.68	0.0151
60	15.22	1.89	0.80	0.0091	4106.19	0.0123
80	9.09	1.13	0.48	0.0055	2877.44	0.0086
100	6.04	0.75	0.32	0.0036	2127.42	0.0064
150	2.83	0.35	0.15	0.0017	1174.14	0.0035
200	1.64	0.20	0.09	0.0010	750.86	0.0022
250	1.07	0.13	0.06	0.0006	526.14	0.0016
500	0.28	0.03	0.01	0.0002	171.69	0.0005
1000	0.07	0.01	0.00	4.2E-05	57.64	0.0002

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0449
Ann Rate [g/s]: 0.0158

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	91.71	1.45	0.62	0.0005	10519.95	0.0337
30	49.17	0.78	0.33	0.0003	8021.08	0.0257
40	30.65	0.48	0.21	0.0002	6281.76	0.0201
50	20.94	0.33	0.14	0.0001	5029.68	0.0161
60	15.22	0.24	0.10	0.0001	4106.19	0.0132
80	9.09	0.14	0.06	4.8E-05	2877.44	0.0092
100	6.04	0.10	0.04	3.2E-05	2127.42	0.0068
150	2.83	0.04	0.02	1.5E-05	1174.14	0.0038
200	1.64	0.03	0.01	8.6E-06	750.86	0.0024
250	1.07	0.02	0.01	5.6E-06	526.14	0.0017
500	0.28	0.00	0.00	1.5E-06	171.69	0.0006
1000	0.07	0.00	0.00	3.7E-07	57.64	0.0002

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0299
Ann Rate [g/s]: 0.0105

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	91.71	1.93	0.82	0.0015	10519.95	0.0000
30	49.17	1.03	0.44	0.0008	8021.08	0.0000
40	30.65	0.64	0.27	0.0005	6281.76	0.0000
50	20.94	0.44	0.19	0.0003	5029.68	0.0000
60	15.22	0.32	0.14	0.0002	4106.19	0.0000
80	9.09	0.19	0.08	0.0001	2877.44	0.0000
100	6.04	0.13	0.05	0.0001	2127.42	0.0000
150	2.83	0.06	0.03	4.6E-05	1174.14	0.0000
200	1.64	0.03	0.01	2.7E-05	750.86	0.0000
250	1.07	0.02	0.01	1.8E-05	526.14	0.0000
500	0.28	0.01	0.00	4.6E-06	171.69	0.0000
1000	0.07	0.00	0.00	1.1E-06	57.64	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	14.74	6.27	0.0570	0.0652
30	7.90	3.36	0.0306	0.0497
40	4.93	2.10	0.0191	0.0390
50	3.37	1.43	0.0130	0.0312
60	2.45	1.04	0.0095	0.0255
80	1.46	0.62	0.0057	0.0178
100	0.97	0.41	0.0038	0.0132
150	0.45	0.19	0.0018	0.0073
200	0.26	0.11	0.0010	0.0047
250	0.17	0.07	0.0007	0.0033
500	0.04	0.02	0.0002	0.0011
1000	0.01	0.00	4.4E-05	0.0004

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Facility G-01 - 55% Perc, 43% TCE

Met Set: Oakland

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0823
Ann Rate [g/s]: 0.0289

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	91.71	15.64	6.66	0.0757	10519.95	0.0433
30	49.17	8.38	3.57	0.0406	8021.08	0.0330
40	30.65	5.23	2.22	0.0253	6281.76	0.0258
50	20.94	3.57	1.52	0.0173	5029.68	0.0207
60	15.22	2.60	1.10	0.0126	4106.19	0.0169
80	9.09	1.55	0.66	0.0075	2877.44	0.0118
100	6.04	1.03	0.44	0.0050	2127.42	0.0088
150	2.83	0.48	0.21	0.0023	1174.14	0.0048
200	1.64	0.28	0.12	0.0014	750.86	0.0031
250	1.07	0.18	0.08	0.0009	526.14	0.0022
500	0.28	0.05	0.02	0.0002	171.69	0.0007
1000	0.07	0.01	0.01	0.0001	57.64	0.0002

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	91.71	0.00	0.00	0.0000	10519.95	0.0000
30	49.17	0.00	0.00	0.0000	8021.08	0.0000
40	30.65	0.00	0.00	0.0000	6281.76	0.0000
50	20.94	0.00	0.00	0.0000	5029.68	0.0000
60	15.22	0.00	0.00	0.0000	4106.19	0.0000
80	9.09	0.00	0.00	0.0000	2877.44	0.0000
100	6.04	0.00	0.00	0.0000	2127.42	0.0000
150	2.83	0.00	0.00	0.0000	1174.14	0.0000
200	1.64	0.00	0.00	0.0000	750.86	0.0000
250	1.07	0.00	0.00	0.0000	526.14	0.0000
500	0.28	0.00	0.00	0.0000	171.69	0.0000
1000	0.07	0.00	0.00	0.0000	57.64	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0644
Ann Rate [g/s]: 0.0226

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	91.71	4.15	1.76	0.0032	10519.95	0.0000
30	49.17	2.22	0.95	0.0017	8021.08	0.0000
40	30.65	1.39	0.59	0.0011	6281.76	0.0000
50	20.94	0.95	0.40	0.0007	5029.68	0.0000
60	15.22	0.69	0.29	0.0005	4106.19	0.0000
80	9.09	0.41	0.17	0.0003	2877.44	0.0000
100	6.04	0.27	0.12	0.0002	2127.42	0.0000
150	2.83	0.13	0.05	0.0001	1174.14	0.0000
200	1.64	0.07	0.03	0.0001	750.86	0.0000
250	1.07	0.05	0.02	3.8E-05	526.14	0.0000
500	0.28	0.01	0.01	9.9E-06	171.69	0.0000
1000	0.07	0.00	0.00	2.5E-06	57.64	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	19.78	8.42	0.0790	0.0433
30	10.61	4.51	0.0423	0.0330
40	6.61	2.81	0.0264	0.0258
50	4.52	1.92	0.0180	0.0207
60	3.28	1.40	0.0131	0.0169
80	1.96	0.83	0.0078	0.0118
100	1.30	0.55	0.0052	0.0088
150	0.61	0.26	0.0024	0.0048
200	0.35	0.15	0.0014	0.0031
250	0.23	0.10	0.0009	0.0022
500	0.06	0.03	0.0002	0.0007
1000	0.02	0.01	0.0001	0.0002

Facility G-01 - 94% Perc

Met Set: Default -0

94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1407

Ann Rate [g/s]: 0.0494

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	89.49	38.09	0.4334	11342.73	0.0798
30	229.98	67.03	28.53	0.3246	8496.33	0.0598
40	178.09	51.91	22.09	0.2514	6579.11	0.0463
50	141.80	41.33	17.59	0.2001	5238.72	0.0369
60	115.56	33.68	14.34	0.1631	4269.33	0.0300
80	81.09	23.64	10.06	0.1145	2995.85	0.0211
100	60.18	17.54	7.47	0.0849	2223.11	0.0156
150	33.55	9.78	4.16	0.0473	1239.31	0.0087
200	21.63	6.30	2.68	0.0305	799.09	0.0056
250	15.25	4.45	1.89	0.0215	563.57	0.0040
500	5.08	1.48	0.63	0.0072	187.51	0.0013
1000	1.74	0.51	0.22	0.0025	64.26	0.0005

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500	5.08	0.00	0.00	0.0000	187.51	0.0000
1000	1.74	0.00	0.00	0.0000	64.26	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500	5.08	0.00	0.00	0.0000	187.51	0.0000
1000	1.74	0.00	0.00	0.0000	64.26	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	89.49	38.09	0.4334	0.0798
30	67.03	28.53	0.3246	0.0598
40	51.91	22.09	0.2514	0.0463
50	41.33	17.59	0.2001	0.0369
60	33.68	14.34	0.1631	0.0300
80	23.64	10.06	0.1145	0.0211
100	17.54	7.47	0.0849	0.0156
150	9.78	4.16	0.0473	0.0087
200	6.30	2.68	0.0305	0.0056
250	4.45	1.89	0.0215	0.0040
500	1.48	0.63	0.0072	0.0013
1000	0.51	0.22	0.0025	0.0005

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Facility G-01 - 55% Perc, 25% MeCl

Met Set: Default -0

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0823
Ann Rate [g/s]: 0.0289

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	52.35	22.29	0.2535	11342.73	0.0467
30	229.98	39.21	16.69	0.1899	8496.33	0.0350
40	178.09	30.37	12.93	0.1470	6579.11	0.0271
50	141.80	24.18	10.29	0.1171	5238.72	0.0216
60	115.56	19.70	8.39	0.0954	4269.33	0.0176
80	81.09	13.83	5.89	0.0670	2995.85	0.0123
100	60.18	10.26	4.37	0.0497	2223.11	0.0091
150	33.55	5.72	2.43	0.0277	1239.31	0.0051
200	21.63	3.69	1.57	0.0179	799.09	0.0033
250	15.25	2.60	1.11	0.0126	563.57	0.0023
500	5.08	0.87	0.37	0.0042	187.51	0.0008
1000	1.74	0.30	0.13	0.0014	64.26	0.0003

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0374
Ann Rate [g/s]: 0.0131

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	4.02	1.71	0.0013	11342.73	0.0303
30	229.98	3.01	1.28	0.0010	8496.33	0.0227
40	178.09	2.33	0.99	0.0008	6579.11	0.0176
50	141.80	1.86	0.79	0.0006	5238.72	0.0140
60	115.56	1.51	0.64	0.0005	4269.33	0.0114
80	81.09	1.06	0.45	0.0004	2995.85	0.0080
100	60.18	0.79	0.34	0.0003	2223.11	0.0059
150	33.55	0.44	0.19	0.0001	1239.31	0.0033
200	21.63	0.28	0.12	0.0001	799.09	0.0021
250	15.25	0.20	0.09	0.0001	563.57	0.0015
500	5.08	0.07	0.03	2.2E-05	187.51	0.0005
1000	1.74	0.02	0.01	7.6E-06	64.26	0.0002

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500	5.08	0.00	0.00	0.0000	187.51	0.0000
1000	1.74	0.00	0.00	0.0000	64.26	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	56.37	24.00	0.2549	0.0770
30	42.23	17.98	0.1909	0.0577
40	32.70	13.92	0.1478	0.0446
50	26.04	11.08	0.1177	0.0356
60	21.22	9.03	0.0959	0.0290
80	14.89	6.34	0.0673	0.0203
100	11.05	4.70	0.0500	0.0151
150	6.16	2.62	0.0278	0.0084
200	3.97	1.69	0.0180	0.0054
250	2.80	1.19	0.0127	0.0038
500	0.93	0.40	0.0042	0.0013
1000	0.32	0.14	0.0014	0.0004

Facility G-01 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Default -0

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0210

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	38.04	16.19	0.1842	11342.73	0.0340
30	229.98	28.49	12.13	0.1380	8496.33	0.0254
40	178.09	22.06	9.39	0.1069	6579.11	0.0197
50	141.80	17.57	7.48	0.0851	5238.72	0.0157
60	115.56	14.32	6.10	0.0693	4269.33	0.0128
80	81.09	10.05	4.28	0.0487	2995.85	0.0090
100	60.18	7.46	3.17	0.0361	2223.11	0.0067
150	33.55	4.16	1.77	0.0201	1239.31	0.0037
200	21.63	2.68	1.14	0.0130	799.09	0.0024
250	15.25	1.89	0.80	0.0092	563.57	0.0017
500	5.08	0.63	0.27	0.0030	187.51	0.0006
1000	1.74	0.22	0.09	0.0010	64.26	0.0002

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0449
Ann Rate [g/s]: 0.0158

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	4.85	2.07	0.0016	11342.73	0.0364
30	229.98	3.63	1.55	0.0012	8496.33	0.0272
40	178.09	2.81	1.20	0.0009	6579.11	0.0211
50	141.80	2.24	0.95	0.0007	5238.72	0.0168
60	115.56	1.83	0.78	0.0006	4269.33	0.0137
80	81.09	1.28	0.55	0.0004	2995.85	0.0096
100	60.18	0.95	0.40	0.0003	2223.11	0.0071
150	33.55	0.53	0.23	0.0002	1239.31	0.0040
200	21.63	0.34	0.15	0.0001	799.09	0.0026
250	15.25	0.24	0.10	0.0001	563.57	0.0018
500	5.08	0.08	0.03	2.7E-05	187.51	0.0006
1000	1.74	0.03	0.01	9.2E-06	64.26	0.0002

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0299
Ann Rate [g/s]: 0.0105

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	6.45	2.74	0.0050	11342.73	0.0000
30	229.98	4.83	2.06	0.0038	8496.33	0.0000
40	178.09	3.74	1.59	0.0029	6579.11	0.0000
50	141.80	2.98	1.27	0.0023	5238.72	0.0000
60	115.56	2.43	1.03	0.0019	4269.33	0.0000
80	81.09	1.70	0.72	0.0013	2995.85	0.0000
100	60.18	1.26	0.54	0.0010	2223.11	0.0000
150	33.55	0.70	0.30	0.0006	1239.31	0.0000
200	21.63	0.45	0.19	0.0004	799.09	0.0000
250	15.25	0.32	0.14	0.0003	563.57	0.0000
500	5.08	0.11	0.05	0.0001	187.51	0.0000
1000	1.74	0.04	0.02	2.9E-05	64.26	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	49.34	21.00	0.1909	0.0703
30	36.96	15.73	0.1430	0.0527
40	28.62	12.18	0.1107	0.0408
50	22.79	9.70	0.0882	0.0325
60	18.57	7.91	0.0718	0.0265
80	13.03	5.55	0.0504	0.0186
100	9.67	4.12	0.0374	0.0138
150	5.39	2.29	0.0209	0.0077
200	3.48	1.48	0.0134	0.0050
250	2.45	1.04	0.0095	0.0035
500	0.82	0.35	0.0032	0.0012
1000	0.28	0.12	0.0011	0.0004

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Facility G-01 - 55% Perc, 43% TCE

Met Set: Default -0

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0823
Ann Rate [g/s]: 0.0289

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	52.35	22.29	0.2535	11342.73	0.0467
30	229.98	39.21	16.69	0.1899	8496.33	0.0350
40	178.09	30.37	12.93	0.1470	6579.11	0.0271
50	141.80	24.18	10.29	0.1171	5238.72	0.0216
60	115.56	19.70	8.39	0.0954	4269.33	0.0176
80	81.09	13.83	5.89	0.0670	2995.85	0.0123
100	60.18	10.26	4.37	0.0497	2223.11	0.0091
150	33.55	5.72	2.43	0.0277	1239.31	0.0051
200	21.63	3.69	1.57	0.0179	799.09	0.0033
250	15.25	2.60	1.11	0.0126	563.57	0.0023
500	5.08	0.87	0.37	0.0042	187.51	0.0008
1000	1.74	0.30	0.13	0.0014	64.26	0.0003

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500	5.08	0.00	0.00	0.0000	187.51	0.0000
1000	1.74	0.00	0.00	0.0000	64.26	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0644
Ann Rate [g/s]: 0.0226

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	13.88	5.91	0.0108	11342.73	0.0000
30	229.98	10.40	4.43	0.0081	8496.33	0.0000
40	178.09	8.05	3.43	0.0063	6579.11	0.0000
50	141.80	6.41	2.73	0.0050	5238.72	0.0000
60	115.56	5.22	2.22	0.0041	4269.33	0.0000
80	81.09	3.67	1.56	0.0029	2995.85	0.0000
100	60.18	2.72	1.16	0.0021	2223.11	0.0000
150	33.55	1.52	0.65	0.0012	1239.31	0.0000
200	21.63	0.98	0.42	0.0008	799.09	0.0000
250	15.25	0.69	0.29	0.0005	563.57	0.0000
500	5.08	0.23	0.10	0.0002	187.51	0.0000
1000	1.74	0.08	0.03	0.0001	64.26	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	66.23	28.19	0.2644	0.0467
30	49.61	21.12	0.1980	0.0350
40	38.42	16.35	0.1533	0.0271
50	30.59	13.02	0.1221	0.0216
60	24.93	10.61	0.0995	0.0176
80	17.49	7.45	0.0698	0.0123
100	12.98	5.53	0.0518	0.0091
150	7.24	3.08	0.0289	0.0051
200	4.67	1.99	0.0186	0.0033
250	3.29	1.40	0.0131	0.0023
500	1.09	0.47	0.0044	0.0008
1000	0.38	0.16	0.0015	0.0003

Risk Assessment Summary - 3 Generic Facilities
Multicomponent Impacts - Brake Cleaners - Acute

Facility G-01 - 94% Perc

Met Set: Fresno

94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1407
Ann Rate [g/s]: 0.0494

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	130.29	37.97	16.16	0.1839	11155.50	0.0785
30	68.87	20.07	8.54	0.0972	8402.65	0.0591
40	42.46	12.38	5.27	0.0599	6521.95	0.0459
50	28.78	8.39	3.57	0.0406	5186.31	0.0365
60	20.79	6.06	2.58	0.0293	4214.74	0.0297
80	12.29	3.58	1.52	0.0173	2937.50	0.0207
100	8.11	2.36	1.01	0.0114	2165.55	0.0152
150	3.76	1.10	0.47	0.0053	1191.61	0.0084
200	2.16	0.63	0.27	0.0030	761.38	0.0054
250	1.40	0.41	0.17	0.0020	533.41	0.0038
500	0.36	0.10	0.04	0.0005	174.25	0.0012
1000	0.09	0.03	0.01	0.0001	58.67	0.0004

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	130.29	0.00	0.00	0.0000	11155.50	0.0000
30	68.87	0.00	0.00	0.0000	8402.65	0.0000
40	42.46	0.00	0.00	0.0000	6521.95	0.0000
50	28.78	0.00	0.00	0.0000	5186.31	0.0000
60	20.79	0.00	0.00	0.0000	4214.74	0.0000
80	12.29	0.00	0.00	0.0000	2937.50	0.0000
100	8.11	0.00	0.00	0.0000	2165.55	0.0000
150	3.76	0.00	0.00	0.0000	1191.61	0.0000
200	2.16	0.00	0.00	0.0000	761.38	0.0000
250	1.40	0.00	0.00	0.0000	533.41	0.0000
500	0.36	0.00	0.00	0.0000	174.25	0.0000
1000	0.09	0.00	0.00	0.0000	58.67	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	130.29	0.00	0.00	0.0000	11155.50	0.0000
30	68.87	0.00	0.00	0.0000	8402.65	0.0000
40	42.46	0.00	0.00	0.0000	6521.95	0.0000
50	28.78	0.00	0.00	0.0000	5186.31	0.0000
60	20.79	0.00	0.00	0.0000	4214.74	0.0000
80	12.29	0.00	0.00	0.0000	2937.50	0.0000
100	8.11	0.00	0.00	0.0000	2165.55	0.0000
150	3.76	0.00	0.00	0.0000	1191.61	0.0000
200	2.16	0.00	0.00	0.0000	761.38	0.0000
250	1.40	0.00	0.00	0.0000	533.41	0.0000
500	0.36	0.00	0.00	0.0000	174.25	0.0000
1000	0.09	0.00	0.00	0.0000	58.67	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	37.97	16.16	0.1839	0.0785
30	20.07	8.54	0.0972	0.0591
40	12.38	5.27	0.0599	0.0459
50	8.39	3.57	0.0406	0.0365
60	6.06	2.58	0.0293	0.0297
80	3.58	1.52	0.0173	0.0207
100	2.36	1.01	0.0114	0.0152
150	1.10	0.47	0.0053	0.0084
200	0.63	0.27	0.0030	0.0054
250	0.41	0.17	0.0020	0.0038
500	0.10	0.04	0.0005	0.0012
1000	0.03	0.01	0.0001	0.0004

Facility G-01 - 55% Perc, 25% MeCl

Met Set: Fresno

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0823
Ann Rate [g/s]: 0.0289

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	130.29	22.22	9.46	0.1076	11155.50	0.0459
30	68.87	11.74	5.00	0.0569	8402.65	0.0346
40	42.46	7.24	3.08	0.0351	6521.95	0.0268
50	28.78	4.91	2.09	0.0238	5186.31	0.0213
60	20.79	3.54	1.51	0.0172	4214.74	0.0173
80	12.29	2.10	0.89	0.0101	2937.50	0.0121
100	8.11	1.38	0.59	0.0067	2165.55	0.0089
150	3.76	0.64	0.27	0.0031	1191.61	0.0049
200	2.16	0.37	0.16	0.0018	761.38	0.0031
250	1.40	0.24	0.10	0.0012	533.41	0.0022
500	0.36	0.06	0.03	0.0003	174.25	0.0007
1000	0.09	0.02	0.01	0.0001	58.67	0.0002

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0374
Ann Rate [g/s]: 0.0131

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	130.29	1.71	0.73	0.0006	11155.50	0.0298
30	68.87	0.90	0.38	0.0003	8402.65	0.0224
40	42.46	0.56	0.24	0.0002	6521.95	0.0174
50	28.78	0.38	0.16	0.0001	5186.31	0.0139
60	20.79	0.27	0.12	0.0001	4214.74	0.0113
80	12.29	0.16	0.07	0.0001	2937.50	0.0078
100	8.11	0.11	0.05	3.5E-05	2165.55	0.0058
150	3.76	0.05	0.02	1.6E-05	1191.61	0.0032
200	2.16	0.03	0.01	9.4E-06	761.38	0.0020
250	1.40	0.02	0.01	6.1E-06	533.41	0.0014
500	0.36	0.00	0.00	1.6E-06	174.25	0.0005
1000	0.09	0.00	0.00	3.9E-07	58.67	0.0002

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	130.29	0.00	0.00	0.0000	11155.50	0.0000
30	68.87	0.00	0.00	0.0000	8402.65	0.0000
40	42.46	0.00	0.00	0.0000	6521.95	0.0000
50	28.78	0.00	0.00	0.0000	5186.31	0.0000
60	20.79	0.00	0.00	0.0000	4214.74	0.0000
80	12.29	0.00	0.00	0.0000	2937.50	0.0000
100	8.11	0.00	0.00	0.0000	2165.55	0.0000
150	3.76	0.00	0.00	0.0000	1191.61	0.0000
200	2.16	0.00	0.00	0.0000	761.38	0.0000
250	1.40	0.00	0.00	0.0000	533.41	0.0000
500	0.36	0.00	0.00	0.0000	174.25	0.0000
1000	0.09	0.00	0.00	0.0000	58.67	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	23.92	10.18	0.1082	0.0757
30	12.65	5.38	0.0572	0.0570
40	7.80	3.32	0.0352	0.0443
50	5.28	2.25	0.0239	0.0352
60	3.82	1.62	0.0173	0.0286
80	2.26	0.96	0.0102	0.0199
100	1.49	0.63	0.0067	0.0147
150	0.69	0.29	0.0031	0.0081
200	0.40	0.17	0.0018	0.0052
250	0.26	0.11	0.0012	0.0036
500	0.07	0.03	0.0003	0.0012
1000	0.02	0.01	0.0001	0.0004

Facility G-01 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Fresno

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0210

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	130.29	16.14	6.87	0.0782	11155.50	0.0334
30	68.87	8.53	3.63	0.0413	8402.65	0.0252
40	42.46	5.26	2.24	0.0255	6521.95	0.0195
50	28.78	3.57	1.52	0.0173	5186.31	0.0155
60	20.79	2.58	1.10	0.0125	4214.74	0.0126
80	12.29	1.52	0.65	0.0074	2937.50	0.0088
100	8.11	1.00	0.43	0.0049	2165.55	0.0065
150	3.76	0.47	0.20	0.0023	1191.61	0.0036
200	2.16	0.27	0.11	0.0013	761.38	0.0023
250	1.40	0.17	0.07	0.0008	533.41	0.0016
500	0.36	0.04	0.02	0.0002	174.25	0.0005
1000	0.09	0.01	0.00	0.0001	58.67	0.0002

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0449
Ann Rate [g/s]: 0.0158

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	130.29	2.06	0.88	0.0007	11155.50	0.0358
30	68.87	1.09	0.46	0.0004	8402.65	0.0269
40	42.46	0.67	0.29	0.0002	6521.95	0.0209
50	28.78	0.45	0.19	0.0002	5186.31	0.0166
60	20.79	0.33	0.14	0.0001	4214.74	0.0135
80	12.29	0.19	0.08	0.0001	2937.50	0.0094
100	8.11	0.13	0.05	4.3E-05	2165.55	0.0069
150	3.76	0.06	0.03	2.0E-05	1191.61	0.0038
200	2.16	0.03	0.01	1.1E-05	761.38	0.0024
250	1.40	0.02	0.01	7.4E-06	533.41	0.0017
500	0.36	0.01	0.00	1.9E-06	174.25	0.0006
1000	0.09	0.00	0.00	4.7E-07	58.67	0.0002

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0299
Ann Rate [g/s]: 0.0105

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	130.29	2.74	1.16	0.0021	11155.50	0.0000
30	68.87	1.45	0.62	0.0011	8402.65	0.0000
40	42.46	0.89	0.38	0.0007	6521.95	0.0000
50	28.78	0.60	0.26	0.0005	5186.31	0.0000
60	20.79	0.44	0.19	0.0003	4214.74	0.0000
80	12.29	0.26	0.11	0.0002	2937.50	0.0000
100	8.11	0.17	0.07	0.0001	2165.55	0.0000
150	3.76	0.08	0.03	0.0001	1191.61	0.0000
200	2.16	0.05	0.02	3.5E-05	761.38	0.0000
250	1.40	0.03	0.01	2.3E-05	533.41	0.0000
500	0.36	0.01	0.00	5.9E-06	174.25	0.0000
1000	0.09	0.00	0.00	1.5E-06	58.67	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	20.94	8.91	0.0810	0.0692
30	11.07	4.71	0.0428	0.0521
40	6.82	2.90	0.0264	0.0405
50	4.62	1.97	0.0179	0.0322
60	3.34	1.42	0.0129	0.0261
80	1.98	0.84	0.0076	0.0182
100	1.30	0.55	0.0050	0.0134
150	0.60	0.26	0.0023	0.0074
200	0.35	0.15	0.0013	0.0047
250	0.22	0.10	0.0009	0.0033
500	0.06	0.02	0.0002	0.0011
1000	0.01	0.01	0.0001	0.0004

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Facility G-01 - 55% Perc, 43% TCE

Met Set: Fresno

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0823
Ann Rate [g/s]: 0.0289

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	130.29	22.22	9.46	0.1076	11155.50	0.0459
30	68.87	11.74	5.00	0.0569	8402.65	0.0346
40	42.46	7.24	3.08	0.0351	6521.95	0.0268
50	28.78	4.91	2.09	0.0238	5186.31	0.0213
60	20.79	3.54	1.51	0.0172	4214.74	0.0173
80	12.29	2.10	0.89	0.0101	2937.50	0.0121
100	8.11	1.38	0.59	0.0067	2165.55	0.0089
150	3.76	0.64	0.27	0.0031	1191.61	0.0049
200	2.16	0.37	0.16	0.0018	761.38	0.0031
250	1.40	0.24	0.10	0.0012	533.41	0.0022
500	0.36	0.06	0.03	0.0003	174.25	0.0007
1000	0.09	0.02	0.01	0.0001	58.67	0.0002

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	130.29	0.00	0.00	0.0000	11155.50	0.0000
30	68.87	0.00	0.00	0.0000	8402.65	0.0000
40	42.46	0.00	0.00	0.0000	6521.95	0.0000
50	28.78	0.00	0.00	0.0000	5186.31	0.0000
60	20.79	0.00	0.00	0.0000	4214.74	0.0000
80	12.29	0.00	0.00	0.0000	2937.50	0.0000
100	8.11	0.00	0.00	0.0000	2165.55	0.0000
150	3.76	0.00	0.00	0.0000	1191.61	0.0000
200	2.16	0.00	0.00	0.0000	761.38	0.0000
250	1.40	0.00	0.00	0.0000	533.41	0.0000
500	0.36	0.00	0.00	0.0000	174.25	0.0000
1000	0.09	0.00	0.00	0.0000	58.67	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0644
Ann Rate [g/s]: 0.0226

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	130.29	5.89	2.51	0.0046	11155.50	0.0000
30	68.87	3.11	1.33	0.0024	8402.65	0.0000
40	42.46	1.92	0.82	0.0015	6521.95	0.0000
50	28.78	1.30	0.55	0.0010	5186.31	0.0000
60	20.79	0.94	0.40	0.0007	4214.74	0.0000
80	12.29	0.56	0.24	0.0004	2937.50	0.0000
100	8.11	0.37	0.16	0.0003	2165.55	0.0000
150	3.76	0.17	0.07	0.0001	1191.61	0.0000
200	2.16	0.10	0.04	0.0001	761.38	0.0000
250	1.40	0.06	0.03	4.9E-05	533.41	0.0000
500	0.36	0.02	0.01	1.3E-05	174.25	0.0000
1000	0.09	0.00	0.00	3.2E-06	58.67	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	28.10	11.96	0.1122	0.0459
30	14.86	6.32	0.0593	0.0346
40	9.16	3.90	0.0366	0.0268
50	6.21	2.64	0.0248	0.0213
60	4.48	1.91	0.0179	0.0173
80	2.65	1.13	0.0106	0.0121
100	1.75	0.74	0.0070	0.0089
150	0.81	0.35	0.0032	0.0049
200	0.47	0.20	0.0019	0.0031
250	0.30	0.13	0.0012	0.0022
500	0.08	0.03	0.0003	0.0007
1000	0.02	0.01	0.0001	0.0002

Facility G-01 - 94% Perc

Met Set: Concord

94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1407

Ann Rate [g/s]: 0.0494

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	161.57	47.09	20.05	0.2280	12417.79	0.0874
30	86.18	25.12	10.69	0.1216	9254.67	0.0651
40	53.59	15.62	6.65	0.0756	7114.91	0.0501
50	36.58	10.66	4.54	0.0516	5625.45	0.0396
60	26.58	7.75	3.30	0.0375	4555.43	0.0320
80	15.87	4.63	1.97	0.0224	3163.52	0.0223
100	10.55	3.07	1.31	0.0149	2329.10	0.0164
150	4.95	1.44	0.61	0.0070	1281.78	0.0090
200	2.86	0.83	0.35	0.0040	820.22	0.0058
250	1.87	0.55	0.23	0.0026	575.61	0.0040
500	0.49	0.14	0.06	0.0007	189.47	0.0013
1000	0.14	0.04	0.02	0.0002	64.58	0.0005

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	161.57	0.00	0.00	0.0000	12417.79	0.0000
30	86.18	0.00	0.00	0.0000	9254.67	0.0000
40	53.59	0.00	0.00	0.0000	7114.91	0.0000
50	36.58	0.00	0.00	0.0000	5625.45	0.0000
60	26.58	0.00	0.00	0.0000	4555.43	0.0000
80	15.87	0.00	0.00	0.0000	3163.52	0.0000
100	10.55	0.00	0.00	0.0000	2329.10	0.0000
150	4.95	0.00	0.00	0.0000	1281.78	0.0000
200	2.86	0.00	0.00	0.0000	820.22	0.0000
250	1.87	0.00	0.00	0.0000	575.61	0.0000
500	0.49	0.00	0.00	0.0000	189.47	0.0000
1000	0.14	0.00	0.00	0.0000	64.58	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	161.57	0.00	0.00	0.0000	12417.79	0.0000
30	86.18	0.00	0.00	0.0000	9254.67	0.0000
40	53.59	0.00	0.00	0.0000	7114.91	0.0000
50	36.58	0.00	0.00	0.0000	5625.45	0.0000
60	26.58	0.00	0.00	0.0000	4555.43	0.0000
80	15.87	0.00	0.00	0.0000	3163.52	0.0000
100	10.55	0.00	0.00	0.0000	2329.10	0.0000
150	4.95	0.00	0.00	0.0000	1281.78	0.0000
200	2.86	0.00	0.00	0.0000	820.22	0.0000
250	1.87	0.00	0.00	0.0000	575.61	0.0000
500	0.49	0.00	0.00	0.0000	189.47	0.0000
1000	0.14	0.00	0.00	0.0000	64.58	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	47.09	20.05	0.2280	0.0874
30	25.12	10.69	0.1216	0.0651
40	15.62	6.65	0.0756	0.0501
50	10.66	4.54	0.0516	0.0396
60	7.75	3.30	0.0375	0.0320
80	4.63	1.97	0.0224	0.0223
100	3.07	1.31	0.0149	0.0164
150	1.44	0.61	0.0070	0.0090
200	0.83	0.35	0.0040	0.0058
250	0.55	0.23	0.0026	0.0040
500	0.14	0.06	0.0007	0.0013
1000	0.04	0.02	0.0002	0.0005

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Facility G-01 - 55% Perc, 25% MeCl

Met Set: Concord

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0823
Ann Rate [g/s]: 0.0289

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	161.57	27.55	11.73	0.1334	12417.79	0.0511
30	86.18	14.69	6.26	0.0712	9254.67	0.0381
40	53.59	9.14	3.89	0.0443	7114.91	0.0293
50	36.58	6.24	2.66	0.0302	5625.45	0.0231
60	26.58	4.53	1.93	0.0219	4555.43	0.0187
80	15.87	2.71	1.15	0.0131	3163.52	0.0130
100	10.55	1.80	0.77	0.0087	2329.10	0.0096
150	4.95	0.84	0.36	0.0041	1281.78	0.0053
200	2.86	0.49	0.21	0.0024	820.22	0.0034
250	1.87	0.32	0.14	0.0015	575.61	0.0024
500	0.49	0.08	0.04	0.0004	189.47	0.0008
1000	0.14	0.02	0.01	0.0001	64.58	0.0003

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0374
Ann Rate [g/s]: 0.0131

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	161.57	2.12	0.90	0.0007	12417.79	0.0332
30	86.18	1.13	0.48	0.0004	9254.67	0.0247
40	53.59	0.70	0.30	0.0002	7114.91	0.0190
50	36.58	0.48	0.20	0.0002	5625.45	0.0150
60	26.58	0.35	0.15	0.0001	4555.43	0.0122
80	15.87	0.21	0.09	0.0001	3163.52	0.0085
100	10.55	0.14	0.06	4.6E-05	2329.10	0.0062
150	4.95	0.06	0.03	2.2E-05	1281.78	0.0034
200	2.86	0.04	0.02	1.2E-05	820.22	0.0022
250	1.87	0.02	0.01	8.2E-06	575.61	0.0015
500	0.49	0.01	0.00	2.1E-06	189.47	0.0005
1000	0.14	0.00	0.00	6.1E-07	64.58	0.0002

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	161.57	0.00	0.00	0.0000	12417.79	0.0000
30	86.18	0.00	0.00	0.0000	9254.67	0.0000
40	53.59	0.00	0.00	0.0000	7114.91	0.0000
50	36.58	0.00	0.00	0.0000	5625.45	0.0000
60	26.58	0.00	0.00	0.0000	4555.43	0.0000
80	15.87	0.00	0.00	0.0000	3163.52	0.0000
100	10.55	0.00	0.00	0.0000	2329.10	0.0000
150	4.95	0.00	0.00	0.0000	1281.78	0.0000
200	2.86	0.00	0.00	0.0000	820.22	0.0000
250	1.87	0.00	0.00	0.0000	575.61	0.0000
500	0.49	0.00	0.00	0.0000	189.47	0.0000
1000	0.14	0.00	0.00	0.0000	64.58	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	29.67	12.63	0.1341	0.0843
30	15.82	6.74	0.0715	0.0628
40	9.84	4.19	0.0445	0.0483
50	6.72	2.86	0.0304	0.0382
60	4.88	2.08	0.0221	0.0309
80	2.91	1.24	0.0132	0.0215
100	1.94	0.82	0.0088	0.0158
150	0.91	0.39	0.0041	0.0087
200	0.53	0.22	0.0024	0.0056
250	0.34	0.15	0.0016	0.0039
500	0.09	0.04	0.0004	0.0013
1000	0.03	0.01	0.0001	0.0004

Facility G-01 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Concord

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0210

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	161.57	20.02	8.52	0.0969	12417.79	0.0372
30	86.18	10.68	4.55	0.0517	9254.67	0.0277
40	53.59	6.64	2.83	0.0322	7114.91	0.0213
50	36.58	4.53	1.93	0.0219	5625.45	0.0168
60	26.58	3.29	1.40	0.0159	4555.43	0.0136
80	15.87	1.97	0.84	0.0095	3163.52	0.0095
100	10.55	1.31	0.56	0.0063	2329.10	0.0070
150	4.95	0.61	0.26	0.0030	1281.78	0.0038
200	2.86	0.35	0.15	0.0017	820.22	0.0025
250	1.87	0.23	0.10	0.0011	575.61	0.0017
500	0.49	0.06	0.03	0.0003	189.47	0.0006
1000	0.14	0.02	0.01	0.0001	64.58	0.0002

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0449
Ann Rate [g/s]: 0.0158

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	161.57	2.55	1.09	0.0009	12417.79	0.0398
30	86.18	1.36	0.58	0.0005	9254.67	0.0297
40	53.59	0.85	0.36	0.0003	7114.91	0.0228
50	36.58	0.58	0.25	0.0002	5625.45	0.0180
60	26.58	0.42	0.18	0.0001	4555.43	0.0146
80	15.87	0.25	0.11	0.0001	3163.52	0.0101
100	10.55	0.17	0.07	0.0001	2329.10	0.0075
150	4.95	0.08	0.03	2.6E-05	1281.78	0.0041
200	2.86	0.05	0.02	1.5E-05	820.22	0.0026
250	1.87	0.03	0.01	9.8E-06	575.61	0.0018
500	0.49	0.01	0.00	2.6E-06	189.47	0.0006
1000	0.14	0.00	0.00	7.4E-07	64.58	0.0002

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0299
Ann Rate [g/s]: 0.0105

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	161.57	3.39	1.44	0.0027	12417.79	0.0000
30	86.18	1.81	0.77	0.0014	9254.67	0.0000
40	53.59	1.13	0.48	0.0009	7114.91	0.0000
50	36.58	0.77	0.33	0.0006	5625.45	0.0000
60	26.58	0.56	0.24	0.0004	4555.43	0.0000
80	15.87	0.33	0.14	0.0003	3163.52	0.0000
100	10.55	0.22	0.09	0.0002	2329.10	0.0000
150	4.95	0.10	0.04	0.0001	1281.78	0.0000
200	2.86	0.06	0.03	4.7E-05	820.22	0.0000
250	1.87	0.04	0.02	3.1E-05	575.61	0.0000
500	0.49	0.01	0.00	8.0E-06	189.47	0.0000
1000	0.14	0.00	0.00	2.3E-06	64.58	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	25.96	11.05	0.1004	0.0770
30	13.85	5.90	0.0536	0.0574
40	8.61	3.67	0.0333	0.0441
50	5.88	2.50	0.0227	0.0349
60	4.27	1.82	0.0165	0.0283
80	2.55	1.09	0.0099	0.0196
100	1.70	0.72	0.0066	0.0144
150	0.80	0.34	0.0031	0.0079
200	0.46	0.20	0.0018	0.0051
250	0.30	0.13	0.0012	0.0036
500	0.08	0.03	0.0003	0.0012
1000	0.02	0.01	0.0001	0.0004

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Facility G-01 - 55% Perc, 43% TCE

Met Set: Concord

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0823
Ann Rate [g/s]: 0.0289

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	161.57	27.55	11.73	0.1334	12417.79	0.0511
30	86.18	14.69	6.26	0.0712	9254.67	0.0381
40	53.59	9.14	3.89	0.0443	7114.91	0.0293
50	36.58	6.24	2.66	0.0302	5625.45	0.0231
60	26.58	4.53	1.93	0.0219	4555.43	0.0187
80	15.87	2.71	1.15	0.0131	3163.52	0.0130
100	10.55	1.80	0.77	0.0087	2329.10	0.0096
150	4.95	0.84	0.36	0.0041	1281.78	0.0053
200	2.86	0.49	0.21	0.0024	820.22	0.0034
250	1.87	0.32	0.14	0.0015	575.61	0.0024
500	0.49	0.08	0.04	0.0004	189.47	0.0008
1000	0.14	0.02	0.01	0.0001	64.58	0.0003

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	161.57	0.00	0.00	0.0000	12417.79	0.0000
30	86.18	0.00	0.00	0.0000	9254.67	0.0000
40	53.59	0.00	0.00	0.0000	7114.91	0.0000
50	36.58	0.00	0.00	0.0000	5625.45	0.0000
60	26.58	0.00	0.00	0.0000	4555.43	0.0000
80	15.87	0.00	0.00	0.0000	3163.52	0.0000
100	10.55	0.00	0.00	0.0000	2329.10	0.0000
150	4.95	0.00	0.00	0.0000	1281.78	0.0000
200	2.86	0.00	0.00	0.0000	820.22	0.0000
250	1.87	0.00	0.00	0.0000	575.61	0.0000
500	0.49	0.00	0.00	0.0000	189.47	0.0000
1000	0.14	0.00	0.00	0.0000	64.58	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0644
Ann Rate [g/s]: 0.0226

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	161.57	7.30	3.11	0.0057	12417.79	0.0000
30	86.18	3.90	1.66	0.0030	9254.67	0.0000
40	53.59	2.42	1.03	0.0019	7114.91	0.0000
50	36.58	1.65	0.70	0.0013	5625.45	0.0000
60	26.58	1.20	0.51	0.0009	4555.43	0.0000
80	15.87	0.72	0.31	0.0006	3163.52	0.0000
100	10.55	0.48	0.20	0.0004	2329.10	0.0000
150	4.95	0.22	0.10	0.0002	1281.78	0.0000
200	2.86	0.13	0.06	0.0001	820.22	0.0000
250	1.87	0.08	0.04	0.0001	575.61	0.0000
500	0.49	0.02	0.01	1.7E-05	189.47	0.0000
1000	0.14	0.01	0.00	4.9E-06	64.58	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	34.85	14.84	0.1391	0.0511
30	18.59	7.91	0.0742	0.0381
40	11.56	4.92	0.0461	0.0293
50	7.89	3.36	0.0315	0.0231
60	5.73	2.44	0.0229	0.0187
80	3.42	1.46	0.0137	0.0130
100	2.28	0.97	0.0091	0.0096
150	1.07	0.45	0.0043	0.0053
200	0.62	0.26	0.0025	0.0034
250	0.40	0.17	0.0016	0.0024
500	0.11	0.04	0.0004	0.0008
1000	0.03	0.01	0.0001	0.0003

Facility G-01 - 94% Perc

Met Set: Mather

94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1407
Ann Rate [g/s]: 0.0494

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	96.52	28.13	11.98	0.1362	8470.50	0.0596
30	50.95	14.85	6.32	0.0719	5762.29	0.0405
40	31.40	9.15	3.90	0.0443	4464.60	0.0314
50	21.29	6.21	2.64	0.0300	3545.55	0.0249
60	15.38	4.48	1.91	0.0217	2878.60	0.0203
80	9.10	2.65	1.13	0.0128	2004.05	0.0141
100	6.00	1.75	0.74	0.0085	1477.56	0.0104
150	2.78	0.81	0.34	0.0039	819.70	0.0058
200	1.60	0.47	0.20	0.0023	527.32	0.0037
250	1.03	0.30	0.13	0.0015	371.22	0.0026
500	0.27	0.08	0.03	0.0004	122.78	0.0009
1000	0.07	0.02	0.01	0.0001	41.91	0.0003

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	96.52	0.00	0.00	0.0000	8470.50	0.0000
30	50.95	0.00	0.00	0.0000	5762.29	0.0000
40	31.40	0.00	0.00	0.0000	4464.60	0.0000
50	21.29	0.00	0.00	0.0000	3545.55	0.0000
60	15.38	0.00	0.00	0.0000	2878.60	0.0000
80	9.10	0.00	0.00	0.0000	2004.05	0.0000
100	6.00	0.00	0.00	0.0000	1477.56	0.0000
150	2.78	0.00	0.00	0.0000	819.70	0.0000
200	1.60	0.00	0.00	0.0000	527.32	0.0000
250	1.03	0.00	0.00	0.0000	371.22	0.0000
500	0.27	0.00	0.00	0.0000	122.78	0.0000
1000	0.07	0.00	0.00	0.0000	41.91	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	96.52	0.00	0.00	0.0000	8470.50	0.0000
30	50.95	0.00	0.00	0.0000	5762.29	0.0000
40	31.40	0.00	0.00	0.0000	4464.60	0.0000
50	21.29	0.00	0.00	0.0000	3545.55	0.0000
60	15.38	0.00	0.00	0.0000	2878.60	0.0000
80	9.10	0.00	0.00	0.0000	2004.05	0.0000
100	6.00	0.00	0.00	0.0000	1477.56	0.0000
150	2.78	0.00	0.00	0.0000	819.70	0.0000
200	1.60	0.00	0.00	0.0000	527.32	0.0000
250	1.03	0.00	0.00	0.0000	371.22	0.0000
500	0.27	0.00	0.00	0.0000	122.78	0.0000
1000	0.07	0.00	0.00	0.0000	41.91	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	28.13	11.98	0.1362	0.0596
30	14.85	6.32	0.0719	0.0405
40	9.15	3.90	0.0443	0.0314
50	6.21	2.64	0.0300	0.0249
60	4.48	1.91	0.0217	0.0203
80	2.65	1.13	0.0128	0.0141
100	1.75	0.74	0.0085	0.0104
150	0.81	0.34	0.0039	0.0058
200	0.47	0.20	0.0023	0.0037
250	0.30	0.13	0.0015	0.0026
500	0.08	0.03	0.0004	0.0009
1000	0.02	0.01	0.0001	0.0003

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Facility G-01 - 55% Perc, 25% MeCl

Met Set: Mather

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0823

Ann Rate [g/s]: 0.0289

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	96.52	16.46	7.01	0.0797	8470.50	0.0349
30	50.95	8.69	3.70	0.0421	5762.29	0.0237
40	31.40	5.35	2.28	0.0259	4464.60	0.0184
50	21.29	3.63	1.55	0.0176	3545.55	0.0146
60	15.38	2.62	1.12	0.0127	2878.60	0.0118
80	9.10	1.55	0.66	0.0075	2004.05	0.0082
100	6.00	1.02	0.44	0.0050	1477.56	0.0061
150	2.78	0.47	0.20	0.0023	819.70	0.0034
200	1.60	0.27	0.12	0.0013	527.32	0.0022
250	1.03	0.18	0.07	0.0009	371.22	0.0015
500	0.27	0.05	0.02	0.0002	122.78	0.0005
1000	0.07	0.01	0.01	0.0001	41.91	0.0002

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0374

Ann Rate [g/s]: 0.0131

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	96.52	1.26	0.54	0.0004	8470.50	0.0226
30	50.95	0.67	0.28	0.0002	5762.29	0.0154
40	31.40	0.41	0.18	0.0001	4464.60	0.0119
50	21.29	0.28	0.12	0.0001	3545.55	0.0095
60	15.38	0.20	0.09	0.0001	2878.60	0.0077
80	9.10	0.12	0.05	4.0E-05	2004.05	0.0054
100	6.00	0.08	0.03	2.6E-05	1477.56	0.0039
150	2.78	0.04	0.02	1.2E-05	819.70	0.0022
200	1.60	0.02	0.01	7.0E-06	527.32	0.0014
250	1.03	0.01	0.01	4.5E-06	371.22	0.0010
500	0.27	0.00	0.00	1.2E-06	122.78	0.0003
1000	0.07	0.00	0.00	3.1E-07	41.91	1.1E-04

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	96.52	0.00	0.00	0.0000	8470.50	0.0000
30	50.95	0.00	0.00	0.0000	5762.29	0.0000
40	31.40	0.00	0.00	0.0000	4464.60	0.0000
50	21.29	0.00	0.00	0.0000	3545.55	0.0000
60	15.38	0.00	0.00	0.0000	2878.60	0.0000
80	9.10	0.00	0.00	0.0000	2004.05	0.0000
100	6.00	0.00	0.00	0.0000	1477.56	0.0000
150	2.78	0.00	0.00	0.0000	819.70	0.0000
200	1.60	0.00	0.00	0.0000	527.32	0.0000
250	1.03	0.00	0.00	0.0000	371.22	0.0000
500	0.27	0.00	0.00	0.0000	122.78	0.0000
1000	0.07	0.00	0.00	0.0000	41.91	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	17.72	7.54	0.0801	0.0575
30	9.35	3.98	0.0423	0.0391
40	5.77	2.45	0.0261	0.0303
50	3.91	1.66	0.0177	0.0241
60	2.82	1.20	0.0128	0.0195
80	1.67	0.71	0.0076	0.0136
100	1.10	0.47	0.0050	0.0100
150	0.51	0.22	0.0023	0.0056
200	0.29	0.13	0.0013	0.0036
250	0.19	0.08	0.0009	0.0025
500	0.05	0.02	0.0002	0.0008
1000	0.01	0.01	0.0001	0.0003

Facility G-01 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Mather

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0210

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	96.52	11.96	5.09	0.0579	8470.50	0.0254
30	50.95	6.31	2.69	0.0306	5762.29	0.0173
40	31.40	3.89	1.66	0.0188	4464.60	0.0134
50	21.29	2.64	1.12	0.0128	3545.55	0.0106
60	15.38	1.91	0.81	0.0092	2878.60	0.0086
80	9.10	1.13	0.48	0.0055	2004.05	0.0060
100	6.00	0.74	0.32	0.0036	1477.56	0.0044
150	2.78	0.34	0.15	0.0017	819.70	0.0025
200	1.60	0.20	0.08	0.0010	527.32	0.0016
250	1.03	0.13	0.05	0.0006	371.22	0.0011
500	0.27	0.03	0.01	0.0002	122.78	0.0004
1000	0.07	0.01	0.00	4.2E-05	41.91	0.0001

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0449
Ann Rate [g/s]: 0.0158

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	96.52	1.53	0.65	0.0005	8470.50	0.0272
30	50.95	0.81	0.34	0.0003	5762.29	0.0185
40	31.40	0.50	0.21	0.0002	4464.60	0.0143
50	21.29	0.34	0.14	0.0001	3545.55	0.0114
60	15.38	0.24	0.10	0.0001	2878.60	0.0092
80	9.10	0.14	0.06	4.8E-05	2004.05	0.0064
100	6.00	0.09	0.04	3.2E-05	1477.56	0.0047
150	2.78	0.04	0.02	1.5E-05	819.70	0.0026
200	1.60	0.03	0.01	8.4E-06	527.32	0.0017
250	1.03	0.02	0.01	5.4E-06	371.22	0.0012
500	0.27	0.00	0.00	1.4E-06	122.78	0.0004
1000	0.07	0.00	0.00	3.7E-07	41.91	0.0001

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0299
Ann Rate [g/s]: 0.0105

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	96.52	2.03	0.86	0.0016	8470.50	0.0000
30	50.95	1.07	0.46	0.0008	5762.29	0.0000
40	31.40	0.66	0.28	0.0005	4464.60	0.0000
50	21.29	0.45	0.19	0.0003	3545.55	0.0000
60	15.38	0.32	0.14	0.0003	2878.60	0.0000
80	9.10	0.19	0.08	0.0001	2004.05	0.0000
100	6.00	0.13	0.05	0.0001	1477.56	0.0000
150	2.78	0.06	0.02	4.6E-05	819.70	0.0000
200	1.60	0.03	0.01	2.6E-05	527.32	0.0000
250	1.03	0.02	0.01	1.7E-05	371.22	0.0000
500	0.27	0.01	0.00	4.4E-06	122.78	0.0000
1000	0.07	0.00	0.00	1.1E-06	41.91	0.0000

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Center	Resident	Worker	Chronic	Acute
20	15.51	6.60	0.0600	0.0525
30	8.19	3.49	0.0317	0.0357
40	5.05	2.15	0.0195	0.0277
50	3.42	1.46	0.0132	0.0220
60	2.47	1.05	0.0096	0.0179
80	1.46	0.62	0.0057	0.0124
100	0.96	0.41	0.0037	0.0092
150	0.45	0.19	0.0017	0.0051
200	0.26	0.11	0.0010	0.0033
250	0.17	0.07	0.0006	0.0023
500	0.04	0.02	0.0002	0.0008
1000	0.01	0.00	4.4E-05	0.0003

Facility G-01 - 55% Perc, 43% TCE

Met Set: Mather

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0823
Ann Rate [g/s]: 0.0289

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	96.52	16.46	7.01	0.0797	8470.50	0.0349
30	50.95	8.69	3.70	0.0421	5762.29	0.0237
40	31.40	5.35	2.28	0.0259	4464.60	0.0184
50	21.29	3.63	1.55	0.0176	3545.55	0.0146
60	15.38	2.62	1.12	0.0127	2878.60	0.0118
80	9.10	1.55	0.66	0.0075	2004.05	0.0082
100	6.00	1.02	0.44	0.0050	1477.56	0.0061
150	2.78	0.47	0.20	0.0023	819.70	0.0034
200	1.60	0.27	0.12	0.0013	527.32	0.0022
250	1.03	0.18	0.07	0.0009	371.22	0.0015
500	0.27	0.05	0.02	0.0002	122.78	0.0005
1000	0.07	0.01	0.01	0.0001	41.91	0.0002

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	96.52	0.00	0.00	0.0000	8470.50	0.0000
30	50.95	0.00	0.00	0.0000	5762.29	0.0000
40	31.40	0.00	0.00	0.0000	4464.60	0.0000
50	21.29	0.00	0.00	0.0000	3545.55	0.0000
60	15.38	0.00	0.00	0.0000	2878.60	0.0000
80	9.10	0.00	0.00	0.0000	2004.05	0.0000
100	6.00	0.00	0.00	0.0000	1477.56	0.0000
150	2.78	0.00	0.00	0.0000	819.70	0.0000
200	1.60	0.00	0.00	0.0000	527.32	0.0000
250	1.03	0.00	0.00	0.0000	371.22	0.0000
500	0.27	0.00	0.00	0.0000	122.78	0.0000
1000	0.07	0.00	0.00	0.0000	41.91	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0644
Ann Rate [g/s]: 0.0226

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	96.52	4.36	1.86	0.0034	8470.50	0.0000
30	50.95	2.30	0.98	0.0018	5762.29	0.0000
40	31.40	1.42	0.60	0.0011	4464.60	0.0000
50	21.29	0.96	0.41	0.0008	3545.55	0.0000
60	15.38	0.70	0.30	0.0005	2878.60	0.0000
80	9.10	0.41	0.18	0.0003	2004.05	0.0000
100	6.00	0.27	0.12	0.0002	1477.56	0.0000
150	2.78	0.13	0.05	0.0001	819.70	0.0000
200	1.60	0.07	0.03	0.0001	527.32	0.0000
250	1.03	0.05	0.02	3.6E-05	371.22	0.0000
500	0.27	0.01	0.01	9.5E-06	122.78	0.0000
1000	0.07	0.00	0.00	2.5E-06	41.91	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	20.82	8.86	0.0831	0.0349
30	10.99	4.68	0.0439	0.0237
40	6.77	2.88	0.0270	0.0184
50	4.59	1.95	0.0183	0.0146
60	3.32	1.41	0.0132	0.0118
80	1.96	0.84	0.0078	0.0082
100	1.29	0.55	0.0052	0.0061
150	0.60	0.26	0.0024	0.0034
200	0.35	0.15	0.0014	0.0022
250	0.22	0.09	0.0009	0.0015
500	0.06	0.02	0.0002	0.0005
1000	0.02	0.01	0.0001	0.0002

Facility G-01 - 94% Perc

Met Set: Default -0

94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1407
Ann Rate [g/s]: 0.0494

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	89.49	38.09	0.4334	11342.73	0.0798
30	229.98	67.03	28.53	0.3246	8496.33	0.0598
40	178.09	51.91	22.09	0.2514	6579.11	0.0463
50	141.80	41.33	17.59	0.2001	5238.72	0.0369
60	115.56	33.68	14.34	0.1631	4269.33	0.0300
80	81.09	23.64	10.06	0.1145	2995.85	0.0211
100	60.18	17.54	7.47	0.0849	2223.11	0.0156
150	33.55	9.78	4.16	0.0473	1239.31	0.0087
200	21.63	6.30	2.68	0.0305	799.09	0.0056
250	15.25	4.45	1.89	0.0215	563.57	0.0040
500	5.08	1.48	0.63	0.0072	187.51	0.0013
1000	1.74	0.51	0.22	0.0025	64.26	0.0005

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500	5.08	0.00	0.00	0.0000	187.51	0.0000
1000	1.74	0.00	0.00	0.0000	64.26	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500	5.08	0.00	0.00	0.0000	187.51	0.0000
1000	1.74	0.00	0.00	0.0000	64.26	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	89.49	38.09	0.4334	0.0798
30	67.03	28.53	0.3246	0.0598
40	51.91	22.09	0.2514	0.0463
50	41.33	17.59	0.2001	0.0369
60	33.68	14.34	0.1631	0.0300
80	23.64	10.06	0.1145	0.0211
100	17.54	7.47	0.0849	0.0156
150	9.78	4.16	0.0473	0.0087
200	6.30	2.68	0.0305	0.0056
250	4.45	1.89	0.0215	0.0040
500	1.48	0.63	0.0072	0.0013
1000	0.51	0.22	0.0025	0.0005

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Facility G-01 - 55% Perc, 25% MeCl

Met Set: Default -0

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0823
Ann Rate [g/s]: 0.0289

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	52.35	22.29	0.2535	11342.73	0.0467
30	229.98	39.21	16.69	0.1899	8496.33	0.0350
40	178.09	30.37	12.93	0.1470	6579.11	0.0271
50	141.80	24.18	10.29	0.1171	5238.72	0.0216
60	115.56	19.70	8.39	0.0954	4269.33	0.0176
80	81.09	13.83	5.89	0.0670	2995.85	0.0123
100	60.18	10.26	4.37	0.0497	2223.11	0.0091
150	33.55	5.72	2.43	0.0277	1239.31	0.0051
200	21.63	3.69	1.57	0.0179	799.09	0.0033
250	15.25	2.60	1.11	0.0126	563.57	0.0023
500	5.08	0.87	0.37	0.0042	187.51	0.0008
1000	1.74	0.30	0.13	0.0014	64.26	0.0003

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0374
Ann Rate [g/s]: 0.0131

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	4.02	1.71	0.0013	11342.73	0.0303
30	229.98	3.01	1.28	0.0010	8496.33	0.0227
40	178.09	2.33	0.99	0.0008	6579.11	0.0176
50	141.80	1.86	0.79	0.0006	5238.72	0.0140
60	115.56	1.51	0.64	0.0005	4269.33	0.0114
80	81.09	1.06	0.45	0.0004	2995.85	0.0080
100	60.18	0.79	0.34	0.0003	2223.11	0.0059
150	33.55	0.44	0.19	0.0001	1239.31	0.0033
200	21.63	0.28	0.12	0.0001	799.09	0.0021
250	15.25	0.20	0.09	0.0001	563.57	0.0015
500	5.08	0.07	0.03	2.2E-05	187.51	0.0005
1000	1.74	0.02	0.01	7.6E-06	64.26	0.0002

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500	5.08	0.00	0.00	0.0000	187.51	0.0000
1000	1.74	0.00	0.00	0.0000	64.26	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	56.37	24.00	0.2549	0.0770
30	42.23	17.98	0.1909	0.0577
40	32.70	13.92	0.1478	0.0446
50	26.04	11.08	0.1177	0.0356
60	21.22	9.03	0.0959	0.0290
80	14.89	6.34	0.0673	0.0203
100	11.05	4.70	0.0500	0.0151
150	6.16	2.62	0.0278	0.0084
200	3.97	1.69	0.0180	0.0054
250	2.80	1.19	0.0127	0.0038
500	0.93	0.40	0.0042	0.0013
1000	0.32	0.14	0.0014	0.0004

Facility G-01 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Default -0

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0210

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	38.04	16.19	0.1842	11342.73	0.0340
30	229.98	28.49	12.13	0.1380	8496.33	0.0254
40	178.09	22.06	9.39	0.1069	6579.11	0.0197
50	141.80	17.57	7.48	0.0851	5238.72	0.0157
60	115.56	14.32	6.10	0.0693	4269.33	0.0128
80	81.09	10.05	4.28	0.0487	2995.85	0.0090
100	60.18	7.46	3.17	0.0361	2223.11	0.0067
150	33.55	4.16	1.77	0.0201	1239.31	0.0037
200	21.63	2.68	1.14	0.0130	799.09	0.0024
250	15.25	1.89	0.80	0.0092	563.57	0.0017
500	5.08	0.63	0.27	0.0030	187.51	0.0006
1000	1.74	0.22	0.09	0.0010	64.26	0.0002

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0449
Ann Rate [g/s]: 0.0158

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	4.85	2.07	0.0016	11342.73	0.0364
30	229.98	3.63	1.55	0.0012	8496.33	0.0272
40	178.09	2.81	1.20	0.0009	6579.11	0.0211
50	141.80	2.24	0.95	0.0007	5238.72	0.0168
60	115.56	1.83	0.78	0.0006	4269.33	0.0137
80	81.09	1.28	0.55	0.0004	2995.85	0.0096
100	60.18	0.95	0.40	0.0003	2223.11	0.0071
150	33.55	0.53	0.23	0.0002	1239.31	0.0040
200	21.63	0.34	0.15	0.0001	799.09	0.0026
250	15.25	0.24	0.10	0.0001	563.57	0.0018
500	5.08	0.08	0.03	2.7E-05	187.51	0.0006
1000	1.74	0.03	0.01	9.2E-06	64.26	0.0002

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0299
Ann Rate [g/s]: 0.0105

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	6.45	2.74	0.0050	11342.73	0.0000
30	229.98	4.83	2.06	0.0038	8496.33	0.0000
40	178.09	3.74	1.59	0.0029	6579.11	0.0000
50	141.80	2.98	1.27	0.0023	5238.72	0.0000
60	115.56	2.43	1.03	0.0019	4269.33	0.0000
80	81.09	1.70	0.72	0.0013	2995.85	0.0000
100	60.18	1.26	0.54	0.0010	2223.11	0.0000
150	33.55	0.70	0.30	0.0006	1239.31	0.0000
200	21.63	0.45	0.19	0.0004	799.09	0.0000
250	15.25	0.32	0.14	0.0003	563.57	0.0000
500	5.08	0.11	0.05	0.0001	187.51	0.0000
1000	1.74	0.04	0.02	2.9E-05	64.26	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	49.34	21.00	0.1909	0.0703
30	36.96	15.73	0.1430	0.0527
40	28.62	12.18	0.1107	0.0408
50	22.79	9.70	0.0882	0.0325
60	18.57	7.91	0.0718	0.0265
80	13.03	5.55	0.0504	0.0186
100	9.67	4.12	0.0374	0.0138
150	5.39	2.29	0.0209	0.0077
200	3.48	1.48	0.0134	0.0050
250	2.45	1.04	0.0095	0.0035
500	0.82	0.35	0.0032	0.0012
1000	0.28	0.12	0.0011	0.0004

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Facility G-01 - 55% Perc, 43% TCE

Met Set: Default -0

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0823
Ann Rate [g/s]: 0.0289

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	52.35	22.29	0.2535	11342.73	0.0467
30	229.98	39.21	16.69	0.1899	8496.33	0.0350
40	178.09	30.37	12.93	0.1470	6579.11	0.0271
50	141.80	24.18	10.29	0.1171	5238.72	0.0216
60	115.56	19.70	8.39	0.0954	4269.33	0.0176
80	81.09	13.83	5.89	0.0670	2995.85	0.0123
100	60.18	10.26	4.37	0.0497	2223.11	0.0091
150	33.55	5.72	2.43	0.0277	1239.31	0.0051
200	21.63	3.69	1.57	0.0179	799.09	0.0033
250	15.25	2.60	1.11	0.0126	563.57	0.0023
500	5.08	0.87	0.37	0.0042	187.51	0.0008
1000	1.74	0.30	0.13	0.0014	64.26	0.0003

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500	5.08	0.00	0.00	0.0000	187.51	0.0000
1000	1.74	0.00	0.00	0.0000	64.26	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0644
Ann Rate [g/s]: 0.0226

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	13.88	5.91	0.0108	11342.73	0.0000
30	229.98	10.40	4.43	0.0081	8496.33	0.0000
40	178.09	8.05	3.43	0.0063	6579.11	0.0000
50	141.80	6.41	2.73	0.0050	5238.72	0.0000
60	115.56	5.22	2.22	0.0041	4269.33	0.0000
80	81.09	3.67	1.56	0.0029	2995.85	0.0000
100	60.18	2.72	1.16	0.0021	2223.11	0.0000
150	33.55	1.52	0.65	0.0012	1239.31	0.0000
200	21.63	0.98	0.42	0.0008	799.09	0.0000
250	15.25	0.69	0.29	0.0005	563.57	0.0000
500	5.08	0.23	0.10	0.0002	187.51	0.0000
1000	1.74	0.08	0.03	0.0001	64.26	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	66.23	28.19	0.2644	0.0467
30	49.61	21.12	0.1980	0.0350
40	38.42	16.35	0.1533	0.0271
50	30.59	13.02	0.1221	0.0216
60	24.93	10.61	0.0995	0.0176
80	17.49	7.45	0.0698	0.0123
100	12.98	5.53	0.0518	0.0091
150	7.24	3.08	0.0289	0.0051
200	4.67	1.99	0.0186	0.0033
250	3.29	1.40	0.0131	0.0023
500	1.09	0.47	0.0044	0.0008
1000	0.38	0.16	0.0015	0.0003

Risk Asse. ent Summary - 3 Generic Facilities
Multicomponent Impacts - Brake Cleaners - Chronic/Cancer

Facility G-02 - 94% Perc

Met Set: Burbank

94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.87	85.52	36.40	0.4141	5528.38	0.0778
30	71.96	62.88	26.77	0.3045	4845.41	0.0682
40	46.45	40.59	17.28	0.1965	4048.28	0.0570
50	32.37	28.28	12.04	0.1370	3418.07	0.0481
60	23.83	20.82	8.86	0.1008	2918.05	0.0411
80	14.48	12.65	5.39	0.0613	2193.50	0.0309
100	9.73	8.50	3.62	0.0412	1708.42	0.0240
150	4.64	4.05	1.73	0.0196	1026.40	0.0144
200	2.71	2.37	1.01	0.0115	690.62	0.0097
250	1.77	1.55	0.66	0.0075	500.60	0.0070
500	0.47	0.41	0.17	0.0020	176.69	0.0025
1000	0.12	0.10	0.04	0.0005	62.47	0.0009

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.87	0.00	0.00	0.0000	5528.38	0.0000
30	71.96	0.00	0.00	0.0000	4845.41	0.0000
40	46.45	0.00	0.00	0.0000	4048.28	0.0000
50	32.37	0.00	0.00	0.0000	3418.07	0.0000
60	23.83	0.00	0.00	0.0000	2918.05	0.0000
80	14.48	0.00	0.00	0.0000	2193.50	0.0000
100	9.73	0.00	0.00	0.0000	1708.42	0.0000
150	4.64	0.00	0.00	0.0000	1026.40	0.0000
200	2.71	0.00	0.00	0.0000	690.62	0.0000
250	1.77	0.00	0.00	0.0000	500.60	0.0000
500	0.47	0.00	0.00	0.0000	176.69	0.0000
1000	0.12	0.00	0.00	0.0000	62.47	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.87	0.00	0.00	0.0000	5528.38	0.0000
30	71.96	0.00	0.00	0.0000	4845.41	0.0000
40	46.45	0.00	0.00	0.0000	4048.28	0.0000
50	32.37	0.00	0.00	0.0000	3418.07	0.0000
60	23.83	0.00	0.00	0.0000	2918.05	0.0000
80	14.48	0.00	0.00	0.0000	2193.50	0.0000
100	9.73	0.00	0.00	0.0000	1708.42	0.0000
150	4.64	0.00	0.00	0.0000	1026.40	0.0000
200	2.71	0.00	0.00	0.0000	690.62	0.0000
250	1.77	0.00	0.00	0.0000	500.60	0.0000
500	0.47	0.00	0.00	0.0000	176.69	0.0000
1000	0.12	0.00	0.00	0.0000	62.47	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	85.52	36.40	0.4141	0.0778
30	62.88	26.77	0.3045	0.0682
40	40.59	17.28	0.1965	0.0570
50	28.28	12.04	0.1370	0.0481
60	20.82	8.86	0.1008	0.0411
80	12.65	5.39	0.0613	0.0309
100	8.50	3.62	0.0412	0.0240
150	4.05	1.73	0.0196	0.0144
200	2.37	1.01	0.0115	0.0097
250	1.55	0.66	0.0075	0.0070
500	0.41	0.17	0.0020	0.0025
1000	0.10	0.04	0.0005	0.0009

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Facility G-02 - 55% Perc, 25% MeCl

Met Set: Burbank

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.87	50.06	21.31	0.2424	5528.38	0.0455
30	71.96	36.81	15.67	0.1783	4845.41	0.0399
40	46.45	23.76	10.11	0.1151	4048.28	0.0333
50	32.37	16.56	7.05	0.0802	3418.07	0.0281
60	23.83	12.19	5.19	0.0590	2918.05	0.0240
80	14.48	7.41	3.15	0.0359	2193.50	0.0181
100	9.73	4.98	2.12	0.0241	1708.42	0.0141
150	4.64	2.37	1.01	0.0115	1026.40	0.0085
200	2.71	1.39	0.59	0.0067	690.62	0.0057
250	1.77	0.91	0.39	0.0044	500.60	0.0041
500	0.47	0.24	0.10	0.0012	176.69	0.0015
1000	0.12	0.06	0.03	0.0003	62.47	0.0005

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0749
Ann Rate [g/s]: 0.0394

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.87	3.86	1.64	0.0013	5528.38	0.0296
30	71.96	2.84	1.21	0.0009	4845.41	0.0259
40	46.45	1.83	0.78	0.0006	4048.28	0.0217
50	32.37	1.28	0.54	0.0004	3418.07	0.0183
60	23.83	0.94	0.40	0.0003	2918.05	0.0156
80	14.48	0.57	0.24	0.0002	2193.50	0.0117
100	9.73	0.38	0.16	0.0001	1708.42	0.0091
150	4.64	0.18	0.08	0.0001	1026.40	0.0055
200	2.71	0.11	0.05	0.0000	690.62	0.0037
250	1.77	0.07	0.03	0.0000	500.60	0.0027
500	0.47	0.02	0.01	0.0000	176.69	0.0009
1000	0.12	0.00	0.00	0.0000	62.47	0.0003

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.87	0.00	0.00	0.0000	5528.38	0.0000
30	71.96	0.00	0.00	0.0000	4845.41	0.0000
40	46.45	0.00	0.00	0.0000	4048.28	0.0000
50	32.37	0.00	0.00	0.0000	3418.07	0.0000
60	23.83	0.00	0.00	0.0000	2918.05	0.0000
80	14.48	0.00	0.00	0.0000	2193.50	0.0000
100	9.73	0.00	0.00	0.0000	1708.42	0.0000
150	4.64	0.00	0.00	0.0000	1026.40	0.0000
200	2.71	0.00	0.00	0.0000	690.62	0.0000
250	1.77	0.00	0.00	0.0000	500.60	0.0000
500	0.47	0.00	0.00	0.0000	176.69	0.0000
1000	0.12	0.00	0.00	0.0000	62.47	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	53.92	22.95	0.2437	0.0751
30	39.64	16.88	0.1792	0.0658
40	25.59	10.89	0.1157	0.0550
50	17.83	7.59	0.0806	0.0464
60	13.13	5.59	0.0593	0.0396
80	7.98	3.40	0.0361	0.0298
100	5.36	2.28	0.0242	0.0232
150	2.56	1.09	0.0116	0.0139
200	1.49	0.64	0.0067	0.0094
250	0.98	0.42	0.0044	0.0068
500	0.26	0.11	0.0012	0.0024
1000	0.07	0.03	0.0003	0.0008

Facility G-02 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Burbank

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1198
Ann Rate [g/s]: 0.0630

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	97.87	36.38	15.49	0.1762	5528.38	0.0331
30	71.96	26.75	11.39	0.1295	4845.41	0.0290
40	46.45	17.27	7.35	0.0836	4048.28	0.0242
50	32.37	12.03	5.12	0.0583	3418.07	0.0205
60	23.83	8.86	3.77	0.0429	2918.05	0.0175
80	14.48	5.38	2.29	0.0261	2193.50	0.0131
100	9.73	3.62	1.54	0.0175	1708.42	0.0102
150	4.64	1.72	0.73	0.0084	1026.40	0.0061
200	2.71	1.01	0.43	0.0049	690.62	0.0041
250	1.77	0.66	0.28	0.0032	500.60	0.0030
500	0.47	0.17	0.07	0.0008	176.69	0.0011
1000	0.12	0.04	0.02	0.0002	62.47	0.0004

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0898
Ann Rate [g/s]: 0.0473

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	97.87	4.63	1.97	0.0015	5528.38	0.0355
30	71.96	3.40	1.45	0.0011	4845.41	0.0311
40	46.45	2.20	0.94	0.0007	4048.28	0.0260
50	32.37	1.53	0.65	0.0005	3418.07	0.0219
60	23.83	1.13	0.48	0.0004	2918.05	0.0187
80	14.48	0.68	0.29	0.0002	2193.50	0.0141
100	9.73	0.46	0.20	0.0002	1708.42	0.0110
150	4.64	0.22	0.09	0.0001	1026.40	0.0066
200	2.71	0.13	0.05	4.3E-05	690.62	0.0044
250	1.77	0.08	0.04	2.8E-05	500.60	0.0032
500	0.47	0.02	0.01	7.4E-06	176.69	0.0011
1000	0.12	0.01	0.00	1.9E-06	62.47	0.0004

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0315

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	97.87	6.17	2.62	0.0048	5528.38	0.0000
30	71.96	4.53	1.93	0.0035	4845.41	0.0000
40	46.45	2.93	1.25	0.0023	4048.28	0.0000
50	32.37	2.04	0.87	0.0016	3418.07	0.0000
60	23.83	1.50	0.64	0.0012	2918.05	0.0000
80	14.48	0.91	0.39	0.0007	2193.50	0.0000
100	9.73	0.61	0.26	0.0005	1708.42	0.0000
150	4.64	0.29	0.12	0.0002	1026.40	0.0000
200	2.71	0.17	0.07	0.0001	690.62	0.0000
250	1.77	0.11	0.05	0.0001	500.60	0.0000
500	0.47	0.03	0.01	0.0	176.69	0.0000
1000	0.12	0.01	0.00	0.0	62.47	0.0000

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Center	Resident	Worker	Chronic	Acute
20	47.17	20.08	0.1825	0.0686
30	34.68	14.76	0.1342	0.0601
40	22.39	9.53	0.0866	0.0502
50	15.60	6.64	0.0604	0.0424
60	11.49	4.89	0.0444	0.0362
80	6.98	2.97	0.0270	0.0272
100	4.69	2.00	0.0181	0.0212
150	2.24	0.95	0.0087	0.0127
200	1.31	0.56	0.0051	0.0086
250	0.85	0.36	0.0033	0.0062
500	0.23	0.10	0.0009	0.0022
1000	0.06	0.02	0.0002	0.0008

333

Facility G-02 - 55% Perc, 43% TCE

Met Set: Burbank

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.87	50.06	21.31	0.2424	5528.38	0.0455
30	71.96	36.81	15.67	0.1783	4845.41	0.0399
40	46.45	23.76	10.11	0.1151	4048.28	0.0333
50	32.37	16.56	7.05	0.0802	3418.07	0.0281
60	23.83	12.19	5.19	0.0590	2918.05	0.0240
80	14.48	7.41	3.15	0.0359	2193.50	0.0181
100	9.73	4.98	2.12	0.0241	1708.42	0.0141
150	4.64	2.37	1.01	0.0115	1026.40	0.0085
200	2.71	1.39	0.59	0.0067	690.62	0.0057
250	1.77	0.91	0.39	0.0044	500.60	0.0041
500	0.47	0.24	0.10	0.0012	176.69	0.0015
1000	0.12	0.06	0.03	0.0003	62.47	0.0005

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.87	0.00	0.00	0.0000	5528.38	0.0000
30	71.96	0.00	0.00	0.0000	4845.41	0.0000
40	46.45	0.00	0.00	0.0000	4048.28	0.0000
50	32.37	0.00	0.00	0.0000	3418.07	0.0000
60	23.83	0.00	0.00	0.0000	2918.05	0.0000
80	14.48	0.00	0.00	0.0000	2193.50	0.0000
100	9.73	0.00	0.00	0.0000	1708.42	0.0000
150	4.64	0.00	0.00	0.0000	1026.40	0.0000
200	2.71	0.00	0.00	0.0000	690.62	0.0000
250	1.77	0.00	0.00	0.0000	500.60	0.0000
500	0.47	0.00	0.00	0.0000	176.69	0.0000
1000	0.12	0.00	0.00	0.0000	62.47	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1288
Ann Rate [g/s]: 0.0677

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.87	13.25	5.64	0.0104	5528.38	0.0000
30	71.96	9.74	4.15	0.0076	4845.41	0.0000
40	46.45	6.29	2.68	0.0049	4048.28	0.0000
50	32.37	4.38	1.87	0.0034	3418.07	0.0000
60	23.83	3.23	1.37	0.0025	2918.05	0.0000
80	14.48	1.96	0.83	0.0015	2193.50	0.0000
100	9.73	1.32	0.56	0.0010	1708.42	0.0000
150	4.64	0.63	0.27	0.0005	1026.40	0.0000
200	2.71	0.37	0.16	0.0003	690.62	0.0000
250	1.77	0.24	0.10	0.0002	500.60	0.0000
500	0.47	0.06	0.03	5.0E-05	176.69	0.0000
1000	0.12	0.02	0.01	1.3E-05	62.47	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	63.32	26.95	0.2528	0.0455
30	46.55	19.82	0.1859	0.0399
40	30.05	12.79	0.1200	0.0333
50	20.94	8.91	0.0836	0.0281
60	15.42	6.56	0.0616	0.0240
80	9.37	3.99	0.0374	0.0181
100	6.29	2.68	0.0251	0.0141
150	3.00	1.28	0.0120	0.0085
200	1.75	0.75	0.0070	0.0057
250	1.15	0.49	0.0046	0.0041
500	0.30	0.13	0.0012	0.0015
1000	0.08	0.03	0.0003	0.0005

Facility G-02 % Perc

Met Set: Anaheim

94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	125.69	109.83	46.75	0.5318	5444.38	0.0766
30	96.66	84.46	35.95	0.4090	4844.11	0.0682
40	62.33	54.46	23.18	0.2637	4046.70	0.0570
50	43.33	37.86	16.12	0.1833	3416.34	0.0481
60	31.84	27.82	11.84	0.1347	2916.25	0.0410
80	19.26	16.83	7.16	0.0815	2191.72	0.0308
100	12.90	11.27	4.80	0.0546	1706.75	0.0240
150	6.11	5.34	2.27	0.0259	1025.07	0.0144
200	3.55	3.10	1.32	0.0150	689.56	0.0097
250	2.32	2.03	0.86	0.0098	499.75	0.0070
500	0.60	0.52	0.22	0.0025	176.33	0.0025
1000	0.16	0.14	0.06	0.0007	62.42	0.0009

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	125.69	0.00	0.00	0.0000	5444.38	0.0000
30	96.66	0.00	0.00	0.0000	4844.11	0.0000
40	62.33	0.00	0.00	0.0000	4046.70	0.0000
50	43.33	0.00	0.00	0.0000	3416.34	0.0000
60	31.84	0.00	0.00	0.0000	2916.25	0.0000
80	19.26	0.00	0.00	0.0000	2191.72	0.0000
100	12.90	0.00	0.00	0.0000	1706.75	0.0000
150	6.11	0.00	0.00	0.0000	1025.07	0.0000
200	3.55	0.00	0.00	0.0000	689.56	0.0000
250	2.32	0.00	0.00	0.0000	499.75	0.0000
500	0.60	0.00	0.00	0.0000	176.33	0.0000
1000	0.16	0.00	0.00	0.0000	62.42	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	125.69	0.00	0.00	0.0000	5444.38	0.0000
30	96.66	0.00	0.00	0.0000	4844.11	0.0000
40	62.33	0.00	0.00	0.0000	4046.70	0.0000
50	43.33	0.00	0.00	0.0000	3416.34	0.0000
60	31.84	0.00	0.00	0.0000	2916.25	0.0000
80	19.26	0.00	0.00	0.0000	2191.72	0.0000
100	12.90	0.00	0.00	0.0000	1706.75	0.0000
150	6.11	0.00	0.00	0.0000	1025.07	0.0000
200	3.55	0.00	0.00	0.0000	689.56	0.0000
250	2.32	0.00	0.00	0.0000	499.75	0.0000
500	0.60	0.00	0.00	0.0000	176.33	0.0000
1000	0.16	0.00	0.00	0.0000	62.42	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	109.83	46.75	0.5318	0.0766
30	84.46	35.95	0.4090	0.0682
40	54.46	23.18	0.2637	0.0570
50	37.86	16.12	0.1833	0.0481
60	27.82	11.84	0.1347	0.0410
80	16.83	7.16	0.0815	0.0308
100	11.27	4.80	0.0546	0.0240
150	5.34	2.27	0.0259	0.0144
200	3.10	1.32	0.0150	0.0097
250	2.03	0.86	0.0098	0.0070
500	0.52	0.22	0.0025	0.0025
1000	0.14	0.06	0.0007	0.0009

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Facility G-02 - 55% Perc, 25% MeCl

Met Set: Default -0

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	73.06	31.10	0.3538	5276.51	0.0435
30	117.98	60.35	25.69	0.2923	4358.64	0.0359
40	98.78	50.53	21.51	0.2447	3649.09	0.0301
50	83.77	42.85	18.24	0.2075	3094.79	0.0255
60	71.89	36.78	15.65	0.1781	2656.01	0.0219
80	54.62	27.94	11.89	0.1353	2017.70	0.0166
100	42.94	21.96	9.35	0.1064	1586.22	0.0131
150	26.25	13.43	5.72	0.0650	969.72	0.0080
200	17.86	9.14	3.89	0.0443	659.99	0.0054
250	13.05	6.68	2.84	0.0323	482.19	0.0040
500	4.69	2.40	1.02	0.0116	173.33	0.0014
1000	1.68	0.86	0.36	0.0042	61.90	0.0005

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0749
Ann Rate [g/s]: 0.0394

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	5.63	2.40	0.0019	5276.51	0.0282
30	117.98	4.65	1.98	0.0015	4358.64	0.0233
40	98.78	3.89	1.66	0.0013	3649.09	0.0195
50	83.77	3.30	1.40	0.0011	3094.79	0.0166
60	71.89	2.83	1.21	0.0009	2656.01	0.0142
80	54.62	2.15	0.92	0.0007	2017.70	0.0108
100	42.94	1.69	0.72	0.0006	1586.22	0.0085
150	26.25	1.03	0.44	0.0003	969.72	0.0052
200	17.86	0.70	0.30	0.0002	659.99	0.0035
250	13.05	0.51	0.22	0.0002	482.19	0.0026
500	4.69	0.18	0.08	0.0001	173.33	0.0009
1000	1.68	0.07	0.03	2.2E-05	61.90	0.0003

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	78.69	33.50	0.3557	0.0717
30	65.00	27.67	0.2938	0.0592
40	54.42	23.16	0.2460	0.0496
50	46.15	19.65	0.2086	0.0420
60	39.61	16.86	0.1790	0.0361
80	30.09	12.81	0.1360	0.0274
100	23.66	10.07	0.1069	0.0215
150	14.46	6.16	0.0654	0.0132
200	9.84	4.19	0.0445	0.0090
250	7.19	3.06	0.0325	0.0066
500	2.58	1.10	0.0117	0.0024
1000	0.92	0.39	0.0042	0.0008

Facility G-02 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Anaheim

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1198
Ann Rate [g/s]: 0.0630

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	125.69	46.72	19.89	0.2262	5444.38	0.0326
30	96.66	35.93	15.29	0.1740	4844.11	0.0290
40	62.33	23.17	9.86	0.1122	4046.70	0.0242
50	43.33	16.11	6.86	0.0780	3416.34	0.0205
60	31.84	11.83	5.04	0.0573	2916.25	0.0175
80	19.26	7.16	3.05	0.0347	2191.72	0.0131
100	12.90	4.79	2.04	0.0232	1706.75	0.0102
150	6.11	2.27	0.97	0.0110	1025.07	0.0061
200	3.55	1.32	0.56	0.0064	689.56	0.0041
250	2.32	0.86	0.37	0.0042	499.75	0.0030
500	0.60	0.22	0.09	0.0011	176.33	0.0011
1000	0.16	0.06	0.03	0.0003	62.42	0.0004

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0898
Ann Rate [g/s]: 0.0473

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	125.69	5.95	2.53	0.0020	5444.38	0.0349
30	96.66	4.57	1.95	0.0015	4844.11	0.0311
40	62.33	2.95	1.25	0.0010	4046.70	0.0260
50	43.33	2.05	0.87	0.0007	3416.34	0.0219
60	31.84	1.51	0.64	0.0005	2916.25	0.0187
80	19.26	0.91	0.39	0.0003	2191.72	0.0141
100	12.90	0.61	0.26	0.0002	1706.75	0.0109
150	6.11	0.29	0.12	0.0001	1025.07	0.0066
200	3.55	0.17	0.07	0.0001	689.56	0.0044
250	2.32	0.11	0.05	3.7E-05	499.75	0.0032
500	0.60	0.03	0.01	9.5E-06	176.33	0.0011
1000	0.16	0.01	0.00	2.5E-06	62.42	0.0004

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0315

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	125.69	7.92	3.37	0.0062	5444.38	0.0000
30	96.66	6.09	2.59	0.0048	4844.11	0.0000
40	62.33	3.93	1.67	0.0031	4046.70	0.0000
50	43.33	2.73	1.16	0.0021	3416.34	0.0000
60	31.84	2.01	0.85	0.0016	2916.25	0.0000
80	19.26	1.21	0.52	0.0009	2191.72	0.0000
100	12.90	0.81	0.35	0.0006	1706.75	0.0000
150	6.11	0.38	0.16	0.0003	1025.07	0.0000
200	3.55	0.22	0.10	0.0002	689.56	0.0000
250	2.32	0.15	0.06	0.0001	499.75	0.0000
500	0.60	0.04	0.02	3.0E-05	176.33	0.0000
1000	0.16	0.01	0.00	7.9E-06	62.42	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	60.58	25.79	0.2344	0.0675
30	46.59	19.83	0.1803	0.0601
40	30.04	12.79	0.1162	0.0502
50	20.89	8.89	0.0808	0.0424
60	15.35	6.53	0.0594	0.0362
80	9.28	3.95	0.0359	0.0272
100	6.22	2.65	0.0241	0.0212
150	2.95	1.25	0.0114	0.0127
200	1.71	0.73	0.0066	0.0086
250	1.12	0.48	0.0043	0.0062
500	0.29	0.12	0.0011	0.0022
1000	0.08	0.03	0.0003	0.0008

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Facility G-02 - 55% Perc, 43% TCE

Met Set: Anaheim

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	125.69	64.29	27.37	0.3114	5444.38	0.0448
30	96.66	49.44	21.05	0.2394	4844.11	0.0399
40	62.33	31.88	13.57	0.1544	4046.70	0.0333
50	43.33	22.16	9.44	0.1073	3416.34	0.0281
60	31.84	16.29	6.93	0.0789	2916.25	0.0240
80	19.26	9.85	4.19	0.0477	2191.72	0.0180
100	12.90	6.60	2.81	0.0320	1706.75	0.0141
150	6.11	3.13	1.33	0.0151	1025.07	0.0084
200	3.55	1.82	0.77	0.0088	689.56	0.0057
250	2.32	1.19	0.51	0.0057	499.75	0.0041
500	0.60	0.31	0.13	0.0015	176.33	0.0015
1000	0.16	0.08	0.03	0.0004	62.42	0.0005

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	125.69	0.00	0.00	0.0000	5444.38	0.0000
30	96.66	0.00	0.00	0.0000	4844.11	0.0000
40	62.33	0.00	0.00	0.0000	4046.70	0.0000
50	43.33	0.00	0.00	0.0000	3416.34	0.0000
60	31.84	0.00	0.00	0.0000	2916.25	0.0000
80	19.26	0.00	0.00	0.0000	2191.72	0.0000
100	12.90	0.00	0.00	0.0000	1706.75	0.0000
150	6.11	0.00	0.00	0.0000	1025.07	0.0000
200	3.55	0.00	0.00	0.0000	689.56	0.0000
250	2.32	0.00	0.00	0.0000	499.75	0.0000
500	0.60	0.00	0.00	0.0000	176.33	0.0000
1000	0.16	0.00	0.00	0.0000	62.42	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1288
Ann Rate [g/s]: 0.0677

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	125.69	17.02	7.24	0.0133	5444.38	0.0000
30	96.66	13.09	5.57	0.0102	4844.11	0.0000
40	62.33	8.44	3.59	0.0066	4046.70	0.0000
50	43.33	5.87	2.50	0.0046	3416.34	0.0000
60	31.84	4.31	1.84	0.0034	2916.25	0.0000
80	19.26	2.61	1.11	0.0020	2191.72	0.0000
100	12.90	1.75	0.74	0.0014	1706.75	0.0000
150	6.11	0.83	0.35	0.0006	1025.07	0.0000
200	3.55	0.48	0.20	0.0004	689.56	0.0000
250	2.32	0.31	0.13	0.0002	499.75	0.0000
500	0.60	0.08	0.03	0.0001	176.33	0.0000
1000	0.16	0.02	0.01	1.7E-05	62.42	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	81.31	34.61	0.3246	0.0448
30	62.53	26.62	0.2497	0.0399
40	40.32	17.16	0.1610	0.0333
50	28.03	11.93	0.1119	0.0281
60	20.60	8.77	0.0822	0.0240
80	12.46	5.30	0.0497	0.0180
100	8.35	3.55	0.0333	0.0141
150	3.95	1.68	0.0158	0.0084
200	2.30	0.98	0.0092	0.0057
250	1.50	0.64	0.0060	0.0041
500	0.39	0.17	0.0015	0.0015
1000	0.10	0.04	0.0004	0.0005

Facility G-02 - 94% Perc

Met Set: Oakland

94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.2815

Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	48.31	42.21	17.97	0.2044	4685.59	0.0659
30	40.60	35.48	15.10	0.1718	4028.18	0.0567
40	26.41	23.08	9.82	0.1118	3439.11	0.0484
50	18.50	16.17	6.88	0.0783	2941.66	0.0414
60	13.67	11.94	5.08	0.0578	2531.88	0.0356
80	8.35	7.30	3.11	0.0353	1940.79	0.0273
100	5.63	4.92	2.09	0.0238	1529.51	0.0215
150	2.70	2.36	1.00	0.0114	931.70	0.0131
200	1.58	1.38	0.59	0.0067	629.79	0.0089
250	1.04	0.91	0.39	0.0044	457.07	0.0064
500	0.28	0.24	0.10	0.0012	160.49	0.0023
1000	0.07	0.06	0.03	0.0003	55.89	0.0008

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	48.31	0.00	0.00	0.0000	4685.59	0.0000
30	40.60	0.00	0.00	0.0000	4028.18	0.0000
40	26.41	0.00	0.00	0.0000	3439.11	0.0000
50	18.50	0.00	0.00	0.0000	2941.66	0.0000
60	13.67	0.00	0.00	0.0000	2531.88	0.0000
80	8.35	0.00	0.00	0.0000	1940.79	0.0000
100	5.63	0.00	0.00	0.0000	1529.51	0.0000
150	2.70	0.00	0.00	0.0000	931.70	0.0000
200	1.58	0.00	0.00	0.0000	629.79	0.0000
250	1.04	0.00	0.00	0.0000	457.07	0.0000
500	0.28	0.00	0.00	0.0000	160.49	0.0000
1000	0.07	0.00	0.00	0.0000	55.89	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	48.31	0.00	0.00	0.0000	4685.59	0.0000
30	40.60	0.00	0.00	0.0000	4028.18	0.0000
40	26.41	0.00	0.00	0.0000	3439.11	0.0000
50	18.50	0.00	0.00	0.0000	2941.66	0.0000
60	13.67	0.00	0.00	0.0000	2531.88	0.0000
80	8.35	0.00	0.00	0.0000	1940.79	0.0000
100	5.63	0.00	0.00	0.0000	1529.51	0.0000
150	2.70	0.00	0.00	0.0000	931.70	0.0000
200	1.58	0.00	0.00	0.0000	629.79	0.0000
250	1.04	0.00	0.00	0.0000	457.07	0.0000
500	0.28	0.00	0.00	0.0000	160.49	0.0000
1000	0.07	0.00	0.00	0.0000	55.89	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	42.21	17.97	0.2044	0.0659
30	35.48	15.10	0.1718	0.0567
40	23.08	9.82	0.1118	0.0484
50	16.17	6.88	0.0783	0.0414
60	11.94	5.08	0.0578	0.0356
80	7.30	3.11	0.0353	0.0273
100	4.92	2.09	0.0238	0.0215
150	2.36	1.00	0.0114	0.0131
200	1.38	0.59	0.0067	0.0089
250	0.91	0.39	0.0044	0.0064
500	0.24	0.10	0.0012	0.0023
1000	0.06	0.03	0.0003	0.0008

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Facility G-02 - 55% Perc, 25% MeCl

Met Set: Oakland

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	48.31	24.71	10.52	0.1197	4685.59	0.0386
30	40.60	20.77	8.84	0.1006	4028.18	0.0332
40	26.41	13.51	5.75	0.0654	3439.11	0.0283
50	18.50	9.46	4.03	0.0458	2941.66	0.0242
60	13.67	6.99	2.98	0.0339	2531.88	0.0209
80	8.35	4.27	1.82	0.0207	1940.79	0.0160
100	5.63	2.88	1.23	0.0139	1529.51	0.0126
150	2.70	1.38	0.59	0.0067	931.70	0.0077
200	1.58	0.81	0.34	0.0039	629.79	0.0052
250	1.04	0.53	0.23	0.0026	457.07	0.0038
500	0.28	0.14	0.06	0.0007	160.49	0.0013
1000	0.07	0.04	0.02	0.0002	55.89	0.0005

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0749
Ann Rate [g/s]: 0.0394

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	48.31	1.90	0.81	0.0006	4685.59	0.0251
30	40.60	1.60	0.68	0.0005	4028.18	0.0216
40	26.41	1.04	0.44	0.0003	3439.11	0.0184
50	18.50	0.73	0.31	0.0002	2941.66	0.0157
60	13.67	0.54	0.23	0.0002	2531.88	0.0135
80	8.35	0.33	0.14	0.0001	1940.79	0.0104
100	5.63	0.22	0.09	0.0001	1529.51	0.0082
150	2.70	0.11	0.05	3.5E-05	931.70	0.0050
200	1.58	0.06	0.03	2.1E-05	629.79	0.0034
250	1.04	0.04	0.02	1.4E-05	457.07	0.0024
500	0.28	0.01	0.00	3.7E-06	160.49	0.0009
1000	0.07	0.00	0.00	9.2E-07	55.89	0.0003

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	48.31	0.00	0.00	0.0000	4685.59	0.0000
30	40.60	0.00	0.00	0.0000	4028.18	0.0000
40	26.41	0.00	0.00	0.0000	3439.11	0.0000
50	18.50	0.00	0.00	0.0000	2941.66	0.0000
60	13.67	0.00	0.00	0.0000	2531.88	0.0000
80	8.35	0.00	0.00	0.0000	1940.79	0.0000
100	5.63	0.00	0.00	0.0000	1529.51	0.0000
150	2.70	0.00	0.00	0.0000	931.70	0.0000
200	1.58	0.00	0.00	0.0000	629.79	0.0000
250	1.04	0.00	0.00	0.0000	457.07	0.0000
500	0.28	0.00	0.00	0.0000	160.49	0.0000
1000	0.07	0.00	0.00	0.0000	55.89	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	26.62	11.33	0.1203	0.0637
30	22.37	9.52	0.1011	0.0547
40	14.55	6.19	0.0658	0.0467
50	10.19	4.34	0.0461	0.0400
60	7.53	3.21	0.0340	0.0344
80	4.60	1.96	0.0208	0.0264
100	3.10	1.32	0.0140	0.0208
150	1.49	0.63	0.0067	0.0127
200	0.87	0.37	0.0039	0.0086
250	0.57	0.24	0.0026	0.0062
500	0.15	0.07	0.0007	0.0022
1000	0.04	0.02	0.0002	0.0008

Facility G-02 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Oakland

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1198
Ann Rate [g/s]: 0.0630

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	48.31	17.96	7.64	0.0870	4685.59	0.0281
30	40.60	15.09	6.42	0.0731	4028.18	0.0241
40	26.41	9.82	4.18	0.0475	3439.11	0.0206
50	18.50	6.88	2.93	0.0333	2941.66	0.0176
60	13.67	5.08	2.16	0.0246	2531.88	0.0152
80	8.35	3.10	1.32	0.0150	1940.79	0.0116
100	5.63	2.09	0.89	0.0101	1529.51	0.0092
150	2.70	1.00	0.43	0.0049	931.70	0.0056
200	1.58	0.59	0.25	0.0028	629.79	0.0038
250	1.04	0.39	0.16	0.0019	457.07	0.0027
500	0.28	0.10	0.04	0.0005	160.49	0.0010
1000	0.07	0.03	0.01	0.0001	55.89	0.0003

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0898
Ann Rate [g/s]: 0.0473

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	48.31	2.29	0.97	0.0008	4685.59	0.0301
30	40.60	1.92	0.82	0.0006	4028.18	0.0258
40	26.41	1.25	0.53	0.0004	3439.11	0.0221
50	18.50	0.88	0.37	0.0003	2941.66	0.0189
60	13.67	0.65	0.28	0.0002	2531.88	0.0162
80	8.35	0.39	0.17	0.0001	1940.79	0.0124
100	5.63	0.27	0.11	0.0001	1529.51	0.0098
150	2.70	0.13	0.05	4.3E-05	931.70	0.0060
200	1.58	0.07	0.03	2.5E-05	629.79	0.0040
250	1.04	0.05	0.02	1.6E-05	457.07	0.0029
500	0.28	0.01	0.01	4.4E-06	160.49	0.0010
1000	0.07	0.00	0.00	1.1E-06	55.89	0.0004

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0315

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	48.31	3.04	1.30	0.0024	4685.59	0.0000
30	40.60	2.56	1.09	0.0020	4028.18	0.0000
40	26.41	1.66	0.71	0.0013	3439.11	0.0000
50	18.50	1.17	0.50	0.0009	2941.66	0.0000
60	13.67	0.86	0.37	0.0007	2531.88	0.0000
80	8.35	0.53	0.22	0.0004	1940.79	0.0000
100	5.63	0.35	0.15	0.0003	1529.51	0.0000
150	2.70	0.17	0.07	0.0001	931.70	0.0000
200	1.58	0.10	0.04	0.0001	629.79	0.0000
250	1.04	0.07	0.03	0.0001	457.07	0.0000
500	0.28	0.02	0.01	1.4E-05	160.49	0.0000
1000	0.07	0.00	0.00	3.4E-06	55.89	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	23.29	9.91	0.0901	0.0581
30	19.57	8.33	0.0757	0.0500
40	12.73	5.42	0.0493	0.0427
50	8.92	3.80	0.0345	0.0365
60	6.59	2.80	0.0255	0.0314
80	4.02	1.71	0.0156	0.0241
100	2.71	1.16	0.0105	0.0190
150	1.30	0.55	0.0050	0.0116
200	0.76	0.32	0.0029	0.0078
250	0.50	0.21	0.0019	0.0057
500	0.13	0.06	0.0005	0.0020
1000	0.03	0.01	0.0001	0.0007

341

Facility G-02 - 55% Perc, 43% TCE

Met Set: Oakland

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	48.31	24.71	10.52	0.1197	4685.59	0.0386
30	40.60	20.77	8.84	0.1006	4028.18	0.0332
40	26.41	13.51	5.75	0.0654	3439.11	0.0283
50	18.50	9.46	4.03	0.0458	2941.66	0.0242
60	13.67	6.99	2.98	0.0339	2531.88	0.0209
80	8.35	4.27	1.82	0.0207	1940.79	0.0160
100	5.63	2.88	1.23	0.0139	1529.51	0.0126
150	2.70	1.38	0.59	0.0067	931.70	0.0077
200	1.58	0.81	0.34	0.0039	629.79	0.0052
250	1.04	0.53	0.23	0.0026	457.07	0.0038
500	0.28	0.14	0.06	0.0007	160.49	0.0013
1000	0.07	0.04	0.02	0.0002	55.89	0.0005

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	48.31	0.00	0.00	0.0000	4685.59	0.0000
30	40.60	0.00	0.00	0.0000	4028.18	0.0000
40	26.41	0.00	0.00	0.0000	3439.11	0.0000
50	18.50	0.00	0.00	0.0000	2941.66	0.0000
60	13.67	0.00	0.00	0.0000	2531.88	0.0000
80	8.35	0.00	0.00	0.0000	1940.79	0.0000
100	5.63	0.00	0.00	0.0000	1529.51	0.0000
150	2.70	0.00	0.00	0.0000	931.70	0.0000
200	1.58	0.00	0.00	0.0000	629.79	0.0000
250	1.04	0.00	0.00	0.0000	457.07	0.0000
500	0.28	0.00	0.00	0.0000	160.49	0.0000
1000	0.07	0.00	0.00	0.0000	55.89	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1288
Ann Rate [g/s]: 0.0677

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	48.31	6.54	2.78	0.0051	4685.59	0.0000
30	40.60	5.50	2.34	0.0043	4028.18	0.0000
40	26.41	3.58	1.52	0.0028	3439.11	0.0000
50	18.50	2.50	1.07	0.0020	2941.66	0.0000
60	13.67	1.85	0.79	0.0014	2531.88	0.0000
80	8.35	1.13	0.48	0.0009	1940.79	0.0000
100	5.63	0.76	0.32	0.0006	1529.51	0.0000
150	2.70	0.37	0.16	0.0003	931.70	0.0000
200	1.58	0.21	0.09	0.0002	629.79	0.0000
250	1.04	0.14	0.06	0.0001	457.07	0.0000
500	0.28	0.04	0.02	3.0E-05	160.49	0.0000
1000	0.07	0.01	0.00	7.4E-06	55.89	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	31.25	13.30	0.1248	0.0386
30	26.27	11.18	0.1049	0.0332
40	17.09	7.27	0.0682	0.0283
50	11.97	5.09	0.0478	0.0242
60	8.84	3.76	0.0353	0.0209
80	5.40	2.30	0.0216	0.0160
100	3.64	1.55	0.0145	0.0126
150	1.75	0.74	0.0070	0.0077
200	1.02	0.44	0.0041	0.0052
250	0.67	0.29	0.0027	0.0038
500	0.18	0.08	0.0007	0.0013
1000	0.05	0.02	0.0002	0.0005

Facility G-02 - 94% Perc

Met Set: Default -0

94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	124.80	53.13	0.6044	5276.51	0.0743
30	117.98	103.09	43.88	0.4992	4358.64	0.0613
40	98.78	86.31	36.74	0.4180	3649.09	0.0514
50	83.77	73.20	31.16	0.3545	3094.79	0.0436
60	71.89	62.82	26.74	0.3042	2656.01	0.0374
80	54.62	47.72	20.31	0.2311	2017.70	0.0284
100	42.94	37.52	15.97	0.1817	1586.22	0.0223
150	26.25	22.94	9.76	0.1111	969.72	0.0136
200	17.86	15.61	6.64	0.0756	659.99	0.0093
250	13.05	11.40	4.85	0.0552	482.19	0.0068
500	4.69	4.10	1.75	0.0199	173.33	0.0024
1000	1.68	1.46	0.62	0.0071	61.90	0.0009

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	124.80	53.13	0.6044	0.0743
30	103.09	43.88	0.4992	0.0613
40	86.31	36.74	0.4180	0.0514
50	73.20	31.16	0.3545	0.0436
60	62.82	26.74	0.3042	0.0374
80	47.72	20.31	0.2311	0.0284
100	37.52	15.97	0.1817	0.0223
150	22.94	9.76	0.1111	0.0136
200	15.61	6.64	0.0756	0.0093
250	11.40	4.85	0.0552	0.0068
500	4.10	1.75	0.0199	0.0024
1000	1.46	0.62	0.0071	0.0009

343

Facility G-02 - 55% Perc, 25% MeCl

Met Set: Default -0

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	73.06	31.10	0.3538	5276.51	0.0435
30	117.98	60.35	25.69	0.2923	4358.64	0.0359
40	98.78	50.53	21.51	0.2447	3649.09	0.0301
50	83.77	42.85	18.24	0.2075	3094.79	0.0255
60	71.89	36.78	15.65	0.1781	2656.01	0.0219
80	54.62	27.94	11.89	0.1353	2017.70	0.0166
100	42.94	21.96	9.35	0.1064	1586.22	0.0131
150	26.25	13.43	5.72	0.0650	969.72	0.0080
200	17.86	9.14	3.89	0.0443	659.99	0.0054
250	13.05	6.68	2.84	0.0323	482.19	0.0040
500	4.69	2.40	1.02	0.0116	173.33	0.0014
1000	1.68	0.86	0.36	0.0042	61.90	0.0005

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0749
Ann Rate [g/s]: 0.0394

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	5.63	2.40	0.0019	5276.51	0.0282
30	117.98	4.65	1.98	0.0015	4358.64	0.0233
40	98.78	3.89	1.66	0.0013	3649.09	0.0195
50	83.77	3.30	1.40	0.0011	3094.79	0.0166
60	71.89	2.83	1.21	0.0009	2656.01	0.0142
80	54.62	2.15	0.92	0.0007	2017.70	0.0108
100	42.94	1.69	0.72	0.0006	1586.22	0.0085
150	26.25	1.03	0.44	0.0003	969.72	0.0052
200	17.86	0.70	0.30	0.0002	659.99	0.0035
250	13.05	0.51	0.22	0.0002	482.19	0.0026
500	4.69	0.18	0.08	0.0001	173.33	0.0009
1000	1.68	0.07	0.03	2.2E-05	61.90	0.0003

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	78.69	33.50	0.3557	0.0717
30	65.00	27.67	0.2938	0.0592
40	54.42	23.16	0.2460	0.0496
50	46.15	19.65	0.2086	0.0420
60	39.61	16.86	0.1790	0.0361
80	30.09	12.81	0.1360	0.0274
100	23.66	10.07	0.1069	0.0215
150	14.46	6.16	0.0654	0.0132
200	9.84	4.19	0.0445	0.0090
250	7.19	3.06	0.0325	0.0066
500	2.58	1.10	0.0117	0.0024
1000	0.92	0.39	0.0042	0.0008

Facility G-02 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Default -0

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1198
Ann Rate [g/s]: 0.0630

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	53.09	22.60	0.2571	5276.51	0.0316
30	117.98	43.85	18.67	0.2124	4358.64	0.0261
40	98.78	36.71	15.63	0.1778	3649.09	0.0219
50	83.77	31.14	13.25	0.1508	3094.79	0.0185
60	71.89	26.72	11.38	0.1294	2656.01	0.0159
80	54.62	20.30	8.64	0.0983	2017.70	0.0121
100	42.94	15.96	6.79	0.0773	1586.22	0.0095
150	26.25	9.76	4.15	0.0472	969.72	0.0058
200	17.86	6.64	2.83	0.0322	659.99	0.0040
250	13.05	4.85	2.07	0.0235	482.19	0.0029
500	4.69	1.74	0.74	0.0084	173.33	0.0010
1000	1.68	0.62	0.27	0.0030	61.90	0.0004

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0898
Ann Rate [g/s]: 0.0473

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	6.76	2.88	0.0023	5276.51	0.0338
30	117.98	5.58	2.38	0.0019	4358.64	0.0280
40	98.78	4.67	1.99	0.0016	3649.09	0.0234
50	83.77	3.96	1.69	0.0013	3094.79	0.0199
60	71.89	3.40	1.45	0.0011	2656.01	0.0170
80	54.62	2.58	1.10	0.0009	2017.70	0.0129
100	42.94	2.03	0.86	0.0007	1586.22	0.0102
150	26.25	1.24	0.53	0.0004	969.72	0.0062
200	17.86	0.85	0.36	0.0003	659.99	0.0042
250	13.05	0.62	0.26	0.0002	482.19	0.0031
500	4.69	0.22	0.09	0.0001	173.33	0.0011
1000	1.68	0.08	0.03	2.6E-05	61.90	0.0004

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0315

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	9.00	3.83	0.0070	5276.51	0.0000
30	117.98	7.43	3.16	0.0058	4358.64	0.0000
40	98.78	6.22	2.65	0.0049	3649.09	0.0000
50	83.77	5.28	2.25	0.0041	3094.79	0.0000
60	71.89	4.53	1.93	0.0035	2656.01	0.0000
80	54.62	3.44	1.46	0.0027	2017.70	0.0000
100	42.94	2.71	1.15	0.0021	1586.22	0.0000
150	26.25	1.65	0.70	0.0013	969.72	0.0000
200	17.86	1.13	0.48	0.0009	659.99	0.0000
250	13.05	0.82	0.35	0.0006	482.19	0.0000
500	4.69	0.30	0.13	0.0002	173.33	0.0000
1000	1.68	0.11	0.04	0.0001	61.90	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	68.84	29.30	0.2664	0.0655
30	56.87	24.21	0.2200	0.0541
40	47.61	20.27	0.1842	0.0453
50	40.38	17.19	0.1562	0.0384
60	34.65	14.75	0.1341	0.0329
80	26.32	11.21	0.1019	0.0250
100	20.70	8.81	0.0801	0.0197
150	12.65	5.39	0.0490	0.0120
200	8.61	3.67	0.0333	0.0082
250	6.29	2.68	0.0243	0.0060
500	2.26	0.96	0.0088	0.0022
1000	0.81	0.34	0.0031	0.0008

345

Facility G-02 - 55% Perc, 43% TCE

Met Set: Default -0

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	73.06	31.10	0.3538	5276.51	0.0435
30	117.98	60.35	25.69	0.2923	4358.64	0.0359
40	98.78	50.53	21.51	0.2447	3649.09	0.0301
50	83.77	42.85	18.24	0.2075	3094.79	0.0255
60	71.89	36.78	15.65	0.1781	2656.01	0.0219
80	54.62	27.94	11.89	0.1353	2017.70	0.0166
100	42.94	21.96	9.35	0.1064	1586.22	0.0131
150	26.25	13.43	5.72	0.0650	969.72	0.0080
200	17.86	9.14	3.89	0.0443	659.99	0.0054
250	13.05	6.68	2.84	0.0323	482.19	0.0040
500	4.69	2.40	1.02	0.0116	173.33	0.0014
1000	1.68	0.86	0.36	0.0042	61.90	0.0005

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1288
Ann Rate [g/s]: 0.0677

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	19.34	8.23	0.0151	5276.51	0.0000
30	117.98	15.97	6.80	0.0125	4358.64	0.0000
40	98.78	13.37	5.69	0.0104	3649.09	0.0000
50	83.77	11.34	4.83	0.0089	3094.79	0.0000
60	71.89	9.73	4.14	0.0076	2656.01	0.0000
80	54.62	7.40	3.15	0.0058	2017.70	0.0000
100	42.94	5.81	2.47	0.0045	1586.22	0.0000
150	26.25	3.55	1.51	0.0028	969.72	0.0000
200	17.86	2.42	1.03	0.0019	659.99	0.0000
250	13.05	1.77	0.75	0.0014	482.19	0.0000
500	4.69	0.64	0.27	0.0005	173.33	0.0000
1000	1.68	0.23	0.10	0.0002	61.90	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	92.40	39.33	0.3689	0.0435
30	76.33	32.49	0.3047	0.0359
40	63.90	27.20	0.2551	0.0301
50	54.19	23.07	0.2164	0.0255
60	46.51	19.80	0.1857	0.0219
80	35.33	15.04	0.1411	0.0166
100	27.78	11.82	0.1109	0.0131
150	16.98	7.23	0.0678	0.0080
200	11.56	4.92	0.0461	0.0054
250	8.44	3.59	0.0337	0.0040
500	3.04	1.29	0.0121	0.0014
1000	1.08	0.46	0.0043	0.0005

Risk Asse ent Summary - 3 Generic Facilities
Multicomponent Impacts - Brake Cleaners - Acute

Facility G-02 - 94% Perc

Met Set: Fresno

94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	72.47	63.32	26.96	0.3067	2850.30	0.0401
30	57.46	50.21	21.37	0.2431	2669.99	0.0376
40	37.02	32.35	13.77	0.1566	2147.67	0.0302
50	25.71	22.47	9.56	0.1088	1809.24	0.0255
60	18.87	16.49	7.02	0.0798	1526.84	0.0215
80	11.40	9.96	4.24	0.0482	1127.36	0.0159
100	7.62	6.66	2.83	0.0322	865.93	0.0122
150	3.60	3.15	1.34	0.0152	507.64	0.0071
200	2.09	1.83	0.78	0.0088	335.73	0.0047
250	1.36	1.19	0.51	0.0058	240.23	0.0034
500	0.35	0.31	0.13	0.0015	81.50	0.0011
1000	0.09	0.08	0.03	0.0004	27.65	0.0004

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	72.47	0.00	0.00	0.0000	2850.30	0.0000
30	57.46	0.00	0.00	0.0000	2669.99	0.0000
40	37.02	0.00	0.00	0.0000	2147.67	0.0000
50	25.71	0.00	0.00	0.0000	1809.24	0.0000
60	18.87	0.00	0.00	0.0000	1526.84	0.0000
80	11.40	0.00	0.00	0.0000	1127.36	0.0000
100	7.62	0.00	0.00	0.0000	865.93	0.0000
150	3.60	0.00	0.00	0.0000	507.64	0.0000
200	2.09	0.00	0.00	0.0000	335.73	0.0000
250	1.36	0.00	0.00	0.0000	240.23	0.0000
500	0.35	0.00	0.00	0.0000	81.50	0.0000
1000	0.09	0.00	0.00	0.0000	27.65	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	72.47	0.00	0.00	0.0000	2850.30	0.0000
30	57.46	0.00	0.00	0.0000	2669.99	0.0000
40	37.02	0.00	0.00	0.0000	2147.67	0.0000
50	25.71	0.00	0.00	0.0000	1809.24	0.0000
60	18.87	0.00	0.00	0.0000	1526.84	0.0000
80	11.40	0.00	0.00	0.0000	1127.36	0.0000
100	7.62	0.00	0.00	0.0000	865.93	0.0000
150	3.60	0.00	0.00	0.0000	507.64	0.0000
200	2.09	0.00	0.00	0.0000	335.73	0.0000
250	1.36	0.00	0.00	0.0000	240.23	0.0000
500	0.35	0.00	0.00	0.0000	81.50	0.0000
1000	0.09	0.00	0.00	0.0000	27.65	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	63.32	26.96	0.3067	0.0401
30	50.21	21.37	0.2431	0.0376
40	32.35	13.77	0.1566	0.0302
50	22.47	9.56	0.1088	0.0255
60	16.49	7.02	0.0798	0.0215
80	9.96	4.24	0.0482	0.0159
100	6.66	2.83	0.0322	0.0122
150	3.15	1.34	0.0152	0.0071
200	1.83	0.78	0.0088	0.0047
250	1.19	0.51	0.0058	0.0034
500	0.31	0.13	0.0015	0.0011
1000	0.08	0.03	0.0004	0.0004

Facility G-02 - 55% Perc, 25% MeCl

Met Set: Fresno

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647

Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	72.47	37.07	15.78	0.1795	2850.30	0.0235
30	57.46	29.39	12.51	0.1423	2669.99	0.0220
40	37.02	18.94	8.06	0.0917	2147.67	0.0177
50	25.71	13.15	5.60	0.0637	1809.24	0.0149
60	18.87	9.65	4.11	0.0467	1526.84	0.0126
80	11.40	5.83	2.48	0.0282	1127.36	0.0093
100	7.62	3.90	1.66	0.0189	865.93	0.0071
150	3.60	1.84	0.78	0.0089	507.64	0.0042
200	2.09	1.07	0.46	0.0052	335.73	0.0028
250	1.36	0.70	0.30	0.0034	240.23	0.0020
500	0.35	0.18	0.08	0.0009	81.50	0.0007
1000	0.09	0.05	0.02	0.0002	27.65	0.0002

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0749

Ann Rate [g/s]: 0.0394

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	72.47	2.86	1.22	0.0010	2850.30	0.0152
30	57.46	2.26	0.96	0.0008	2669.99	0.0143
40	37.02	1.46	0.62	0.0005	2147.67	0.0115
50	25.71	1.01	0.43	0.0003	1809.24	0.0097
60	18.87	0.74	0.32	0.0002	1526.84	0.0082
80	11.40	0.45	0.19	0.0001	1127.36	0.0060
100	7.62	0.30	0.13	0.0001	865.93	0.0046
150	3.60	0.14	0.06	4.7E-05	507.64	0.0027
200	2.09	0.08	0.04	2.7E-05	335.73	0.0018
250	1.36	0.05	0.02	1.8E-05	240.23	0.0013
500	0.35	0.01	0.01	4.6E-06	81.50	0.0004
1000	0.09	0.00	0.00	1.2E-06	27.65	0.0001

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	72.47	0.00	0.00	0.0000	2850.30	0.0000
30	57.46	0.00	0.00	0.0000	2669.99	0.0000
40	37.02	0.00	0.00	0.0000	2147.67	0.0000
50	25.71	0.00	0.00	0.0000	1809.24	0.0000
60	18.87	0.00	0.00	0.0000	1526.84	0.0000
80	11.40	0.00	0.00	0.0000	1127.36	0.0000
100	7.62	0.00	0.00	0.0000	865.93	0.0000
150	3.60	0.00	0.00	0.0000	507.64	0.0000
200	2.09	0.00	0.00	0.0000	335.73	0.0000
250	1.36	0.00	0.00	0.0000	240.23	0.0000
500	0.35	0.00	0.00	0.0000	81.50	0.0000
1000	0.09	0.00	0.00	0.0000	27.65	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	39.93	17.00	0.1805	0.0387
30	31.66	13.48	0.1431	0.0363
40	20.40	8.68	0.0922	0.0292
50	14.16	6.03	0.0640	0.0246
60	10.40	4.43	0.0470	0.0207
80	6.28	2.67	0.0284	0.0153
100	4.20	1.79	0.0190	0.0118
150	1.98	0.84	0.0090	0.0069
200	1.15	0.49	0.0052	0.0046
250	0.75	0.32	0.0034	0.0033
500	0.19	0.08	0.0009	0.0011
1000	0.05	0.02	0.0002	0.0004

Facility G-02 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Fresno

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1198
Ann Rate [g/s]: 0.0630

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	72.47	26.94	11.47	0.1304	2850.30	0.0171
30	57.46	21.36	9.09	0.1034	2669.99	0.0160
40	37.02	13.76	5.86	0.0666	2147.67	0.0129
50	25.71	9.56	4.07	0.0463	1809.24	0.0108
60	18.87	7.01	2.99	0.0340	1526.84	0.0091
80	11.40	4.24	1.80	0.0205	1127.36	0.0068
100	7.62	2.83	1.21	0.0137	865.93	0.0052
150	3.60	1.34	0.57	0.0065	507.64	0.0030
200	2.09	0.78	0.33	0.0038	335.73	0.0020
250	1.36	0.51	0.22	0.0024	240.23	0.0014
500	0.35	0.13	0.06	0.0006	81.50	0.0005
1000	0.09	0.03	0.01	0.0002	27.65	0.0002

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0898
Ann Rate [g/s]: 0.0473

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	72.47	3.43	1.46	0.0011	2850.30	0.0183
30	57.46	2.72	1.16	0.0009	2669.99	0.0171
40	37.02	1.75	0.75	0.0006	2147.67	0.0138
50	25.71	1.22	0.52	0.0004	1809.24	0.0116
60	18.87	0.89	0.38	0.0003	1526.84	0.0098
80	11.40	0.54	0.23	0.0002	1127.36	0.0072
100	7.62	0.36	0.15	0.0001	865.93	0.0056
150	3.60	0.17	0.07	0.0001	507.64	0.0033
200	2.09	0.10	0.04	3.3E-05	335.73	0.0022
250	1.36	0.06	0.03	2.1E-05	240.23	0.0015
500	0.35	0.02	0.01	5.5E-06	81.50	0.0005
1000	0.09	0.00	0.00	1.4E-06	27.65	0.0002

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0315

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	72.47	4.57	1.94	0.0036	2850.30	0.0000
30	57.46	3.62	1.54	0.0028	2669.99	0.0000
40	37.02	2.33	0.99	0.0018	2147.67	0.0000
50	25.71	1.62	0.69	0.0013	1809.24	0.0000
60	18.87	1.19	0.51	0.0009	1526.84	0.0000
80	11.40	0.72	0.31	0.0006	1127.36	0.0000
100	7.62	0.48	0.20	0.0004	865.93	0.0000
150	3.60	0.23	0.10	0.0002	507.64	0.0000
200	2.09	0.13	0.06	0.0001	335.73	0.0000
250	1.36	0.09	0.04	0.0001	240.23	0.0000
500	0.35	0.02	0.01	1.7E-05	81.50	0.0000
1000	0.09	0.01	0.00	4.4E-06	27.65	0.0000

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Center	Resident	Worker	Chronic	Acute
20	34.93	14.87	0.1352	0.0354
30	27.70	11.79	0.1072	0.0331
40	17.84	7.60	0.0690	0.0266
50	12.39	5.28	0.0479	0.0224
60	9.10	3.87	0.0352	0.0189
80	5.49	2.34	0.0213	0.0140
100	3.67	1.56	0.0142	0.0107
150	1.74	0.74	0.0067	0.0063
200	1.01	0.43	0.0039	0.0042
250	0.66	0.28	0.0025	0.0030
500	0.17	0.07	0.0007	0.0010
1000	0.04	0.02	0.0002	0.0003

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Facility G-02 - 55% Perc, 43% TCE

Met Set: Fresno

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	72.47	37.07	15.78	0.1795	2850.30	0.0235
30	57.46	29.39	12.51	0.1423	2669.99	0.0220
40	37.02	18.94	8.06	0.0917	2147.67	0.0177
50	25.71	13.15	5.60	0.0637	1809.24	0.0149
60	18.87	9.65	4.11	0.0467	1526.84	0.0126
80	11.40	5.83	2.48	0.0282	1127.36	0.0093
100	7.62	3.90	1.66	0.0189	865.93	0.0071
150	3.60	1.84	0.78	0.0089	507.64	0.0042
200	2.09	1.07	0.46	0.0052	335.73	0.0028
250	1.36	0.70	0.30	0.0034	240.23	0.0020
500	0.35	0.18	0.08	0.0009	81.50	0.0007
1000	0.09	0.05	0.02	0.0002	27.65	0.0002

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	72.47	0.00	0.00	0.0000	2850.30	0.0000
30	57.46	0.00	0.00	0.0000	2669.99	0.0000
40	37.02	0.00	0.00	0.0000	2147.67	0.0000
50	25.71	0.00	0.00	0.0000	1809.24	0.0000
60	18.87	0.00	0.00	0.0000	1526.84	0.0000
80	11.40	0.00	0.00	0.0000	1127.36	0.0000
100	7.62	0.00	0.00	0.0000	865.93	0.0000
150	3.60	0.00	0.00	0.0000	507.64	0.0000
200	2.09	0.00	0.00	0.0000	335.73	0.0000
250	1.36	0.00	0.00	0.0000	240.23	0.0000
500	0.35	0.00	0.00	0.0000	81.50	0.0000
1000	0.09	0.00	0.00	0.0000	27.65	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1288
Ann Rate [g/s]: 0.0677

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	72.47	9.81	4.18	0.0077	2850.30	0.0000
30	57.46	7.78	3.31	0.0061	2669.99	0.0000
40	37.02	5.01	2.13	0.0039	2147.67	0.0000
50	25.71	3.48	1.48	0.0027	1809.24	0.0000
60	18.87	2.55	1.09	0.0020	1526.84	0.0000
80	11.40	1.54	0.66	0.0012	1127.36	0.0000
100	7.62	1.03	0.44	0.0008	865.93	0.0000
150	3.60	0.49	0.21	0.0004	507.64	0.0000
200	2.09	0.28	0.12	0.0002	335.73	0.0000
250	1.36	0.18	0.08	0.0001	240.23	0.0000
500	0.35	0.05	0.02	3.7E-05	81.50	0.0000
1000	0.09	0.01	0.01	9.5E-06	27.65	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	46.88	19.96	0.1872	0.0235
30	37.17	15.82	0.1484	0.0220
40	23.95	10.19	0.0956	0.0177
50	16.63	7.08	0.0664	0.0149
60	12.21	5.20	0.0487	0.0126
80	7.38	3.14	0.0294	0.0093
100	4.93	2.10	0.0197	0.0071
150	2.33	0.99	0.0093	0.0042
200	1.35	0.58	0.0054	0.0028
250	0.88	0.37	0.0035	0.0020
500	0.23	0.10	0.0009	0.0007
1000	0.06	0.02	0.0002	0.0002

Facility G-02 - 94% Perc

Met Set: Concord
94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.28	85.00	36.18	0.4116	5532.86	0.0779
30	71.32	62.32	26.53	0.3018	4845.41	0.0682
40	46.19	40.36	17.18	0.1954	4048.28	0.0570
50	32.27	28.20	12.00	0.1365	3418.07	0.0481
60	23.83	20.82	8.86	0.1008	2918.05	0.0411
80	14.54	12.70	5.41	0.0615	2193.50	0.0309
100	9.80	8.56	3.65	0.0415	1708.42	0.0240
150	4.70	4.11	1.75	0.0199	1026.40	0.0144
200	2.75	2.40	1.02	0.0116	690.62	0.0097
250	1.81	1.58	0.67	0.0077	500.60	0.0070
500	0.48	0.42	0.18	0.0020	176.69	0.0025
1000	0.14	0.12	0.05	0.0006	62.47	0.0009

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.28	0.00	0.00	0.0000	5532.86	0.0000
30	71.32	0.00	0.00	0.0000	4845.41	0.0000
40	46.19	0.00	0.00	0.0000	4048.28	0.0000
50	32.27	0.00	0.00	0.0000	3418.07	0.0000
60	23.83	0.00	0.00	0.0000	2918.05	0.0000
80	14.54	0.00	0.00	0.0000	2193.50	0.0000
100	9.80	0.00	0.00	0.0000	1708.42	0.0000
150	4.70	0.00	0.00	0.0000	1026.40	0.0000
200	2.75	0.00	0.00	0.0000	690.62	0.0000
250	1.81	0.00	0.00	0.0000	500.60	0.0000
500	0.48	0.00	0.00	0.0000	176.69	0.0000
1000	0.14	0.00	0.00	0.0000	62.47	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.28	0.00	0.00	0.0000	5532.86	0.0000
30	71.32	0.00	0.00	0.0000	4845.41	0.0000
40	46.19	0.00	0.00	0.0000	4048.28	0.0000
50	32.27	0.00	0.00	0.0000	3418.07	0.0000
60	23.83	0.00	0.00	0.0000	2918.05	0.0000
80	14.54	0.00	0.00	0.0000	2193.50	0.0000
100	9.80	0.00	0.00	0.0000	1708.42	0.0000
150	4.70	0.00	0.00	0.0000	1026.40	0.0000
200	2.75	0.00	0.00	0.0000	690.62	0.0000
250	1.81	0.00	0.00	0.0000	500.60	0.0000
500	0.48	0.00	0.00	0.0000	176.69	0.0000
1000	0.14	0.00	0.00	0.0000	62.47	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	85.00	36.18	0.4116	0.0779
30	62.32	26.53	0.3018	0.0682
40	40.36	17.18	0.1954	0.0570
50	28.20	12.00	0.1365	0.0481
60	20.82	8.86	0.1008	0.0411
80	12.70	5.41	0.0615	0.0309
100	8.56	3.65	0.0415	0.0240
150	4.11	1.75	0.0199	0.0144
200	2.40	1.02	0.0116	0.0097
250	1.58	0.67	0.0077	0.0070
500	0.42	0.18	0.0020	0.0025
1000	0.12	0.05	0.0006	0.0009

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Facility G-02 - 55% Perc, 25% MeCl

Met Set: Concord

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.28	49.76	21.18	0.2410	5532.86	0.0456
30	71.32	36.48	15.53	0.1767	4845.41	0.0399
40	46.19	23.63	10.06	0.1144	4048.28	0.0333
50	32.27	16.51	7.03	0.0799	3418.07	0.0281
60	23.83	12.19	5.19	0.0590	2918.05	0.0240
80	14.54	7.44	3.17	0.0360	2193.50	0.0181
100	9.80	5.01	2.13	0.0243	1708.42	0.0141
150	4.70	2.40	1.02	0.0116	1026.40	0.0085
200	2.75	1.41	0.60	0.0068	690.62	0.0057
250	1.81	0.93	0.39	0.0045	500.60	0.0041
500	0.48	0.25	0.10	0.0012	176.69	0.0015
1000	0.14	0.07	0.03	0.0003	62.47	0.0005

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0749
Ann Rate [g/s]: 0.0473

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.28	3.83	1.63	0.0013	5532.86	0.0296
30	71.32	2.81	1.20	0.0009	4845.41	0.0259
40	46.19	1.82	0.77	0.0006	4048.28	0.0217
50	32.27	1.27	0.54	0.0004	3418.07	0.0183
60	23.83	0.94	0.40	0.0003	2918.05	0.0156
80	14.54	0.57	0.24	0.0002	2193.50	0.0117
100	9.80	0.39	0.16	0.0001	1708.42	0.0091
150	4.70	0.19	0.08	0.0001	1026.40	0.0055
200	2.75	0.11	0.05	3.6E-05	690.62	0.0037
250	1.81	0.07	0.03	2.4E-05	500.60	0.0027
500	0.48	0.02	0.01	6.3E-06	176.69	0.0009
1000	0.14	0.01	0.00	1.8E-06	62.47	0.0003

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.28	0.00	0.00	0.0000	5532.86	0.0000
30	71.32	0.00	0.00	0.0000	4845.41	0.0000
40	46.19	0.00	0.00	0.0000	4048.28	0.0000
50	32.27	0.00	0.00	0.0000	3418.07	0.0000
60	23.83	0.00	0.00	0.0000	2918.05	0.0000
80	14.54	0.00	0.00	0.0000	2193.50	0.0000
100	9.80	0.00	0.00	0.0000	1708.42	0.0000
150	4.70	0.00	0.00	0.0000	1026.40	0.0000
200	2.75	0.00	0.00	0.0000	690.62	0.0000
250	1.81	0.00	0.00	0.0000	500.60	0.0000
500	0.48	0.00	0.00	0.0000	176.69	0.0000
1000	0.14	0.00	0.00	0.0000	62.47	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	53.59	22.81	0.2423	0.0752
30	39.29	16.73	0.1776	0.0658
40	25.45	10.83	0.1150	0.0550
50	17.78	7.57	0.0804	0.0464
60	13.13	5.59	0.0593	0.0396
80	8.01	3.41	0.0362	0.0298
100	5.40	2.30	0.0244	0.0232
150	2.59	1.10	0.0117	0.0139
200	1.52	0.64	0.0068	0.0094
250	1.00	0.42	0.0045	0.0068
500	0.26	0.11	0.0012	0.0024
1000	0.08	0.03	0.0003	0.0008

Facility G-02 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Concord

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1198
Ann Rate [g/s]: 0.0630

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.28	36.16	15.39	0.1751	5532.86	0.0331
30	71.32	26.51	11.28	0.1284	4845.41	0.0290
40	46.19	17.17	7.31	0.0831	4048.28	0.0242
50	32.27	11.99	5.11	0.0581	3418.07	0.0205
60	23.83	8.86	3.77	0.0429	2918.05	0.0175
80	14.54	5.40	2.30	0.0262	2193.50	0.0131
100	9.80	3.64	1.55	0.0176	1708.42	0.0102
150	4.70	1.75	0.74	0.0085	1026.40	0.0061
200	2.75	1.02	0.44	0.0050	690.62	0.0041
250	1.81	0.67	0.29	0.0033	500.60	0.0030
500	0.48	0.18	0.08	0.0009	176.69	0.0011
1000	0.14	0.05	0.02	0.0003	62.47	0.0004

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0898
Ann Rate [g/s]: 0.0473

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.28	4.60	1.96	0.0015	5532.86	0.0355
30	71.32	3.37	1.44	0.0011	4845.41	0.0311
40	46.19	2.18	0.93	0.0007	4048.28	0.0260
50	32.27	1.53	0.65	0.0005	3418.07	0.0219
60	23.83	1.13	0.48	0.0004	2918.05	0.0187
80	14.54	0.69	0.29	0.0002	2193.50	0.0141
100	9.80	0.46	0.20	0.0002	1708.42	0.0110
150	4.70	0.22	0.09	0.0001	1026.40	0.0066
200	2.75	0.13	0.06	4.3E-05	690.62	0.0044
250	1.81	0.09	0.04	2.9E-05	500.60	0.0032
500	0.48	0.02	0.01	7.6E-06	176.69	0.0011
1000	0.14	0.01	0.00	2.2E-06	62.47	0.0004

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0315

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.28	6.13	2.61	0.0048	5532.86	0.0000
30	71.32	4.49	1.91	0.0035	4845.41	0.0000
40	46.19	2.91	1.24	0.0023	4048.28	0.0000
50	32.27	2.03	0.87	0.0016	3418.07	0.0000
60	23.83	1.50	0.64	0.0012	2918.05	0.0000
80	14.54	0.92	0.39	0.0007	2193.50	0.0000
100	9.80	0.62	0.26	0.0005	1708.42	0.0000
150	4.70	0.30	0.13	0.0002	1026.40	0.0000
200	2.75	0.17	0.07	0.0001	690.62	0.0000
250	1.81	0.11	0.05	0.0001	500.60	0.0000
500	0.48	0.03	0.01	2.4E-05	176.69	0.0000
1000	0.14	0.01	0.00	6.9E-06	62.47	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Worker	Harzard Index Chronic	Hazard Index Acute
20	46.89	19.96	0.1814	0.0686
30	34.38	14.63	0.1330	0.0601
40	22.26	9.48	0.0861	0.0502
50	15.55	6.62	0.0602	0.0424
60	11.49	4.89	0.0444	0.0362
80	7.01	2.98	0.0271	0.0272
100	4.72	2.01	0.0183	0.0212
150	2.27	0.96	0.0088	0.0127
200	1.33	0.56	0.0051	0.0086
250	0.87	0.37	0.0034	0.0062
500	0.23	0.10	0.0009	0.0022
1000	0.07	0.03	0.0003	0.0008

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Facility G-02 - 55% Perc, 43% TCE

Met Set: Concord

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.28	49.76	21.18	0.2410	5532.86	0.0456
30	71.32	36.48	15.53	0.1767	4845.41	0.0399
40	46.19	23.63	10.06	0.1144	4048.28	0.0333
50	32.27	16.51	7.03	0.0799	3418.07	0.0281
60	23.83	12.19	5.19	0.0590	2918.05	0.0240
80	14.54	7.44	3.17	0.0360	2193.50	0.0181
100	9.80	5.01	2.13	0.0243	1708.42	0.0141
150	4.70	2.40	1.02	0.0116	1026.40	0.0085
200	2.75	1.41	0.60	0.0068	690.62	0.0057
250	1.81	0.93	0.39	0.0045	500.60	0.0041
500	0.48	0.25	0.10	0.0012	176.69	0.0015
1000	0.14	0.07	0.03	0.0003	62.47	0.0005

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.28	0.00	0.00	0.0000	5532.86	0.0000
30	71.32	0.00	0.00	0.0000	4845.41	0.0000
40	46.19	0.00	0.00	0.0000	4048.28	0.0000
50	32.27	0.00	0.00	0.0000	3418.07	0.0000
60	23.83	0.00	0.00	0.0000	2918.05	0.0000
80	14.54	0.00	0.00	0.0000	2193.50	0.0000
100	9.80	0.00	0.00	0.0000	1708.42	0.0000
150	4.70	0.00	0.00	0.0000	1026.40	0.0000
200	2.75	0.00	0.00	0.0000	690.62	0.0000
250	1.81	0.00	0.00	0.0000	500.60	0.0000
500	0.48	0.00	0.00	0.0000	176.69	0.0000
1000	0.14	0.00	0.00	0.0000	62.47	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1288
Ann Rate [g/s]: 0.0677

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	97.28	13.17	5.61	0.0103	5532.86	0.0000
30	71.32	9.66	4.11	0.0075	4845.41	0.0000
40	46.19	6.25	2.66	0.0049	4048.28	0.0000
50	32.27	4.37	1.86	0.0034	3418.07	0.0000
60	23.83	3.23	1.37	0.0025	2918.05	0.0000
80	14.54	1.97	0 84	0.0015	2193.50	0.0000
100	9.80	1.33	0.56	0.0010	1708.42	0.0000
150	4.70	0.64	0.27	0.0005	1026.40	0.0000
200	2.75	0.37	0.16	0.0003	690.62	0.0000
250	1.81	0.25	0.10	0.0002	500.60	0.0000
500	0.48	0.06	0.03	0.0001	176.69	0.0000
1000	0.14	0.02	0.01	1.5E-05	62.47	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	62.93	26.79	0.2513	0.0456
30	46.14	19.64	0.1842	0.0399
40	29.88	12.72	0.1193	0.0333
50	20.88	8.89	0.0834	0.0281
60	15.42	6.56	0.0616	0.0240
80	9.41	4.00	0.0376	0.0181
100	6.34	2.70	0.0253	0.0141
150	3.04	1.29	0.0121	0.0085
200	1.78	0.76	0.0071	0.0057
250	1.17	0.50	0.0047	0.0041
500	0.31	0.13	0.0012	0.0015
1000	0.09	0.04	0.0004	0.0005

Facility G-02 - 94% Perc

Met Set: Mather

94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	57.90	50.59	21.54	0.2450	3794.23	0.0534
30	42.67	37.28	15.87	0.1806	3373.60	0.0475
40	27.44	23.98	10.21	0.1161	2579.42	0.0363
50	19.05	16.65	7.09	0.0806	2118.71	0.0298
60	13.97	12.21	5.20	0.0591	1819.33	0.0256
80	8.44	7.37	3.14	0.0357	1377.52	0.0194
100	5.64	4.93	2.10	0.0239	1077.14	0.0152
150	2.66	2.32	0.99	0.0113	649.65	0.0091
200	1.55	1.35	0.58	0.0066	438.54	0.0062
250	1.01	0.88	0.38	0.0043	319.33	0.0045
500	0.26	0.23	0.10	0.0011	113.98	0.0016
1000	0.07	0.06	0.03	0.0003	40.48	0.0006

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	57.90	0.00	0.00	0.0000	3794.23	0.0000
30	42.67	0.00	0.00	0.0000	3373.60	0.0000
40	27.44	0.00	0.00	0.0000	2579.42	0.0000
50	19.05	0.00	0.00	0.0000	2118.71	0.0000
60	13.97	0.00	0.00	0.0000	1819.33	0.0000
80	8.44	0.00	0.00	0.0000	1377.52	0.0000
100	5.64	0.00	0.00	0.0000	1077.14	0.0000
150	2.66	0.00	0.00	0.0000	649.65	0.0000
200	1.55	0.00	0.00	0.0000	438.54	0.0000
250	1.01	0.00	0.00	0.0000	319.33	0.0000
500	0.26	0.00	0.00	0.0000	113.98	0.0000
1000	0.07	0.00	0.00	0.0000	40.48	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	57.90	0.00	0.00	0.0000	3794.23	0.0000
30	42.67	0.00	0.00	0.0000	3373.60	0.0000
40	27.44	0.00	0.00	0.0000	2579.42	0.0000
50	19.05	0.00	0.00	0.0000	2118.71	0.0000
60	13.97	0.00	0.00	0.0000	1819.33	0.0000
80	8.44	0.00	0.00	0.0000	1377.52	0.0000
100	5.64	0.00	0.00	0.0000	1077.14	0.0000
150	2.66	0.00	0.00	0.0000	649.65	0.0000
200	1.55	0.00	0.00	0.0000	438.54	0.0000
250	1.01	0.00	0.00	0.0000	319.33	0.0000
500	0.26	0.00	0.00	0.0000	113.98	0.0000
1000	0.07	0.00	0.00	0.0000	40.48	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	50.59	21.54	0.2450	0.0534
30	37.28	15.87	0.1806	0.0475
40	23.98	10.21	0.1161	0.0363
50	16.65	7.09	0.0806	0.0298
60	12.21	5.20	0.0591	0.0256
80	7.37	3.14	0.0357	0.0194
100	4.93	2.10	0.0239	0.0152
150	2.32	0.99	0.0113	0.0091
200	1.35	0.58	0.0066	0.0062
250	0.88	0.38	0.0043	0.0045
500	0.23	0.10	0.0011	0.0016
1000	0.06	0.03	0.0003	0.0006

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Facility G-02 - 55% Perc, 25% MeCl

Met Set: Mather

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	57.90	29.62	12.61	0.1434	3794.23	0.0312
30	42.67	21.83	9.29	0.1057	3373.60	0.0278
40	27.44	14.04	5.98	0.0680	2579.42	0.0212
50	19.05	9.74	4.15	0.0472	2118.71	0.0174
60	13.97	7.15	3.04	0.0346	1819.33	0.0150
80	8.44	4.32	1.84	0.0209	1377.52	0.0113
100	5.64	2.89	1.23	0.0140	1077.14	0.0089
150	2.66	1.36	0.58	0.0066	649.65	0.0053
200	1.55	0.79	0.34	0.0038	438.54	0.0036
250	1.01	0.52	0.22	0.0025	319.33	0.0026
500	0.26	0.13	0.06	0.0006	113.98	0.0009
1000	0.07	0.04	0.02	0.0002	40.48	0.0003

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0749
Ann Rate [g/s]: 0.0394

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	57.90	2.28	0.97	0.0008	3794.23	0.0203
30	42.67	1.68	0.72	0.0006	3373.60	0.0180
40	27.44	1.08	0.46	0.0004	2579.42	0.0138
50	19.05	0.75	0.32	0.0003	2118.71	0.0113
60	13.97	0.55	0.23	0.0002	1819.33	0.0097
80	8.44	0.33	0.14	0.0001	1377.52	0.0074
100	5.64	0.22	0.09	0.0001	1077.14	0.0058
150	2.66	0.10	0.04	3.5E-05	649.65	0.0035
200	1.55	0.06	0.03	2.0E-05	438.54	0.0023
250	1.01	0.04	0.02	1.3E-05	319.33	0.0017
500	0.26	0.01	0.00	3.4E-06	113.98	0.0006
1000	0.07	0.00	0.00	9.2E-07	40.48	0.0002

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	57.90	0.00	0.00	0.0000	3794.23	0.0000
30	42.67	0.00	0.00	0.0000	3373.60	0.0000
40	27.44	0.00	0.00	0.0000	2579.42	0.0000
50	19.05	0.00	0.00	0.0000	2118.71	0.0000
60	13.97	0.00	0.00	0.0000	1819.33	0.0000
80	8.44	0.00	0.00	0.0000	1377.52	0.0000
100	5.64	0.00	0.00	0.0000	1077.14	0.0000
150	2.66	0.00	0.00	0.0000	649.65	0.0000
200	1.55	0.00	0.00	0.0000	438.54	0.0000
250	1.01	0.00	0.00	0.0000	319.33	0.0000
500	0.26	0.00	0.00	0.0000	113.98	0.0000
1000	0.07	0.00	0.00	0.0000	40.48	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	31.90	13.58	0.1442	0.0515
30	23.51	10.01	0.1063	0.0458
40	15.12	6.44	0.0683	0.0350
50	10.50	4.47	0.0474	0.0288
60	7.70	3.28	0.0348	0.0247
80	4.65	1.98	0.0210	0.0187
100	3.11	1.32	0.0140	0.0146
150	1.47	0.62	0.0066	0.0088
200	0.85	0.36	0.0039	0.0060
250	0.56	0.24	0.0025	0.0043
500	0.14	0.06	0.0006	0.0015
1000	0.04	0.02	0.0002	0.0005

Facility G-02 0% Perc, 30% MeCl, 20% TCE

Met Set: Mather

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1198
Ann Rate [g/s]: 0.0630

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	57.90	21.52	9.16	0.1042	3794.23	0.0227
30	42.67	15.86	6.75	0.0768	3373.60	0.0202
40	27.44	10.20	4.34	0.0494	2579.42	0.0155
50	19.05	7.08	3.01	0.0343	2118.71	0.0127
60	13.97	5.19	2.21	0.0251	1819.33	0.0109
80	8.44	3.14	1.34	0.0152	1377.52	0.0083
100	5.64	2.10	0.89	0.0102	1077.14	0.0065
150	2.66	0.99	0.42	0.0048	649.65	0.0039
200	1.55	0.58	0.25	0.0028	438.54	0.0026
250	1.01	0.38	0.16	0.0018	319.33	0.0019
500	0.26	0.10	0.04	0.0005	113.98	0.0007
1000	0.07	0.03	0.01	0.0001	40.48	0.0002

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0898
Ann Rate [g/s]: 0.0473

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	57.90	2.74	1.17	0.0009	3794.23	0.0243
30	42.67	2.02	0.86	0.0007	3373.60	0.0216
40	27.44	1.30	0.55	0.0004	2579.42	0.0165
50	19.05	0.90	0.38	0.0003	2118.71	0.0136
60	13.97	0.66	0.28	0.0002	1819.33	0.0117
80	8.44	0.40	0.17	0.0001	1377.52	0.0088
100	5.64	0.27	0.11	0.0001	1077.14	0.0069
150	2.66	0.13	0.05	4.2E-05	649.65	0.0042
200	1.55	0.07	0.03	2.4E-05	438.54	0.0028
250	1.01	0.05	0.02	1.6E-05	319.33	0.0020
500	0.26	0.01	0.01	4.1E-06	113.98	0.0007
1000	0.07	0.00	0.00	1.1E-06	40.48	0.0003

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0315

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	57.90	3.65	1.55	0.0028	3794.23	0.0000
30	42.67	2.69	1.14	0.0021	3373.60	0.0000
40	27.44	1.73	0.74	0.0014	2579.42	0.0000
50	19.05	1.20	0.51	0.0009	2118.71	0.0000
60	13.97	0.88	0.37	0.0007	1819.33	0.0000
80	8.44	0.53	0.23	0.0004	1377.52	0.0000
100	5.64	0.36	0.15	0.0003	1077.14	0.0000
150	2.66	0.17	0.07	0.0001	649.65	0.0000
200	1.55	0.10	0.04	0.0001	438.54	0.0000
250	1.01	0.06	0.03	5.0E-05	319.33	0.0000
500	0.26	0.02	0.01	1.3E-05	113.98	0.0000
1000	0.07	0.00	0.00	3.4E-06	40.48	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	27.91	11.88	0.1080	0.0471
30	20.57	8.75	0.0796	0.0418
40	13.23	5.63	0.0512	0.0320
50	9.18	3.91	0.0355	0.0263
60	6.73	2.87	0.0261	0.0226
80	4.07	1.73	0.0157	0.0171
100	2.72	1.16	0.0105	0.0134
150	1.28	0.55	0.0050	0.0081
200	0.75	0.32	0.0029	0.0054
250	0.49	0.21	0.0019	0.0040
500	0.13	0.05	0.0005	0.0014
1000	0.03	0.01	0.0001	0.0005

Facility G-02 - 55% Perc, 43% TCE

Met Set: Mather

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	57.90	29.62	12.61	0.1434	3794.23	0.0312
30	42.67	21.83	9.29	0.1057	3373.60	0.0278
40	27.44	14.04	5.98	0.0680	2579.42	0.0212
50	19.05	9.74	4.15	0.0472	2118.71	0.0174
60	13.97	7.15	3.04	0.0346	1819.33	0.0150
80	8.44	4.32	1.84	0.0209	1377.52	0.0113
100	5.64	2.89	1.23	0.0140	1077.14	0.0089
150	2.66	1.36	0.58	0.0066	649.65	0.0053
200	1.55	0.79	0.34	0.0038	438.54	0.0036
250	1.01	0.52	0.22	0.0025	319.33	0.0026
500	0.26	0.13	0.06	0.0006	113.98	0.0009
1000	0.07	0.04	0.02	0.0002	40.48	0.0003

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	57.90	0.00	0.00	0.0000	3794.23	0.0000
30	42.67	0.00	0.00	0.0000	3373.60	0.0000
40	27.44	0.00	0.00	0.0000	2579.42	0.0000
50	19.05	0.00	0.00	0.0000	2118.71	0.0000
60	13.97	0.00	0.00	0.0000	1819.33	0.0000
80	8.44	0.00	0.00	0.0000	1377.52	0.0000
100	5.64	0.00	0.00	0.0000	1077.14	0.0000
150	2.66	0.00	0.00	0.0000	649.65	0.0000
200	1.55	0.00	0.00	0.0000	438.54	0.0000
250	1.01	0.00	0.00	0.0000	319.33	0.0000
500	0.26	0.00	0.00	0.0000	113.98	0.0000
1000	0.07	0.00	0.00	0.0000	40.48	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1288
Ann Rate [g/s]: 0.0677

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	57.90	7.84	3.34	0.0061	3794.23	0.0000
30	42.67	5.78	2.46	0.0045	3373.60	0.0000
40	27.44	3.72	1.58	0.0029	2579.42	0.0000
50	19.05	2.58	1.10	0.0020	2118.71	0.0000
60	13.97	1.89	0.81	0.0015	1819.33	0.0000
80	8.44	1.14	0.49	0.0009	1377.52	0.0000
100	5.64	0.76	0.33	0.0006	1077.14	0.0000
150	2.66	0.36	0.15	0.0003	649.65	0.0000
200	1.55	0.21	0.09	0.0002	438.54	0.0000
250	1.01	0.14	0.06	0.0001	319.33	0.0000
500	0.26	0.04	0.01	2.8E-05	113.98	0.0000
1000	0.07	0.01	0.00	7.4E-06	40.48	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	37.46	15.94	0.1496	0.0312
30	27.60	11.75	0.1102	0.0278
40	17.75	7.56	0.0709	0.0212
50	12.32	5.25	0.0492	0.0174
60	9.04	3.85	0.0361	0.0150
80	5.46	2.32	0.0218	0.0113
100	3.65	1.55	0.0146	0.0089
150	1.72	0.73	0.0069	0.0053
200	1.00	0.43	0.0040	0.0036
250	0.65	0.28	0.0026	0.0026
500	0.17	0.07	0.0007	0.0009
1000	0.05	0.02	0.0002	0.0003

Facility G-02 - 94% Perc

Met Set: Default -0

94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.2815

Ann Rate [g/s]: 0.1481

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	124.80	53.13	0.6044	5276.51	0.0743
30	117.98	103.09	43.88	0.4992	4358.64	0.0613
40	98.78	86.31	36.74	0.4180	3649.09	0.0514
50	83.77	73.20	31.16	0.3545	3094.79	0.0436
60	71.89	62.82	26.74	0.3042	2656.01	0.0374
80	54.62	47.72	20.31	0.2311	2017.70	0.0284
100	42.94	37.52	15.97	0.1817	1586.22	0.0223
150	26.25	22.94	9.76	0.1111	969.72	0.0136
200	17.86	15.61	6.64	0.0756	659.99	0.0093
250	13.05	11.40	4.85	0.0552	482.19	0.0068
500	4.69	4.10	1.75	0.0199	173.33	0.0024
1000	1.68	1.46	0.62	0.0071	61.90	0.0009

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	124.80	53.13	0.6044	0.0743
30	103.09	43.88	0.4992	0.0613
40	86.31	36.74	0.4180	0.0514
50	73.20	31.16	0.3545	0.0436
60	62.82	26.74	0.3042	0.0374
80	47.72	20.31	0.2311	0.0284
100	37.52	15.97	0.1817	0.0223
150	22.94	9.76	0.1111	0.0136
200	15.61	6.64	0.0756	0.0093
250	11.40	4.85	0.0552	0.0068
500	4.10	1.75	0.0199	0.0024
1000	1.46	0.62	0.0071	0.0009

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Facility G-02 - 55% Perc, 25% MeCl

Met Set: Default -0

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	73.06	31.10	0.3538	5276.51	0.0435
30	117.98	60.35	25.69	0.2923	4358.64	0.0359
40	98.78	50.53	21.51	0.2447	3649.09	0.0301
50	83.77	42.85	18.24	0.2075	3094.79	0.0255
60	71.89	36.78	15.65	0.1781	2656.01	0.0219
80	54.62	27.94	11.89	0.1353	2017.70	0.0166
100	42.94	21.96	9.35	0.1064	1586.22	0.0131
150	26.25	13.43	5.72	0.0650	969.72	0.0080
200	17.86	9.14	3.89	0.0443	659.99	0.0054
250	13.05	6.68	2.84	0.0323	482.19	0.0040
500	4.69	2.40	1.02	0.0116	173.33	0.0014
1000	1.68	0.86	0.36	0.0042	61.90	0.0005

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0749
Ann Rate [g/s]: 0.0394

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	5.63	2.40	0.0019	5276.51	0.0282
30	117.98	4.65	1.98	0.0015	4358.64	0.0233
40	98.78	3.89	1.66	0.0013	3649.09	0.0195
50	83.77	3.30	1.40	0.0011	3094.79	0.0166
60	71.89	2.83	1.21	0.0009	2656.01	0.0142
80	54.62	2.15	0.92	0.0007	2017.70	0.0108
100	42.94	1.69	0.72	0.0006	1586.22	0.0085
150	26.25	1.03	0.44	0.0003	969.72	0.0052
200	17.86	0.70	0.30	0.0002	659.99	0.0035
250	13.05	0.51	0.22	0.0002	482.19	0.0026
500	4.69	0.18	0.08	0.0001	173.33	0.0009
1000	1.68	0.07	0.03	2.2E-05	61.90	0.0003

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	78.69	33.50	0.3557	0.0717
30	65.00	27.67	0.2938	0.0592
40	54.42	23.16	0.2460	0.0496
50	46.15	19.65	0.2086	0.0420
60	39.61	16.86	0.1790	0.0361
80	30.09	12.81	0.1360	0.0274
100	23.66	10.07	0.1069	0.0215
150	14.46	6.16	0.0654	0.0132
200	9.84	4.19	0.0445	0.0090
250	7.19	3.06	0.0325	0.0066
500	2.58	1.10	0.0117	0.0024
1000	0.92	0.39	0.0042	0.0008

Facility G-02 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Default -0

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1198
Ann Rate [g/s]: 0.0630

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	53.09	22.60	0.2571	5276.51	0.0316
30	117.98	43.85	18.67	0.2124	4358.64	0.0261
40	98.78	36.71	15.63	0.1778	3649.09	0.0219
50	83.77	31.14	13.25	0.1508	3094.79	0.0185
60	71.89	26.72	11.38	0.1294	2656.01	0.0159
80	54.62	20.30	8.64	0.0983	2017.70	0.0121
100	42.94	15.96	6.79	0.0773	1586.22	0.0095
150	26.25	9.76	4.15	0.0472	969.72	0.0058
200	17.86	6.64	2.83	0.0322	659.99	0.0040
250	13.05	4.85	2.07	0.0235	482.19	0.0029
500	4.69	1.74	0.74	0.0084	173.33	0.0010
1000	1.68	0.62	0.27	0.0030	61.90	0.0004

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0898
Ann Rate [g/s]: 0.0473

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	6.76	2.88	0.0023	5276.51	0.0338
30	117.98	5.58	2.38	0.0019	4358.64	0.0280
40	98.78	4.67	1.99	0.0016	3649.09	0.0234
50	83.77	3.96	1.69	0.0013	3094.79	0.0199
60	71.89	3.40	1.45	0.0011	2656.01	0.0170
80	54.62	2.58	1.10	0.0009	2017.70	0.0129
100	42.94	2.03	0.86	0.0007	1586.22	0.0102
150	26.25	1.24	0.53	0.0004	969.72	0.0062
200	17.86	0.85	0.36	0.0003	659.99	0.0042
250	13.05	0.62	0.26	0.0002	482.19	0.0031
500	4.69	0.22	0.09	0.0001	173.33	0.0011
1000	1.68	0.08	0.03	2.6E-05	61.90	0.0004

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0315

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	9.00	3.83	0.0070	5276.51	0.0000
30	117.98	7.43	3.16	0.0058	4358.64	0.0000
40	98.78	6.22	2.65	0.0049	3649.09	0.0000
50	83.77	5.28	2.25	0.0041	3094.79	0.0000
60	71.89	4.53	1.93	0.0035	2656.01	0.0000
80	54.62	3.44	1.46	0.0027	2017.70	0.0000
100	42.94	2.71	1.15	0.0021	1586.22	0.0000
150	26.25	1.65	0.70	0.0013	969.72	0.0000
200	17.86	1.13	0.48	0.0009	659.99	0.0000
250	13.05	0.82	0.35	0.0006	482.19	0.0000
500	4.69	0.30	0.13	0.0002	173.33	0.0000
1000	1.68	0.11	0.04	0.0001	61.90	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	68.84	29.30	0.2664	0.0655
30	56.87	24.21	0.2200	0.0541
40	47.61	20.27	0.1842	0.0453
50	40.38	17.19	0.1562	0.0384
60	34.65	14.75	0.1341	0.0329
80	26.32	11.21	0.1019	0.0250
100	20.70	8.81	0.0801	0.0197
150	12.65	5.39	0.0490	0.0120
200	8.61	3.67	0.0333	0.0082
250	6.29	2.68	0.0243	0.0060
500	2.26	0.96	0.0088	0.0022
1000	0.81	0.34	0.0031	0.0008

361

Facility G-02 - 55% Perc, 43% TCE

Met Set: Default -0

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	73.06	31.10	0.3538	5276.51	0.0435
30	117.98	60.35	25.69	0.2923	4358.64	0.0359
40	98.78	50.53	21.51	0.2447	3649.09	0.0301
50	83.77	42.85	18.24	0.2075	3094.79	0.0255
60	71.89	36.78	15.65	0.1781	2656.01	0.0219
80	54.62	27.94	11.89	0.1353	2017.70	0.0166
100	42.94	21.96	9.35	0.1064	1586.22	0.0131
150	26.25	13.43	5.72	0.0650	969.72	0.0080
200	17.86	9.14	3.89	0.0443	659.99	0.0054
250	13.05	6.68	2.84	0.0323	482.19	0.0040
500	4.69	2.40	1.02	0.0116	173.33	0.0014
1000	1.68	0.86	0.36	0.0042	61.90	0.0005

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1288
Ann Rate [g/s]: 0.0677

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	19.34	8.23	0.0151	5276.51	0.0000
30	117.98	15.97	6.80	0.0125	4358.64	0.0000
40	98.78	13.37	5.69	0.0104	3649.09	0.0000
50	83.77	11.34	4.83	0.0089	3094.79	0.0000
60	71.89	9.73	4.14	0.0076	2656.01	0.0000
80	54.62	7.40	3.15	0.0058	2017.70	0.0000
100	42.94	5.81	2.47	0.0045	1586.22	0.0000
150	26.25	3.55	1.51	0.0028	969.72	0.0000
200	17.86	2.42	1.03	0.0019	659.99	0.0000
250	13.05	1.77	0.75	0.0014	482.19	0.0000
500	4.69	0.64	0.27	0.0005	173.33	0.0000
1000	1.68	0.23	0.10	0.0002	61.90	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	92.40	39.33	0.3689	0.0435
30	76.33	32.49	0.3047	0.0359
40	63.90	27.20	0.2551	0.0301
50	54.19	23.07	0.2164	0.0255
60	46.51	19.80	0.1857	0.0219
80	35.33	15.04	0.1411	0.0166
100	27.78	11.82	0.1109	0.0131
150	16.98	7.23	0.0678	0.0080
200	11.56	4.92	0.0461	0.0054
250	8.44	3.59	0.0337	0.0040
500	3.04	1.29	0.0121	0.0014
1000	1.08	0.46	0.0043	0.0005

Risk Asse[illegible]ent Summary - 3 Generic Facilities
Multicomponent Impacts - Brake Cleaners - Chronic/Cancer

Facility G-03 - 94% Perc

Met Set: Burbank
94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	17.91	15.65	6.66	0.0758	1344.25	0.0189
30	42.20	36.87	15.70	0.1786	1964.95	0.0277
40	35.87	31.34	13.34	0.1518	1702.10	0.0240
50	33.01	28.84	12.28	0.1397	2640.90	0.0372
60	26.91	23.51	10.01	0.1139	2498.24	0.0352
80	15.68	13.70	5.83	0.0663	1915.64	0.0270
100	10.28	8.98	3.82	0.0435	1511.07	0.0213
150	4.76	4.16	1.77	0.0201	927.46	0.0131
200	2.75	2.40	1.02	0.0116	633.44	0.0089
250	1.79	1.56	0.67	0.0076	464.37	0.0065
500	0.47	0.41	0.17	0.0020	169.00	0.0024
1000	0.12	0.10	0.04	0.0005	61.00	0.0009

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	17.91	0.00	0.00	0.0000	1344.25	0.0000
30	42.20	0.00	0.00	0.0000	1964.95	0.0000
40	35.87	0.00	0.00	0.0000	1702.10	0.0000
50	33.01	0.00	0.00	0.0000	2640.90	0.0000
60	26.91	0.00	0.00	0.0000	2498.24	0.0000
80	15.68	0.00	0.00	0.0000	1915.64	0.0000
100	10.28	0.00	0.00	0.0000	1511.07	0.0000
150	4.76	0.00	0.00	0.0000	927.46	0.0000
200	2.75	0.00	0.00	0.0000	633.44	0.0000
250	1.79	0.00	0.00	0.0000	464.37	0.0000
500	0.47	0.00	0.00	0.0000	169.00	0.0000
1000	0.12	0.00	0.00	0.0000	61.00	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	17.91	0.00	0.00	0.0000	1344.25	0.0000
30	42.20	0.00	0.00	0.0000	1964.95	0.0000
40	35.87	0.00	0.00	0.0000	1702.10	0.0000
50	33.01	0.00	0.00	0.0000	2640.90	0.0000
60	26.91	0.00	0.00	0.0000	2498.24	0.0000
80	15.68	0.00	0.00	0.0000	1915.64	0.0000
100	10.28	0.00	0.00	0.0000	1511.07	0.0000
150	4.76	0.00	0.00	0.0000	927.46	0.0000
200	2.75	0.00	0.00	0.0000	633.44	0.0000
250	1.79	0.00	0.00	0.0000	464.37	0.0000
500	0.47	0.00	0.00	0.0000	169.00	0.0000
1000	0.12	0.00	0.00	0.0000	61.00	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	15.65	6.66	0.0758	0.0189
30	36.87	15.70	0.1786	0.0277
40	31.34	13.34	0.1518	0.0240
50	28.84	12.28	0.1397	0.0372
60	23.51	10.01	0.1139	0.0352
80	13.70	5.83	0.0663	0.0270
100	8.98	3.82	0.0435	0.0213
150	4.16	1.77	0.0201	0.0131
200	2.40	1.02	0.0116	0.0089
250	1.56	0.67	0.0076	0.0065
500	0.41	0.17	0.0020	0.0024
1000	0.10	0.04	0.0005	0.0009

Facility G-03 - 55% Perc, 25% MeCl

Met Set: Burbank

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	17.91	9.16	3.90	0.0444	1344.25	0.0111
30	42.20	21.59	9.19	0.1045	1964.95	0.0162
40	35.87	18.35	7.81	0.0889	1702.10	0.0140
50	33.01	16.89	7.19	0.0818	2640.90	0.0217
60	26.91	13.77	5.86	0.0667	2498.24	0.0206
80	15.68	8.02	3.41	0.0388	1915.64	0.0158
100	10.28	5.26	2.24	0.0255	1511.07	0.0124
150	4.76	2.43	1.04	0.0118	927.46	0.0076
200	2.75	1.41	0.60	0.0068	633.44	0.0052
250	1.79	0.92	0.39	0.0044	464.37	0.0038
500	0.47	0.24	0.10	0.0012	169.00	0.0014
1000	0.12	0.06	0.03	0.0003	61.00	0.0005

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0749
Ann Rate [g/s]: 0.0394

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	17.91	0.71	0.30	0.0002	1344.25	0.0072
30	42.20	1.66	0.71	0.0006	1964.95	0.0105
40	35.87	1.41	0.60	0.0005	1702.10	0.0091
50	33.01	1.30	0.55	0.0004	2640.90	0.0141
60	26.91	1.06	0.45	0.0004	2498.24	0.0134
80	15.68	0.62	0.26	0.0002	1915.64	0.0102
100	10.28	0.41	0.17	0.0001	1511.07	0.0081
150	4.76	0.19	0.08	0.0001	927.46	0.0050
200	2.75	0.11	0.05	3.6E-05	633.44	0.0034
250	1.79	0.07	0.03	2.4E-05	464.37	0.0025
500	0.47	0.02	0.01	6.2E-06	169.00	0.0009
1000	0.12	0.00	0.00	1.6E-06	61.00	0.0003

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	17.91	0.00	0.00	0.0000	1344.25	0.0000
30	42.20	0.00	0.00	0.0000	1964.95	0.0000
40	35.87	0.00	0.00	0.0000	1702.10	0.0000
50	33.01	0.00	0.00	0.0000	2640.90	0.0000
60	26.91	0.00	0.00	0.0000	2498.24	0.0000
80	15.68	0.00	0.00	0.0000	1915.64	0.0000
100	10.28	0.00	0.00	0.0000	1511.07	0.0000
150	4.76	0.00	0.00	0.0000	927.46	0.0000
200	2.75	0.00	0.00	0.0000	633.44	0.0000
250	1.79	0.00	0.00	0.0000	464.37	0.0000
500	0.47	0.00	0.00	0.0000	169.00	0.0000
1000	0.12	0.00	0.00	0.0000	61.00	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	9.87	4.20	0.0446	0.0183
30	23.25	9.90	0.1051	0.0267
40	19.76	8.41	0.0893	0.0231
50	18.19	7.74	0.0822	0.0359
60	14.83	6.31	0.0670	0.0339
80	8.64	3.68	0.0390	0.0260
100	5.66	2.41	0.0256	0.0205
150	2.62	1.12	0.0119	0.0126
200	1.52	0.64	0.0068	0.0086
250	0.99	0.42	0.0045	0.0063
500	0.26	0.11	0.0012	0.0023
1000	0.07	0.03	0.0003	0.0008

Facility G-03 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Burbank

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1198
Ann Rate [g/s]: 0.0630

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	17.91	6.66	2.83	0.0322	1344.25	0.0081
30	42.20	15.69	6.68	0.0760	1964.95	0.0118
40	35.87	13.33	5.68	0.0646	1702.10	0.0102
50	33.01	12.27	5.22	0.0594	2640.90	0.0158
60	26.91	10.00	4.26	0.0484	2498.24	0.0150
80	15.68	5.83	2.48	0.0282	1915.64	0.0115
100	10.28	3.82	1.63	0.0185	1511.07	0.0091
150	4.76	1.77	0.75	0.0086	927.46	0.0056
200	2.75	1.02	0.44	0.0050	633.44	0.0038
250	1.79	0.67	0.28	0.0032	464.37	0.0028
500	0.47	0.17	0.07	0.0008	169.00	0.0010
1000	0.12	0.04	0.02	0.0002	61.00	0.0004

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0898
Ann Rate [g/s]: 0.0473

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	14.40	0.68	0.29	0.0002	1344.25	0.0086
30	22.00	1.04	0.44	0.0003	1964.95	0.0126
40	17.01	0.80	0.34	0.0003	1702.10	0.0109
50	14.68	0.69	0.30	0.0002	2640.90	0.0169
60	11.12	0.53	0.22	0.0002	2498.24	0.0160
80	6.47	0.31	0.13	0.0001	1915.64	0.0123
100	4.24	0.20	0.09	0.0001	1511.07	0.0097
150	1.88	0.09	0.04	3.0E-05	927.46	0.0059
200	1.05	0.05	0.02	1.7E-05	633.44	0.0041
250	0.67	0.03	0.01	1.0E-05	464.37	0.0030
500	0.17	0.01	0.00	2.8E-06	169.00	0.0011
1000	0.04	0.00	0.00	7.0E-07	61.00	0.0004

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0315

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	17.91	1.13	0.48	0.0009	1344.25	0.0000
30	42.20	2.66	1.13	0.0021	1964.95	0.0000
40	35.87	2.26	0.96	0.0018	1702.10	0.0000
50	33.01	2.08	0.89	0.0016	2640.90	0.0000
60	26.91	1.70	0.72	0.0013	2498.24	0.0000
80	15.68	0.99	0.42	0.0008	1915.64	0.0000
100	10.28	0.65	0.28	0.0005	1511.07	0.0000
150	4.76	0.30	0.13	0.0002	927.46	0.0000
200	2.75	0.17	0.07	0.0001	633.44	0.0000
250	1.79	0.11	0.05	0.0001	464.37	0.0000
500	0.47	0.03	0.01	2.3E-05	169.00	0.0000
1000	0.12	0.01	0.00	5.9E-06	61.00	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	8.47	3.60	0.0333	0.0167
30	19.38	8.25	0.0784	0.0244
40	16.40	6.98	0.0666	0.0211
50	15.04	6.40	0.0613	0.0328
60	12.22	5.20	0.0499	0.0310
80	7.12	3.03	0.0291	0.0238
100	4.67	1.99	0.0191	0.0187
150	2.16	0.92	0.0088	0.0115
200	1.25	0.53	0.0051	0.0079
250	0.81	0.34	0.0033	0.0058
500	0.21	0.09	0.0009	0.0021
1000	0.05	0.02	0.0002	0.0008

365

Facility G-03 - 55% Perc, 43% TCE

Met Set: Burbank

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	17.91	9.16	3.90	0.0444	1344.25	0.0111
30	42.20	21.59	9.19	0.1045	1964.95	0.0162
40	35.87	18.35	7.81	0.0889	1702.10	0.0140
50	33.01	16.89	7.19	0.0818	2640.90	0.0217
60	26.91	13.77	5.86	0.0667	2498.24	0.0206
80	15.68	8.02	3.41	0.0388	1915.64	0.0158
100	10.28	5.26	2.24	0.0255	1511.07	0.0124
150	4.76	2.43	1.04	0.0118	927.46	0.0076
200	2.75	1.41	0.60	0.0068	633.44	0.0052
250	1.79	0.92	0.39	0.0044	464.37	0.0038
500	0.47	0.24	0.10	0.0012	169.00	0.0014
1000	0.12	0.06	0.03	0.0003	61.00	0.0005

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	17.91	0.00	0.00	0.0000	1344.25	0.0000
30	42.20	0.00	0.00	0.0000	1964.95	0.0000
40	35.87	0.00	0.00	0.0000	1702.10	0.0000
50	33.01	0.00	0.00	0.0000	2640.90	0.0000
60	26.91	0.00	0.00	0.0000	2498.24	0.0000
80	15.68	0.00	0.00	0.0000	1915.64	0.0000
100	10.28	0.00	0.00	0.0000	1511.07	0.0000
150	4.76	0.00	0.00	0.0000	927.46	0.0000
200	2.75	0.00	0.00	0.0000	633.44	0.0000
250	1.79	0.00	0.00	0.0000	464.37	0.0000
500	0.47	0.00	0.00	0.0000	169.00	0.0000
1000	0.12	0.00	0.00	0.0000	61.00	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1288
Ann Rate [g/s]: 0.0677

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	17.91	2.43	1.03	0.0019	1344.25	0.0000
30	42.20	5.71	2.43	0.0045	1964.95	0.0000
40	35.87	4.86	2.07	0.0038	1702.10	0.0000
50	33.01	4.47	1.90	0.0035	2640.90	0.0000
60	26.91	3.64	1.55	0.0028	2498.24	0.0000
80	15.68	2.12	0.90	0.0017	1915.64	0.0000
100	10.28	1.39	0.59	0.0011	1511.07	0.0000
150	4.76	0.64	0.27	0.0005	927.46	0.0000
200	2.75	0.37	0.16	0.0003	633.44	0.0000
250	1.79	0.24	0.10	0.0002	464.37	0.0000
500	0.47	0.06	0.03	5.0E-05	169.00	0.0000
1000	0.12	0.02	0.01	1.3E-05	61.00	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	11.59	4.93	0.0463	0.0111
30	27.30	11.62	0.1090	0.0162
40	23.21	9.88	0.0926	0.0140
50	21.36	9.09	0.0853	0.0217
60	17.41	7.41	0.0695	0.0206
80	10.14	4.32	0.0405	0.0158
100	6.65	2.83	0.0266	0.0124
150	3.08	1.31	0.0123	0.0076
200	1.78	0.76	0.0071	0.0052
250	1.16	0.49	0.0046	0.0038
500	0.30	0.13	0.0012	0.0014
1000	0.08	0.03	0.0003	0.0005

Facility G-03 % Perc

Met Set: Anaheim

94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	31.15	27.22	11.59	0.1318	1343.62	0.0189
30	57.73	50.44	21.47	0.2443	1964.47	0.0276
40	44.96	39.29	16.72	0.1902	1701.54	0.0239
50	41.98	36.68	15.61	0.1776	2643.73	0.0372
60	35.48	31.00	13.20	0.1501	2497.42	0.0352
80	20.76	18.14	7.72	0.0878	1914.71	0.0269
100	13.59	11.87	5.05	0.0575	1510.10	0.0213
150	6.26	5.47	2.33	0.0265	926.57	0.0130
200	3.60	3.15	1.34	0.0152	632.67	0.0089
250	2.34	2.04	0.87	0.0099	463.72	0.0065
500	0.61	0.53	0.23	0.0026	168.65	0.0024
1000	0.16	0.14	0.06	0.0007	60.83	0.0009

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	31.15	0.00	0.00	0.0000	1343.62	0.0000
30	57.73	0.00	0.00	0.0000	1964.47	0.0000
40	44.96	0.00	0.00	0.0000	1701.54	0.0000
50	41.98	0.00	0.00	0.0000	2643.73	0.0000
60	35.48	0.00	0.00	0.0000	2497.42	0.0000
80	20.76	0.00	0.00	0.0000	1914.71	0.0000
100	13.59	0.00	0.00	0.0000	1510.10	0.0000
150	6.26	0.00	0.00	0.0000	926.57	0.0000
200	3.60	0.00	0.00	0.0000	632.67	0.0000
250	2.34	0.00	0.00	0.0000	463.72	0.0000
500	0.61	0.00	0.00	0.0000	168.65	0.0000
1000	0.16	0.00	0.00	0.0000	60.83	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	31.15	0.00	0.00	0.0000	1343.62	0.0000
30	57.73	0.00	0.00	0.0000	1964.47	0.0000
40	44.96	0.00	0.00	0.0000	1701.54	0.0000
50	41.98	0.00	0.00	0.0000	2643.73	0.0000
60	35.48	0.00	0.00	0.0000	2497.42	0.0000
80	20.76	0.00	0.00	0.0000	1914.71	0.0000
100	13.59	0.00	0.00	0.0000	1510.10	0.0000
150	6.26	0.00	0.00	0.0000	926.57	0.0000
200	3.60	0.00	0.00	0.0000	632.67	0.0000
250	2.34	0.00	0.00	0.0000	463.72	0.0000
500	0.61	0.00	0.00	0.0000	168.65	0.0000
1000	0.16	0.00	0.00	0.0000	60.83	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	27.22	11.59	0.1318	0.0189
30	50.44	21.47	0.2443	0.0276
40	39.29	16.72	0.1902	0.0239
50	36.68	15.61	0.1776	0.0372
60	31.00	13.20	0.1501	0.0352
80	18.14	7.72	0.0878	0.0269
100	11.87	5.05	0.0575	0.0213
150	5.47	2.33	0.0265	0.0130
200	3.15	1.34	0.0152	0.0089
250	2.04	0.87	0.0099	0.0065
500	0.53	0.23	0.0026	0.0024
1000	0.14	0.06	0.0007	0.0009

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Facility G-03 - 55% Perc, 25% MeCl

Met Set: Anaheim

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	31.15	15.93	6.78	0.0772	1343.62	0.0111
30	57.73	29.53	12.57	0.1430	1964.47	0.0162
40	44.96	23.00	9.79	0.1114	1701.54	0.0140
50	41.98	21.47	9.14	0.1040	2643.73	0.0218
60	35.48	18.15	7.73	0.0879	2497.42	0.0206
80	20.76	10.62	4.52	0.0514	1914.71	0.0158
100	13.59	6.95	2.96	0.0337	1510.10	0.0124
150	6.26	3.20	1.36	0.0155	926.57	0.0076
200	3.60	1.84	0.78	0.0089	632.67	0.0052
250	2.34	1.20	0.51	0.0058	463.72	0.0038
500	0.61	0.31	0.13	0.0015	168.65	0.0014
1000	0.16	0.08	0.03	0.0004	60.83	0.0005

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0749
Ann Rate [g/s]: 0.0394

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	31.15	1.23	0.52	0.0004	1343.62	0.0072
30	57.73	2.27	0.97	0.0008	1964.47	0.0105
40	44.96	1.77	0.75	0.0006	1701.54	0.0091
50	41.98	1.65	0.70	0.0006	2643.73	0.0141
60	35.48	1.40	0.60	0.0005	2497.42	0.0134
80	20.76	0.82	0.35	0.0003	1914.71	0.0102
100	13.59	0.54	0.23	0.0002	1510.10	0.0081
150	6.26	0.25	0.10	0.0001	926.57	0.0050
200	3.60	0.14	0.06	4.7E-05	632.67	0.0034
250	2.34	0.09	0.04	3.1E-05	463.72	0.0025
500	0.61	0.02	0.01	8.0E-06	168.65	0.0009
1000	0.16	0.01	0.00	2.1E-06	60.83	0.0003

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	31.15	0.00	0.00	0.0000	1343.62	0.0000
30	57.73	0.00	0.00	0.0000	1964.47	0.0000
40	44.96	0.00	0.00	0.0000	1701.54	0.0000
50	41.98	0.00	0.00	0.0000	2643.73	0.0000
60	35.48	0.00	0.00	0.0000	2497.42	0.0000
80	20.76	0.00	0.00	0.0000	1914.71	0.0000
100	13.59	0.00	0.00	0.0000	1510.10	0.0000
150	6.26	0.00	0.00	0.0000	926.57	0.0000
200	3.60	0.00	0.00	0.0000	632.67	0.0000
250	2.34	0.00	0.00	0.0000	463.72	0.0000
500	0.61	0.00	0.00	0.0000	168.65	0.0000
1000	0.16	0.00	0.00	0.0000	60.83	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	17.16	7.31	0.0776	0.0183
30	31.81	13.54	0.1438	0.0267
40	24.77	10.54	0.1120	0.0231
50	23.13	9.85	0.1045	0.0359
60	19.55	8.32	0.0884	0.0339
80	11.44	4.87	0.0517	0.0260
100	7.49	3.19	0.0338	0.0205
150	3.45	1.47	0.0156	0.0126
200	1.98	0.84	0.0090	0.0086
250	1.29	0.55	0.0058	0.0063
500	0.34	0.14	0.0015	0.0023
1000	0.09	0.04	0.0004	0.0008

Facility G-03 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Anaheim

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1198
Ann Rate [g/s]: 0.0630

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	31.15	11.58	4.93	0.0561	1343.62	0.0080
30	57.73	21.46	9.13	0.1039	1964.47	0.0118
40	44.96	16.71	7.11	0.0809	1701.54	0.0102
50	41.98	15.60	6.64	0.0756	2643.73	0.0158
60	35.48	13.19	5.61	0.0639	2497.42	0.0150
80	20.76	7.72	3.28	0.0374	1914.71	0.0115
100	13.59	5.05	2.15	0.0245	1510.10	0.0090
150	6.26	2.33	0.99	0.0113	926.57	0.0056
200	3.60	1.34	0.57	0.0065	632.67	0.0038
250	2.34	0.87	0.37	0.0042	463.72	0.0028
500	0.61	0.23	0.10	0.0011	168.65	0.0010
1000	0.16	0.06	0.03	0.0003	60.83	0.0004

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0898
Ann Rate [g/s]: 0.0473

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	31.15	1.47	0.63	0.0005	1343.62	0.0086
30	57.73	2.73	1.16	0.0009	1964.47	0.0126
40	44.96	2.13	0.91	0.0007	1701.54	0.0109
50	41.98	1.99	0.85	0.0007	2643.73	0.0170
60	35.48	1.68	0.71	0.0006	2497.42	0.0160
80	20.76	0.98	0.42	0.0003	1914.71	0.0123
100	13.59	0.64	0.27	0.0002	1510.10	0.0097
150	6.26	0.30	0.13	0.0001	926.57	0.0059
200	3.60	0.17	0.07	0.0001	632.67	0.0041
250	2.34	0.11	0.05	3.7E-05	463.72	0.0030
500	0.61	0.03	0.01	9.6E-06	168.65	0.0011
1000	0.16	0.01	0.00	2.5E-06	60.83	0.0004

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0315

Distance [m]	ISC Ann Emis.	Cancer Risk [x/million]		Harzard Index	ISC Acute Emis	Hazard Index
Center	[ug/m^3]	Resident	Worker	Chronic	[ug/m^3]	Acute
20	31.15	1.96	0.84	0.0015	1343.62	0.0000
30	57.73	3.64	1.55	0.0028	1964.47	0.0000
40	44.96	2.83	1.21	0.0022	1701.54	0.0000
50	41.98	2.64	1.13	0.0021	2643.73	0.0000
60	35.48	2.24	0.95	0.0017	2497.42	0.0000
80	20.76	1.31	0.56	0.0010	1914.71	0.0000
100	13.59	0.86	0.36	0.0007	1510.10	0.0000
150	6.26	0.39	0.17	0.0003	926.57	0.0000
200	3.60	0.23	0.10	0.0002	632.67	0.0000
250	2.34	0.15	0.06	0.0001	463.72	0.0000
500	0.61	0.04	0.02	3.0E-05	168.65	0.0000
1000	0.16	0.01	0.00	7.9E-06	60.83	0.0000

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Center	Resident	Worker	Chronic	Acute
20	15.01	6.39	0.0581	0.0167
30	27.83	11.84	0.1077	0.0244
40	21.67	9.22	0.0838	0.0211
50	20.23	8.61	0.0783	0.0328
60	17.10	7.28	0.0662	0.0310
80	10.01	4.26	0.0387	0.0238
100	6.55	2.79	0.0253	0.0187
150	3.02	1.28	0.0117	0.0115
200	1.74	0.74	0.0067	0.0078
250	1.13	0.48	0.0044	0.0058
500	0.29	0.13	0.0011	0.0021
1000	0.08	0.03	0.0003	0.0008

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Facility G-03 - 55% Perc, 43% TCE

Met Set: Anaheim

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	31.15	15.93	6.78	0.0772	1343.62	0.0111
30	57.73	29.53	12.57	0.1430	1964.47	0.0162
40	44.96	23.00	9.79	0.1114	1701.54	0.0140
50	41.98	21.47	9.14	0.1040	2643.73	0.0218
60	35.48	18.15	7.73	0.0879	2497.42	0.0206
80	20.76	10.62	4.52	0.0514	1914.71	0.0158
100	13.59	6.95	2.96	0.0337	1510.10	0.0124
150	6.26	3.20	1.36	0.0155	926.57	0.0076
200	3.60	1.84	0.78	0.0089	632.67	0.0052
250	2.34	1.20	0.51	0.0058	463.72	0.0038
500	0.61	0.31	0.13	0.0015	168.65	0.0014
1000	0.16	0.08	0.03	0.0004	60.83	0.0005

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	31.15	0.00	0.00	0.0000	1343.62	0.0000
30	57.73	0.00	0.00	0.0000	1964.47	0.0000
40	44.96	0.00	0.00	0.0000	1701.54	0.0000
50	41.98	0.00	0.00	0.0000	2643.73	0.0000
60	35.48	0.00	0.00	0.0000	2497.42	0.0000
80	20.76	0.00	0.00	0.0000	1914.71	0.0000
100	13.59	0.00	0.00	0.0000	1510.10	0.0000
150	6.26	0.00	0.00	0.0000	926.57	0.0000
200	3.60	0.00	0.00	0.0000	632.67	0.0000
250	2.34	0.00	0.00	0.0000	463.72	0.0000
500	0.61	0.00	0.00	0.0000	168.65	0.0000
1000	0.16	0.00	0.00	0.0000	60.83	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1288
Ann Rate [g/s]: 0.0677

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	31.15	4.22	1.80	0.0033	1343.62	0.0000
30	57.73	7.82	3.33	0.0061	1964.47	0.0000
40	44.96	6.09	2.59	0.0048	1701.54	0.0000
50	41.98	5.68	2.42	0.0044	2643.73	0.0000
60	35.48	4.80	2.04	0.0038	2497.42	0.0000
80	20.76	2.81	1.20	0.0022	1914.71	0.0000
100	13.59	1.84	0.78	0.0014	1510.10	0.0000
150	6.26	0.85	0.36	0.0007	926.57	0.0000
200	3.60	0.49	0.21	0.0004	632.67	0.0000
250	2.34	0.32	0.13	0.0002	463.72	0.0000
500	0.61	0.08	0.04	0.0001	168.65	0.0000
1000	0.16	0.02	0.01	1.7E-05	60.83	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	20.15	8.58	0.0805	0.0111
30	37.35	15.90	0.1491	0.0162
40	29.09	12.38	0.1161	0.0140
50	27.16	11.56	0.1084	0.0218
60	22.95	9.77	0.0916	0.0206
80	13.43	5.72	0.0536	0.0158
100	8.79	3.74	0.0351	0.0124
150	4.05	1.72	0.0162	0.0076
200	2.33	0.99	0.0093	0.0052
250	1.51	0.64	0.0060	0.0038
500	0.39	0.17	0.0016	0.0014
1000	0.10	0.04	0.0004	0.0005

Facility G-03 - 94% Perc

Met Set: Oakland

94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.2815

Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	15.58	13.61	5.80	0.0659	1242.49	0.0175
30	24.65	21.54	9.17	0.1043	1456.60	0.0205
40	18.32	16.01	6.81	0.0775	1455.87	0.0205
50	16.79	14.67	6.25	0.0710	1716.38	0.0242
60	15.06	13.16	5.60	0.0637	1622.23	0.0228
80	8.95	7.82	3.33	0.0379	1243.92	0.0175
100	5.91	5.16	2.20	0.0250	981.21	0.0138
150	2.76	2.41	1.03	0.0117	669.93	0.0094
200	1.60	1.40	0.60	0.0068	487.14	0.0069
250	1.05	0.92	0.39	0.0044	367.88	0.0052
500	0.28	0.24	0.10	0.0012	145.98	0.0021
1000	0.07	0.06	0.03	0.0003	53.80	0.0008

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	15.58	0.00	0.00	0.0000	1242.49	0.0000
30	24.65	0.00	0.00	0.0000	1456.60	0.0000
40	18.32	0.00	0.00	0.0000	1455.87	0.0000
50	16.79	0.00	0.00	0.0000	1716.38	0.0000
60	15.06	0.00	0.00	0.0000	1622.23	0.0000
80	8.95	0.00	0.00	0.0000	1243.92	0.0000
100	5.91	0.00	0.00	0.0000	981.21	0.0000
150	2.76	0.00	0.00	0.0000	669.93	0.0000
200	1.60	0.00	0.00	0.0000	487.14	0.0000
250	1.05	0.00	0.00	0.0000	367.88	0.0000
500	0.28	0.00	0.00	0.0000	145.98	0.0000
1000	0.07	0.00	0.00	0.0000	53.80	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	15.58	0.00	0.00	0.0000	1242.49	0.0000
30	24.65	0.00	0.00	0.0000	1456.60	0.0000
40	18.32	0.00	0.00	0.0000	1455.87	0.0000
50	16.79	0.00	0.00	0.0000	1716.38	0.0000
60	15.06	0.00	0.00	0.0000	1622.23	0.0000
80	8.95	0.00	0.00	0.0000	1243.92	0.0000
100	5.91	0.00	0.00	0.0000	981.21	0.0000
150	2.76	0.00	0.00	0.0000	669.93	0.0000
200	1.60	0.00	0.00	0.0000	487.14	0.0000
250	1.05	0.00	0.00	0.0000	367.88	0.0000
500	0.28	0.00	0.00	0.0000	145.98	0.0000
1000	0.07	0.00	0.00	0.0000	53.80	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	13.61	5.80	0.0659	0.0175
30	21.54	9.17	0.1043	0.0205
40	16.01	6.81	0.0775	0.0205
50	14.67	6.25	0.0710	0.0242
60	13.16	5.60	0.0637	0.0228
80	7.82	3.33	0.0379	0.0175
100	5.16	2.20	0.0250	0.0138
150	2.41	1.03	0.0117	0.0094
200	1.40	0.60	0.0068	0.0069
250	0.92	0.39	0.0044	0.0052
500	0.24	0.10	0.0012	0.0021
1000	0.06	0.03	0.0003	0.0008

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Facility G-03 - 55% Perc, 25% MeCl

Met Set: Oakland

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	15.58	7.97	3.39	0.0659	1242.49	0.0102
30	24.65	12.61	5.37	0.1043	1456.60	0.0120
40	18.32	9.37	3.99	0.0775	1455.87	0.0120
50	16.79	8.59	3.66	0.0710	1716.38	0.0141
60	15.06	7.70	3.28	0.0637	1622.23	0.0134
80	8.95	4.58	1.95	0.0379	1243.92	0.0102
100	5.91	3.02	1.29	0.0250	981.21	0.0081
150	2.76	1.41	0.60	0.0117	669.93	0.0055
200	1.60	0.82	0.35	0.0068	487.14	0.0040
250	1.05	0.54	0.23	0.0044	367.88	0.0030
500	0.28	0.14	0.06	0.0012	145.98	0.0012
1000	0.07	0.04	0.02	0.0003	53.80	0.0004

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0749
Ann Rate [g/s]: 0.0394

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	15.58	0.61	0.26	0.0002	1242.49	0.0066
30	24.65	0.97	0.41	0.0003	1456.60	0.0078
40	18.32	0.72	0.31	0.0002	1455.87	0.0078
50	16.79	0.66	0.28	0.0002	1716.38	0.0092
60	15.06	0.59	0.25	0.0002	1622.23	0.0087
80	8.95	0.35	0.15	0.0001	1243.92	0.0067
100	5.91	0.23	0.10	0.0001	981.21	0.0052
150	2.76	0.11	0.05	3.6E-05	669.93	0.0036
200	1.60	0.06	0.03	2.1E-05	487.14	0.0026
250	1.05	0.04	0.02	1.4E-05	367.88	0.0020
500	0.28	0.01	0.00	3.7E-06	145.98	0.0008
1000	0.07	0.00	0.00	9.2E-07	53.80	0.0003

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	15.58	0.00	0.00	0.0000	1242.49	0.0000
30	24.65	0.00	0.00	0.0000	1456.60	0.0000
40	18.32	0.00	0.00	0.0000	1455.87	0.0000
50	16.79	0.00	0.00	0.0000	1716.38	0.0000
60	15.06	0.00	0.00	0.0000	1622.23	0.0000
80	8.95	0.00	0.00	0.0000	1243.92	0.0000
100	5.91	0.00	0.00	0.0000	981.21	0.0000
150	2.76	0.00	0.00	0.0000	669.93	0.0000
200	1.60	0.00	0.00	0.0000	487.14	0.0000
250	1.05	0.00	0.00	0.0000	367.88	0.0000
500	0.28	0.00	0.00	0.0000	145.98	0.0000
1000	0.07	0.00	0.00	0.0000	53.80	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	8.58	3.65	0.0661	0.0169
30	13.58	5.78	0.1046	0.0198
40	10.09	4.30	0.0778	0.0198
50	9.25	3.94	0.0713	0.0233
60	8.30	3.53	0.0639	0.0220
80	4.93	2.10	0.0380	0.0169
100	3.26	1.39	0.0251	0.0133
150	1.52	0.65	0.0117	0.0091
200	0.88	0.38	0.0068	0.0066
250	0.58	0.25	0.0045	0.0050
500	0.15	0.07	0.0012	0.0020
1000	0.04	0.02	0.0003	0.0007

Facility G-03 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Oakland

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1198
Ann Rate [g/s]: 0.0630

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	15.58	5.79	2.47	0.0280	1242.49	0.0074
30	24.65	9.16	3.90	0.0444	1456.60	0.0087
40	18.32	6.81	2.90	0.0330	1455.87	0.0087
50	16.79	6.24	2.66	0.0302	1716.38	0.0103
60	15.06	5.60	2.38	0.0271	1622.23	0.0097
80	8.95	3.33	1.42	0.0161	1243.92	0.0075
100	5.91	2.20	0.94	0.0106	981.21	0.0059
150	2.76	1.03	0.44	0.0050	669.93	0.0040
200	1.60	0.59	0.25	0.0029	487.14	0.0029
250	1.05	0.39	0.17	0.0019	367.88	0.0022
500	0.28	0.10	0.04	0.0005	145.98	0.0009
1000	0.07	0.03	0.01	0.0001	53.80	0.0003

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0898
Ann Rate [g/s]: 0.0473

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	15.58	0.74	0.31	0.0002	1242.49	0.0080
30	24.65	1.17	0.50	0.0004	1456.60	0.0093
40	18.32	0.87	0.37	0.0003	1455.87	0.0093
50	16.79	0.79	0.34	0.0003	1716.38	0.0110
60	15.06	0.71	0.30	0.0002	1622.23	0.0104
80	8.95	0.42	0.18	0.0001	1243.92	0.0080
100	5.91	0.28	0.12	0.0001	981.21	0.0063
150	2.76	0.13	0.06	4.4E-05	669.93	0.0043
200	1.60	0.08	0.03	2.5E-05	487.14	0.0031
250	1.05	0.05	0.02	1.7E-05	367.88	0.0024
500	0.28	0.01	0.01	4.4E-06	145.98	0.0009
1000	0.07	0.00	0.00	1.1E-06	53.80	0.0003

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0315

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	15.58	0.98	0.42	0.0008	1242.49	0.0000
30	24.65	1.55	0.66	0.0012	1456.60	0.0000
40	18.32	1.15	0.49	0.0009	1455.87	0.0000
50	16.79	1.06	0.45	0.0008	1716.38	0.0000
60	15.06	0.95	0.40	0.0007	1622.23	0.0000
80	8.95	0.56	0.24	0.0004	1243.92	0.0000
100	5.91	0.37	0.16	0.0003	981.21	0.0000
150	2.76	0.17	0.07	0.0001	669.93	0.0000
200	1.60	0.10	0.04	0.0001	487.14	0.0000
250	1.05	0.07	0.03	0.0001	367.88	0.0000
500	0.28	0.02	0.01	1.4E-05	145.98	0.0000
1000	0.07	0.00	0.00	3.4E-06	53.80	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	7.51	3.20	0.0291	0.0154
30	11.88	5.06	0.0460	0.0181
40	8.83	3.76	0.0342	0.0181
50	8.09	3.44	0.0313	0.0213
60	7.26	3.09	0.0281	0.0201
80	4.31	1.84	0.0167	0.0154
100	2.85	1.21	0.0110	0.0122
150	1.33	0.57	0.0051	0.0083
200	0.77	0.33	0.0030	0.0060
250	0.51	0.22	0.0020	0.0046
500	0.13	0.06	0.0005	0.0018
1000	0.03	0.01	0.0001	0.0007

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Facility G-03 - 55% Perc, 43% TCE

Met Set: Oakland

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	15.58	7.97	3.39	0.0386	1242.49	0.0102
30	24.65	12.61	5.37	0.0611	1456.60	0.0120
40	18.32	9.37	3.99	0.0454	1455.87	0.0120
50	16.79	8.59	3.66	0.0416	1716.38	0.0141
60	15.06	7.70	3.28	0.0373	1622.23	0.0134
80	8.95	4.58	1.95	0.0222	1243.92	0.0102
100	5.91	3.02	1.29	0.0146	981.21	0.0081
150	2.76	1.41	0.60	0.0068	669.93	0.0055
200	1.60	0.82	0.35	0.0040	487.14	0.0040
250	1.05	0.54	0.23	0.0026	367.88	0.0030
500	0.28	0.14	0.06	0.0007	145.98	0.0012
1000	0.07	0.04	0.02	0.0002	53.80	0.0004

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	15.58	0.00	0.00	0.0000	1242.49	0.0000
30	24.65	0.00	0.00	0.0000	1456.60	0.0000
40	18.32	0.00	0.00	0.0000	1455.87	0.0000
50	16.79	0.00	0.00	0.0000	1716.38	0.0000
60	15.06	0.00	0.00	0.0000	1622.23	0.0000
80	8.95	0.00	0.00	0.0000	1243.92	0.0000
100	5.91	0.00	0.00	0.0000	981.21	0.0000
150	2.76	0.00	0.00	0.0000	669.93	0.0000
200	1.60	0.00	0.00	0.0000	487.14	0.0000
250	1.05	0.00	0.00	0.0000	367.88	0.0000
500	0.28	0.00	0.00	0.0000	145.98	0.0000
1000	0.07	0.00	0.00	0.0000	53.80	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1288
Ann Rate [g/s]: 0.0677

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	15.58	2.11	0.90	0.0016	1242.49	0.0000
30	24.65	3.34	1.42	0.0026	1456.60	0.0000
40	18.32	2.48	1.06	0.0019	1455.87	0.0000
50	16.79	2.27	0.97	0.0018	1716.38	0.0000
60	15.06	2.04	0.87	0.0016	1622.23	0.0000
80	8.95	1.21	0.52	0.0009	1243.92	0.0000
100	5.91	0.80	0.34	0.0006	981.21	0.0000
150	2.76	0.37	0.16	0.0003	669.93	0.0000
200	1.60	0.22	0.09	0.0002	487.14	0.0000
250	1.05	0.14	0.06	0.0001	367.88	0.0000
500	0.28	0.04	0.02	3.0E-05	145.98	0.0000
1000	0.07	0.01	0.00	7.4E-06	53.80	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	10.08	4.29	0.0402	0.0102
30	15.95	6.79	0.0637	0.0120
40	11.85	5.05	0.0473	0.0120
50	10.86	4.62	0.0434	0.0141
60	9.74	4.15	0.0389	0.0134
80	5.79	2.46	0.0231	0.0102
100	3.82	1.63	0.0153	0.0081
150	1.79	0.76	0.0071	0.0055
200	1.04	0.44	0.0041	0.0040
250	0.68	0.29	0.0027	0.0030
500	0.18	0.08	0.0007	0.0012
1000	0.05	0.02	0.0002	0.0004

Facility G-03 - 94% Perc

Met Set: Default -0

94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.2815

Ann Rate [g/s]: 0.1481

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	64.92	27.64	0.3144	2744.96	0.0386
30	64.57	56.42	24.02	0.2732	2385.45	0.0336
40	56.52	49.39	21.02	0.2392	2088.05	0.0294
50	49.84	43.55	18.54	0.2109	1841.40	0.0259
60	44.27	38.69	16.47	0.1873	1635.59	0.0230
80	35.62	31.13	13.25	0.1507	1315.96	0.0185
100	29.32	25.62	10.90	0.1241	1083.10	0.0152
150	19.45	17.00	7.24	0.0823	718.69	0.0101
200	13.97	12.21	5.20	0.0591	516.25	0.0073
250	10.61	9.27	3.94	0.0449	391.81	0.0055
500	4.18	3.66	1.56	0.0177	154.56	0.0022
1000	1.58	1.38	0.59	0.0067	58.40	0.0008

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	64.92	27.64	0.3144	0.0386
30	56.42	24.02	0.2732	0.0336
40	49.39	21.02	0.2392	0.0294
50	43.55	18.54	0.2109	0.0259
60	38.69	16.47	0.1873	0.0230
80	31.13	13.25	0.1507	0.0185
100	25.62	10.90	0.1241	0.0152
150	17.00	7.24	0.0823	0.0101
200	12.21	5.20	0.0591	0.0073
250	9.27	3.94	0.0449	0.0055
500	3.66	1.56	0.0177	0.0022
1000	1.38	0.59	0.0067	0.0008

375

Facility G-03 - 55% Perc, 25% MeCl

Met Set: Default -0

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	38.01	16.18	0.1841	2744.96	0.0226
30	64.57	33.03	14.06	0.1600	2385.45	0.0196
40	56.52	28.91	12.31	0.1400	2088.05	0.0172
50	49.84	25.50	10.85	0.1235	1841.40	0.0152
60	44.27	22.65	9.64	0.1097	1635.59	0.0135
80	35.62	18.22	7.76	0.0882	1315.96	0.0108
100	29.32	15.00	6.38	0.0726	1083.10	0.0089
150	19.45	9.95	4.24	0.0482	718.69	0.0059
200	13.97	7.15	3.04	0.0346	516.25	0.0043
250	10.61	5.43	2.31	0.0263	391.81	0.0032
500	4.18	2.14	0.91	0.0104	154.56	0.0013
1000	1.58	0.81	0.34	0.0039	58.40	0.0005

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0749
Ann Rate [g/s]: 0.0394

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	2.93	1.25	0.0010	2744.96	0.0147
30	64.57	2.54	1.08	0.0008	2385.45	0.0128
40	56.52	2.23	0.95	0.0007	2088.05	0.0112
50	49.84	1.96	0.84	0.0007	1841.40	0.0099
60	44.27	1.74	0.74	0.0006	1635.59	0.0088
80	35.62	1.40	0.60	0.0005	1315.96	0.0070
100	29.32	1.16	0.49	0.0004	1083.10	0.0058
150	19.45	0.77	0.33	0.0003	718.69	0.0038
200	13.97	0.55	0.23	0.0002	516.25	0.0028
250	10.61	0.42	0.18	0.0001	391.81	0.0021
500	4.18	0.16	0.07	0.0001	154.56	0.0008
1000	1.58	0.06	0.03	2.1E-05	58.40	0.0003

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	40.94	17.43	0.1850	0.0373
30	35.57	15.14	0.1608	0.0324
40	31.14	13.26	0.1408	0.0284
50	27.46	11.69	0.1241	0.0250
60	24.39	10.38	0.1103	0.0222
80	19.62	8.35	0.0887	0.0179
100	16.15	6.88	0.0730	0.0147
150	10.72	4.56	0.0484	0.0098
200	7.70	3.28	0.0348	0.0070
250	5.84	2.49	0.0264	0.0053
500	2.30	0.98	0.0104	0.0021
1000	0.87	0.37	0.0039	0.0008

Facility G-03 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Default -0

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1198
Ann Rate [g/s]: 0.0630

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	27.62	11.76	0.1337	2744.96	0.0164
30	64.57	24.00	10.22	0.1162	2385.45	0.0143
40	56.52	21.01	8.94	0.1017	2088.05	0.0125
50	49.84	18.53	7.89	0.0897	1841.40	0.0110
60	44.27	16.46	7.01	0.0797	1635.59	0.0098
80	35.62	13.24	5.64	0.0641	1315.96	0.0079
100	29.32	10.90	4.64	0.0528	1083.10	0.0065
150	19.45	7.23	3.08	0.0350	718.69	0.0043
200	13.97	5.19	2.21	0.0252	516.25	0.0031
250	10.61	3.94	1.68	0.0191	391.81	0.0023
500	4.18	1.56	0.66	0.0075	154.56	0.0009
1000	1.58	0.59	0.25	0.0028	58.40	0.0003

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0898
Ann Rate [g/s]: 0.0473

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	3.51	1.50	0.0012	2744.96	0.0176
30	64.57	3.05	1.30	0.0010	2385.45	0.0153
40	56.52	2.67	1.14	0.0009	2088.05	0.0134
50	49.84	2.36	1.00	0.0008	1841.40	0.0118
60	44.27	2.09	0.89	0.0007	1635.59	0.0105
80	35.62	1.68	0.72	0.0006	1315.96	0.0084
100	29.32	1.39	0.59	0.0005	1083.10	0.0069
150	19.45	0.92	0.39	0.0003	718.69	0.0046
200	13.97	0.66	0.28	0.0002	516.25	0.0033
250	10.61	0.50	0.21	0.0002	391.81	0.0025
500	4.18	0.20	0.08	0.0001	154.56	0.0010
1000	1.58	0.07	0.03	2.5E-05	58.40	0.0004

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0315

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	4.68	1.99	0.0037	2744.96	0.0000
30	64.57	4.07	1.73	0.0032	2385.45	0.0000
40	56.52	3.56	1.52	0.0028	2088.05	0.0000
50	49.84	3.14	1.34	0.0025	1841.40	0.0000
60	44.27	2.79	1.19	0.0022	1635.59	0.0000
80	35.62	2.24	0.96	0.0018	1315.96	0.0000
100	29.32	1.85	0.79	0.0014	1083.10	0.0000
150	19.45	1.23	0.52	0.0010	718.69	0.0000
200	13.97	0.88	0.37	0.0007	516.25	0.0000
250	10.61	0.67	0.28	0.0005	391.81	0.0000
500	4.18	0.26	0.11	0.0002	154.56	0.0000
1000	1.58	0.10	0.04	0.0001	58.40	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	35.81	15.25	0.1386	0.0340
30	31.12	13.25	0.1204	0.0296
40	27.24	11.60	0.1054	0.0259
50	24.02	10.23	0.0930	0.0228
60	21.34	9.08	0.0826	0.0203
80	17.17	7.31	0.0664	0.0163
100	14.13	6.02	0.0547	0.0134
150	9.38	3.99	0.0363	0.0089
200	6.74	2.87	0.0261	0.0064
250	5.11	2.18	0.0198	0.0049
500	2.02	0.86	0.0078	0.0019
1000	0.76	0.32	0.0029	0.0007

377

Facility G-03 - 55% Perc, 43% TCE

Met Set: Default -0

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	38.01	16.18	0.1841	2744.96	0.0226
30	64.57	33.03	14.06	0.1600	2385.45	0.0196
40	56.52	28.91	12.31	0.1400	2088.05	0.0172
50	49.84	25.50	10.85	0.1235	1841.40	0.0152
60	44.27	22.65	9.64	0.1097	1635.59	0.0135
80	35.62	18.22	7.76	0.0882	1315.96	0.0108
100	29.32	15.00	6.38	0.0726	1083.10	0.0089
150	19.45	9.95	4.24	0.0482	718.69	0.0059
200	13.97	7.15	3.04	0.0346	516.25	0.0043
250	10.61	5.43	2.31	0.0263	391.81	0.0032
500	4.18	2.14	0.91	0.0104	154.56	0.0013
1000	1.58	0.81	0.34	0.0039	58.40	0.0005

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1288
Ann Rate [g/s]: 0.0677

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	10.06	4.28	0.0079	2744.96	0.0000
30	64.57	8.74	3.72	0.0068	2385.45	0.0000
40	56.52	7.65	3.26	0.0060	2088.05	0.0000
50	49.84	6.75	2.87	0.0053	1841.40	0.0000
60	44.27	5.99	2.55	0.0047	1635.59	0.0000
80	35.62	4.82	2.05	0.0038	1315.96	0.0000
100	29.32	3.97	1.69	0.0031	1083.10	0.0000
150	19.45	2.63	1.12	0.0021	718.69	0.0000
200	13.97	1.89	0.81	0.0015	516.25	0.0000
250	10.61	1.44	0.61	0.0011	391.81	0.0000
500	4.18	0.57	0.24	0.0004	154.56	0.0000
1000	1.58	0.21	0.09	0.0002	58.40	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	48.07	20.46	0.1919	0.0226
30	41.77	17.78	0.1668	0.0196
40	36.56	15.56	0.1460	0.0172
50	32.25	13.73	0.1287	0.0152
60	28.64	12.19	0.1144	0.0135
80	23.04	9.81	0.0920	0.0108
100	18.97	8.07	0.0757	0.0089
150	12.59	5.36	0.0502	0.0059
200	9.04	3.85	0.0361	0.0043
250	6.86	2.92	0.0274	0.0032
500	2.71	1.15	0.0108	0.0013
1000	1.02	0.44	0.0041	0.0005

Risk Asse ent Summary - 3 Generic Facilities
Multicomponent Impacts - Brake Cleaners - Acute

Facility G-03 - 94% Perc

Met Set: Fresno

94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.2815
Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	20.09	17.55	7.47	0.0850	1266.24	0.0178
30	34.50	30.15	12.83	0.1460	1668.13	0.0235
40	26.10	22.81	9.71	0.1104	1472.59	0.0207
50	24.31	21.24	9.04	0.1029	1934.45	0.0272
60	20.92	18.28	7.78	0.0885	1746.52	0.0246
80	12.26	10.71	4.56	0.0519	1403.39	0.0198
100	8.02	7.01	2.98	0.0339	1167.81	0.0164
150	3.69	3.22	1.37	0.0156	760.67	0.0107
200	2.12	1.85	0.79	0.0090	527.81	0.0074
250	1.37	1.20	0.51	0.0058	395.54	0.0056
500	0.35	0.31	0.13	0.0015	151.49	0.0021
1000	0.09	0.08	0.03	0.0004	55.11	0.0008

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	20.09	0.00	0.00	0.0000	1266.24	0.0000
30	34.50	0.00	0.00	0.0000	1668.13	0.0000
40	26.10	0.00	0.00	0.0000	1472.59	0.0000
50	24.31	0.00	0.00	0.0000	1934.45	0.0000
60	20.92	0.00	0.00	0.0000	1746.52	0.0000
80	12.26	0.00	0.00	0.0000	1403.39	0.0000
100	8.02	0.00	0.00	0.0000	1167.81	0.0000
150	3.69	0.00	0.00	0.0000	760.67	0.0000
200	2.12	0.00	0.00	0.0000	527.81	0.0000
250	1.37	0.00	0.00	0.0000	395.54	0.0000
500	0.35	0.00	0.00	0.0000	151.49	0.0000
1000	0.09	0.00	0.00	0.0000	55.11	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	20.09	0.00	0.00	0.0000	1266.24	0.0000
30	34.50	0.00	0.00	0.0000	1668.13	0.0000
40	26.10	0.00	0.00	0.0000	1472.59	0.0000
50	24.31	0.00	0.00	0.0000	1934.45	0.0000
60	20.92	0.00	0.00	0.0000	1746.52	0.0000
80	12.26	0.00	0.00	0.0000	1403.39	0.0000
100	8.02	0.00	0.00	0.0000	1167.81	0.0000
150	3.69	0.00	0.00	0.0000	760.67	0.0000
200	2.12	0.00	0.00	0.0000	527.81	0.0000
250	1.37	0.00	0.00	0.0000	395.54	0.0000
500	0.35	0.00	0.00	0.0000	151.49	0.0000
1000	0.09	0.00	0.00	0.0000	55.11	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	17.55	7.47	0.0850	0.0178
30	30.15	12.83	0.1460	0.0235
40	22.81	9.71	0.1104	0.0207
50	21.24	9.04	0.1029	0.0272
60	18.28	7.78	0.0885	0.0246
80	10.71	4.56	0.0519	0.0198
100	7.01	2.98	0.0339	0.0164
150	3.22	1.37	0.0156	0.0107
200	1.85	0.79	0.0090	0.0074
250	1.20	0.51	0.0058	0.0056
500	0.31	0.13	0.0015	0.0021
1000	0.08	0.03	0.0004	0.0008

Facility G-03 - 55% Perc, 25% MeCl

Met Set: Fresno

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647

Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	20.09	10.28	4.37	0.0498	1266.24	0.0104
30	34.50	17.65	7.51	0.0855	1668.13	0.0137
40	26.10	13.35	5.68	0.0647	1472.59	0.0121
50	24.31	12.44	5.29	0.0602	1934.45	0.0159
60	20.92	10.70	4.56	0.0518	1746.52	0.0144
80	12.26	6.27	2.67	0.0304	1403.39	0.0116
100	8.02	4.10	1.75	0.0199	1167.81	0.0096
150	3.69	1.89	0.80	0.0091	760.67	0.0063
200	2.12	1.08	0.46	0.0053	527.81	0.0043
250	1.37	0.70	0.30	0.0034	395.54	0.0033
500	0.35	0.18	0.08	0.0009	151.49	0.0012
1000	0.09	0.05	0.02	0.0002	55.11	0.0005

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0749

Ann Rate [g/s]: 0.0394

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	20.09	0.79	0.34	0.0003	1266.24	0.0068
30	34.50	1.36	0.58	0.0005	1668.13	0.0089
40	26.10	1.03	0.44	0.0003	1472.59	0.0079
50	24.31	0.96	0.41	0.0003	1934.45	0.0103
60	20.92	0.82	0.35	0.0003	1746.52	0.0093
80	12.26	0.48	0.21	0.0002	1403.39	0.0075
100	8.02	0.32	0.13	0.0001	1167.81	0.0062
150	3.69	0.15	0.06	4.8E-05	760.67	0.0041
200	2.12	0.08	0.04	2.8E-05	527.81	0.0028
250	1.37	0.05	0.02	1.8E-05	395.54	0.0021
500	0.35	0.01	0.01	4.6E-06	151.49	0.0008
1000	0.09	0.00	0.00	1.2E-06	55.11	0.0003

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	20.09	0.00	0.00	0.0000	1266.24	0.0000
30	34.50	0.00	0.00	0.0000	1668.13	0.0000
40	26.10	0.00	0.00	0.0000	1472.59	0.0000
50	24.31	0.00	0.00	0.0000	1934.45	0.0000
60	20.92	0.00	0.00	0.0000	1746.52	0.0000
80	12.26	0.00	0.00	0.0000	1403.39	0.0000
100	8.02	0.00	0.00	0.0000	1167.81	0.0000
150	3.69	0.00	0.00	0.0000	760.67	0.0000
200	2.12	0.00	0.00	0.0000	527.81	0.0000
250	1.37	0.00	0.00	0.0000	395.54	0.0000
500	0.35	0.00	0.00	0.0000	151.49	0.0000
1000	0.09	0.00	0.00	0.0000	55.11	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	11.07	4.71	0.0500	0.0172
30	19.01	8.09	0.0859	0.0227
40	14.38	6.12	0.0650	0.0200
50	13.39	5.70	0.0605	0.0263
60	11.53	4.91	0.0521	0.0237
80	6.75	2.88	0.0305	0.0191
100	4.42	1.88	0.0200	0.0159
150	2.03	0.87	0.0092	0.0103
200	1.17	0.50	0.0053	0.0072
250	0.75	0.32	0.0034	0.0054
500	0.19	0.08	0.0009	0.0021
1000	0.05	0.02	0.0002	0.0007

Facility G-03 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Fresno

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1198
Ann Rate [g/s]: 0.0630

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	20.09	7.47	3.18	0.0362	1266.24	0.0076
30	34.50	12.82	5.46	0.0621	1668.13	0.0100
40	26.10	9.70	4.13	0.0470	1472.59	0.0088
50	24.31	9.04	3.85	0.0438	1934.45	0.0116
60	20.92	7.78	3.31	0.0377	1746.52	0.0105
80	12.26	4.56	1.94	0.0221	1403.39	0.0084
100	8.02	2.98	1.27	0.0144	1167.81	0.0070
150	3.69	1.37	0.58	0.0066	760.67	0.0046
200	2.12	0.79	0.34	0.0038	527.81	0.0032
250	1.37	0.51	0.22	0.0025	395.54	0.0024
500	0.35	0.13	0.06	0.0006	151.49	0.0009
1000	0.09	0.03	0.01	0.0002	55.11	0.0003

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0898
Ann Rate [g/s]: 0.0473

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	20.09	0.95	0.40	0.0003	1266.24	0.0081
30	34.50	1.63	0.69	0.0005	1668.13	0.0107
40	26.10	1.23	0.53	0.0004	1472.59	0.0094
50	24.31	1.15	0.49	0.0004	1934.45	0.0124
60	20.92	0.99	0.42	0.0003	1746.52	0.0112
80	12.26	0.58	0.25	0.0002	1403.39	0.0090
100	8.02	0.38	0.16	0.0001	1167.81	0.0075
150	3.69	0.17	0.07	0.0001	760.67	0.0049
200	2.12	0.10	0.04	3.3E-05	527.81	0.0034
250	1.37	0.06	0.03	2.2E-05	395.54	0.0025
500	0.35	0.02	0.01	5.5E-06	151.49	0.0010
1000	0.09	0.00	0.00	1.4E-06	55.11	0.0004

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0315

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	20.09	1.27	0.54	0.0010	1266.24	0.0000
30	34.50	2.17	0.93	0.0017	1668.13	0.0000
40	26.10	1.64	0.70	0.0013	1472.59	0.0000
50	24.31	1.53	0.65	0.0012	1934.45	0.0000
60	20.92	1.32	0.56	0.0010	1746.52	0.0000
80	12.26	0.77	0.33	0.0006	1403.39	0.0000
100	8.02	0.51	0.22	0.0004	1167.81	0.0000
150	3.69	0.23	0.10	0.0002	760.67	0.0000
200	2.12	0.13	0.06	0.0001	527.81	0.0000
250	1.37	0.09	0.04	0.0001	395.54	0.0000
500	0.35	0.02	0.01	1.7E-05	151.49	0.0000
1000	0.09	0.01	0.00	4.4E-06	55.11	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	9.68	4.12	0.0375	0.0157
30	16.63	7.08	0.0643	0.0207
40	12.58	5.36	0.0487	0.0183
50	11.72	4.99	0.0453	0.0240
60	10.08	4.29	0.0390	0.0217
80	5.91	2.52	0.0229	0.0174
100	3.87	1.65	0.0150	0.0145
150	1.78	0.76	0.0069	0.0094
200	1.02	0.43	0.0040	0.0065
250	0.66	0.28	0.0026	0.0049
500	0.17	0.07	0.0007	0.0019
1000	0.04	0.02	0.0002	0.0007

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Facility G-03 - 55% Perc, 43% TCE

Met Set: Fresno

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	20.09	10.28	4.37	0.0498	1266.24	0.0104
30	34.50	17.65	7.51	0.0855	1668.13	0.0137
40	26.10	13.35	5.68	0.0647	1472.59	0.0121
50	24.31	12.44	5.29	0.0602	1934.45	0.0159
60	20.92	10.70	4.56	0.0518	1746.52	0.0144
80	12.26	6.27	2.67	0.0304	1403.39	0.0116
100	8.02	4.10	1.75	0.0199	1167.81	0.0096
150	3.69	1.89	0.80	0.0091	760.67	0.0063
200	2.12	1.08	0.46	0.0053	527.81	0.0043
250	1.37	0.70	0.30	0.0034	395.54	0.0033
500	0.35	0.18	0.08	0.0009	151.49	0.0012
1000	0.09	0.05	0.02	0.0002	55.11	0.0005

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	20.09	0.00	0.00	0.0000	1266.24	0.0000
30	34.50	0.00	0.00	0.0000	1668.13	0.0000
40	26.10	0.00	0.00	0.0000	1472.59	0.0000
50	24.31	0.00	0.00	0.0000	1934.45	0.0000
60	20.92	0.00	0.00	0.0000	1746.52	0.0000
80	12.26	0.00	0.00	0.0000	1403.39	0.0000
100	8.02	0.00	0.00	0.0000	1167.81	0.0000
150	3.69	0.00	0.00	0.0000	760.67	0.0000
200	2.12	0.00	0.00	0.0000	527.81	0.0000
250	1.37	0.00	0.00	0.0000	395.54	0.0000
500	0.35	0.00	0.00	0.0000	151.49	0.0000
1000	0.09	0.00	0.00	0.0000	55.11	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1288
Ann Rate [g/s]: 0.0677

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	20.09	2.72	1.16	0.0021	1266.24	0.0000
30	34.50	4.67	1.99	0.0036	1668.13	0.0000
40	26.10	3.53	1.50	0.0028	1472.59	0.0000
50	24.31	3.29	1.40	0.0026	1934.45	0.0000
60	20.92	2.83	1.21	0.0022	1746.52	0.0000
80	12.26	1.66	0.71	0.0013	1403.39	0.0000
100	8.02	1.09	0.46	0.0008	1167.81	0.0000
150	3.69	0.50	0.21	0.0004	760.67	0.0000
200	2.12	0.29	0.12	0.0002	527.81	0.0000
250	1.37	0.19	0.08	0.0001	395.54	0.0000
500	0.35	0.05	0.02	3.7E-05	151.49	0.0000
1000	0.09	0.01	0.01	9.5E-06	55.11	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	13.00	5.53	0.0519	0.0104
30	22.32	9.50	0.0891	0.0137
40	16.88	7.19	0.0674	0.0121
50	15.73	6.69	0.0628	0.0159
60	13.53	5.76	0.0540	0.0144
80	7.93	3.38	0.0317	0.0116
100	5.19	2.21	0.0207	0.0096
150	2.39	1.02	0.0095	0.0063
200	1.37	0.58	0.0055	0.0043
250	0.89	0.38	0.0035	0.0033
500	0.23	0.10	0.0009	0.0012
1000	0.06	0.02	0.0002	0.0005

Facility G-03 - 94% Perc

Met Set: Concord

94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.2815

Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	18.28	15.97	6.80	0.0774	1344.83	0.0189
30	41.78	36.51	15.54	0.1768	1964.95	0.0277
40	35.45	30.98	13.19	0.1500	1702.10	0.0240
50	32.92	28.77	12.24	0.1393	2643.95	0.0372
60	26.78	23.40	9.96	0.1133	2498.24	0.0352
80	15.70	13.72	5.84	0.0664	1915.64	0.0270
100	10.33	9.03	3.84	0.0437	1511.07	0.0213
150	4.82	4.21	1.79	0.0204	927.46	0.0131
200	2.79	2.44	1.04	0.0118	633.44	0.0089
250	1.83	1.60	0.68	0.0077	464.37	0.0065
500	0.48	0.42	0.18	0.0020	169.00	0.0024
1000	0.14	0.12	0.05	0.0006	61.00	0.0009

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	18.28	0.00	0.00	0.0000	1344.83	0.0000
30	41.78	0.00	0.00	0.0000	1964.95	0.0000
40	35.45	0.00	0.00	0.0000	1702.10	0.0000
50	32.92	0.00	0.00	0.0000	2643.95	0.0000
60	26.78	0.00	0.00	0.0000	2498.24	0.0000
80	15.70	0.00	0.00	0.0000	1915.64	0.0000
100	10.33	0.00	0.00	0.0000	1511.07	0.0000
150	4.82	0.00	0.00	0.0000	927.46	0.0000
200	2.79	0.00	0.00	0.0000	633.44	0.0000
250	1.83	0.00	0.00	0.0000	464.37	0.0000
500	0.48	0.00	0.00	0.0000	169.00	0.0000
1000	0.14	0.00	0.00	0.0000	61.00	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	18.28	0.00	0.00	0.0000	1344.83	0.0000
30	41.78	0.00	0.00	0.0000	1964.95	0.0000
40	35.45	0.00	0.00	0.0000	1702.10	0.0000
50	32.92	0.00	0.00	0.0000	2643.95	0.0000
60	26.78	0.00	0.00	0.0000	2498.24	0.0000
80	15.70	0.00	0.00	0.0000	1915.64	0.0000
100	10.33	0.00	0.00	0.0000	1511.07	0.0000
150	4.82	0.00	0.00	0.0000	927.46	0.0000
200	2.79	0.00	0.00	0.0000	633.44	0.0000
250	1.83	0.00	0.00	0.0000	464.37	0.0000
500	0.48	0.00	0.00	0.0000	169.00	0.0000
1000	0.14	0.00	0.00	0.0000	61.00	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	15.97	6.80	0.0774	0.0189
30	36.51	15.54	0.1768	0.0277
40	30.98	13.19	0.1500	0.0240
50	28.77	12.24	0.1393	0.0372
60	23.40	9.96	0.1133	0.0352
80	13.72	5.84	0.0664	0.0270
100	9.03	3.84	0.0437	0.0213
150	4.21	1.79	0.0204	0.0131
200	2.44	1.04	0.0118	0.0089
250	1.60	0.68	0.0077	0.0065
500	0.42	0.18	0.0020	0.0024
1000	0.12	0.05	0.0006	0.0009

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Facility G-03 - 55% Perc, 25% MeCl

Met Set: Concord

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	18.28	9.35	3.98	0.0453	1344.83	0.0111
30	41.78	21.37	9.10	0.1035	1964.95	0.0162
40	35.45	18.13	7.72	0.0878	1702.10	0.0140
50	32.92	16.84	7.17	0.0815	2643.95	0.0218
60	26.78	13.70	5.83	0.0663	2498.24	0.0206
80	15.70	8.03	3.42	0.0389	1915.64	0.0158
100	10.33	5.28	2.25	0.0256	1511.07	0.0124
150	4.82	2.47	1.05	0.0119	927.46	0.0076
200	2.79	1.43	0.61	0.0069	633.44	0.0052
250	1.83	0.94	0.40	0.0045	464.37	0.0038
500	0.48	0.25	0.10	0.0012	169.00	0.0014
1000	0.14	0.07	0.03	0.0003	61.00	0.0005

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0749
Ann Rate [g/s]: 0.0473

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	18.28	0.72	0.31	0.0002	1344.83	0.0072
30	41.78	1.65	0.70	0.0005	1964.95	0.0105
40	35.45	1.40	0.59	0.0005	1702.10	0.0091
50	32.92	1.30	0.55	0.0004	2643.95	0.0141
60	26.78	1.06	0.45	0.0004	2498.24	0.0134
80	15.70	0.62	0.26	0.0002	1915.64	0.0102
100	10.33	0.41	0.17	0.0001	1511.07	0.0081
150	4.82	0.19	0.08	0.0001	927.46	0.0050
200	2.79	0.11	0.05	0.0000	633.44	0.0034
250	1.83	0.07	0.03	0.0000	464.37	0.0025
500	0.48	0.02	0.01	0.0000	169.00	0.0009
1000	0.14	0.01	0.00	0.0000	61.00	0.0003

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	18.28	0.00	0.00	0.0000	1344.83	0.0000
30	41.78	0.00	0.00	0.0000	1964.95	0.0000
40	35.45	0.00	0.00	0.0000	1702.10	0.0000
50	32.92	0.00	0.00	0.0000	2643.95	0.0000
60	26.78	0.00	0.00	0.0000	2498.24	0.0000
80	15.70	0.00	0.00	0.0000	1915.64	0.0000
100	10.33	0.00	0.00	0.0000	1511.07	0.0000
150	4.82	0.00	0.00	0.0000	927.46	0.0000
200	2.79	0.00	0.00	0.0000	633.44	0.0000
250	1.83	0.00	0.00	0.0000	464.37	0.0000
500	0.48	0.00	0.00	0.0000	169.00	0.0000
1000	0.14	0.00	0.00	0.0000	61.00	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	10.07	4.29	0.0455	0.0183
30	23.02	9.80	0.1040	0.0267
40	19.53	8.31	0.0883	0.0231
50	18.14	7.72	0.0820	0.0359
60	14.75	6.28	0.0667	0.0339
80	8.65	3.68	0.0391	0.0260
100	5.69	2.42	0.0257	0.0205
150	2.66	1.13	0.0120	0.0126
200	1.54	0.65	0.0069	0.0086
250	1.01	0.43	0.0046	0.0063
500	0.26	0.11	0.0012	0.0023
1000	0.08	0.03	0.0003	0.0008

Facility G-03 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Concord

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1198
Ann Rate [g/s]: 0.0630

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	18.28	6.79	2.89	0.0329	1344.83	0.0081
30	41.78	15.53	6.61	0.0752	1964.95	0.0118
40	35.45	13.18	5.61	0.0638	1702.10	0.0102
50	32.92	12.24	5.21	0.0593	2643.95	0.0158
60	26.78	9.95	4.24	0.0482	2498.24	0.0150
80	15.70	5.84	2.48	0.0283	1915.64	0.0115
100	10.33	3.84	1.63	0.0186	1511.07	0.0091
150	4.82	1.79	0.76	0.0087	927.46	0.0056
200	2.79	1.04	0.44	0.0050	633.44	0.0038
250	1.83	0.68	0.29	0.0033	464.37	0.0028
500	0.48	0.18	0.08	0.0009	169.00	0.0010
1000	0.14	0.05	0.02	0.0003	61.00	0.0004

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0898
Ann Rate [g/s]: 0.0473

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	18.28	0.86	0.37	0.0003	1344.83	0.0086
30	41.78	1.98	0.84	0.0007	1964.95	0.0126
40	35.45	1.68	0.71	0.0006	1702.10	0.0109
50	32.92	1.56	0.66	0.0005	2643.95	0.0170
60	26.78	1.27	0.54	0.0004	2498.24	0.0160
80	15.70	0.74	0.32	0.0002	1915.64	0.0123
100	10.33	0.49	0.21	0.0002	1511.07	0.0097
150	4.82	0.23	0.10	0.0001	927.46	0.0059
200	2.79	0.13	0.06	4.4E-05	633.44	0.0041
250	1.83	0.09	0.04	2.9E-05	464.37	0.0030
500	0.48	0.02	0.01	7.6E-06	169.00	0.0011
1000	0.14	0.01	0.00	2.2E-06	61.00	0.0004

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0315

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	18.28	1.15	0.49	0.0009	1344.83	0.0000
30	41.78	2.63	1.12	0.0021	1964.95	0.0000
40	35.45	2.23	0.95	0.0017	1702.10	0.0000
50	32.92	2.07	0.88	0.0016	2643.95	0.0000
60	26.78	1.69	0.72	0.0013	2498.24	0.0000
80	15.70	0.99	0.42	0.0008	1915.64	0.0000
100	10.33	0.65	0.28	0.0005	1511.07	0.0000
150	4.82	0.30	0.13	0.0002	927.46	0.0000
200	2.79	0.18	0.07	0.0001	633.44	0.0000
250	1.83	0.12	0.05	0.0001	464.37	0.0000
500	0.48	0.03	0.01	2.4E-05	169.00	0.0000
1000	0.14	0.01	0.00	6.9E-06	61.00	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	8.81	3.75	0.0341	0.0167
30	20.14	8.57	0.0779	0.0244
40	17.09	7.27	0.0661	0.0211
50	15.87	6.75	0.0614	0.0328
60	12.91	5.49	0.0499	0.0310
80	7.57	3.22	0.0293	0.0238
100	4.98	2.12	0.0193	0.0187
150	2.32	0.99	0.0090	0.0115
200	1.34	0.57	0.0052	0.0079
250	0.88	0.38	0.0034	0.0058
500	0.23	0.10	0.0009	0.0021
1000	0.07	0.03	0.0003	0.0008

385

Facility G-03 - 55% Perc, 43% TCE

Met Set: Concord

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	18.28	9.35	3.98	0.0453	1344.83	0.0111
30	41.78	21.37	9.10	0.1035	1964.95	0.0162
40	35.45	18.13	7.72	0.0878	1702.10	0.0140
50	32.92	16.84	7.17	0.0815	2643.95	0.0218
60	26.78	13.70	5.83	0.0663	2498.24	0.0206
80	15.70	8.03	3.42	0.0389	1915.64	0.0158
100	10.33	5.28	2.25	0.0256	1511.07	0.0124
150	4.82	2.47	1.05	0.0119	927.46	0.0076
200	2.79	1.43	0.61	0.0069	633.44	0.0052
250	1.83	0.94	0.40	0.0045	464.37	0.0038
500	0.48	0.25	0.10	0.0012	169.00	0.0014
1000	0.14	0.07	0.03	0.0003	61.00	0.0005

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	18.28	0.00	0.00	0.0000	1344.83	0.0000
30	41.78	0.00	0.00	0.0000	1964.95	0.0000
40	35.45	0.00	0.00	0.0000	1702.10	0.0000
50	32.92	0.00	0.00	0.0000	2643.95	0.0000
60	26.78	0.00	0.00	0.0000	2498.24	0.0000
80	15.70	0.00	0.00	0.0000	1915.64	0.0000
100	10.33	0.00	0.00	0.0000	1511.07	0.0000
150	4.82	0.00	0.00	0.0000	927.46	0.0000
200	2.79	0.00	0.00	0.0000	633.44	0.0000
250	1.83	0.00	0.00	0.0000	464.37	0.0000
500	0.48	0.00	0.00	0.0000	169.00	0.0000
1000	0.14	0.00	0.00	0.0000	61.00	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1288
Ann Rate [g/s]: 0.0677

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	18.28	2.48	1.05	0.0019	1344.83	0.0000
30	41.78	5.66	2.41	0.0044	1964.95	0.0000
40	35.45	4.80	2.04	0.0037	1702.10	0.0000
50	32.92	4.46	1.90	0.0035	2643.95	0.0000
60	26.78	3.63	1.54	0.0028	2498.24	0.0000
80	15.70	2.13	0.90	0.0017	1915.64	0.0000
100	10.33	1.40	0.60	0.0011	1511.07	0.0000
150	4.82	0.65	0.28	0.0005	927.46	0.0000
200	2.79	0.38	0.16	0.0003	633.44	0.0000
250	1.83	0.25	0.11	0.0002	464.37	0.0000
500	0.48	0.06	0.03	0.0001	169.00	0.0000
1000	0.14	0.02	0.01	1.5E-05	61.00	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	11.83	5.03	0.0472	0.0111
30	27.03	11.51	0.1079	0.0162
40	22.93	9.76	0.0916	0.0140
50	21.30	9.07	0.0850	0.0218
60	17.32	7.37	0.0692	0.0206
80	10.16	4.32	0.0406	0.0158
100	6.68	2.84	0.0267	0.0124
150	3.12	1.33	0.0124	0.0076
200	1.80	0.77	0.0072	0.0052
250	1.18	0.50	0.0047	0.0038
500	0.31	0.13	0.0012	0.0014
1000	0.09	0.04	0.0004	0.0005

Facility G-03 - 94% Perc

Met Set: Mather

94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.2815

Ann Rate [g/s]: 0.1481

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	11.46	10.01	4.26	0.0485	958.09	0.0135
30	25.06	21.90	9.32	0.1060	1290.22	0.0182
40	20.77	18.15	7.73	0.0879	1240.56	0.0175
50	19.28	16.85	7.17	0.0816	1734.69	0.0244
60	15.76	13.77	5.86	0.0667	1546.97	0.0218
80	9.15	8.00	3.40	0.0387	1057.88	0.0149
100	5.97	5.22	2.22	0.0253	790.98	0.0111
150	2.74	2.39	1.02	0.0116	526.98	0.0074
200	1.57	1.37	0.58	0.0066	374.12	0.0053
250	1.02	0.89	0.38	0.0043	280.03	0.0039
500	0.26	0.23	0.10	0.0011	105.06	0.0015
1000	0.07	0.06	0.03	0.0003	38.59	0.0005

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	11.46	0.00	0.00	0.0000	958.09	0.0000
30	25.06	0.00	0.00	0.0000	1290.22	0.0000
40	20.77	0.00	0.00	0.0000	1240.56	0.0000
50	19.28	0.00	0.00	0.0000	1734.69	0.0000
60	15.76	0.00	0.00	0.0000	1546.97	0.0000
80	9.15	0.00	0.00	0.0000	1057.88	0.0000
100	5.97	0.00	0.00	0.0000	790.98	0.0000
150	2.74	0.00	0.00	0.0000	526.98	0.0000
200	1.57	0.00	0.00	0.0000	374.12	0.0000
250	1.02	0.00	0.00	0.0000	280.03	0.0000
500	0.26	0.00	0.00	0.0000	105.06	0.0000
1000	0.07	0.00	0.00	0.0000	38.59	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	11.46	0.00	0.00	0.0000	958.09	0.0000
30	25.06	0.00	0.00	0.0000	1290.22	0.0000
40	20.77	0.00	0.00	0.0000	1240.56	0.0000
50	19.28	0.00	0.00	0.0000	1734.69	0.0000
60	15.76	0.00	0.00	0.0000	1546.97	0.0000
80	9.15	0.00	0.00	0.0000	1057.88	0.0000
100	5.97	0.00	0.00	0.0000	790.98	0.0000
150	2.74	0.00	0.00	0.0000	526.98	0.0000
200	1.57	0.00	0.00	0.0000	374.12	0.0000
250	1.02	0.00	0.00	0.0000	280.03	0.0000
500	0.26	0.00	0.00	0.0000	105.06	0.0000
1000	0.07	0.00	0.00	0.0000	38.59	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	10.01	4.26	0.0485	0.0135
30	21.90	9.32	0.1060	0.0182
40	18.15	7.73	0.0879	0.0175
50	16.85	7.17	0.0816	0.0244
60	13.77	5.86	0.0667	0.0218
80	8.00	3.40	0.0387	0.0149
100	5.22	2.22	0.0253	0.0111
150	2.39	1.02	0.0116	0.0074
200	1.37	0.58	0.0066	0.0053
250	0.89	0.38	0.0043	0.0039
500	0.23	0.10	0.0011	0.0015
1000	0.06	0.03	0.0003	0.0005

387

Facility G-03 - 55% Perc, 25% MeCl

Met Set: Mather

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647

Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	11.46	5.86	2.50	0.0284	958.09	0.0079
30	25.06	12.82	5.46	0.0621	1290.22	0.0106
40	20.77	10.62	4.52	0.0515	1240.56	0.0102
50	19.28	9.86	4.20	0.0478	1734.69	0.0143
60	15.76	8.06	3.43	0.0390	1546.97	0.0127
80	9.15	4.68	1.99	0.0227	1057.88	0.0087
100	5.97	3.05	1.30	0.0148	790.98	0.0065
150	2.74	1.40	0.60	0.0068	526.98	0.0043
200	1.57	0.80	0.34	0.0039	374.12	0.0031
250	1.02	0.52	0.22	0.0025	280.03	0.0023
500	0.26	0.13	0.06	0.0006	105.06	0.0009
1000	0.07	0.04	0.02	0.0002	38.59	0.0003

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0749

Ann Rate [g/s]: 0.0394

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	11.46	0.45	0.19	0.0002	958.09	0.0051
30	25.06	0.99	0.42	0.0003	1290.22	0.0069
40	20.77	0.82	0.35	0.0003	1240.56	0.0066
50	19.28	0.76	0.32	0.0003	1734.69	0.0093
60	15.76	0.62	0.26	0.0002	1546.97	0.0083
80	9.15	0.36	0.15	0.0001	1057.88	0.0057
100	5.97	0.24	0.10	0.0001	790.98	0.0042
150	2.74	0.11	0.05	3.6E-05	526.98	0.0028
200	1.57	0.06	0.03	2.1E-05	374.12	0.0020
250	1.02	0.04	0.02	1.3E-05	280.03	0.0015
500	0.26	0.01	0.00	3.4E-06	105.06	0.0006
1000	0.07	0.00	0.00	9.2E-07	38.59	0.0002

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	11.46	0.00	0.00	0.0000	958.09	0.0000
30	25.06	0.00	0.00	0.0000	1290.22	0.0000
40	20.77	0.00	0.00	0.0000	1240.56	0.0000
50	19.28	0.00	0.00	0.0000	1734.69	0.0000
60	15.76	0.00	0.00	0.0000	1546.97	0.0000
80	9.15	0.00	0.00	0.0000	1057.88	0.0000
100	5.97	0.00	0.00	0.0000	790.98	0.0000
150	2.74	0.00	0.00	0.0000	526.98	0.0000
200	1.57	0.00	0.00	0.0000	374.12	0.0000
250	1.02	0.00	0.00	0.0000	280.03	0.0000
500	0.26	0.00	0.00	0.0000	105.06	0.0000
1000	0.07	0.00	0.00	0.0000	38.59	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	6.31	2.69	0.0285	0.0130
30	13.81	5.88	0.0624	0.0175
40	11.44	4.87	0.0517	0.0169
50	10.62	4.52	0.0480	0.0236
60	8.68	3.70	0.0392	0.0210
80	5.04	2.15	0.0228	0.0144
100	3.29	1.40	0.0149	0.0107
150	1.51	0.64	0.0068	0.0072
200	0.86	0.37	0.0039	0.0051
250	0.56	0.24	0.0025	0.0038
500	0.14	0.06	0.0006	0.0014
1000	0.04	0.02	0.0002	0.0005

Facility G-03 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Mather

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1198
Ann Rate [g/s]: 0.0630

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	11.46	4.26	1.81	0.0206	958.09	0.0057
30	25.06	9.31	3.97	0.0451	1290.22	0.0077
40	20.77	7.72	3.29	0.0374	1240.56	0.0074
50	19.28	7.17	3.05	0.0347	1734.69	0.0104
60	15.76	5.86	2.49	0.0284	1546.97	0.0093
80	9.15	3.40	1.45	0.0165	1057.88	0.0063
100	5.97	2.22	0.94	0.0107	790.98	0.0047
150	2.74	1.02	0.43	0.0049	526.98	0.0032
200	1.57	0.58	0.25	0.0028	374.12	0.0022
250	1.02	0.38	0.16	0.0018	280.03	0.0017
500	0.26	0.10	0.04	0.0005	105.06	0.0006
1000	0.07	0.03	0.01	0.0001	38.59	0.0002

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0898
Ann Rate [g/s]: 0.0473

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	11.46	0.54	0.23	0.0002	958.09	0.0061
30	25.06	1.19	0.50	0.0004	1290.22	0.0083
40	20.77	0.98	0.42	0.0003	1240.56	0.0080
50	19.28	0.91	0.39	0.0003	1734.69	0.0111
60	15.76	0.75	0.32	0.0002	1546.97	0.0099
80	9.15	0.43	0.18	0.0001	1057.88	0.0068
100	5.97	0.28	0.12	0.0001	790.98	0.0051
150	2.74	0.13	0.06	4.3E-05	526.98	0.0034
200	1.57	0.07	0.03	2.5E-05	374.12	0.0024
250	1.02	0.05	0.02	1.6E-05	280.03	0.0018
500	0.26	0.01	0.01	4.1E-06	105.06	0.0007
1000	0.07	0.00	0.00	1.1E-06	38.59	0.0002

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0315

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	11.46	0.72	0.31	0.0006	958.09	0.0000
30	25.06	1.58	0.67	0.0012	1290.22	0.0000
40	20.77	1.31	0.56	0.0010	1240.56	0.0000
50	19.28	1.21	0.52	0.0009	1734.69	0.0000
60	15.76	0.99	0.42	0.0008	1546.97	0.0000
80	9.15	0.58	0.25	0.0005	1057.88	0.0000
100	5.97	0.38	0.16	0.0003	790.98	0.0000
150	2.74	0.17	0.07	0.0001	526.98	0.0000
200	1.57	0.10	0.04	0.0001	374.12	0.0000
250	1.02	0.06	0.03	0.0001	280.03	0.0000
500	0.26	0.02	0.01	1.3E-05	105.06	0.0000
1000	0.07	0.00	0.00	3.4E-06	38.59	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	5.52	2.35	0.0214	0.0119
30	12.08	5.14	0.0467	0.0160
40	10.01	4.26	0.0387	0.0154
50	9.29	3.96	0.0360	0.0215
60	7.60	3.23	0.0294	0.0192
80	4.41	1.88	0.0171	0.0131
100	2.88	1.22	0.0111	0.0098
150	1.32	0.56	0.0051	0.0065
200	0.76	0.32	0.0029	0.0046
250	0.49	0.21	0.0019	0.0035
500	0.13	0.05	0.0005	0.0013
1000	0.03	0.01	0.0001	0.0005

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Facility G-03 - 55% Perc, 43% TCE

Met Set: Mather

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	11.46	5.86	2.50	0.0284	958.09	0.0079
30	25.06	12.82	5.46	0.0621	1290.22	0.0106
40	20.77	10.62	4.52	0.0515	1240.56	0.0102
50	19.28	9.86	4.20	0.0478	1734.69	0.0143
60	15.76	8.06	3.43	0.0390	1546.97	0.0127
80	9.15	4.68	1.99	0.0227	1057.88	0.0087
100	5.97	3.05	1.30	0.0148	790.98	0.0065
150	2.74	1.40	0.60	0.0068	526.98	0.0043
200	1.57	0.80	0.34	0.0039	374.12	0.0031
250	1.02	0.52	0.22	0.0025	280.03	0.0023
500	0.26	0.13	0.06	0.0006	105.06	0.0009
1000	0.07	0.04	0.02	0.0002	38.59	0.0003

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	11.46	0.00	0.00	0.0000	958.09	0.0000
30	25.06	0.00	0.00	0.0000	1290.22	0.0000
40	20.77	0.00	0.00	0.0000	1240.56	0.0000
50	19.28	0.00	0.00	0.0000	1734.69	0.0000
60	15.76	0.00	0.00	0.0000	1546.97	0.0000
80	9.15	0.00	0.00	0.0000	1057.88	0.0000
100	5.97	0.00	0.00	0.0000	790.98	0.0000
150	2.74	0.00	0.00	0.0000	526.98	0.0000
200	1.57	0.00	0.00	0.0000	374.12	0.0000
250	1.02	0.00	0.00	0.0000	280.03	0.0000
500	0.26	0.00	0.00	0.0000	105.06	0.0000
1000	0.07	0.00	0.00	0.0000	38.59	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1288
Ann Rate [g/s]: 0.0677

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	11.46	1.55	0.66	0.0012	958.09	0.0000
30	25.06	3.39	1.44	0.0027	1290.22	0.0000
40	20.77	2.81	1.20	0.0022	1240.56	0.0000
50	19.28	2.61	1.11	0.0020	1734.69	0.0000
60	15.76	2.13	0.91	0.0017	1546.97	0.0000
80	9.15	1.24	0.53	0.0010	1057.88	0.0000
100	5.97	0.81	0.34	0.0006	790.98	0.0000
150	2.74	0.37	0.16	0.0003	526.98	0.0000
200	1.57	0.21	0.09	0.0002	374.12	0.0000
250	1.02	0.14	0.06	0.0001	280.03	0.0000
500	0.26	0.04	0.01	2.8E-05	105.06	0.0000
1000	0.07	0.01	0.00	7.4E-06	38.59	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	7.41	3.16	0.0296	0.0079
30	16.21	6.90	0.0647	0.0106
40	13.44	5.72	0.0536	0.0102
50	12.47	5.31	0.0498	0.0143
60	10.20	4.34	0.0407	0.0127
80	5.92	2.52	0.0236	0.0087
100	3.86	1.64	0.0154	0.0065
150	1.77	0.75	0.0071	0.0043
200	1.02	0.43	0.0041	0.0031
250	0.66	0.28	0.0026	0.0023
500	0.17	0.07	0.0007	0.0009
1000	0.05	0.02	0.0002	0.0003

Facility G-03 - 94% Perc

Met Set: Default -0

94% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.2815

Ann Rate [g/s]: 0.1481

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	64.92	27.64	0.3144	2744.96	0.0386
30	64.57	56.42	24.02	0.2732	2385.45	0.0336
40	56.52	49.39	21.02	0.2392	2088.05	0.0294
50	49.84	43.55	18.54	0.2109	1841.40	0.0259
60	44.27	38.69	16.47	0.1873	1635.59	0.0230
80	35.62	31.13	13.25	0.1507	1315.96	0.0185
100	29.32	25.62	10.90	0.1241	1083.10	0.0152
150	19.45	17.00	7.24	0.0823	718.69	0.0101
200	13.97	12.21	5.20	0.0591	516.25	0.0073
250	10.61	9.27	3.94	0.0449	391.81	0.0055
500	4.18	3.66	1.56	0.0177	154.56	0.0022
1000	1.58	1.38	0.59	0.0067	58.40	0.0008

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	64.92	27.64	0.3144	0.0386
30	56.42	24.02	0.2732	0.0336
40	49.39	21.02	0.2392	0.0294
50	43.55	18.54	0.2109	0.0259
60	38.69	16.47	0.1873	0.0230
80	31.13	13.25	0.1507	0.0185
100	25.62	10.90	0.1241	0.0152
150	17.00	7.24	0.0823	0.0101
200	12.21	5.20	0.0591	0.0073
250	9.27	3.94	0.0449	0.0055
500	3.66	1.56	0.0177	0.0022
1000	1.38	0.59	0.0067	0.0008

391

Facility G-03 - 55% Perc, 25% MeCl

Met Set: Default -0

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	38.01	16.18	0.1841	2744.96	0.0226
30	64.57	33.03	14.06	0.1600	2385.45	0.0196
40	56.52	28.91	12.31	0.1400	2088.05	0.0172
50	49.84	25.50	10.85	0.1235	1841.40	0.0152
60	44.27	22.65	9.64	0.1097	1635.59	0.0135
80	35.62	18.22	7.76	0.0882	1315.96	0.0108
100	29.32	15.00	6.38	0.0726	1083.10	0.0089
150	19.45	9.95	4.24	0.0482	718.69	0.0059
200	13.97	7.15	3.04	0.0346	516.25	0.0043
250	10.61	5.43	2.31	0.0263	391.81	0.0032
500	4.18	2.14	0.91	0.0104	154.56	0.0013
1000	1.58	0.81	0.34	0.0039	58.40	0.0005

25% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0749
Ann Rate [g/s]: 0.0394

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	2.93	1.25	0.0010	2744.96	0.0147
30	64.57	2.54	1.08	0.0008	2385.45	0.0128
40	56.52	2.23	0.95	0.0007	2088.05	0.0112
50	49.84	1.96	0.84	0.0007	1841.40	0.0099
60	44.27	1.74	0.74	0.0006	1635.59	0.0088
80	35.62	1.40	0.60	0.0005	1315.96	0.0070
100	29.32	1.16	0.49	0.0004	1083.10	0.0058
150	19.45	0.77	0.33	0.0003	718.69	0.0038
200	13.97	0.55	0.23	0.0002	516.25	0.0028
250	10.61	0.42	0.18	0.0001	391.81	0.0021
500	4.18	0.16	0.07	0.0001	154.56	0.0008
1000	1.58	0.06	0.03	2.1E-05	58.40	0.0003

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	40.94	17.43	0.1850	0.0373
30	35.57	15.14	0.1608	0.0324
40	31.14	13.26	0.1408	0.0284
50	27.46	11.69	0.1241	0.0250
60	24.39	10.38	0.1103	0.0222
80	19.62	8.35	0.0887	0.0179
100	16.15	6.88	0.0730	0.0147
150	10.72	4.56	0.0484	0.0098
200	7.70	3.28	0.0348	0.0070
250	5.84	2.49	0.0264	0.0053
500	2.30	0.98	0.0104	0.0021
1000	0.87	0.37	0.0039	0.0008

Facility G-03 - 40% Perc, 30% MeCl, 20% TCE

Met Set: Default -0

40% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1198
Ann Rate [g/s]: 0.0630

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	27.62	11.76	0.1337	2744.96	0.0164
30	64.57	24.00	10.22	0.1162	2385.45	0.0143
40	56.52	21.01	8.94	0.1017	2088.05	0.0125
50	49.84	18.53	7.89	0.0897	1841.40	0.0110
60	44.27	16.46	7.01	0.0797	1635.59	0.0098
80	35.62	13.24	5.64	0.0641	1315.96	0.0079
100	29.32	10.90	4.64	0.0528	1083.10	0.0065
150	19.45	7.23	3.08	0.0350	718.69	0.0043
200	13.97	5.19	2.21	0.0252	516.25	0.0031
250	10.61	3.94	1.68	0.0191	391.81	0.0023
500	4.18	1.56	0.66	0.0075	154.56	0.0009
1000	1.58	0.59	0.25	0.0028	58.40	0.0003

30% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0898
Ann Rate [g/s]: 0.0473

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	3.51	1.50	0.0012	2744.96	0.0176
30	64.57	3.05	1.30	0.0010	2385.45	0.0153
40	56.52	2.67	1.14	0.0009	2088.05	0.0134
50	49.84	2.36	1.00	0.0008	1841.40	0.0118
60	44.27	2.09	0.89	0.0007	1635.59	0.0105
80	35.62	1.68	0.72	0.0006	1315.96	0.0084
100	29.32	1.39	0.59	0.0005	1083.10	0.0069
150	19.45	0.92	0.39	0.0003	718.69	0.0046
200	13.97	0.66	0.28	0.0002	516.25	0.0033
250	10.61	0.50	0.21	0.0002	391.81	0.0025
500	4.18	0.20	0.08	0.0001	154.56	0.0010
1000	1.58	0.07	0.03	2.5E-05	58.40	0.0004

20% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0599
Ann Rate [g/s]: 0.0315

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	4.68	1.99	0.0037	2744.96	0.0000
30	64.57	4.07	1.73	0.0032	2385.45	0.0000
40	56.52	3.56	1.52	0.0028	2088.05	0.0000
50	49.84	3.14	1.34	0.0025	1841.40	0.0000
60	44.27	2.79	1.19	0.0022	1635.59	0.0000
80	35.62	2.24	0.96	0.0018	1315.96	0.0000
100	29.32	1.85	0.79	0.0014	1083.10	0.0000
150	19.45	1.23	0.52	0.0010	718.69	0.0000
200	13.97	0.88	0.37	0.0007	516.25	0.0000
250	10.61	0.67	0.28	0.0005	391.81	0.0000
500	4.18	0.26	0.11	0.0002	154.56	0.0000
1000	1.58	0.10	0.04	0.0001	58.40	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	35.81	15.25	0.1386	0.0340
30	31.12	13.25	0.1204	0.0296
40	27.24	11.60	0.1054	0.0259
50	24.02	10.23	0.0930	0.0228
60	21.34	9.08	0.0826	0.0203
80	17.17	7.31	0.0664	0.0163
100	14.13	6.02	0.0547	0.0134
150	9.38	3.99	0.0363	0.0089
200	6.74	2.87	0.0261	0.0064
250	5.11	2.18	0.0198	0.0049
500	2.02	0.86	0.0078	0.0019
1000	0.76	0.32	0.0029	0.0007

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Facility G-03 - 55% Perc, 43% TCE

Met Set: Default -0

55% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.1647
Ann Rate [g/s]: 0.0867

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	38.01	16.18	0.1841	2744.96	0.0226
30	64.57	33.03	14.06	0.1600	2385.45	0.0196
40	56.52	28.91	12.31	0.1400	2088.05	0.0172
50	49.84	25.50	10.85	0.1235	1841.40	0.0152
60	44.27	22.65	9.64	0.1097	1635.59	0.0135
80	35.62	18.22	7.76	0.0882	1315.96	0.0108
100	29.32	15.00	6.38	0.0726	1083.10	0.0089
150	19.45	9.95	4.24	0.0482	718.69	0.0059
200	13.97	7.15	3.04	0.0346	516.25	0.0043
250	10.61	5.43	2.31	0.0263	391.81	0.0032
500	4.18	2.14	0.91	0.0104	154.56	0.0013
1000	1.58	0.81	0.34	0.0039	58.40	0.0005

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

43% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1288
Ann Rate [g/s]: 0.0677

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	10.06	4.28	0.0079	2744.96	0.0000
30	64.57	8.74	3.72	0.0068	2385.45	0.0000
40	56.52	7.65	3.26	0.0060	2088.05	0.0000
50	49.84	6.75	2.87	0.0053	1841.40	0.0000
60	44.27	5.99	2.55	0.0047	1635.59	0.0000
80	35.62	4.82	2.05	0.0038	1315.96	0.0000
100	29.32	3.97	1.69	0.0031	1083.10	0.0000
150	19.45	2.63	1.12	0.0021	718.69	0.0000
200	13.97	1.89	0.81	0.0015	516.25	0.0000
250	10.61	1.44	0.61	0.0011	391.81	0.0000
500	4.18	0.57	0.24	0.0004	154.56	0.0000
1000	1.58	0.21	0.09	0.0002	58.40	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	48.07	20.46	0.1919	0.0226
30	41.77	17.78	0.1668	0.0196
40	36.56	15.56	0.1460	0.0172
50	32.25	13.73	0.1287	0.0152
60	28.64	12.19	0.1144	0.0135
80	23.04	9.81	0.0920	0.0108
100	18.97	8.07	0.0757	0.0089
150	12.59	5.36	0.0502	0.0059
200	9.04	3.85	0.0361	0.0043
250	6.86	2.92	0.0274	0.0032
500	2.71	1.15	0.0108	0.0013
1000	1.02	0.44	0.0041	0.0005

Risk Asse ent Summary - 3 Generic Facilities
Multicomponent Impacts - Carburetor Cleaners - Average of 10 Met Sets

Facility G-01 - 68% Perc

Met Set: Averaged
68% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0347
Ann Rate [g/s]: 0.0041

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	3.09	1.31	0.0149	10938.41	0.0190
30	67.72	1.64	0.70	0.0079	8158.81	0.0142
40	41.93	1.01	0.43	0.0049	6322.28	0.0110
50	28.51	0.69	0.29	0.0033	5024.56	0.0087
60	20.66	0.50	0.21	0.0024	4082.78	0.0071
80	12.27	0.30	0.13	0.0014	2846.71	0.0049
100	8.12	0.20	0.08	0.0010	2100.30	0.0036
150	3.78	0.09	0.04	0.0004	1171.11	0.0020
200	2.18	0.05	0.02	0.0003	763.65	0.0013
250	1.42	0.03	0.01	0.0002	545.14	0.0009
500	0.37	0.01	0.00	4.3E-05	192.37	0.0003
1000	0.10	0.00	0.00	1.1E-05	72.27	0.0001

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	0.00	0.00	0.0000	10938.41	0.0000
30	67.72	0.00	0.00	0.0000	8158.81	0.0000
40	41.93	0.00	0.00	0.0000	6322.28	0.0000
50	28.51	0.00	0.00	0.0000	5024.56	0.0000
60	20.66	0.00	0.00	0.0000	4082.78	0.0000
80	12.27	0.00	0.00	0.0000	2846.71	0.0000
100	8.12	0.00	0.00	0.0000	2100.30	0.0000
150	3.78	0.00	0.00	0.0000	1171.11	0.0000
200	2.18	0.00	0.00	0.0000	763.65	0.0000
250	1.42	0.00	0.00	0.0000	545.14	0.0000
500	0.37	0.00	0.00	0.0000	192.37	0.0000
1000	0.10	0.00	0.00	0.0000	72.27	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	0.00	0.00	0.0000	10938.41	0.0000
30	67.72	0.00	0.00	0.0000	8158.81	0.0000
40	41.93	0.00	0.00	0.0000	6322.28	0.0000
50	28.51	0.00	0.00	0.0000	5024.56	0.0000
60	20.66	0.00	0.00	0.0000	4082.78	0.0000
80	12.27	0.00	0.00	0.0000	2846.71	0.0000
100	8.12	0.00	0.00	0.0000	2100.30	0.0000
150	3.78	0.00	0.00	0.0000	1171.11	0.0000
200	2.18	0.00	0.00	0.0000	763.65	0.0000
250	1.42	0.00	0.00	0.0000	545.14	0.0000
500	0.37	0.00	0.00	0.0000	192.37	0.0000
1000	0.10	0.00	0.00	0.0000	72.27	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	3.09	1.31	0.0149	0.0190
30	1.64	0.70	0.0079	0.0142
40	1.01	0.43	0.0049	0.0110
50	0.69	0.29	0.0033	0.0087
60	0.50	0.21	0.0024	0.0071
80	0.30	0.13	0.0014	0.0049
100	0.20	0.08	0.0010	0.0036
150	0.09	0.04	0.0004	0.0020
200	0.05	0.02	0.0003	0.0013
250	0.03	0.01	0.0002	0.0009
500	0.01	0.00	4.3E-05	0.0003
1000	0.00	0.00	1.1E-05	0.0001

Facility G-01 - 57% MeCl

Met Set: Averaged

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	0.00	0.00	0.0000	10938.41	0.0000
30	67.72	0.00	0.00	0.0000	8158.81	0.0000
40	41.93	0.00	0.00	0.0000	6322.28	0.0000
50	28.51	0.00	0.00	0.0000	5024.56	0.0000
60	20.66	0.00	0.00	0.0000	4082.78	0.0000
80	12.27	0.00	0.00	0.0000	2846.71	0.0000
100	8.12	0.00	0.00	0.0000	2100.30	0.0000
150	3.78	0.00	0.00	0.0000	1171.11	0.0000
200	2.18	0.00	0.00	0.0000	763.65	0.0000
250	1.42	0.00	0.00	0.0000	545.14	0.0000
500	0.37	0.00	0.00	0.0000	192.37	0.0000
1000	0.10	0.00	0.00	0.0000	72.27	0.0000

57% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0314
Ann Rate [g/s]: 0.0037

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	0.47	0.20	0.0002	10938.41	0.0245
30	67.72	0.25	0.11	0.0001	8158.81	0.0183
40	41.93	0.16	0.07	0.0001	6322.28	0.0142
50	28.51	0.11	0.04	3.5E-05	5024.56	0.0113
60	20.66	0.08	0.03	2.5E-05	4082.78	0.0092
80	12.27	0.05	0.02	1.5E-05	2846.71	0.0064
100	8.12	0.03	0.01	1.0E-05	2100.30	0.0047
150	3.78	0.01	0.01	4.7E-06	1171.11	0.0026
200	2.18	0.01	0.00	2.7E-06	763.65	0.0017
250	1.42	0.01	0.00	1.7E-06	545.14	0.0012
500	0.37	0.00	0.00	4.5E-07	192.37	0.0004
1000	0.10	0.00	0.00	1.2E-07	72.27	0.0002

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	0.00	0.00	0.0000	10938.41	0.0000
30	67.72	0.00	0.00	0.0000	8158.81	0.0000
40	41.93	0.00	0.00	0.0000	6322.28	0.0000
50	28.51	0.00	0.00	0.0000	5024.56	0.0000
60	20.66	0.00	0.00	0.0000	4082.78	0.0000
80	12.27	0.00	0.00	0.0000	2846.71	0.0000
100	8.12	0.00	0.00	0.0000	2100.30	0.0000
150	3.78	0.00	0.00	0.0000	1171.11	0.0000
200	2.18	0.00	0.00	0.0000	763.65	0.0000
250	1.42	0.00	0.00	0.0000	545.14	0.0000
500	0.37	0.00	0.00	0.0000	192.37	0.0000
1000	0.10	0.00	0.00	0.0000	72.27	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Worker	Harzard Index Chronic	Hazard Index Acute
20	0.47	0.20	0.0002	0.0245
30	0.25	0.11	0.0001	0.0183
40	0.16	0.07	0.0001	0.0142
50	0.11	0.04	3.5E-05	0.0113
60	0.08	0.03	2.5E-05	0.0092
80	0.05	0.02	1.5E-05	0.0064
100	0.03	0.01	1.0E-05	0.0047
150	0.01	0.01	4.7E-06	0.0026
200	0.01	0.00	2.7E-06	0.0017
250	0.01	0.00	1.7E-06	0.0012
500	0.00	0.00	4.5E-07	0.0004
1000	0.00	0.00	1.2E-07	0.0002

Averaged Multi-component Health Impacts from Carburetor Cleaners for Facility G-01

Weightings:			
	1	68% Perc	10.4%
	2	57% MeCl	89.6%

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Center	Resident	Worker	Chronic	Acute
20	0.74	0.32	0.0017	0.0240
30	0.39	0.17	0.0009	0.0179
40	0.24	0.10	0.0006	0.0138
50	0.17	0.07	0.0004	0.0110
60	0.12	0.05	0.0003	0.0089
80	0.07	0.03	0.0002	0.0062
100	0.05	0.02	0.0001	0.0046
150	0.02	0.01	0.0001	0.0026
200	0.01	0.01	2.9E-05	0.0017
250	0.01	0.00	1.9E-05	0.0012
500	0.00	0.00	4.9E-06	0.0004
1000	0.00	0.00	1.3E-06	0.0002

Facility G-02 - 68% Perc

Met Set: Averaged
68% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0347
Ann Rate [g/s]: 0.0041

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	1.79	0.76	0.0087	4985.68	0.0087
30	56.37	1.36	0.58	0.0066	4251.05	0.0074
40	36.41	0.88	0.37	0.0043	3540.67	0.0061
50	25.36	0.61	0.26	0.0030	3001.30	0.0052
60	18.66	0.45	0.19	0.0022	2575.36	0.0045
80	11.32	0.27	0.12	0.0013	1951.11	0.0034
100	7.60	0.18	0.08	0.0009	1532.53	0.0027
150	3.61	0.09	0.04	0.0004	943.04	0.0016
200	2.11	0.05	0.02	0.0002	647.01	0.0011
250	1.38	0.03	0.01	0.0002	477.16	0.0008
500	0.36	0.01	0.00	4.3E-05	180.51	0.0003
1000	0.10	0.00	0.00	1.1E-05	70.25	0.0001

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	0.00	0.00	0.0000	4985.68	0.0000
30	56.37	0.00	0.00	0.0000	4251.05	0.0000
40	36.41	0.00	0.00	0.0000	3540.67	0.0000
50	25.36	0.00	0.00	0.0000	3001.30	0.0000
60	18.66	0.00	0.00	0.0000	2575.36	0.0000
80	11.32	0.00	0.00	0.0000	1951.11	0.0000
100	7.60	0.00	0.00	0.0000	1532.53	0.0000
150	3.61	0.00	0.00	0.0000	943.04	0.0000
200	2.11	0.00	0.00	0.0000	647.01	0.0000
250	1.38	0.00	0.00	0.0000	477.16	0.0000
500	0.36	0.00	0.00	0.0000	180.51	0.0000
1000	0.10	0.00	0.00	0.0000	70.25	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	0.00	0.00	0.0000	4985.68	0.0000
30	56.37	0.00	0.00	0.0000	4251.05	0.0000
40	36.41	0.00	0.00	0.0000	3540.67	0.0000
50	25.36	0.00	0.00	0.0000	3001.30	0.0000
60	18.66	0.00	0.00	0.0000	2575.36	0.0000
80	11.32	0.00	0.00	0.0000	1951.11	0.0000
100	7.60	0.00	0.00	0.0000	1532.53	0.0000
150	3.61	0.00	0.00	0.0000	943.04	0.0000
200	2.11	0.00	0.00	0.0000	647.01	0.0000
250	1.38	0.00	0.00	0.0000	477.16	0.0000
500	0.36	0.00	0.00	0.0000	180.51	0.0000
1000	0.10	0.00	0.00	0.0000	70.25	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	1.79	0.76	0.0087	0.0087
30	1.36	0.58	0.0066	0.0074
40	0.88	0.37	0.0043	0.0061
50	0.61	0.26	0.0030	0.0052
60	0.45	0.19	0.0022	0.0045
80	0.27	0.12	0.0013	0.0034
100	0.18	0.08	0.0009	0.0027
150	0.09	0.04	0.0004	0.0016
200	0.05	0.02	0.0002	0.0011
250	0.03	0.01	0.0002	0.0008
500	0.01	0.00	4.3E-05	0.0003
1000	0.00	0.00	1.1E-05	0.0001

Facility G-02 - 57% MeCl

Met Set: Averaged

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	0.00	0.00	0.0000	4985.68	0.0000
30	56.37	0.00	0.00	0.0000	4251.05	0.0000
40	36.41	0.00	0.00	0.0000	3540.67	0.0000
50	25.36	0.00	0.00	0.0000	3001.30	0.0000
60	18.66	0.00	0.00	0.0000	2575.36	0.0000
80	11.32	0.00	0.00	0.0000	1951.11	0.0000
100	7.60	0.00	0.00	0.0000	1532.53	0.0000
150	3.61	0.00	0.00	0.0000	943.04	0.0000
200	2.11	0.00	0.00	0.0000	647.01	0.0000
250	1.38	0.00	0.00	0.0000	477.16	0.0000
500	0.36	0.00	0.00	0.0000	180.51	0.0000
1000	0.10	0.00	0.00	0.0000	70.25	0.0000

57% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0314
Ann Rate [g/s]: 0.0037

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	0.27	0.12	0.0001	4985.68	0.0112
30	56.37	0.21	0.09	0.0001	4251.05	0.0095
40	36.41	0.13	0.06	4.5E-05	3540.67	0.0079
50	25.36	0.09	0.04	3.1E-05	3001.30	0.0067
60	18.66	0.07	0.03	2.3E-05	2575.36	0.0058
80	11.32	0.04	0.02	1.4E-05	1951.11	0.0044
100	7.60	0.03	0.01	9.4E-06	1532.53	0.0034
150	3.61	0.01	0.01	4.5E-06	943.04	0.0021
200	2.11	0.01	0.00	2.6E-06	647.01	0.0015
250	1.38	0.01	0.00	1.7E-06	477.16	0.0011
500	0.36	0.00	0.00	4.5E-07	180.51	0.0004
1000	0.10	0.00	0.00	1.2E-07	70.25	0.0002

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	0.00	0.00	0.0000	4985.68	0.0000
30	56.37	0.00	0.00	0.0000	4251.05	0.0000
40	36.41	0.00	0.00	0.0000	3540.67	0.0000
50	25.36	0.00	0.00	0.0000	3001.30	0.0000
60	18.66	0.00	0.00	0.0000	2575.36	0.0000
80	11.32	0.00	0.00	0.0000	1951.11	0.0000
100	7.60	0.00	0.00	0.0000	1532.53	0.0000
150	3.61	0.00	0.00	0.0000	943.04	0.0000
200	2.11	0.00	0.00	0.0000	647.01	0.0000
250	1.38	0.00	0.00	0.0000	477.16	0.0000
500	0.36	0.00	0.00	0.0000	180.51	0.0000
1000	0.10	0.00	0.00	0.0000	70.25	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	0.27	0.12	0.0001	0.0112
30	0.21	0.09	0.0001	0.0095
40	0.13	0.06	4.5E-05	0.0079
50	0.09	0.04	3.1E-05	0.0067
60	0.07	0.03	2.3E-05	0.0058
80	0.04	0.02	1.4E-05	0.0044
100	0.03	0.01	9.4E-06	0.0034
150	0.01	0.01	4.5E-06	0.0021
200	0.01	0.00	2.6E-06	0.0015
250	0.01	0.00	1.7E-06	0.0011
500	0.00	0.00	4.5E-07	0.0004
1000	0.00	0.00	1.2E-07	0.0002

399

Averaged Multicomponent Health Impacts from Carburetor Cleaners for Facility G-02

Weightings:	1	68% Perc	10.4%
	2	57% MeCl	89.6%

400

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Center	Resident	Worker	Chronic	Acute
20	0.43	0.18	0.0010	0.0109
30	0.33	0.14	0.0007	0.0093
40	0.21	0.09	0.0005	0.0078
50	0.15	0.06	0.0003	0.0066
60	0.11	0.05	0.0002	0.0056
80	0.07	0.03	0.0002	0.0043
100	0.04	0.02	0.0001	0.0034
150	0.02	0.01	4.8E-05	0.0021
200	0.01	0.01	2.8E-05	0.0014
250	0.01	0.00	1.8E-05	0.0010
500	0.00	0.00	4.8E-06	0.0004
1000	0.00	0.00	1.3E-06	0.0002

Facility G-03 % Perc

Met Set: Averaged

68% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0347
Ann Rate [g/s]: 0.0041

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.40	0.17	0.0020	1231.74	0.0021
30	33.45	0.81	0.34	0.0039	1650.82	0.0029
40	27.02	0.65	0.28	0.0032	1484.02	0.0026
50	25.03	0.61	0.26	0.0029	2079.26	0.0036
60	20.90	0.51	0.22	0.0024	1915.91	0.0033
80	12.23	0.30	0.13	0.0014	1479.75	0.0026
100	8.02	0.19	0.08	0.0009	1184.75	0.0021
150	3.71	0.09	0.04	0.0004	769.33	0.0013
200	2.14	0.05	0.02	0.0003	550.34	0.0010
250	1.39	0.03	0.01	0.0002	417.99	0.0007
500	0.36	0.01	0.00	4.3E-05	169.20	0.0003
1000	0.10	0.00	0.00	1.1E-05	68.13	0.0001

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.00	0.00	0.0000	1231.74	0.0000
30	33.45	0.00	0.00	0.0000	1650.82	0.0000
40	27.02	0.00	0.00	0.0000	1484.02	0.0000
50	25.03	0.00	0.00	0.0000	2079.26	0.0000
60	20.90	0.00	0.00	0.0000	1915.91	0.0000
80	12.23	0.00	0.00	0.0000	1479.75	0.0000
100	8.02	0.00	0.00	0.0000	1184.75	0.0000
150	3.71	0.00	0.00	0.0000	769.33	0.0000
200	2.14	0.00	0.00	0.0000	550.34	0.0000
250	1.39	0.00	0.00	0.0000	417.99	0.0000
500	0.36	0.00	0.00	0.0000	169.20	0.0000
1000	0.10	0.00	0.00	0.0000	68.13	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.00	0.00	0.0000	1231.74	0.0000
30	33.45	0.00	0.00	0.0000	1650.82	0.0000
40	27.02	0.00	0.00	0.0000	1484.02	0.0000
50	25.03	0.00	0.00	0.0000	2079.26	0.0000
60	20.90	0.00	0.00	0.0000	1915.91	0.0000
80	12.23	0.00	0.00	0.0000	1479.75	0.0000
100	8.02	0.00	0.00	0.0000	1184.75	0.0000
150	3.71	0.00	0.00	0.0000	769.33	0.0000
200	2.14	0.00	0.00	0.0000	550.34	0.0000
250	1.39	0.00	0.00	0.0000	417.99	0.0000
500	0.36	0.00	0.00	0.0000	169.20	0.0000
1000	0.10	0.00	0.00	0.0000	68.13	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	0.40	0.17	0.0020	0.0021
30	0.81	0.34	0.0039	0.0029
40	0.65	0.28	0.0032	0.0026
50	0.61	0.26	0.0029	0.0036
60	0.51	0.22	0.0024	0.0033
80	0.30	0.13	0.0014	0.0026
100	0.19	0.08	0.0009	0.0021
150	0.09	0.04	0.0004	0.0013
200	0.05	0.02	0.0003	0.0010
250	0.03	0.01	0.0002	0.0007
500	0.01	0.00	4.3E-05	0.0003
1000	0.00	0.00	1.1E-05	0.0001

401

Facility G-03 - 57% MeCl

Met Set: Averaged

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.00	0.00	0.0000	1231.74	0.0000
30	33.45	0.00	0.00	0.0000	1650.82	0.0000
40	27.02	0.00	0.00	0.0000	1484.02	0.0000
50	25.03	0.00	0.00	0.0000	2079.26	0.0000
60	20.90	0.00	0.00	0.0000	1915.91	0.0000
80	12.23	0.00	0.00	0.0000	1479.75	0.0000
100	8.02	0.00	0.00	0.0000	1184.75	0.0000
150	3.71	0.00	0.00	0.0000	769.33	0.0000
200	2.14	0.00	0.00	0.0000	550.34	0.0000
250	1.39	0.00	0.00	0.0000	417.99	0.0000
500	0.36	0.00	0.00	0.0000	169.20	0.0000
1000	0.10	0.00	0.00	0.0000	68.13	0.0000

57% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0314
Ann Rate [g/s]: 0.0037

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.06	0.03	2.1E-05	1231.74	0.0028
30	33.45	0.12	0.05	4.1E-05	1650.82	0.0037
40	27.02	0.10	0.04	3.3E-05	1484.02	0.0033
50	25.03	0.09	0.04	3.1E-05	2079.26	0.0047
60	20.90	0.08	0.03	2.6E-05	1915.91	0.0043
80	12.23	0.05	0.02	1.5E-05	1479.75	0.0033
100	8.02	0.03	0.01	9.9E-06	1184.75	0.0027
150	3.71	0.01	0.01	4.6E-06	769.33	0.0017
200	2.14	0.01	0.00	2.6E-06	550.34	0.0012
250	1.39	0.01	0.00	1.7E-06	417.99	0.0009
500	0.36	0.00	0.00	4.5E-07	169.20	0.0004
1000	0.10	0.00	0.00	1.2E-07	68.13	0.0002

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.00	0.00	0.0000	1231.74	0.0000
30	33.45	0.00	0.00	0.0000	1650.82	0.0000
40	27.02	0.00	0.00	0.0000	1484.02	0.0000
50	25.03	0.00	0.00	0.0000	2079.26	0.0000
60	20.90	0.00	0.00	0.0000	1915.91	0.0000
80	12.23	0.00	0.00	0.0000	1479.75	0.0000
100	8.02	0.00	0.00	0.0000	1184.75	0.0000
150	3.71	0.00	0.00	0.0000	769.33	0.0000
200	2.14	0.00	0.00	0.0000	550.34	0.0000
250	1.39	0.00	0.00	0.0000	417.99	0.0000
500	0.36	0.00	0.00	0.0000	169.20	0.0000
1000	0.10	0.00	0.00	0.0000	68.13	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	0.06	0.03	2.1E-05	0.0028
30	0.12	0.05	4.1E-05	0.0037
40	0.10	0.04	3.3E-05	0.0033
50	0.09	0.04	3.1E-05	0.0047
60	0.08	0.03	2.6E-05	0.0043
80	0.05	0.02	1.5E-05	0.0033
100	0.03	0.01	9.9E-06	0.0027
150	0.01	0.01	4.6E-06	0.0017
200	0.01	0.00	2.6E-06	0.0012
250	0.01	0.00	1.7E-06	0.0009
500	0.00	0.00	4.5E-07	0.0004
1000	0.00	0.00	1.2E-07	0.0002

Averaged Multicomponent Health Impacts from Carburetor Cleaners for Facility G-03

Weightings:			
	1	68% Perc	10.4%
	2	57% MeCl	89.6%

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Center	Resident	Worker	Chronic	Acute
20	0.10	0.04	0.0002	0.0027
30	0.20	0.08	0.0004	0.0036
40	0.16	0.07	0.0004	0.0033
50	0.15	0.06	0.0003	0.0046
60	0.12	0.05	0.0003	0.0042
80	0.07	0.03	0.0002	0.0032
100	0.05	0.02	0.0001	0.0026
150	0.02	0.01	4.9E-05	0.0017
200	0.01	0.01	2.8E-05	0.0012
250	0.01	0.00	1.9E-05	0.0009
500	0.00	0.00	4.8E-06	0.0004
1000	0.00	0.00	1.3E-06	0.0001

Risk Assessment Summary - 3 Generic Facilities
Multicomponent Impacts - Carburetor Cleaners - Default Met

Facility G-01 - 68% Perc

404

Met Set: Default-0
68% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0347
Ann Rate [g/s]: 0.0041

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	7.43	3.16	0.0360	11342.73	0.0197
30	229.98	5.56	2.37	0.0269	8496.33	0.0147
40	178.09	4.31	1.83	0.0209	6579.11	0.0114
50	141.80	3.43	1.46	0.0166	5238.72	0.0091
60	115.56	2.80	1.19	0.0135	4269.33	0.0074
80	81.09	1.96	0.84	0.0095	2995.85	0.0052
100	60.18	1.46	0.62	0.0070	2223.11	0.0039
150	33.55	0.81	0.35	0.0039	1239.31	0.0022
200	21.63	0.52	0.22	0.0025	799.09	0.0014
250	15.25	0.37	0.16	0.0018	563.57	0.0010
500	5.08	0.12	0.05	0.0006	187.51	0.0003
1000	1.74	0.04	0.02	0.0002	64.26	0.0001

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500	5.08	0.00	0.00	0.0000	187.51	0.0000
1000	1.74	0.00	0.00	0.0000	64.26	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500		0.00	0.00	0.0000	187.51	0.0000
1000		0.00	0.00	0.0000	64.26	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	7.43	3.16	0.0360	0.0197
30	5.56	2.37	0.0269	0.0147
40	4.31	1.83	0.0209	0.0114
50	3.43	1.46	0.0166	0.0091
60	2.80	1.19	0.0135	0.0074
80	1.96	0.84	0.0095	0.0052
100	1.46	0.62	0.0070	0.0039
150	0.81	0.35	0.0039	0.0022
200	0.52	0.22	0.0025	0.0014
250	0.37	0.16	0.0018	0.0010
500	0.12	0.05	0.0006	0.0003
1000	0.04	0.02	0.0002	0.0001

Facility G-01 - 57% MeCl

Met Set: Default-0

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500	5.08	0.00	0.00	0.0000	187.51	0.0000
1000	1.74	0.00	0.00	0.0000	64.26	0.0000

57% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0314
Ann Rate [g/s]: 0.0037

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	1.14	0.48	0.0004	11342.73	0.0254
30	229.98	0.85	0.36	0.0003	8496.33	0.0191
40	178.09	0.66	0.28	0.0002	6579.11	0.0148
50	141.80	0.52	0.22	0.0002	5238.72	0.0117
60	115.56	0.43	0.18	0.0001	4269.33	0.0096
80	81.09	0.30	0.13	0.0001	2995.85	0.0067
100	60.18	0.22	0.09	0.0001	2223.11	0.0050
150	33.55	0.12	0.05	4.1E-05	1239.31	0.0028
200	21.63	0.08	0.03	2.7E-05	799.09	0.0018
250	15.25	0.06	0.02	1.9E-05	563.57	0.0013
500	5.08	0.02	0.01	6.3E-06	187.51	0.0004
1000	1.74	0.01	0.00	2.1E-06	64.26	0.0001

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500	5.08	0.00	0.00	0.0000	187.51	0.0000
1000	1.74	0.00	0.00	0.0000	64.26	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	1.14	0.48	0.0004	0.0254
30	0.85	0.36	0.0003	0.0191
40	0.66	0.28	0.0002	0.0148
50	0.52	0.22	0.0002	0.0117
60	0.43	0.18	0.0001	0.0096
80	0.30	0.13	0.0001	0.0067
100	0.22	0.09	0.0001	0.0050
150	0.12	0.05	4.1E-05	0.0028
200	0.08	0.03	2.7E-05	0.0018
250	0.06	0.02	1.9E-05	0.0013
500	0.02	0.01	6.3E-06	0.0004
1000	0.01	0.00	2.1E-06	0.0001

405

Averaged Multicomponent Health Impacts from Carburetor Cleaners for Facility G-01

Weightings:		
	1 68% Perc	10.4%
	2 57% MeCl	89.6%

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Envelope	Resident	Worker	Chronic	Acute
20	1.79	0.76	0.0041	0.0248
30	1.34	0.57	0.0031	0.0186
40	1.04	0.44	0.0024	0.0144
50	0.83	0.35	0.0019	0.0115
60	0.67	0.29	0.0015	0.0094
80	0.47	0.20	0.0011	0.0066
100	0.35	0.15	0.0008	0.0049
150	0.20	0.08	0.0004	0.0027
200	0.13	0.05	0.0003	0.0018
250	0.09	0.04	0.0002	0.0012
500	0.03	0.01	0.0001	0.0004
1000	0.01	0.00	2.3E-05	0.0001

Facility G-0[illegible] [illegible]% Perc

Met Set: Default-0

68% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0347
Ann Rate [g/s]: 0.0041

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	3.45	1.47	0.0167	5276.51	0.0092
30	117.98	2.85	1.21	0.0138	4358.64	0.0076
40	98.78	2.39	1.02	0.0116	3649.09	0.0063
50	83.77	2.03	0.86	0.0098	3094.79	0.0054
60	71.89	1.74	0.74	0.0084	2656.01	0.0046
80	54.62	1.32	0.56	0.0064	2017.7	0.0035
100	42.94	1.04	0.44	0.0050	1586.22	0.0028
150	26.25	0.63	0.27	0.0031	969.72	0.0017
200	17.86	0.43	0.18	0.0021	659.99	0.0011
250	13.05	0.32	0.13	0.0015	482.19	0.0008
500	4.69	0.11	0.05	0.0005	173.33	0.0003
1000	1.68	0.04	0.02	0.0002	61.9	0.0001

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	3.45	1.47	0.0167	0.0092
30	2.85	1.21	0.0138	0.0076
40	2.39	1.02	0.0116	0.0063
50	2.03	0.86	0.0098	0.0054
60	1.74	0.74	0.0084	0.0046
80	1.32	0.56	0.0064	0.0035
100	1.04	0.44	0.0050	0.0028
150	0.63	0.27	0.0031	0.0017
200	0.43	0.18	0.0021	0.0011
250	0.32	0.13	0.0015	0.0008
500	0.11	0.05	0.0005	0.0003
1000	0.04	0.02	0.0002	0.0001

407

Facility G-02 - 57% MeCl

Met Set: Default-0

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

57% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0314
Ann Rate [g/s]: 0.0037

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.53	0.22	0.0002	5276.51	0.0118
30	117.98	0.44	0.19	0.0001	4358.64	0.0098
40	98.78	0.37	0.16	0.0001	3649.09	0.0082
50	83.77	0.31	0.13	0.0001	3094.79	0.0069
60	71.89	0.27	0.11	0.0001	2656.01	0.0060
80	54.62	0.20	0.09	0.0001	2017.70	0.0045
100	42.94	0.16	0.07	0.0001	1586.22	0.0036
150	26.25	0.10	0.04	3.2E-05	969.72	0.0022
200	17.86	0.07	0.03	2.2E-05	659.99	0.0015
250	13.05	0.05	0.02	1.6E-05	482.19	0.0011
500	4.69	0.02	0.01	5.8E-06	173.33	0.0004
1000	1.68	0.01	0.00	2.1E-06	61.90	0.0001

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	0.53	0.22	0.0002	0.0118
30	0.44	0.19	0.0001	0.0098
40	0.37	0.16	0.0001	0.0082
50	0.31	0.13	0.0001	0.0069
60	0.27	0.11	0.0001	0.0060
80	0.20	0.09	0.0001	0.0045
100	0.16	0.07	0.0001	0.0036
150	0.10	0.04	3.2E-05	0.0022
200	0.07	0.03	2.2E-05	0.0015
250	0.05	0.02	1.6E-05	0.0011
500	0.02	0.01	5.8E-06	0.0004
1000	0.01	0.00	2.1E-06	0.0001

TABLE 7 (continued).

B. **NEAREST** Business/Residential Receptor Maximum **HOURLY** Concentrations (ug/m^3).

Type	ID	X (m)	Y (m)	Distance[a] (m)		Direction[b] (deg.)	HIGH[c]	LOW[c]	AVG[c]
Bus.	A-07	-5	20	32	*	348	3818	2724	3021
	A-08	10	-10	32	*	132	5430	3356	4485
(NBR)	A-09	0	10	32	*	0	2333	1752	1937
	A-28	-80	-90	120		222	1404	733	976
	A-52	-30	-10	32		252	2496	1914	2311
	A-83	-30	0	32	*	270	2966	2095	2654
	A-86	60	-160	171		159	439	253	345
	A-92	-30	10	32		288	5903	4006	4467
	I	30	90	95		18	960	721	771
	O	0	-26	32	*	180	7258	6540	7085
	P	0	-31	32	*	180	2261	1462	1862
	T	0	-30	32	*	180	3148	2948	3059
	U	91	0	91		90	2399	2399	2399
Res.	A-07	10	0	32	*	90	3399	2200	2615
	A-08	-40	10	41		284	4340	1836	3605
(NRR)	A-09	30	0	32	*	90	3437	2318	2712
	A-28	-90	-10	91		264	1351	1202	1302
	A-52	-35	30	46		311	4098	3073	3720
	A-83	0	-35	35		180	3972	3742	3865
	A-86	250	250	354		45	155	60	121
	A-92	-50	-50	71		225	1265	1263	1264
	I	-130	70	148		298	746	503	592
	O	-100	0	100		270	2139	1344	1906
	P	-35	0	35		270	2652	2360	2537
	T	0	6	32	*	0	3148	3026	3112
	U	0	6	32	*	0	3107	3107	3107

NOTES:

The symbol "*" indicates the receptor is closer than 32 meters from the source centroid. In this case, the concentration is replaced with modeling results for the estimated concentration at 32 meters in the equivalent direction from the source (i.e., +/- 3 degrees).

Direction is measured clockwise, from North.

For each facility and receptor, one maximum concentration was modeled per year of meteorological data indicated in Table 4 (during hours of operation). For example, facility A-7 has five years of Oakland meteorological data (1960,1961,1962,1963, and 1964). Thus, five maximum estimates were made for each A-7 receptor. The tabulated high, low, and average concentrations are the high, low, and average statistics based on these concentrations. Therefor, if the concentrations were 1, 2, 3, 4, and 5, then the low would be 1, the average would be 3 and the high would be 5 (ug/m^3).

Facility G-03 - 68% Perc

Met Set: Default-0

68% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0347

Ann Rate [g/s]: 0.0041

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	1.80	0.77	0.0087	2744.96	0.0048
30	64.57	1.56	0.66	0.0076	2385.45	0.0041
40	56.52	1.37	0.58	0.0066	2088.05	0.0036
50	49.84	1.21	0.51	0.0058	1841.4	0.0032
60	44.27	1.07	0.46	0.0052	1635.59	0.0028
80	35.62	0.86	0.37	0.0042	1315.96	0.0023
100	29.32	0.71	0.30	0.0034	1083.1	0.0019
150	19.45	0.47	0.20	0.0023	718.69	0.0012
200	13.97	0.34	0.14	0.0016	516.25	0.0009
250	10.61	0.26	0.11	0.0012	391.81	0.0007
500	4.18	0.10	0.04	0.0005	154.56	0.0003
1000	1.58	0.04	0.02	0.0002	58.4	0.0001

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	1.80	0.77	0.0087	0.0048
30	1.56	0.66	0.0076	0.0041
40	1.37	0.58	0.0066	0.0036
50	1.21	0.51	0.0058	0.0032
60	1.07	0.46	0.0052	0.0028
80	0.86	0.37	0.0042	0.0023
100	0.71	0.30	0.0034	0.0019
150	0.47	0.20	0.0023	0.0012
200	0.34	0.14	0.0016	0.0009
250	0.26	0.11	0.0012	0.0007
500	0.10	0.04	0.0005	0.0003
1000	0.04	0.02	0.0002	0.0001

Facility G-03 - 57% MeCl

Met Set: Default-0

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

57% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0314
Ann Rate [g/s]: 0.0037

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.27	0.12	0.0001	2744.96	0.0062
30	64.57	0.24	0.10	0.0001	2385.45	0.0054
40	56.52	0.21	0.09	0.0001	2088.05	0.0047
50	49.84	0.18	0.08	0.0001	1841.40	0.0041
60	44.27	0.16	0.07	0.0001	1635.59	0.0037
80	35.62	0.13	0.06	4.4E-05	1315.96	0.0030
100	29.32	0.11	0.05	3.6E-05	1083.10	0.0024
150	19.45	0.07	0.03	2.4E-05	718.69	0.0016
200	13.97	0.05	0.02	1.7E-05	516.25	0.0012
250	10.61	0.04	0.02	1.3E-05	391.81	0.0009
500	4.18	0.02	0.01	5.2E-06	154.56	0.0003
1000	1.58	0.01	0.00	1.9E-06	58.40	0.0001

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	0.27	0.12	0.0001	0.0062
30	0.24	0.10	0.0001	0.0054
40	0.21	0.09	0.0001	0.0047
50	0.18	0.08	0.0001	0.0041
60	0.16	0.07	0.0001	0.0037
80	0.13	0.06	4.4E-05	0.0030
100	0.11	0.05	3.6E-05	0.0024
150	0.07	0.03	2.4E-05	0.0016
200	0.05	0.02	1.7E-05	0.0012
250	0.04	0.02	1.3E-05	0.0009
500	0.02	0.01	5.2E-06	0.0003
1000	0.01	0.00	1.9E-06	0.0001

411

Averaged Multicomponent Health Impacts from Carburetor Cleaners for Facility G-03

Weightings:		
	1 68% Perc	10.4%
	2 57% MeCl	89.6%

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Envelope	Resident	Worker	Chronic	Acute
20	0.43	0.18	0.0010	0.0060
30	0.38	0.16	0.0009	0.0052
40	0.33	0.14	0.0008	0.0046
50	0.29	0.12	0.0007	0.0040
60	0.26	0.11	0.0006	0.0036
80	0.21	0.09	0.0005	0.0029
100	0.17	0.07	0.0004	0.0024
150	0.11	0.05	0.0003	0.0016
200	0.08	0.03	0.0002	0.0011
250	0.06	0.03	0.0001	0.0009
500	0.02	0.01	0.0001	0.0003
1000	0.01	0.00	2.1E-05	0.0001

Risk Asse ent Summary - 3 Generic Facilities
Multicomponent Impacts - Engine Degreasers - Average of 10 Met Sets

Facility G-01 - 47% Perc

Met Set: Averaged

47%

op hrs/wk: 57

Acu Rate [g/s]: 0.0708
Ann Rate [g/s]: 0.0035

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	2.63	1.12	0.0128	10938.41	0.0387
30	67.72	1.40	0.60	0.0068	8158.81	0.0289
40	41.93	0.87	0.37	0.0042	6322.28	0.0224
50	28.51	0.59	0.25	0.0029	5024.56	0.0178
60	20.66	0.43	0.18	0.0021	4082.78	0.0145
80	12.27	0.25	0.11	0.0012	2846.71	0.0101
100	8.12	0.17	0.07	0.0008	2100.30	0.0074
150	3.78	0.08	0.03	0.0004	1171.11	0.0041
200	2.18	0.05	0.02	0.0002	763.65	0.0027
250	1.42	0.03	0.01	0.0001	545.14	0.0019
500	0.37	0.01	0.00	3.7E-05	192.37	0.0007
1000	0.10	0.00	0.00	9.6E-06	72.27	0.0003

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	0.00	0.00	0.0000	10938.41	0.0000
30	67.72	0.00	0.00	0.0000	8158.81	0.0000
40	41.93	0.00	0.00	0.0000	6322.28	0.0000
50	28.51	0.00	0.00	0.0000	5024.56	0.0000
60	20.66	0.00	0.00	0.0000	4082.78	0.0000
80	12.27	0.00	0.00	0.0000	2846.71	0.0000
100	8.12	0.00	0.00	0.0000	2100.30	0.0000
150	3.78	0.00	0.00	0.0000	1171.11	0.0000
200	2.18	0.00	0.00	0.0000	763.65	0.0000
250	1.42	0.00	0.00	0.0000	545.14	0.0000
500	0.37	0.00	0.00	0.0000	192.37	0.0000
1000	0.10	0.00	0.00	0.0000	72.27	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	0.00	0.00	0.0000	10938.41	0.0000
30	67.72	0.00	0.00	0.0000	8158.81	0.0000
40	41.93	0.00	0.00	0.0000	6322.28	0.0000
50	28.51	0.00	0.00	0.0000	5024.56	0.0000
60	20.66	0.00	0.00	0.0000	4082.78	0.0000
80	12.27	0.00	0.00	0.0000	2846.71	0.0000
100	8.12	0.00	0.00	0.0000	2100.30	0.0000
150	3.78	0.00	0.00	0.0000	1171.11	0.0000
200	2.18	0.00	0.00	0.0000	763.65	0.0000
250	1.42	0.00	0.00	0.0000	545.14	0.0000
500	0.37	0.00	0.00	0.0000	192.37	0.0000
1000	0.10	0.00	0.00	0.0000	72.27	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	2.63	1.12	0.0128	0.0387
30	1.40	0.60	0.0068	0.0289
40	0.87	0.37	0.0042	0.0224
50	0.59	0.25	0.0029	0.0178
60	0.43	0.18	0.0021	0.0145
80	0.25	0.11	0.0012	0.0101
100	0.17	0.07	0.0008	0.0074
150	0.08	0.03	0.0004	0.0041
200	0.05	0.02	0.0002	0.0027
250	0.03	0.01	0.0001	0.0019
500	0.01	0.00	3.7E-05	0.0007
1000	0.00	0.00	9.6E-06	0.0003

413

Facility G-01 - 99% TCE

Met Set: Averaged

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	0.00	0.00	0.0000	10938.41	0.0000
30	67.72	0.00	0.00	0.0000	8158.81	0.0000
40	41.93	0.00	0.00	0.0000	6322.28	0.0000
50	28.51	0.00	0.00	0.0000	5024.56	0.0000
60	20.66	0.00	0.00	0.0000	4082.78	0.0000
80	12.27	0.00	0.00	0.0000	2846.71	0.0000
100	8.12	0.00	0.00	0.0000	2100.30	0.0000
150	3.78	0.00	0.00	0.0000	1171.11	0.0000
200	2.18	0.00	0.00	0.0000	763.65	0.0000
250	1.42	0.00	0.00	0.0000	545.14	0.0000
500	0.37	0.00	0.00	0.0000	192.37	0.0000
1000	0.10	0.00	0.00	0.0000	72.27	0.0000

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	0.00	0.00	0.0000	10938.41	0.0000
30	67.72	0.00	0.00	0.0000	8158.81	0.0000
40	41.93	0.00	0.00	0.0000	6322.28	0.0000
50	28.51	0.00	0.00	0.0000	5024.56	0.0000
60	20.66	0.00	0.00	0.0000	4082.78	0.0000
80	12.27	0.00	0.00	0.0000	2846.71	0.0000
100	8.12	0.00	0.00	0.0000	2100.30	0.0000
150	3.78	0.00	0.00	0.0000	1171.11	0.0000
200	2.18	0.00	0.00	0.0000	763.65	0.0000
250	1.42	0.00	0.00	0.0000	545.14	0.0000
500	0.37	0.00	0.00	0.0000	192.37	0.0000
1000	0.10	0.00	0.00	0.0000	72.27	0.0000

99% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1492
Ann Rate [g/s]: 0.0074

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	1.89	0.80	0.0015	10938.41	0.0000
30	67.72	1.00	0.43	0.0008	8158.81	0.0000
40	41.93	0.62	0.26	0.0005	6322.28	0.0000
50	28.51	0.42	0.18	0.0003	5024.56	0.0000
60	20.66	0.31	0.13	0.0002	4082.78	0.0000
80	12.27	0.18	0.08	0.0001	2846.71	0.0000
100	8.12	0.12	0.05	0.0001	2100.30	0.0000
150	3.78	0.06	0.02	4.4E-05	1171.11	0.0000
200	2.18	0.03	0.01	2.5E-05	763.65	0.0000
250	1.42	0.02	0.01	1.6E-05	545.14	0.0000
500	0.37	0.01	0.00	4.3E-06	192.37	0.0000
1000	0.10	0.00	0.00	1.1E-06	72.27	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	1.89	0.80	0.0015	0.0000
30	1.00	0.43	0.0008	0.0000
40	0.62	0.26	0.0005	0.0000
50	0.42	0.18	0.0003	0.0000
60	0.31	0.13	0.0002	0.0000
80	0.18	0.08	0.0001	0.0000
100	0.12	0.05	0.0001	0.0000
150	0.06	0.02	4.4E-05	0.0000
200	0.03	0.01	2.5E-05	0.0000
250	0.02	0.01	1.6E-05	0.0000
500	0.01	0.00	4.3E-06	0.0000
1000	0.00	0.00	1.1E-06	0.0000

Averaged Multicomponent Health Impacts from Engine Degreasers for Facility G-01

Weightings:		
	1 47% Perc	41.0%
	2 99% TCE	59.0%

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Center	Resident	Worker	Chronic	Acute
20	2.19	0.93	0.0061	0.0159
30	1.16	0.50	0.0032	0.0118
40	0.72	0.31	0.0020	0.0092
50	0.49	0.21	0.0014	0.0073
60	0.36	0.15	0.0010	0.0059
80	0.21	0.09	0.0006	0.0041
100	0.14	0.06	0.0004	0.0030
150	0.07	0.03	0.0002	0.0017
200	0.04	0.02	0.0001	0.0011
250	0.02	0.01	0.0001	0.0008
500	0.01	0.00	1.8E-05	0.0003
1000	0.00	0.00	4.6E-06	1.0E-04

415

Facility G-02 - 47% Perc

Met Set: Averaged

47% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0708
Ann Rate [g/s]: 0.0035

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	1.53	0.65	0.0074	4985.68	0.0176
30	56.37	1.16	0.50	0.0056	4251.05	0.0150
40	36.41	0.75	0.32	0.0036	3540.67	0.0125
50	25.36	0.52	0.22	0.0025	3001.30	0.0106
60	18.66	0.39	0.16	0.0019	2575.36	0.0091
80	11.32	0.23	0.10	0.0011	1951.11	0.0069
100	7.60	0.16	0.07	0.0008	1532.53	0.0054
150	3.61	0.07	0.03	0.0004	943.04	0.0033
200	2.11	0.04	0.02	0.0002	647.01	0.0023
250	1.38	0.03	0.01	0.0001	477.16	0.0017
500	0.36	0.01	0.00	3.6E-05	180.51	0.0006
1000	0.10	0.00	0.00	9.6E-06	70.25	0.0002

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	0.00	0.00	0.0000	4985.68	0.0000
30	56.37	0.00	0.00	0.0000	4251.05	0.0000
40	36.41	0.00	0.00	0.0000	3540.67	0.0000
50	25.36	0.00	0.00	0.0000	3001.30	0.0000
60	18.66	0.00	0.00	0.0000	2575.36	0.0000
80	11.32	0.00	0.00	0.0000	1951.11	0.0000
100	7.60	0.00	0.00	0.0000	1532.53	0.0000
150	3.61	0.00	0.00	0.0000	943.04	0.0000
200	2.11	0.00	0.00	0.0000	647.01	0.0000
250	1.38	0.00	0.00	0.0000	477.16	0.0000
500	0.36	0.00	0.00	0.0000	180.51	0.0000
1000	0.10	0.00	0.00	0.0000	70.25	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	0.00	0.00	0.0000	4985.68	0.0000
30	56.37	0.00	0.00	0.0000	4251.05	0.0000
40	36.41	0.00	0.00	0.0000	3540.67	0.0000
50	25.36	0.00	0.00	0.0000	3001.30	0.0000
60	18.66	0.00	0.00	0.0000	2575.36	0.0000
80	11.32	0.00	0.00	0.0000	1951.11	0.0000
100	7.60	0.00	0.00	0.0000	1532.53	0.0000
150	3.61	0.00	0.00	0.0000	943.04	0.0000
200	2.11	0.00	0.00	0.0000	647.01	0.0000
250	1.38	0.00	0.00	0.0000	477.16	0.0000
500	0.36	0.00	0.00	0.0000	180.51	0.0000
1000	0.10	0.00	0.00	0.0000	70.25	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	1.53	0.65	0.0074	0.0176
30	1.16	0.50	0.0056	0.0150
40	0.75	0.32	0.0036	0.0125
50	0.52	0.22	0.0025	0.0106
60	0.39	0.16	0.0019	0.0091
80	0.23	0.10	0.0011	0.0069
100	0.16	0.07	0.0008	0.0054
150	0.07	0.03	0.0004	0.0033
200	0.04	0.02	0.0002	0.0023
250	0.03	0.01	0.0001	0.0017
500	0.01	0.00	3.6E-05	0.0006
1000	0.00	0.00	9.6E-06	0.0002

Facility G-02 - 99% TCE

Met Set: Averaged

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	0.00	0.00	0.0000	4985.68	0.0000
30	56.37	0.00	0.00	0.0000	4251.05	0.0000
40	36.41	0.00	0.00	0.0000	3540.67	0.0000
50	25.36	0.00	0.00	0.0000	3001.30	0.0000
60	18.66	0.00	0.00	0.0000	2575.36	0.0000
80	11.32	0.00	0.00	0.0000	1951.11	0.0000
100	7.60	0.00	0.00	0.0000	1532.53	0.0000
150	3.61	0.00	0.00	0.0000	943.04	0.0000
200	2.11	0.00	0.00	0.0000	647.01	0.0000
250	1.38	0.00	0.00	0.0000	477.16	0.0000
500	0.36	0.00	0.00	0.0000	180.51	0.0000
1000	0.10	0.00	0.00	0.0000	70.25	0.0000

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	0.00	0.00	0.0000	4985.68	0.0000
30	56.37	0.00	0.00	0.0000	4251.05	0.0000
40	36.41	0.00	0.00	0.0000	3540.67	0.0000
50	25.36	0.00	0.00	0.0000	3001.30	0.0000
60	18.66	0.00	0.00	0.0000	2575.36	0.0000
80	11.32	0.00	0.00	0.0000	1951.11	0.0000
100	7.60	0.00	0.00	0.0000	1532.53	0.0000
150	3.61	0.00	0.00	0.0000	943.04	0.0000
200	2.11	0.00	0.00	0.0000	647.01	0.0000
250	1.38	0.00	0.00	0.0000	477.16	0.0000
500	0.36	0.00	0.00	0.0000	180.51	0.0000
1000	0.10	0.00	0.00	0.0000	70.25	0.0000

99% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1492
Ann Rate [g/s]: 0.0074

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	1.10	0.47	0.0009	4985.68	0.0000
30	56.37	0.83	0.36	0.0007	4251.05	0.0000
40	36.41	0.54	0.23	0.0004	3540.67	0.0000
50	25.36	0.38	0.16	0.0003	3001.30	0.0000
60	18.66	0.28	0.12	0.0002	2575.36	0.0000
80	11.32	0.17	0.07	0.0001	1951.11	0.0000
100	7.60	0.11	0.05	0.0001	1532.53	0.0000
150	3.61	0.05	0.02	4.2E-05	943.04	0.0000
200	2.11	0.03	0.01	2.4E-05	647.01	0.0000
250	1.38	0.02	0.01	1.6E-05	477.16	0.0000
500	0.36	0.01	0.00	4.2E-06	180.51	0.0000
1000	0.10	0.00	0.00	1.1E-06	70.25	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	1.10	0.47	0.0009	0.0000
30	0.83	0.36	0.0007	0.0000
40	0.54	0.23	0.0004	0.0000
50	0.38	0.16	0.0003	0.0000
60	0.28	0.12	0.0002	0.0000
80	0.17	0.07	0.0001	0.0000
100	0.11	0.05	0.0001	0.0000
150	0.05	0.02	4.2E-05	0.0000
200	0.03	0.01	2.4E-05	0.0000
250	0.02	0.01	1.6E-05	0.0000
500	0.01	0.00	4.2E-06	0.0000
1000	0.00	0.00	1.1E-06	0.0000

417

Averaged Multicomponent Health Impacts from Engine Degreasers for Facility G-02

Weightings:		
	1 24% Perc	41.0%
	2 99% TCE	59.0%

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Center	Resident	Worker	Chronic	Acute
20	1.28	0.54	0.0035	0.0072
30	0.97	0.41	0.0027	0.0062
40	0.63	0.27	0.0017	0.0051
50	0.44	0.19	0.0012	0.0044
60	0.32	0.14	0.0009	0.0037
80	0.19	0.08	0.0005	0.0028
100	0.13	0.06	0.0004	0.0022
150	0.06	0.03	0.0002	0.0014
200	0.04	0.02	0.0001	0.0009
250	0.02	0.01	0.0001	0.0007
500	0.01	0.00	1.7E-05	0.0003
1000	0.00	0.00	4.6E-06	1.0E-04

Facility G-03 % Perc

Met Set: Averaged

47% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0708
Ann Rate [g/s]: 0.0035

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.34	0.15	0.0017	1231.74	0.0044
30	33.45	0.69	0.29	0.0033	1650.82	0.0058
40	27.02	0.56	0.24	0.0027	1484.02	0.0053
50	25.03	0.52	0.22	0.0025	2079.26	0.0074
60	20.90	0.43	0.18	0.0021	1915.91	0.0068
80	12.23	0.25	0.11	0.0012	1479.75	0.0052
100	8.02	0.17	0.07	0.0008	1184.75	0.0042
150	3.71	0.08	0.03	0.0004	769.33	0.0027
200	2.14	0.04	0.02	0.0002	550.34	0.0019
250	1.39	0.03	0.01	0.0001	417.99	0.0015
500	0.36	0.01	0.00	3.6E-05	169.20	0.0006
1000	0.10	0.00	0.00	9.6E-06	68.13	0.0002

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.00	0.00	0.0000	1231.74	0.0000
30	33.45	0.00	0.00	0.0000	1650.82	0.0000
40	27.02	0.00	0.00	0.0000	1484.02	0.0000
50	25.03	0.00	0.00	0.0000	2079.26	0.0000
60	20.90	0.00	0.00	0.0000	1915.91	0.0000
80	12.23	0.00	0.00	0.0000	1479.75	0.0000
100	8.02	0.00	0.00	0.0000	1184.75	0.0000
150	3.71	0.00	0.00	0.0000	769.33	0.0000
200	2.14	0.00	0.00	0.0000	550.34	0.0000
250	1.39	0.00	0.00	0.0000	417.99	0.0000
500	0.36	0.00	0.00	0.0000	169.20	0.0000
1000	0.10	0.00	0.00	0.0000	68.13	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.00	0.00	0.0000	1231.74	0.0000
30	33.45	0.00	0.00	0.0000	1650.82	0.0000
40	27.02	0.00	0.00	0.0000	1484.02	0.0000
50	25.03	0.00	0.00	0.0000	2079.26	0.0000
60	20.90	0.00	0.00	0.0000	1915.91	0.0000
80	12.23	0.00	0.00	0.0000	1479.75	0.0000
100	8.02	0.00	0.00	0.0000	1184.75	0.0000
150	3.71	0.00	0.00	0.0000	769.33	0.0000
200	2.14	0.00	0.00	0.0000	550.34	0.0000
250	1.39	0.00	0.00	0.0000	417.99	0.0000
500	0.36	0.00	0.00	0.0000	169.20	0.0000
1000	0.10	0.00	0.00	0.0000	68.13	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	0.34	0.15	0.0017	0.0044
30	0.69	0.29	0.0033	0.0058
40	0.56	0.24	0.0027	0.0053
50	0.52	0.22	0.0025	0.0074
60	0.43	0.18	0.0021	0.0068
80	0.25	0.11	0.0012	0.0052
100	0.17	0.07	0.0008	0.0042
150	0.08	0.03	0.0004	0.0027
200	0.04	0.02	0.0002	0.0019
250	0.03	0.01	0.0001	0.0015
500	0.01	0.00	3.6E-05	0.0006
1000	0.00	0.00	9.6E-06	0.0002

419

Facility G-03 - 99% TCE

Met Set: Averaged

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.00	0.00	0.0000	1231.74	0.0000
30	33.45	0.00	0.00	0.0000	1650.82	0.0000
40	27.02	0.00	0.00	0.0000	1484.02	0.0000
50	25.03	0.00	0.00	0.0000	2079.26	0.0000
60	20.90	0.00	0.00	0.0000	1915.91	0.0000
80	12.23	0.00	0.00	0.0000	1479.75	0.0000
100	8.02	0.00	0.00	0.0000	1184.75	0.0000
150	3.71	0.00	0.00	0.0000	769.33	0.0000
200	2.14	0.00	0.00	0.0000	550.34	0.0000
250	1.39	0.00	0.00	0.0000	417.99	0.0000
500	0.36	0.00	0.00	0.0000	169.20	0.0000
1000	0.10	0.00	0.00	0.0000	68.13	0.0000

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.00	0.00	0.0000	1231.74	0.0000
30	33.45	0.00	0.00	0.0000	1650.82	0.0000
40	27.02	0.00	0.00	0.0000	1484.02	0.0000
50	25.03	0.00	0.00	0.0000	2079.26	0.0000
60	20.90	0.00	0.00	0.0000	1915.91	0.0000
80	12.23	0.00	0.00	0.0000	1479.75	0.0000
100	8.02	0.00	0.00	0.0000	1184.75	0.0000
150	3.71	0.00	0.00	0.0000	769.33	0.0000
200	2.14	0.00	0.00	0.0000	550.34	0.0000
250	1.39	0.00	0.00	0.0000	417.99	0.0000
500	0.36	0.00	0.00	0.0000	169.20	0.0000
1000	0.10	0.00	0.00	0.0000	68.13	0.0000

99% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1492
Ann Rate [g/s]: 0.0074

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.25	0.11	0.0002	1231.74	0.0000
30	33.45	0.50	0.21	0.0004	1650.82	0.0000
40	27.02	0.40	0.17	0.0003	1484.02	0.0000
50	25.03	0.37	0.16	0.0003	2079.26	0.0000
60	20.90	0.31	0.13	0.0002	1915.91	0.0000
80	12.23	0.18	0.08	0.0001	1479.75	0.0000
100	8.02	0.12	0.05	0.0001	1184.75	0.0000
150	3.71	0.05	0.02	4.3E-05	769.33	0.0000
200	2.14	0.03	0.01	2.5E-05	550.34	0.0000
250	1.39	0.02	0.01	1.6E-05	417.99	0.0000
500	0.36	0.01	0.00	4.2E-06	169.20	0.0000
1000	0.10	0.00	0.00	1.1E-06	68.13	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	0.25	0.11	0.0002	0.0000
30	0.50	0.21	0.0004	0.0000
40	0.40	0.17	0.0003	0.0000
50	0.37	0.16	0.0003	0.0000
60	0.31	0.13	0.0002	0.0000
80	0.18	0.08	0.0001	0.0000
100	0.12	0.05	0.0001	0.0000
150	0.05	0.02	4.3E-05	0.0000
200	0.03	0.01	2.5E-05	0.0000
250	0.02	0.01	1.6E-05	0.0000
500	0.01	0.00	4.2E-06	0.0000
1000	0.00	0.00	1.1E-06	0.0000

Averaged Multicomponent Health Impacts from Engine Degreasers for Facility G-03

Weightings:		
	1 24% Perc	41.0%
	2 99% TCE	59.0%

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Center	Resident	Worker	Chronic	Acute
20	0.29	0.12	0.0008	0.0018
30	0.58	0.24	0.0016	0.0024
40	0.46	0.20	0.0013	0.0022
50	0.43	0.18	0.0012	0.0030
60	0.36	0.15	0.0010	0.0028
80	0.21	0.09	0.0006	0.0021
100	0.14	0.06	0.0004	0.0017
150	0.06	0.03	0.0002	0.0011
200	0.04	0.02	0.0001	0.0008
250	0.02	0.01	0.0001	0.0006
500	0.01	0.00	0.0000	0.0002
1000	0.00	0.00	0.0000	0.0001

Risk Assessment Summary - 3 Generic Facilities
Multicomponent Impacts - Engine Degreasers - Default Met

Facility G-01 - 47% Perc

422

Met Set: Default-0

47%

op hrs/wk: 57

Acu Rate [g/s]: 0.0708
Ann Rate [g/s]: 0.0035

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	6.34	2.70	0.0307	11342.73	0.0402
30	229.98	4.75	2.02	0.0230	8496.33	0.0301
40	178.09	3.68	1.57	0.0178	6579.11	0.0233
50	141.80	2.93	1.25	0.0142	5238.72	0.0185
60	115.56	2.39	1.02	0.0116	4269.33	0.0151
80	81.09	1.67	0.71	0.0081	2995.85	0.0106
100	60.18	1.24	0.53	0.0060	2223.11	0.0079
150	33.55	0.69	0.29	0.0034	1239.31	0.0044
200	21.63	0.45	0.19	0.0022	799.09	0.0028
250	15.25	0.32	0.13	0.0015	563.57	0.0020
500	5.08	0.10	0.04	0.0005	187.51	0.0007
1000	1.74	0.04	0.02	0.0002	64.26	0.0002

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500	5.08	0.00	0.00	0.0000	187.51	0.0000
1000	1.74	0.00	0.00	0.0000	64.26	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500		0.00	0.00	0.0000	187.51	0.0000
1000		0.00	0.00	0.0000	64.26	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	6.34	2.70	0.0307	0.0402
30	4.75	2.02	0.0230	0.0301
40	3.68	1.57	0.0178	0.0233
50	2.93	1.25	0.0142	0.0185
60	2.39	1.02	0.0116	0.0151
80	1.67	0.71	0.0081	0.0106
100	1.24	0.53	0.0060	0.0079
150	0.69	0.29	0.0034	0.0044
200	0.45	0.19	0.0022	0.0028
250	0.32	0.13	0.0015	0.0020
500	0.10	0.04	0.0005	0.0007
1000	0.04	0.02	0.0002	0.0002

Facility G-01 - 99% TCE

Met Set: Default-0

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500	5.08	0.00	0.00	0.0000	187.51	0.0000
1000	1.74	0.00	0.00	0.0000	64.26	0.0000

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500	5.08	0.00	0.00	0.0000	187.51	0.0000
1000	1.74	0.00	0.00	0.0000	64.26	0.0000

99% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1492
Ann Rate [g/s]: 0.0074

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	4.54	1.93	0.0036	11342.73	0.0000
30	229.98	3.40	1.45	0.0027	8496.33	0.0000
40	178.09	2.64	1.12	0.0021	6579.11	0.0000
50	141.80	2.10	0.89	0.0016	5238.72	0.0000
60	115.56	1.71	0.73	0.0013	4269.33	0.0000
80	81.09	1.20	0.51	0.0009	2995.85	0.0000
100	60.18	0.89	0.38	0.0007	2223.11	0.0000
150	33.55	0.50	0.21	0.0004	1239.31	0.0000
200	21.63	0.32	0.14	0.0003	799.09	0.0000
250	15.25	0.23	0.10	0.0002	563.57	0.0000
500	5.08	0.08	0.03	0.0001	187.51	0.0000
1000	1.74	0.03	0.01	2.0E-05	64.26	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	4.54	1.93	0.0036	0.0000
30	3.40	1.45	0.0027	0.0000
40	2.64	1.12	0.0021	0.0000
50	2.10	0.89	0.0016	0.0000
60	1.71	0.73	0.0013	0.0000
80	1.20	0.51	0.0009	0.0000
100	0.89	0.38	0.0007	0.0000
150	0.50	0.21	0.0004	0.0000
200	0.32	0.14	0.0003	0.0000
250	0.23	0.10	0.0002	0.0000
500	0.08	0.03	0.0001	0.0000
1000	0.03	0.01	2.0E-05	0.0000

423

Averaged Multicomponent Health Impacts from Engine Degreasers for Facility G-01

Weightings:		
	1 47% Perc	41.0%
	2 99% TCE	59.0%

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Envelope	Resident	Worker	Chronic	Acute
20	5.28	2.25	0.0147	0.0165
30	3.96	1.68	0.0110	0.0123
40	3.06	1.30	0.0085	0.0095
50	2.44	1.04	0.0068	0.0076
60	1.99	0.85	0.0055	0.0062
80	1.39	0.59	0.0039	0.0043
100	1.03	0.44	0.0029	0.0032
150	0.58	0.25	0.0016	0.0018
200	0.37	0.16	0.0010	0.0012
250	0.26	0.11	0.0007	0.0008
500	0.09	0.04	0.0002	0.0003
1000	0.03	0.01	0.0001	0.0001

Facility G-02 % Perc

Met Set: Default-0

47% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0708
Ann Rate [g/s]: 0.0035

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	2.95	1.26	0.0143	5276.51	0.0187
30	117.98	2.44	1.04	0.0118	4358.64	0.0154
40	98.78	2.04	0.87	0.0099	3649.09	0.0129
50	83.77	1.73	0.74	0.0084	3094.79	0.0110
60	71.89	1.48	0.63	0.0072	2656.01	0.0094
80	54.62	1.13	0.48	0.0055	2017.7	0.0071
100	42.94	0.89	0.38	0.0043	1586.22	0.0056
150	26.25	0.54	0.23	0.0026	969.72	0.0034
200	17.86	0.37	0.16	0.0018	659.99	0.0023
250	13.05	0.27	0.11	0.0013	482.19	0.0017
500	4.69	0.10	0.04	0.0005	173.33	0.0006
1000	1.68	0.03	0.01	0.0002	61.9	0.0002

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Worker	Harzard Index Chronic	Hazard Index Acute
20	2.95	1.26	0.0143	0.0187
30	2.44	1.04	0.0118	0.0154
40	2.04	0.87	0.0099	0.0129
50	1.73	0.74	0.0084	0.0110
60	1.48	0.63	0.0072	0.0094
80	1.13	0.48	0.0055	0.0071
100	0.89	0.38	0.0043	0.0056
150	0.54	0.23	0.0026	0.0034
200	0.37	0.16	0.0018	0.0023
250	0.27	0.11	0.0013	0.0017
500	0.10	0.04	0.0005	0.0006
1000	0.03	0.01	0.0002	0.0002

425

Facility G-02 - 99% TCE

Met Set: Default-0

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

99% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1492
Ann Rate [g/s]: 0.0074

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	2.11	0.90	0.0017	5276.51	0.0000
30	117.98	1.75	0.74	0.0014	4358.64	0.0000
40	98.78	1.46	0.62	0.0011	3649.09	0.0000
50	83.77	1.24	0.53	0.0010	3094.79	0.0000
60	71.89	1.06	0.45	0.0008	2656.01	0.0000
80	54.62	0.81	0.34	0.0006	2017.70	0.0000
100	42.94	0.64	0.27	0.0005	1586.22	0.0000
150	26.25	0.39	0.17	0.0003	969.72	0.0000
200	17.86	0.26	0.11	0.0002	659.99	0.0000
250	13.05	0.19	0.08	0.0002	482.19	0.0000
500	4.69	0.07	0.03	0.0001	173.33	0.0000
1000	1.68	0.02	0.01	1.9E-05	61.90	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	2.11	0.90	0.0017	0.0000
30	1.75	0.74	0.0014	0.0000
40	1.46	0.62	0.0011	0.0000
50	1.24	0.53	0.0010	0.0000
60	1.06	0.45	0.0008	0.0000
80	0.81	0.34	0.0006	0.0000
100	0.64	0.27	0.0005	0.0000
150	0.39	0.17	0.0003	0.0000
200	0.26	0.11	0.0002	0.0000
250	0.19	0.08	0.0002	0.0000
500	0.07	0.03	0.0001	0.0000
1000	0.02	0.01	1.9E-05	0.0000

Averaged Multicomponent Health Impacts from Engine Degreasers for Facility G-02

Weightings:			
	1	24% Perc	41.0%
	2	99% TCE	59.0%

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Envelope	Resident	Worker	Chronic	Acute
20	2.46	1.05	0.0068	0.0077
30	2.03	0.86	0.0056	0.0063
40	1.70	0.72	0.0047	0.0053
50	1.44	0.61	0.0040	0.0045
60	1.24	0.53	0.0034	0.0039
80	0.94	0.40	0.0026	0.0029
100	0.74	0.31	0.0021	0.0023
150	0.45	0.19	0.0013	0.0014
200	0.31	0.13	0.0009	0.0010
250	0.22	0.10	0.0006	0.0007
500	0.08	0.03	0.0002	0.0003
1000	0.03	0.01	0.0001	0.0001

Facility G-03 - 47% Perc

Met Set: Default-0

47% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0708
Ann Rate [g/s]: 0.0035

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	1.53	0.65	0.0074	2744.96	0.0097
30	64.57	1.33	0.57	0.0065	2385.45	0.0084
40	56.52	1.17	0.50	0.0057	2088.05	0.0074
50	49.84	1.03	0.44	0.0050	1841.4	0.0065
60	44.27	0.91	0.39	0.0044	1635.59	0.0058
80	35.62	0.74	0.31	0.0036	1315.96	0.0047
100	29.32	0.61	0.26	0.0029	1083.1	0.0038
150	19.45	0.40	0.17	0.0019	718.69	0.0025
200	13.97	0.29	0.12	0.0014	516.25	0.0018
250	10.61	0.22	0.09	0.0011	391.81	0.0014
500	4.18	0.09	0.04	0.0004	154.56	0.0005
1000	1.58	0.03	0.01	0.0002	58.4	0.0002

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	1.53	0.65	0.0074	0.0097
30	1.33	0.57	0.0065	0.0084
40	1.17	0.50	0.0057	0.0074
50	1.03	0.44	0.0050	0.0065
60	0.91	0.39	0.0044	0.0058
80	0.74	0.31	0.0036	0.0047
100	0.61	0.26	0.0029	0.0038
150	0.40	0.17	0.0019	0.0025
200	0.29	0.12	0.0014	0.0018
250	0.22	0.09	0.0011	0.0014
500	0.09	0.04	0.0004	0.0005
1000	0.03	0.01	0.0002	0.0002

Facility G-03 - 99% TCE

Met Set: Default-0

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

99% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.1492
Ann Rate [g/s]: 0.0074

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	1.10	0.47	0.0009	2744.96	0.0000
30	64.57	0.96	0.41	0.0007	2385.45	0.0000
40	56.52	0.84	0.36	0.0007	2088.05	0.0000
50	49.84	0.74	0.31	0.0006	1841.40	0.0000
60	44.27	0.66	0.28	0.0005	1635.59	0.0000
80	35.62	0.53	0.22	0.0004	1315.96	0.0000
100	29.32	0.43	0.18	0.0003	1083.10	0.0000
150	19.45	0.29	0.12	0.0002	718.69	0.0000
200	13.97	0.21	0.09	0.0002	516.25	0.0000
250	10.61	0.16	0.07	0.0001	391.81	0.0000
500	4.18	0.06	0.03	4.8E-05	154.56	0.0000
1000	1.58	0.02	0.01	1.8E-05	58.40	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	1.10	0.47	0.0009	0.0000
30	0.96	0.41	0.0007	0.0000
40	0.84	0.36	0.0007	0.0000
50	0.74	0.31	0.0006	0.0000
60	0.66	0.28	0.0005	0.0000
80	0.53	0.22	0.0004	0.0000
100	0.43	0.18	0.0003	0.0000
150	0.29	0.12	0.0002	0.0000
200	0.21	0.09	0.0002	0.0000
250	0.16	0.07	0.0001	0.0000
500	0.06	0.03	4.8E-05	0.0000
1000	0.02	0.01	1.8E-05	0.0000

429

Averaged Multicomponent Health Impacts from Engine Degreasers for Facility G-03

Weightings:		
	1 24% Perc	41.0%
	2 99% TCE	59.0%

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Envelope	Resident	Worker	Chronic	Acute
20	1.28	0.54	0.0036	0.0040
30	1.11	0.47	0.0031	0.0035
40	0.97	0.41	0.0027	0.0030
50	0.86	0.36	0.0024	0.0027
60	0.76	0.32	0.0021	0.0024
80	0.61	0.26	0.0017	0.0019
100	0.50	0.21	0.0014	0.0016
150	0.33	0.14	0.0009	0.0010
200	0.24	0.10	0.0007	0.0007
250	0.18	0.08	0.0005	0.0006
500	0.07	0.03	0.0002	0.0002
1000	0.03	0.01	0.0001	0.0001

Risk Assessment Summary - 3 Generic Facilities
Multicomponent Impacts - General Degreasers - Average of 10 Met Sets

Facility G-01 - 24% Perc

Met Set: Averaged

24% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0151
Ann Rate [g/s]: 0.0016

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	1.20	0.51	0.0058	10938.41	0.0083
30	67.72	0.64	0.27	0.0031	8158.81	0.0062
40	41.93	0.40	0.17	0.0019	6322.28	0.0048
50	28.51	0.27	0.11	0.0013	5024.56	0.0038
60	20.66	0.19	0.08	0.0009	4082.78	0.0031
80	12.27	0.12	0.05	0.0006	2846.71	0.0021
100	8.12	0.08	0.03	0.0004	2100.30	0.0016
150	3.78	0.04	0.02	0.0002	1171.11	0.0009
200	2.18	0.02	0.01	0.0001	763.65	0.0006
250	1.42	0.01	0.01	0.0001	545.14	0.0004
500	0.37	0.00	0.00	1.7E-05	192.37	0.0001
1000	0.10	0.00	0.00	4.4E-06	72.27	5.5E-05

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	0.00	0.00	0.0000	10938.41	0.0000
30	67.72	0.00	0.00	0.0000	8158.81	0.0000
40	41.93	0.00	0.00	0.0000	6322.28	0.0000
50	28.51	0.00	0.00	0.0000	5024.56	0.0000
60	20.66	0.00	0.00	0.0000	4082.78	0.0000
80	12.27	0.00	0.00	0.0000	2846.71	0.0000
100	8.12	0.00	0.00	0.0000	2100.30	0.0000
150	3.78	0.00	0.00	0.0000	1171.11	0.0000
200	2.18	0.00	0.00	0.0000	763.65	0.0000
250	1.42	0.00	0.00	0.0000	545.14	0.0000
500	0.37	0.00	0.00	0.0000	192.37	0.0000
1000	0.10	0.00	0.00	0.0000	72.27	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	0.00	0.00	0.0000	10938.41	0.0000
30	67.72	0.00	0.00	0.0000	8158.81	0.0000
40	41.93	0.00	0.00	0.0000	6322.28	0.0000
50	28.51	0.00	0.00	0.0000	5024.56	0.0000
60	20.66	0.00	0.00	0.0000	4082.78	0.0000
80	12.27	0.00	0.00	0.0000	2846.71	0.0000
100	8.12	0.00	0.00	0.0000	2100.30	0.0000
150	3.78	0.00	0.00	0.0000	1171.11	0.0000
200	2.18	0.00	0.00	0.0000	763.65	0.0000
250	1.42	0.00	0.00	0.0000	545.14	0.0000
500	0.37	0.00	0.00	0.0000	192.37	0.0000
1000	0.10	0.00	0.00	0.0000	72.27	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	1.20	0.51	0.0058	0.0083
30	0.64	0.27	0.0031	0.0062
40	0.40	0.17	0.0019	0.0048
50	0.27	0.11	0.0013	0.0038
60	0.19	0.08	0.0009	0.0031
80	0.12	0.05	0.0006	0.0021
100	0.08	0.03	0.0004	0.0016
150	0.04	0.02	0.0002	0.0009
200	0.02	0.01	0.0001	0.0006
250	0.01	0.01	0.0001	0.0004
500	0.00	0.00	1.7E-05	0.0001
1000	0.00	0.00	4.4E-06	5.5E-05

Facility G-01 - 41% Perc, 55% MeCl

Met Set: Averaged

41% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0259

Ann Rate [g/s]: 0.0027

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	2.03	0.86	0.0098	10938.41	0.0142
30	67.72	1.08	0.46	0.0052	8158.81	0.0106
40	41.93	0.67	0.28	0.0032	6322.28	0.0082
50	28.51	0.45	0.19	0.0022	5024.56	0.0065
60	20.66	0.33	0.14	0.0016	4082.78	0.0053
80	12.27	0.20	0.08	0.0009	2846.71	0.0037
100	8.12	0.13	0.06	0.0006	2100.30	0.0027
150	3.78	0.06	0.03	0.0003	1171.11	0.0015
200	2.18	0.03	0.01	1.7E-04	763.65	0.0010
250	1.42	0.02	0.01	1.1E-04	545.14	0.0007
500	0.37	0.01	0.00	2.8E-05	192.37	2.5E-04
1000	0.10	0.00	0.00	7.4E-06	72.27	9.4E-05

55% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0347

Ann Rate [g/s]: 0.0036

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	0.46	0.20	0.0011	10938.41	0.0271
30	67.72	0.24	0.10	0.0006	8158.81	0.0202
40	41.93	0.15	0.06	0.0004	6322.28	0.0157
50	28.51	0.10	0.04	0.0003	5024.56	0.0125
60	20.66	0.07	0.03	0.0002	4082.78	0.0101
80	12.27	0.04	0.02	0.0001	2846.71	0.0071
100	8.12	0.03	0.01	0.0001	2100.30	0.0052
150	3.78	0.01	0.01	3.41E-05	1171.11	0.0029
200	2.18	0.01	0.00	1.96E-05	763.65	0.0019
250	1.42	0.01	0.00	1.28E-05	545.14	0.0014
500	0.37	0.00	0.00	3.31E-06	192.37	0.0005
1000	0.10	0.00	0.00	8.64E-07	72.27	0.0002

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0

Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	0.00	0.00	0.0000	10938.41	0.0000
30	67.72	0.00	0.00	0.0000	8158.81	0.0000
40	41.93	0.00	0.00	0.0000	6322.28	0.0000
50	28.51	0.00	0.00	0.0000	5024.56	0.0000
60	20.66	0.00	0.00	0.0000	4082.78	0.0000
80	12.27	0.00	0.00	0.0000	2846.71	0.0000
100	8.12	0.00	0.00	0.0000	2100.30	0.0000
150	3.78	0.00	0.00	0.0000	1171.11	0.0000
200	2.18	0.00	0.00	0.0000	763.65	0.0000
250	1.42	0.00	0.00	0.0000	545.14	0.0000
500	0.37	0.00	0.00	0.0000	192.37	0.0000
1000	0.10	0.00	0.00	0.0000	72.27	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	2.49	1.06	0.0110	0.0413
30	1.32	0.56	0.0058	0.0308
40	0.82	0.35	0.0036	0.0239
50	0.56	0.24	0.0025	0.0190
60	0.40	0.17	0.0018	0.0154
80	0.24	0.10	0.0011	0.0107
100	0.16	0.07	0.0007	0.0079
150	0.07	0.03	0.0003	0.0044
200	0.04	0.02	0.0002	0.0029
250	0.03	0.01	1.2E-04	0.0021
500	0.01	0.00	3.2E-05	7.3E-04
1000	0.00	0.00	8.3E-06	2.7E-04

Facility G-01 - 46% MeCl

Met Set: Averaged

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	0.00	0.00	0.0000	10938.41	0.0000
30	67.72	0.00	0.00	0.0000	8158.81	0.0000
40	41.93	0.00	0.00	0.0000	6322.28	0.0000
50	28.51	0.00	0.00	0.0000	5024.56	0.0000
60	20.66	0.00	0.00	0.0000	4082.78	0.0000
80	12.27	0.00	0.00	0.0000	2846.71	0.0000
100	8.12	0.00	0.00	0.0000	2100.30	0.0000
150	3.78	0.00	0.00	0.0000	1171.11	0.0000
200	2.18	0.00	0.00	0.0000	763.65	0.0000
250	1.42	0.00	0.00	0.0000	545.14	0.0000
500	0.37	0.00	0.00	0.0000	192.37	0.0000
1000	0.10	0.00	0.00	0.0000	72.27	0.0000

46% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0290
Ann Rate [g/s]: 0.0030

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	0.38	0.16	0.0001	10938.41	0.0227
30	67.72	0.20	0.09	0.0001	8158.81	0.0169
40	41.93	0.13	0.05	4.2E-05	6322.28	0.0131
50	28.51	0.09	0.04	2.9E-05	5024.56	0.0104
60	20.66	0.06	0.03	2.1E-05	4082.78	0.0085
80	12.27	0.04	0.02	1.2E-05	2846.71	0.0059
100	8.12	0.02	0.01	8.1E-06	2100.30	0.0044
150	3.78	0.01	0.00	3.8E-06	1171.11	0.0024
200	2.18	0.01	0.00	2.2E-06	763.65	0.0016
250	1.42	0.00	0.00	1.4E-06	545.14	0.0011
500	0.37	0.00	0.00	3.7E-07	192.37	0.0004
1000	0.10	0.00	0.00	9.6E-08	72.27	0.0001

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	0.00	0.00	0.0000	10938.41	0.0000
30	67.72	0.00	0.00	0.0000	8158.81	0.0000
40	41.93	0.00	0.00	0.0000	6322.28	0.0000
50	28.51	0.00	0.00	0.0000	5024.56	0.0000
60	20.66	0.00	0.00	0.0000	4082.78	0.0000
80	12.27	0.00	0.00	0.0000	2846.71	0.0000
100	8.12	0.00	0.00	0.0000	2100.30	0.0000
150	3.78	0.00	0.00	0.0000	1171.11	0.0000
200	2.18	0.00	0.00	0.0000	763.65	0.0000
250	1.42	0.00	0.00	0.0000	545.14	0.0000
500	0.37	0.00	0.00	0.0000	192.37	0.0000
1000	0.10	0.00	0.00	0.0000	72.27	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	0.38	0.16	0.0001	0.0227
30	0.20	0.09	0.0001	0.0169
40	0.13	0.05	4.2E-05	0.0131
50	0.09	0.04	2.9E-05	0.0104
60	0.06	0.03	2.1E-05	0.0085
80	0.04	0.02	1.2E-05	0.0059
100	0.02	0.01	8.1E-06	0.0044
150	0.01	0.00	3.8E-06	0.0024
200	0.01	0.00	2.2E-06	0.0016
250	0.00	0.00	1.4E-06	0.0011
500	0.00	0.00	3.7E-07	0.0004
1000	0.00	0.00	9.6E-08	0.0001

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Facility G-01 - 97% TCE

Met Set: Averaged

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	0.00	0.00	0.0000	10938.41	0.0000
30	67.72	0.00	0.00	0.0000	8158.81	0.0000
40	41.93	0.00	0.00	0.0000	6322.28	0.0000
50	28.51	0.00	0.00	0.0000	5024.56	0.0000
60	20.66	0.00	0.00	0.0000	4082.78	0.0000
80	12.27	0.00	0.00	0.0000	2846.71	0.0000
100	8.12	0.00	0.00	0.0000	2100.30	0.0000
150	3.78	0.00	0.00	0.0000	1171.11	0.0000
200	2.18	0.00	0.00	0.0000	763.65	0.0000
250	1.42	0.00	0.00	0.0000	545.14	0.0000
500	0.37	0.00	0.00	0.0000	192.37	0.0000
1000	0.10	0.00	0.00	0.0000	72.27	0.0000

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	0.00	0.00	0.0000	10938.41	0.0000
30	67.72	0.00	0.00	0.0000	8158.81	0.0000
40	41.93	0.00	0.00	0.0000	6322.28	0.0000
50	28.51	0.00	0.00	0.0000	5024.56	0.0000
60	20.66	0.00	0.00	0.0000	4082.78	0.0000
80	12.27	0.00	0.00	0.0000	2846.71	0.0000
100	8.12	0.00	0.00	0.0000	2100.30	0.0000
150	3.78	0.00	0.00	0.0000	1171.11	0.0000
200	2.18	0.00	0.00	0.0000	763.65	0.0000
250	1.42	0.00	0.00	0.0000	545.14	0.0000
500	0.37	0.00	0.00	0.0000	192.37	0.0000
1000	0.10	0.00	0.00	0.0000	72.27	0.0000

97% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0612
Ann Rate [g/s]: 0.0064

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	127.54	1.63	0.69	0.0013	10938.41	0.0000
30	67.72	0.87	0.37	0.0007	8158.81	0.0000
40	41.93	0.54	0.23	0.0004	6322.28	0.0000
50	28.51	0.36	0.16	0.0003	5024.56	0.0000
60	20.66	0.26	0.11	0.0002	4082.78	0.0000
80	12.27	0.16	0.07	0.0001	2846.71	0.0000
100	8.12	0.10	0.04	0.0001	2100.30	0.0000
150	3.78	0.05	0.02	3.8E-05	1171.11	0.0000
200	2.18	0.03	0.01	2.2E-05	763.65	0.0000
250	1.42	0.02	0.01	1.4E-05	545.14	0.0000
500	0.37	0.00	0.00	3.7E-06	192.37	0.0000
1000	0.10	0.00	0.00	9.6E-07	72.27	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	1.63	0.69	0.0013	0.0000
30	0.87	0.37	0.0007	0.0000
40	0.54	0.23	0.0004	0.0000
50	0.36	0.16	0.0003	0.0000
60	0.26	0.11	0.0002	0.0000
80	0.16	0.07	0.0001	0.0000
100	0.10	0.04	0.0001	0.0000
150	0.05	0.02	3.8E-05	0.0000
200	0.03	0.01	2.2E-05	0.0000
250	0.02	0.01	1.4E-05	0.0000
500	0.00	0.00	3.7E-06	0.0000
1000	0.00	0.00	9.6E-07	0.0000

Averaged M[illegible]mponent Health Impacts from General Degreasers for Faci[illegible]-01

Weightings:			
	1	24% Perc	5.3%
	2	41% Perc/55% MeCl	1.1%
	3	46% MeCl	7.2%
	4	97% TCE	86.0%

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Center	Resident	Worker	Chronic	Acute
20	1.52	0.65	0.0015	0.0025
30	0.81	0.34	0.0008	0.0019
40	0.50	0.21	0.0005	0.0015
50	0.34	0.14	0.0003	0.0012
60	0.25	0.10	0.0002	0.0009
80	0.15	0.06	0.0001	0.0007
100	0.10	0.04	0.0001	0.0005
150	0.05	0.02	0.0000	0.0003
200	0.03	0.01	2.6E-05	0.0002
250	0.02	0.01	1.7E-05	0.0001
500	0.00	0.00	4.4E-06	4.4E-05
1000	0.00	0.00	1.2E-06	1.7E-05

Facility G-02 - 24% Perc

Met Set: Averaged

24% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0151
Ann Rate [g/s]: 0.0016

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	0.70	0.30	0.0034	4985.68	0.0038
30	56.37	0.53	0.23	0.0026	4251.05	0.0032
40	36.41	0.34	0.15	0.0017	3540.67	0.0027
50	25.36	0.24	0.10	0.0012	3001.30	0.0023
60	18.66	0.18	0.07	0.0009	2575.36	0.0019
80	11.32	0.11	0.05	0.0005	1951.11	0.0015
100	7.60	0.07	0.03	0.0003	1532.53	0.0012
150	3.61	0.03	0.01	0.0002	943.04	0.0007
200	2.11	0.02	0.01	0.0001	647.01	0.0005
250	1.38	0.01	0.01	0.0001	477.16	0.0004
500	0.36	0.00	0.00	1.7E-05	180.51	0.0001
1000	0.10	0.00	0.00	4.4E-06	70.25	5.3E-05

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	0.00	0.00	0.0000	4985.68	0.0000
30	56.37	0.00	0.00	0.0000	4251.05	0.0000
40	36.41	0.00	0.00	0.0000	3540.67	0.0000
50	25.36	0.00	0.00	0.0000	3001.30	0.0000
60	18.66	0.00	0.00	0.0000	2575.36	0.0000
80	11.32	0.00	0.00	0.0000	1951.11	0.0000
100	7.60	0.00	0.00	0.0000	1532.53	0.0000
150	3.61	0.00	0.00	0.0000	943.04	0.0000
200	2.11	0.00	0.00	0.0000	647.01	0.0000
250	1.38	0.00	0.00	0.0000	477.16	0.0000
500	0.36	0.00	0.00	0.0000	180.51	0.0000
1000	0.10	0.00	0.00	0.0000	70.25	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	0.00	0.00	0.0000	4985.68	0.0000
30	56.37	0.00	0.00	0.0000	4251.05	0.0000
40	36.41	0.00	0.00	0.0000	3540.67	0.0000
50	25.36	0.00	0.00	0.0000	3001.30	0.0000
60	18.66	0.00	0.00	0.0000	2575.36	0.0000
80	11.32	0.00	0.00	0.0000	1951.11	0.0000
100	7.60	0.00	0.00	0.0000	1532.53	0.0000
150	3.61	0.00	0.00	0.0000	943.04	0.0000
200	2.11	0.00	0.00	0.0000	647.01	0.0000
250	1.38	0.00	0.00	0.0000	477.16	0.0000
500	0.36	0.00	0.00	0.0000	180.51	0.0000
1000	0.10	0.00	0.00	0.0000	70.25	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	0.70	0.30	0.0034	0.0038
30	0.53	0.23	0.0026	0.0032
40	0.34	0.15	0.0017	0.0027
50	0.24	0.10	0.0012	0.0023
60	0.18	0.07	0.0009	0.0019
80	0.11	0.05	0.0005	0.0015
100	0.07	0.03	0.0003	0.0012
150	0.03	0.01	0.0002	0.0007
200	0.02	0.01	0.0001	0.0005
250	0.01	0.01	0.0001	0.0004
500	0.00	0.00	1.7E-05	0.0001
1000	0.00	0.00	4.4E-06	5.3E-05

Facility G-02 - 41% Perc, 55% MeCl

Met Set: Averaged

41% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0259
Ann Rate [g/s]: 0.0027

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	1.18	0.50	0.0057	4985.68	0.0065
30	56.37	0.90	0.38	0.0043	4251.05	0.0055
40	36.41	0.58	0.25	0.0028	3540.67	0.0046
50	25.36	0.40	0.17	0.0020	3001.30	0.0039
60	18.66	0.30	0.13	0.0014	2575.36	0.0033
80	11.32	0.18	0.08	0.0009	1951.11	0.0025
100	7.60	0.12	0.05	0.0006	1532.53	0.0020
150	3.61	0.06	0.02	0.0003	943.04	0.0012
200	2.11	0.03	0.01	1.6E-04	647.01	0.0008
250	1.38	0.02	0.01	1.1E-04	477.16	0.0006
500	0.36	0.01	0.00	2.8E-05	180.51	2.3E-04
1000	0.10	0.00	0.00	7.4E-06	70.25	9.1E-05

55% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0347
Ann Rate [g/s]: 0.0036

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	0.27	0.11	0.0007	4985.68	0.0124
30	56.37	0.20	0.09	0.0005	4251.05	0.0105
40	36.41	0.13	0.06	0.0003	3540.67	0.0088
50	25.36	0.09	0.04	0.0002	3001.30	0.0074
60	18.66	0.07	0.03	0.0002	2575.36	0.0064
80	11.32	0.04	0.02	0.0001	1951.11	0.0048
100	7.60	0.03	0.01	0.0001	1532.53	0.0038
150	3.61	0.01	0.01	3.3E-05	943.04	0.0023
200	2.11	0.01	0.00	1.9E-05	647.01	0.0016
250	1.38	0.00	0.00	1.2E-05	477.16	0.0012
500	0.36	0.00	0.00	3.3E-06	180.51	0.0004
1000	0.10	0.00	0.00	8.6E-07	70.25	0.0002

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	0.00	0.00	0.0000	4985.68	0.0000
30	56.37	0.00	0.00	0.0000	4251.05	0.0000
40	36.41	0.00	0.00	0.0000	3540.67	0.0000
50	25.36	0.00	0.00	0.0000	3001.30	0.0000
60	18.66	0.00	0.00	0.0000	2575.36	0.0000
80	11.32	0.00	0.00	0.0000	1951.11	0.0000
100	7.60	0.00	0.00	0.0000	1532.53	0.0000
150	3.61	0.00	0.00	0.0000	943.04	0.0000
200	2.11	0.00	0.00	0.0000	647.01	0.0000
250	1.38	0.00	0.00	0.0000	477.16	0.0000
500	0.36	0.00	0.00	0.0000	180.51	0.0000
1000	0.10	0.00	0.00	0.0000	70.25	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	1.45	0.62	0.0064	0.0188
30	1.10	0.47	0.0049	0.0160
40	0.71	0.30	0.0031	0.0134
50	0.50	0.21	0.0022	0.0113
60	0.36	0.16	0.0016	0.0097
80	0.22	0.09	0.0010	0.0074
100	0.15	0.06	0.0007	0.0058
150	0.07	0.03	0.0003	0.0036
200	0.04	0.02	0.0002	0.0024
250	0.03	0.01	1.2E-04	0.0018
500	0.01	0.00	3.1E-05	6.8E-04
1000	0.00	0.00	8.3E-06	2.7E-04

437

Facility G-02 - 46% MeCl

Met Set: Averaged

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	0.00	0.00	0.0000	4985.68	0.0000
30	56.37	0.00	0.00	0.0000	4251.05	0.0000
40	36.41	0.00	0.00	0.0000	3540.67	0.0000
50	25.36	0.00	0.00	0.0000	3001.30	0.0000
60	18.66	0.00	0.00	0.0000	2575.36	0.0000
80	11.32	0.00	0.00	0.0000	1951.11	0.0000
100	7.60	0.00	0.00	0.0000	1532.53	0.0000
150	3.61	0.00	0.00	0.0000	943.04	0.0000
200	2.11	0.00	0.00	0.0000	647.01	0.0000
250	1.38	0.00	0.00	0.0000	477.16	0.0000
500	0.36	0.00	0.00	0.0000	180.51	0.0000
1000	0.10	0.00	0.00	0.0000	70.25	0.0000

46% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0290
Ann Rate [g/s]: 0.0030

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	0.22	0.09	0.0001	4985.68	0.0103
30	56.37	0.17	0.07	0.0001	4251.05	0.0088
40	36.41	0.11	0.05	3.6E-05	3540.67	0.0073
50	25.36	0.08	0.03	2.5E-05	3001.30	0.0062
60	18.66	0.06	0.02	1.9E-05	2575.36	0.0053
80	11.32	0.03	0.01	1.1E-05	1951.11	0.0040
100	7.60	0.02	0.01	7.6E-06	1532.53	0.0032
150	3.61	0.01	0.00	3.6E-06	943.04	0.0020
200	2.11	0.01	0.00	2.1E-06	647.01	0.0013
250	1.38	0.00	0.00	1.4E-06	477.16	0.0010
500	0.36	0.00	0.00	3.6E-07	180.51	0.0004
1000	0.10	0.00	0.00	9.6E-08	70.25	0.0001

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	0.00	0.00	0.0000	4985.68	0.0000
30	56.37	0.00	0.00	0.0000	4251.05	0.0000
40	36.41	0.00	0.00	0.0000	3540.67	0.0000
50	25.36	0.00	0.00	0.0000	3001.30	0.0000
60	18.66	0.00	0.00	0.0000	2575.36	0.0000
80	11.32	0.00	0.00	0.0000	1951.11	0.0000
100	7.60	0.00	0.00	0.0000	1532.53	0.0000
150	3.61	0.00	0.00	0.0000	943.04	0.0000
200	2.11	0.00	0.00	0.0000	647.01	0.0000
250	1.38	0.00	0.00	0.0000	477.16	0.0000
500	0.36	0.00	0.00	0.0000	180.51	0.0000
1000	0.10	0.00	0.00	0.0000	70.25	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Worker	Harzard Index Chronic	Hazard Index Acute
20	0.22	0.09	0.0001	0.0103
30	0.17	0.07	0.0001	0.0088
40	0.11	0.05	3.6E-05	0.0073
50	0.08	0.03	2.5E-05	0.0062
60	0.06	0.02	1.9E-05	0.0053
80	0.03	0.01	1.1E-05	0.0040
100	0.02	0.01	7.6E-06	0.0032
150	0.01	0.00	3.6E-06	0.0020
200	0.01	0.00	2.1E-06	0.0013
250	0.00	0.00	1.4E-06	0.0010
500	0.00	0.00	3.6E-07	0.0004
1000	0.00	0.00	9.6E-08	0.0001

Facility G-02 - 97% TCE

Met Set: Averaged

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	0.00	0.00	0.0000	4985.68	0.0000
30	56.37	0.00	0.00	0.0000	4251.05	0.0000
40	36.41	0.00	0.00	0.0000	3540.67	0.0000
50	25.36	0.00	0.00	0.0000	3001.30	0.0000
60	18.66	0.00	0.00	0.0000	2575.36	0.0000
80	11.32	0.00	0.00	0.0000	1951.11	0.0000
100	7.60	0.00	0.00	0.0000	1532.53	0.0000
150	3.61	0.00	0.00	0.0000	943.04	0.0000
200	2.11	0.00	0.00	0.0000	647.01	0.0000
250	1.38	0.00	0.00	0.0000	477.16	0.0000
500	0.36	0.00	0.00	0.0000	180.51	0.0000
1000	0.10	0.00	0.00	0.0000	70.25	0.0000

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	0.00	0.00	0.0000	4985.68	0.0000
30	56.37	0.00	0.00	0.0000	4251.05	0.0000
40	36.41	0.00	0.00	0.0000	3540.67	0.0000
50	25.36	0.00	0.00	0.0000	3001.30	0.0000
60	18.66	0.00	0.00	0.0000	2575.36	0.0000
80	11.32	0.00	0.00	0.0000	1951.11	0.0000
100	7.60	0.00	0.00	0.0000	1532.53	0.0000
150	3.61	0.00	0.00	0.0000	943.04	0.0000
200	2.11	0.00	0.00	0.0000	647.01	0.0000
250	1.38	0.00	0.00	0.0000	477.16	0.0000
500	0.36	0.00	0.00	0.0000	180.51	0.0000
1000	0.10	0.00	0.00	0.0000	70.25	0.0000

97% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0612
Ann Rate [g/s]: 0.0064

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.17	0.95	0.40	0.0007	4985.68	0.0000
30	56.37	0.72	0.31	0.0006	4251.05	0.0000
40	36.41	0.47	0.20	0.0004	3540.67	0.0000
50	25.36	0.32	0.14	0.0003	3001.30	0.0000
60	18.66	0.24	0.10	0.0002	2575.36	0.0000
80	11.32	0.14	0.06	0.0001	1951.11	0.0000
100	7.60	0.10	0.04	0.0001	1532.53	0.0000
150	3.61	0.05	0.02	3.6E-05	943.04	0.0000
200	2.11	0.03	0.01	2.1E-05	647.01	0.0000
250	1.38	0.02	0.01	1.4E-05	477.16	0.0000
500	0.36	0.00	0.00	3.6E-06	180.51	0.0000
1000	0.10	0.00	0.00	9.6E-07	70.25	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	0.95	0.40	0.0007	0.0000
30	0.72	0.31	0.0006	0.0000
40	0.47	0.20	0.0004	0.0000
50	0.32	0.14	0.0003	0.0000
60	0.24	0.10	0.0002	0.0000
80	0.14	0.06	0.0001	0.0000
100	0.10	0.04	0.0001	0.0000
150	0.05	0.02	3.6E-05	0.0000
200	0.03	0.01	2.1E-05	0.0000
250	0.02	0.01	1.4E-05	0.0000
500	0.00	0.00	3.6E-06	0.0000
1000	0.00	0.00	9.6E-07	0.0000

439

Averaged Multicomponent Health Impacts from General Degreasers for Facility G-02

Weightings:			
	1	24% Perc	5.3%
	2	41% Perc/55% MeCl	1.1%
	3	46% MeCl	7.2%
	4	97% TCE	86.0%

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Center	Resident	Worker	Chronic	Acute
20	0.89	0.38	0.0009	0.0012
30	0.67	0.29	0.0007	0.0010
40	0.43	0.19	0.0004	0.0008
50	0.30	0.13	0.0003	0.0007
60	0.22	0.09	0.0002	0.0006
80	0.14	0.06	0.0001	0.0005
100	0.09	0.04	0.0001	0.0004
150	0.04	0.02	4.4E-05	0.0002
200	0.03	0.01	2.5E-05	0.0001
250	0.02	0.01	1.7E-05	0.0001
500	0.00	0.00	4.4E-06	4.2E-05
1000	0.00	0.00	1.2E-06	1.6E-05

Facility G-03 % Perc

Met Set: Averaged

24% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0151
Ann Rate [g/s]: 0.0016

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.16	0.07	0.0008	1231.74	0.0009
30	33.45	0.32	0.13	0.0015	1650.82	0.0012
40	27.02	0.26	0.11	0.0012	1484.02	0.0011
50	25.03	0.24	0.10	0.0011	2079.26	0.0016
60	20.90	0.20	0.08	0.0010	1915.91	0.0014
80	12.23	0.12	0.05	0.0006	1479.75	0.0011
100	8.02	0.08	0.03	0.0004	1184.75	0.0009
150	3.71	0.04	0.01	0.0002	769.33	0.0006
200	2.14	0.02	0.01	0.0001	550.34	0.0004
250	1.39	0.01	0.01	0.0001	417.99	0.0003
500	0.36	0.00	0.00	1.7E-05	169.20	0.0001
1000	0.10	0.00	0.00	4.4E-06	68.13	5.1E-05

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.00	0.00	0.0000	1231.74	0.0000
30	33.45	0.00	0.00	0.0000	1650.82	0.0000
40	27.02	0.00	0.00	0.0000	1484.02	0.0000
50	25.03	0.00	0.00	0.0000	2079.26	0.0000
60	20.90	0.00	0.00	0.0000	1915.91	0.0000
80	12.23	0.00	0.00	0.0000	1479.75	0.0000
100	8.02	0.00	0.00	0.0000	1184.75	0.0000
150	3.71	0.00	0.00	0.0000	769.33	0.0000
200	2.14	0.00	0.00	0.0000	550.34	0.0000
250	1.39	0.00	0.00	0.0000	417.99	0.0000
500	0.36	0.00	0.00	0.0000	169.20	0.0000
1000	0.10	0.00	0.00	0.0000	68.13	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.00	0.00	0.0000	1231.74	0.0000
30	33.45	0.00	0.00	0.0000	1650.82	0.0000
40	27.02	0.00	0.00	0.0000	1484.02	0.0000
50	25.03	0.00	0.00	0.0000	2079.26	0.0000
60	20.90	0.00	0.00	0.0000	1915.91	0.0000
80	12.23	0.00	0.00	0.0000	1479.75	0.0000
100	8.02	0.00	0.00	0.0000	1184.75	0.0000
150	3.71	0.00	0.00	0.0000	769.33	0.0000
200	2.14	0.00	0.00	0.0000	550.34	0.0000
250	1.39	0.00	0.00	0.0000	417.99	0.0000
500	0.36	0.00	0.00	0.0000	169.20	0.0000
1000	0.10	0.00	0.00	0.0000	68.13	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	0.16	0.07	0.0008	0.0009
30	0.32	0.13	0.0015	0.0012
40	0.26	0.11	0.0012	0.0011
50	0.24	0.10	0.0011	0.0016
60	0.20	0.08	0.0010	0.0014
80	0.12	0.05	0.0006	0.0011
100	0.08	0.03	0.0004	0.0009
150	0.04	0.01	0.0002	0.0006
200	0.02	0.01	0.0001	0.0004
250	0.01	0.01	0.0001	0.0003
500	0.00	0.00	1.7E-05	0.0001
1000	0.00	0.00	4.4E-06	5.1E-05

441

Facility G-03 - 41% Perc, 55% MeCl

Met Set: Averaged

41% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0259
Ann Rate [g/s]: 0.0027

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.27	0.11	0.0013	1231.74	0.0016
30	33.45	0.53	0.23	0.0026	1650.82	0.0021
40	27.02	0.43	0.18	0.0021	1484.02	0.0019
50	25.03	0.40	0.17	0.0019	2079.26	0.0027
60	20.90	0.33	0.14	0.0016	1915.91	0.0025
80	12.23	0.19	0.08	0.0009	1479.75	0.0019
100	8.02	0.13	0.05	0.0006	1184.75	0.0015
150	3.71	0.06	0.03	0.0003	769.33	0.0010
200	2.14	0.03	0.01	1.6E-04	550.34	0.0007
250	1.39	0.02	0.01	1.1E-04	417.99	0.0005
500	0.36	0.01	0.00	2.8E-05	169.20	2.2E-04
1000	0.10	0.00	0.00	7.4E-06	68.13	8.8E-05

55% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0347
Ann Rate [g/s]: 0.0036

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.06	0.03	0.0002	1231.74	0.0031
30	33.45	0.12	0.05	0.0003	1650.82	0.0041
40	27.02	0.10	0.04	0.0002	1484.02	0.0037
50	25.03	0.09	0.04	0.0002	2079.26	0.0052
60	20.90	0.08	0.03	0.0002	1915.91	0.0047
80	12.23	0.04	0.02	0.0001	1479.75	0.0037
100	8.02	0.03	0.01	0.0001	1184.75	0.0029
150	3.71	0.01	0.01	3.3E-05	769.33	0.0019
200	2.14	0.01	0.00	1.9E-05	550.34	0.0014
250	1.39	0.01	0.00	1.3E-05	417.99	0.0010
500	0.36	0.00	0.00	3.3E-06	169.20	0.0004
1000	0.10	0.00	0.00	8.6E-07	68.13	0.0002

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0000
Ann Rate [g/s]: 0.0000

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.00	0.00	0.0000	1231.74	0.0000
30	33.45	0.00	0.00	0.0000	1650.82	0.0000
40	27.02	0.00	0.00	0.0000	1484.02	0.0000
50	25.03	0.00	0.00	0.0000	2079.26	0.0000
60	20.90	0.00	0.00	0.0000	1915.91	0.0000
80	12.23	0.00	0.00	0.0000	1479.75	0.0000
100	8.02	0.00	0.00	0.0000	1184.75	0.0000
150	3.71	0.00	0.00	0.0000	769.33	0.0000
200	2.14	0.00	0.00	0.0000	550.34	0.0000
250	1.39	0.00	0.00	0.0000	417.99	0.0000
500	0.36	0.00	0.00	0.0000	169.20	0.0000
1000	0.10	0.00	0.00	0.0000	68.13	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	0.33	0.14	0.0014	0.0046
30	0.65	0.28	0.0029	0.0062
40	0.53	0.22	0.0023	0.0056
50	0.49	0.21	0.0022	0.0078
60	0.41	0.17	0.0018	0.0072
80	0.24	0.10	0.0011	0.0056
100	0.16	0.07	0.0007	0.0045
150	0.07	0.03	0.0003	0.0029
200	0.04	0.02	0.0002	0.0021
250	0.03	0.01	1.2E-04	0.0016
500	0.01	0.00	3.1E-05	6.4E-04
1000	0.00	0.00	8.3E-06	2.6E-04

Facility G-03 - 46% MeCl

Met Set: Averaged

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.00	0.00	0.0000	1231.74	0.0000
30	33.45	0.00	0.00	0.0000	1650.82	0.0000
40	27.02	0.00	0.00	0.0000	1484.02	0.0000
50	25.03	0.00	0.00	0.0000	2079.26	0.0000
60	20.90	0.00	0.00	0.0000	1915.91	0.0000
80	12.23	0.00	0.00	0.0000	1479.75	0.0000
100	8.02	0.00	0.00	0.0000	1184.75	0.0000
150	3.71	0.00	0.00	0.0000	769.33	0.0000
200	2.14	0.00	0.00	0.0000	550.34	0.0000
250	1.39	0.00	0.00	0.0000	417.99	0.0000
500	0.36	0.00	0.00	0.0000	169.20	0.0000
1000	0.10	0.00	0.00	0.0000	68.13	0.0000

46% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0290
Ann Rate [g/s]: 0.0030

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.05	0.02	1.7E-05	1231.74	0.0026
30	33.45	0.10	0.04	3.3E-05	1650.82	0.0034
40	27.02	0.08	0.03	2.7E-05	1484.02	0.0031
50	25.03	0.08	0.03	2.5E-05	2079.26	0.0043
60	20.90	0.06	0.03	2.1E-05	1915.91	0.0040
80	12.23	0.04	0.02	1.2E-05	1479.75	0.0031
100	8.02	0.02	0.01	8.0E-06	1184.75	0.0025
150	3.71	0.01	0.00	3.7E-06	769.33	0.0016
200	2.14	0.01	0.00	2.1E-06	550.34	0.0011
250	1.39	0.00	0.00	1.4E-06	417.99	0.0009
500	0.36	0.00	0.00	3.6E-07	169.20	0.0004
1000	0.10	0.00	0.00	9.6E-08	68.13	0.0001

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.00	0.00	0.0000	1231.74	0.0000
30	33.45	0.00	0.00	0.0000	1650.82	0.0000
40	27.02	0.00	0.00	0.0000	1484.02	0.0000
50	25.03	0.00	0.00	0.0000	2079.26	0.0000
60	20.90	0.00	0.00	0.0000	1915.91	0.0000
80	12.23	0.00	0.00	0.0000	1479.75	0.0000
100	8.02	0.00	0.00	0.0000	1184.75	0.0000
150	3.71	0.00	0.00	0.0000	769.33	0.0000
200	2.14	0.00	0.00	0.0000	550.34	0.0000
250	1.39	0.00	0.00	0.0000	417.99	0.0000
500	0.36	0.00	0.00	0.0000	169.20	0.0000
1000	0.10	0.00	0.00	0.0000	68.13	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	0.05	0.02	1.7E-05	0.0026
30	0.10	0.04	3.3E-05	0.0034
40	0.08	0.03	2.7E-05	0.0031
50	0.08	0.03	2.5E-05	0.0043
60	0.06	0.03	2.1E-05	0.0040
80	0.04	0.02	1.2E-05	0.0031
100	0.02	0.01	8.0E-06	0.0025
150	0.01	0.00	3.7E-06	0.0016
200	0.01	0.00	2.1E-06	0.0011
250	0.00	0.00	1.4E-06	0.0009
500	0.00	0.00	3.6E-07	0.0004
1000	0.00	0.00	9.6E-08	0.0001

443

Facility G-03 - 97% TCE

Met Set: Averaged

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.00	0.00	0.0000	1231.74	0.0000
30	33.45	0.00	0.00	0.0000	1650.82	0.0000
40	27.02	0.00	0.00	0.0000	1484.02	0.0000
50	25.03	0.00	0.00	0.0000	2079.26	0.0000
60	20.90	0.00	0.00	0.0000	1915.91	0.0000
80	12.23	0.00	0.00	0.0000	1479.75	0.0000
100	8.02	0.00	0.00	0.0000	1184.75	0.0000
150	3.71	0.00	0.00	0.0000	769.33	0.0000
200	2.14	0.00	0.00	0.0000	550.34	0.0000
250	1.39	0.00	0.00	0.0000	417.99	0.0000
500	0.36	0.00	0.00	0.0000	169.20	0.0000
1000	0.10	0.00	0.00	0.0000	68.13	0.0000

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.00	0.00	0.0000	1231.74	0.0000
30	33.45	0.00	0.00	0.0000	1650.82	0.0000
40	27.02	0.00	0.00	0.0000	1484.02	0.0000
50	25.03	0.00	0.00	0.0000	2079.26	0.0000
60	20.90	0.00	0.00	0.0000	1915.91	0.0000
80	12.23	0.00	0.00	0.0000	1479.75	0.0000
100	8.02	0.00	0.00	0.0000	1184.75	0.0000
150	3.71	0.00	0.00	0.0000	769.33	0.0000
200	2.14	0.00	0.00	0.0000	550.34	0.0000
250	1.39	0.00	0.00	0.0000	417.99	0.0000
500	0.36	0.00	0.00	0.0000	169.20	0.0000
1000	0.10	0.00	0.00	0.0000	68.13	0.0000

98% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0612
Ann Rate [g/s]: 0.0064

Distance [m] Center	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	16.68	0.21	0.09	0.0002	1231.74	0.0000
30	33.45	0.43	0.18	0.0003	1650.82	0.0000
40	27.02	0.35	0.15	0.0003	1484.02	0.0000
50	25.03	0.32	0.14	0.0003	2079.26	0.0000
60	20.90	0.27	0.11	0.0002	1915.91	0.0000
80	12.23	0.16	0.07	0.0001	1479.75	0.0000
100	8.02	0.10	0.04	0.0001	1184.75	0.0000
150	3.71	0.05	0.02	3.7E-05	769.33	0.0000
200	2.14	0.03	0.01	2.1E-05	550.34	0.0000
250	1.39	0.02	0.01	1.4E-05	417.99	0.0000
500	0.36	0.00	0.00	3.6E-06	169.20	0.0000
1000	0.10	0.00	0.00	9.6E-07	68.13	0.0000

Total Health Impacts

Distance [m] Center	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	0.21	0.09	0.0002	0.0000
30	0.43	0.18	0.0003	0.0000
40	0.35	0.15	0.0003	0.0000
50	0.32	0.14	0.0003	0.0000
60	0.27	0.11	0.0002	0.0000
80	0.16	0.07	0.0001	0.0000
100	0.10	0.04	0.0001	0.0000
150	0.05	0.02	3.7E-05	0.0000
200	0.03	0.01	2.1E-05	0.0000
250	0.02	0.01	1.4E-05	0.0000
500	0.00	0.00	3.6E-06	0.0000
1000	0.00	0.00	9.6E-07	0.0000

Averaged M[illegible]omponent Health Impacts from General Degreasers for Fac[illegible]3-03

Weightings:			
	1	24% Perc	5.3%
	2	41% Perc/55% MeCl	1.1%
	3	46% MeCl	7.2%
	4	97% TCE	86.0%

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Center	Resident	Worker	Chronic	Acute
20	0.20	0.08	0.0002	0.0003
30	0.40	0.17	0.0004	0.0004
40	0.32	0.14	0.0003	0.0003
50	0.30	0.13	0.0003	0.0005
60	0.25	0.11	0.0003	0.0004
80	0.15	0.06	0.0001	0.0003
100	0.10	0.04	0.0001	0.0003
150	0.04	0.02	4.5E-05	0.0002
200	0.03	0.01	2.6E-05	0.0001
250	0.02	0.01	1.7E-05	0.0001
500	0.00	0.00	4.4E-06	3.9E-05
1000	0.00	0.00	1.2E-06	1.6E-05

Risk Assessment Summary - 3 Generic Facilities
Multicomponent Impacts - General Degreasers - Default Met

Facility G-01 - 24% Perc

Met Set: Default-0

24% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0151
Ann Rate [g/s]: 0.0016

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	2.90	1.23	0.0140	11342.73	0.0086
30	229.98	2.17	0.92	0.0105	8496.33	0.0064
40	178.09	1.68	0.72	0.0081	6579.11	0.0050
50	141.80	1.34	0.57	0.0065	5238.72	0.0040
60	115.56	1.09	0.46	0.0053	4269.33	0.0032
80	81.09	0.77	0.33	0.0037	2995.85	0.0023
100	60.18	0.57	0.24	0.0028	2223.11	0.0017
150	33.55	0.32	0.13	0.0015	1239.31	0.0009
200	21.63	0.20	0.09	0.0010	799.09	0.0006
250	15.25	0.14	0.06	0.0007	563.57	0.0004
500	5.08	0.05	0.02	0.0002	187.51	0.0001
1000	1.74	0.02	0.01	0.0001	64.26	4.9E-05

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500	5.08	0.00	0.00	0.0000	187.51	0.0000
1000	1.74	0.00	0.00	0.0000	64.26	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500	[illegible]	0.00	0.00	0.0000	187.51	0.0000
1000	[illegible]	0.00	0.00	0.0000	64.26	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	2.90	1.23	0.0140	0.0086
30	2.17	0.92	0.0105	0.0064
40	1.68	0.72	0.0081	0.0050
50	1.34	0.57	0.0065	0.0040
60	1.09	0.46	0.0053	0.0032
80	0.77	0.33	0.0037	0.0023
100	0.57	0.24	0.0028	0.0017
150	0.32	0.13	0.0015	0.0009
200	0.20	0.09	0.0010	0.0006
250	0.14	0.06	0.0007	0.0004
500	0.05	0.02	0.0002	0.0001
1000	[illegible].000	0.02	0.01	0.0001	4.9E-05

Facility G-01 - 41% Perc, 55% MeCl

Met Set: Default-0

41% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0259
Ann Rate [g/s]: 0.0027

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	4.89	2.08	0.0237	11342.73	0.0147
30	229.98	3.66	1.56	0.0177	8496.33	0.0110
40	178.09	2.84	1.21	0.0137	6579.11	0.0085
50	141.80	2.26	0.96	0.0109	5238.72	0.0068
60	115.56	1.84	0.78	0.0089	4269.33	0.0055
80	81.09	1.29	0.55	0.0063	2995.85	0.0039
100	60.18	0.96	0.41	0.0046	2223.11	0.0029
150	33.55	0.53	0.23	0.0026	1239.31	0.0016
200	21.63	0.34	0.15	0.0017	799.09	0.0010
250	15.25	0.24	0.10	0.0012	563.57	0.0007
500	5.08	0.08	0.03	0.0004	187.51	0.0002
1000	1.74	0.03	0.01	0.0001	64.26	0.0001

55% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0347
Ann Rate [g/s]: 0.0036

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	1.11	0.47	0.0028	11342.73	0.0281
30	229.98	0.83	0.35	0.0021	8496.33	0.0211
40	178.09	0.64	0.27	0.0016	6579.11	0.0163
50	141.80	0.51	0.22	0.0013	5238.72	0.0130
60	115.56	0.42	0.18	0.0010	4269.33	0.0106
80	81.09	0.29	0.12	0.0007	2995.85	0.0074
100	60.18	0.22	0.09	0.0005	2223.11	0.0055
150	33.55	0.12	0.05	0.0003	1239.31	0.0031
200	21.63	0.08	0.03	0.0002	799.09	0.0020
250	15.25	0.05	0.02	0.0001	563.57	0.0014
500	5.08	0.02	0.01	4.57E-05	187.51	0.0005
1000	1.74	0.01	0.00	1.57E-05	64.26	0.0002

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500	5.08	0.00	0.00	0.0000	187.51	0.0000
1000	1.74	0.00	0.00	0.0000	64.26	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	6.00	2.55	0.0264	0.0428
30	4.49	1.91	0.0198	0.0321
40	3.48	1.48	0.0153	0.0248
50	2.77	1.18	0.0122	0.0198
60	2.26	0.96	0.0100	0.0161
80	1.58	0.67	0.0070	0.0113
100	1.18	0.50	0.0052	0.0084
150	0.66	0.28	0.0029	0.0047
200	0.42	0.18	0.0019	0.0030
250	0.30	0.13	0.0013	0.0021
500	0.10	0.04	0.0004	0.0007
1000	0.03	0.01	0.0001	0.0002

447

Facility G-01 - 46% MeCl

Met Set: Default-0

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500	5.08	0.00	0.00	0.0000	187.51	0.0000
1000	1.74	0.00	0.00	0.0000	64.26	0.0000

46% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0290
Ann Rate [g/s]: 0.0030

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.92	0.39	0.0003	11342.73	0.0235
30	229.98	0.69	0.29	0.0002	8496.33	0.0176
40	178.09	0.53	0.23	0.0002	6579.11	0.0136
50	141.80	0.43	0.18	0.0001	5238.72	0.0109
60	115.56	0.35	0.15	0.0001	4269.33	0.0088
80	81.09	0.24	0.10	0.0001	2995.85	0.0062
100	60.18	0.18	0.08	0.0001	2223.11	0.0046
150	33.55	0.10	0.04	3.4E-05	1239.31	0.0026
200	21.63	0.06	0.03	2.2E-05	799.09	0.0017
250	15.25	0.05	0.02	1.5E-05	563.57	0.0012
500	5.08	0.02	0.01	5.1E-06	187.51	0.0004
1000	1.74	0.01	0.00	1.7E-06	64.26	0.0001

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500	5.08	0.00	0.00	0.0000	187.51	0.0000
1000	1.74	0.00	0.00	0.0000	64.26	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	0.92	0.39	0.0003	0.0235
30	0.69	0.29	0.0002	0.0176
40	0.53	0.23	0.0002	0.0136
50	0.43	0.18	0.0001	0.0109
60	0.35	0.15	0.0001	0.0088
80	0.24	0.10	0.0001	0.0062
100	0.18	0.08	0.0001	0.0046
150	0.10	0.04	3.4E-05	0.0026
200	0.06	0.03	2.2E-05	0.0017
250	0.05	0.02	1.5E-05	0.0012
500	0.02	0.01	5.1E-06	0.0004
1000	0.01	0.00	1.7E-06	0.0001

Facility G-01 - 97% TCE

Met Set: Default-0

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500	5.08	0.00	0.00	0.0000	187.51	0.0000
1000	1.74	0.00	0.00	0.0000	64.26	0.0000

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	0.00	0.00	0.0000	11342.73	0.0000
30	229.98	0.00	0.00	0.0000	8496.33	0.0000
40	178.09	0.00	0.00	0.0000	6579.11	0.0000
50	141.80	0.00	0.00	0.0000	5238.72	0.0000
60	115.56	0.00	0.00	0.0000	4269.33	0.0000
80	81.09	0.00	0.00	0.0000	2995.85	0.0000
100	60.18	0.00	0.00	0.0000	2223.11	0.0000
150	33.55	0.00	0.00	0.0000	1239.31	0.0000
200	21.63	0.00	0.00	0.0000	799.09	0.0000
250	15.25	0.00	0.00	0.0000	563.57	0.0000
500	5.08	0.00	0.00	0.0000	187.51	0.0000
1000	1.74	0.00	0.00	0.0000	64.26	0.0000

97% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0612
Ann Rate [g/s]: 0.0064

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	307.03	3.93	1.67	0.0031	11342.73	0.0000
30	229.98	2.94	1.25	0.0023	8496.33	0.0000
40	178.09	2.28	0.97	0.0018	6579.11	0.0000
50	141.80	1.82	0.77	0.0014	5238.72	0.0000
60	115.56	1.48	0.63	0.0012	4269.33	0.0000
80	81.09	1.04	0.44	0.0008	2995.85	0.0000
100	60.18	0.77	0.33	0.0006	2223.11	0.0000
150	33.55	0.43	0.18	0.0003	1239.31	0.0000
200	21.63	0.28	0.12	0.0002	799.09	0.0000
250	15.25	0.20	0.08	0.0002	563.57	0.0000
500	5.08	0.06	0.03	0.0001	187.51	0.0000
1000	1.74	0.02	0.01	1.7E-05	64.26	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	3.93	1.67	0.0031	0.0000
30	2.94	1.25	0.0023	0.0000
40	2.28	0.97	0.0018	0.0000
50	1.82	0.77	0.0014	0.0000
60	1.48	0.63	0.0012	0.0000
80	1.04	0.44	0.0008	0.0000
100	0.77	0.33	0.0006	0.0000
150	0.43	0.18	0.0003	0.0000
200	0.28	0.12	0.0002	0.0000
250	0.20	0.08	0.0002	0.0000
500	0.06	0.03	0.0001	0.0000
1000	0.02	0.01	1.7E-05	0.0000

449

Averaged Multicomponent Health Impacts from General Degreasers for Facility G-01

Weightings:		
	1 24% Perc	5.3%
	2 41% Perc/55% MeCl	1.1%
	3 46% MeCl	7.2%
	4 97% TCE	86.0%

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Envelope	Resident	Worker	Chronic	Acute
20	3.67	1.56	0.0037	0.0026
30	2.75	1.17	0.0028	0.0020
40	2.13	0.91	0.0021	0.0015
50	1.69	0.72	0.0017	0.0012
60	1.38	0.59	0.0014	0.0010
80	0.97	0.41	0.0010	0.0007
100	0.72	0.31	0.0007	0.0005
150	0.40	0.17	0.0004	0.0003
200	0.26	0.11	0.0003	0.0002
250	0.18	0.08	0.0002	0.0001
500	0.06	0.03	0.0001	4.3E-05
1000	0.02	0.01	2.1E-05	1.5E-05

Facility G-02 % Perc

Met Set: Default-0

24% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0151
Ann Rate [g/s]: 0.0016

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	1.35	0.57	0.0065	5276.51	0.0040
30	117.98	1.11	0.47	0.0054	4358.64	0.0033
40	98.78	0.93	0.40	0.0045	3649.09	0.0028
50	83.77	0.79	0.34	0.0038	3094.79	0.0023
60	71.89	0.68	0.29	0.0033	2656.01	0.0020
80	54.62	0.52	0.22	0.0025	2017.70	0.0015
100	42.94	0.41	0.17	0.0020	1586.22	0.0012
150	26.25	0.25	0.11	0.0012	969.72	0.0007
200	17.86	0.17	0.07	0.0008	659.99	0.0005
250	13.05	0.12	0.05	0.0006	482.19	0.0004
500	4.69	0.04	0.02	0.0002	173.33	0.0001
1000	1.68	0.02	0.01	0.0001	61.90	4.7E-05

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	1.35	0.57	0.0065	0.0040
30	1.11	0.47	0.0054	0.0033
40	0.93	0.40	0.0045	0.0028
50	0.79	0.34	0.0038	0.0023
60	0.68	0.29	0.0033	0.0020
80	0.52	0.22	0.0025	0.0015
100	0.41	0.17	0.0020	0.0012
150	0.25	0.11	0.0012	0.0007
200	0.17	0.07	0.0008	0.0005
250	0.12	0.05	0.0006	0.0004
500	0.04	0.02	0.0002	0.0001
1000	0.02	0.01	0.0001	4.7E-05

451

Facility G-02 - 41% Perc, 55% MeCl

Met Set: Default-0

41% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0259
Ann Rate [g/s]: 0.0027

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	2.28	0.97	0.0110	5276.51	0.0068
30	117.98	1.88	0.80	0.0091	4358.64	0.0056
40	98.78	1.57	0.67	0.0076	3649.09	0.0047
50	83.77	1.33	0.57	0.0065	3094.79	0.0040
60	71.89	1.15	0.49	0.0055	2656.01	0.0034
80	54.62	0.87	0.37	0.0042	2017.70	0.0026
100	42.94	0.68	0.29	0.0033	1586.22	0.0021
150	26.25	0.42	0.18	0.0020	969.72	0.0013
200	17.86	0.28	0.12	0.0014	659.99	0.0009
250	13.05	0.21	0.09	0.0010	482.19	0.0006
500	4.69	0.07	0.03	0.0004	173.33	0.0002
1000	1.68	0.03	0.01	0.0001	61.90	8.0E-05

55% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0347
Ann Rate [g/s]: 0.0036

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.51	0.22	0.0013	5276.51	0.0131
30	117.98	0.42	0.18	0.0011	4358.64	0.0108
40	98.78	0.36	0.15	0.0009	3649.09	0.0090
50	83.77	0.30	0.13	0.0008	3094.79	0.0077
60	71.89	0.26	0.11	0.0006	2656.01	0.0066
80	54.62	0.20	0.08	0.0005	2017.70	0.0050
100	42.94	0.15	0.07	0.0004	1586.22	0.0039
150	26.25	0.09	0.04	0.0002	969.72	0.0024
200	17.86	0.06	0.03	0.0002	659.99	0.0016
250	13.05	0.05	0.02	0.0001	482.19	0.0012
500	4.69	0.02	0.01	4.2E-05	173.33	0.0004
1000	1.68	0.01	0.00	1.5E-05	61.90	0.0002

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	2.79	1.19	0.0123	0.0199
30	2.30	0.98	0.0102	0.0164
40	1.93	0.82	0.0085	0.0138
50	1.64	0.70	0.0072	0.0117
60	1.40	0.60	0.0062	0.0100
80	1.07	0.45	0.0047	0.0076
100	0.84	0.36	0.0037	0.0060
150	0.51	0.22	0.0023	0.0037
200	0.35	0.15	0.0015	0.0025
250	0.25	0.11	0.0011	0.0018
500	0.09	0.04	0.0004	0.0007
1000	0.03	0.01	1.4E-04	2.3E-04

Facility G-02 - 46% MeCl

Met Set: Default-0

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

46% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0290
Ann Rate [g/s]: 0.0030

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.43	0.18	0.0001	5276.51	0.0109
30	117.98	0.35	0.15	0.0001	4358.64	0.0090
40	98.78	0.30	0.13	0.0001	3649.09	0.0076
50	83.77	0.25	0.11	8.4E-05	3094.79	0.0064
60	71.89	0.22	0.09	7.2E-05	2656.01	0.0055
80	54.62	0.16	0.07	5.5E-05	2017.70	0.0042
100	42.94	0.13	0.05	4.3E-05	1586.22	0.0033
150	26.25	0.08	0.03	2.6E-05	969.72	0.0020
200	17.86	0.05	0.02	1.8E-05	659.99	0.0014
250	13.05	0.04	0.02	1.3E-05	482.19	0.0010
500	4.69	0.01	0.01	4.7E-06	173.33	0.0004
1000	1.68	0.01	0.00	1.7E-06	61.90	0.0001

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	0.43	0.18	0.0001	0.0109
30	0.35	0.15	0.0001	0.0090
40	0.30	0.13	0.0001	0.0076
50	0.25	0.11	8.4E-05	0.0064
60	0.22	0.09	7.2E-05	0.0055
80	0.16	0.07	5.5E-05	0.0042
100	0.13	0.05	4.3E-05	0.0033
150	0.08	0.03	2.6E-05	0.0020
200	0.05	0.02	1.8E-05	0.0014
250	0.04	0.02	1.3E-05	0.0010
500	0.01	0.01	4.7E-06	0.0004
1000	0.01	0.00	1.7E-06	0.0001

453

Facility G-02 - 97% TCE

Met Set: Default-0

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	0.00	0.00	0.0000	5276.51	0.0000
30	117.98	0.00	0.00	0.0000	4358.64	0.0000
40	98.78	0.00	0.00	0.0000	3649.09	0.0000
50	83.77	0.00	0.00	0.0000	3094.79	0.0000
60	71.89	0.00	0.00	0.0000	2656.01	0.0000
80	54.62	0.00	0.00	0.0000	2017.70	0.0000
100	42.94	0.00	0.00	0.0000	1586.22	0.0000
150	26.25	0.00	0.00	0.0000	969.72	0.0000
200	17.86	0.00	0.00	0.0000	659.99	0.0000
250	13.05	0.00	0.00	0.0000	482.19	0.0000
500	4.69	0.00	0.00	0.0000	173.33	0.0000
1000	1.68	0.00	0.00	0.0000	61.90	0.0000

97% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0612
Ann Rate [g/s]: 0.0064

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	142.83	1.83	0.78	0.0014	5276.51	0.0000
30	117.98	1.51	0.64	0.0012	4358.64	0.0000
40	98.78	1.26	0.54	0.0010	3649.09	0.0000
50	83.77	1.07	0.46	0.0008	3094.79	0.0000
60	71.89	0.92	0.39	0.0007	2656.01	0.0000
80	54.62	0.70	0.30	0.0005	2017.70	0.0000
100	42.94	0.55	0.23	0.0004	1586.22	0.0000
150	26.25	0.34	0.14	0.0003	969.72	0.0000
200	17.86	0.23	0.10	0.0002	659.99	0.0000
250	13.05	0.17	0.07	0.0001	482.19	0.0000
500	4.69	0.06	0.03	4.7E-05	173.33	0.0000
1000	1.68	0.02	0.01	1.7E-05	61.90	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	1.83	0.78	0.0014	0.0000
30	1.51	0.64	0.0012	0.0000
40	1.26	0.54	0.0010	0.0000
50	1.07	0.46	0.0008	0.0000
60	0.92	0.39	0.0007	0.0000
80	0.70	0.30	0.0005	0.0000
100	0.55	0.23	0.0004	0.0000
150	0.34	0.14	0.0003	0.0000
200	0.23	0.10	0.0002	0.0000
250	0.17	0.07	0.0001	0.0000
500	0.06	0.03	4.7E-05	0.0000
1000	0.02	0.01	1.7E-05	0.0000

Averaged M[illegible]omponent Health Impacts from General Degreasers for Faci[illegible]3-02

Weightings:		
	1 24% Perc	5.3%
	2 41% Perc/55% MeCl	1.1%
	3 46% MeCl	7.2%
	4 97% TCE	86.0%

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Envelope	Resident	Worker	Chronic	Acute
20	1.71	0.73	0.0017	0.0012
30	1.41	0.60	0.0014	0.0010
40	1.18	0.50	0.0012	0.0008
50	1.00	0.43	0.0010	0.0007
60	0.86	0.37	0.0009	0.0006
80	0.65	0.28	0.0007	0.0005
100	0.51	0.22	0.0005	0.0004
150	0.31	0.13	0.0003	0.0002
200	0.21	0.09	0.0002	0.0002
250	0.16	0.07	0.0002	0.0001
500	0.06	0.02	0.0001	4.0E-05
1000	0.02	0.01	2.0E-05	1.4E-05

Facility G-03 - 24% Perc

Met Set: Default-0

24% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0151
Ann Rate [g/s]: 0.0016

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.70	0.30	0.0034	2744.96	0.0021
30	64.57	0.61	0.26	0.0030	2385.45	0.0018
40	56.52	0.53	0.23	0.0026	2088.05	0.0016
50	49.84	0.47	0.20	0.0023	1841.40	0.0014
60	44.27	0.42	0.18	0.0020	1635.59	0.0012
80	35.62	0.34	0.14	0.0016	1315.96	0.0010
100	29.32	0.28	0.12	0.0013	1083.10	0.0008
150	19.45	0.18	0.08	0.0009	718.69	0.0005
200	13.97	0.13	0.06	0.0006	516.25	0.0004
250	10.61	0.10	0.04	0.0005	391.81	0.0003
500	4.18	0.04	0.02	0.0002	154.56	0.0001
1000	1.58	0.01	0.01	0.0001	58.40	4.4E-05

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	0.70	0.30	0.0034	0.0021
30	0.61	0.26	0.0030	0.0018
40	0.53	0.23	0.0026	0.0016
50	0.47	0.20	0.0023	0.0014
60	0.42	0.18	0.0020	0.0012
80	0.34	0.14	0.0016	0.0010
100	0.28	0.12	0.0013	0.0008
150	0.18	0.08	0.0009	0.0005
200	0.13	0.06	0.0006	0.0004
250	0.10	0.04	0.0005	0.0003
500	0.04	0.02	0.0002	0.0001
1000	0.01	0.01	0.0001	4.4E-05

D

Facility G-03 - 41% Perc, 55% MeCl

Met Set: Default-0

41% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0.0259
Ann Rate [g/s]: 0.0027

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	1.18	0.50	0.0057	2744.96	0.0036
30	64.57	1.03	0.44	0.0050	2385.45	0.0031
40	56.52	0.90	0.38	0.0044	2088.05	0.0027
50	49.84	0.79	0.34	0.0038	1841.40	0.0024
60	44.27	0.71	0.30	0.0034	1635.59	0.0021
80	35.62	0.57	0.24	0.0027	1315.96	0.0017
100	29.32	0.47	0.20	0.0023	1083.10	0.0014
150	19.45	0.31	0.13	0.0015	718.69	0.0009
200	13.97	0.22	0.09	0.0011	516.25	0.0007
250	10.61	0.17	0.07	0.0008	391.81	0.0005
500	4.18	0.07	0.03	0.0003	154.56	2.0E-04
1000	1.58	0.03	0.01	1.2E-04	58.40	7.6E-05

55% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0347
Ann Rate [g/s]: 0.0036

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.27	0.11	0.0007	2744.96	0.0068
30	64.57	0.23	0.10	0.0006	2385.45	0.0059
40	56.52	0.20	0.09	0.0005	2088.05	0.0052
50	49.84	0.18	0.08	0.0004	1841.40	0.0046
60	44.27	0.16	0.07	0.0004	1635.59	0.0041
80	35.62	0.13	0.05	0.0003	1315.96	0.0033
100	29.32	0.11	0.04	0.0003	1083.10	0.0027
150	19.45	0.07	0.03	0.0002	718.69	0.0018
200	13.97	0.05	0.02	0.0001	516.25	0.0013
250	10.61	0.04	0.02	0.0001	391.81	0.0010
500	4.18	0.02	0.01	3.8E-05	154.56	0.0004
1000	1.58	0.01	0.00	1.4E-05	58.40	0.0001

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	1.45	0.62	0.0064	0.0104
30	1.26	0.54	0.0056	0.0090
40	1.10	0.47	0.0049	0.0079
50	0.97	0.41	0.0043	0.0069
60	0.86	0.37	0.0038	0.0062
80	0.70	0.30	0.0031	0.0050
100	0.57	0.24	0.0025	0.0041
150	0.38	0.16	0.0017	0.0027
200	0.27	0.12	0.0012	0.0019
250	0.21	0.09	0.0009	0.0015
500	0.08	0.03	0.0004	5.8E-04
1000	0.03	0.01	1.4E-04	2.2E-04

457

Facility G-03 - 46% MeCl

Met Set: Default-0

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

46% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0.0290
Ann Rate [g/s]: 0.0030

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.22	0.09	0.0001	2744.96	0.0057
30	64.57	0.19	0.08	0.0001	2385.45	0.0049
40	56.52	0.17	0.07	0.0001	2088.05	0.0043
50	49.84	0.15	0.06	0.0000	1841.40	0.0038
60	44.27	0.13	0.06	0.0000	1635.59	0.0034
80	35.62	0.11	0.05	3.6E-05	1315.96	0.0027
100	29.32	0.09	0.04	2.9E-05	1083.10	0.0022
150	19.45	0.06	0.02	1.9E-05	718.69	0.0015
200	13.97	0.04	0.02	1.4E-05	516.25	0.0011
250	10.61	0.03	0.01	1.1E-05	391.81	0.0008
500	4.18	0.01	0.01	4.2E-06	154.56	0.0003
1000	1.58	0.00	0.00	1.6E-06	58.40	0.0001

0% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	0.22	0.09	0.0001	0.0057
30	0.19	0.08	0.0001	0.0049
40	0.17	0.07	0.0001	0.0043
50	0.15	0.06	4.98E-05	0.0038
60	0.13	0.06	4.43E-05	0.0034
80	0.11	0.05	3.6E-05	0.0027
100	0.09	0.04	2.9E-05	0.0022
150	0.06	0.02	1.9E-05	0.0015
200	0.04	0.02	1.4E-05	0.0011
250	0.03	0.01	1.1E-05	0.0008
500	0.01	0.01	4.2E-06	0.0003
1000	0.00	0.00	1.6E-06	0.0001

Facility G-03 - 97% TCE

Met Set: Default-0

0% Perc

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

0% MeCl

op hrs/wk: 57

Acu Rate [g/s]: 0
Ann Rate [g/s]: 0

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.00	0.00	0.0000	2744.96	0.0000
30	64.57	0.00	0.00	0.0000	2385.45	0.0000
40	56.52	0.00	0.00	0.0000	2088.05	0.0000
50	49.84	0.00	0.00	0.0000	1841.40	0.0000
60	44.27	0.00	0.00	0.0000	1635.59	0.0000
80	35.62	0.00	0.00	0.0000	1315.96	0.0000
100	29.32	0.00	0.00	0.0000	1083.10	0.0000
150	19.45	0.00	0.00	0.0000	718.69	0.0000
200	13.97	0.00	0.00	0.0000	516.25	0.0000
250	10.61	0.00	0.00	0.0000	391.81	0.0000
500	4.18	0.00	0.00	0.0000	154.56	0.0000
1000	1.58	0.00	0.00	0.0000	58.40	0.0000

97% TCE

op hrs/wk: 57

Acu Rate [g/s]: 0.0612
Ann Rate [g/s]: 0.0064

Distance [m] Envelope	ISC Ann Emis. [ug/m^3]	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	ISC Acute Emis [ug/m^3]	Hazard Index Acute
20	74.30	0.95	0.40	0.0007	2744.96	0.0000
30	64.57	0.83	0.35	0.0006	2385.45	0.0000
40	56.52	0.72	0.31	0.0006	2088.05	0.0000
50	49.84	0.64	0.27	0.0005	1841.40	0.0000
60	44.27	0.57	0.24	0.0004	1635.59	0.0000
80	35.62	0.46	0.19	0.0004	1315.96	0.0000
100	29.32	0.38	0.16	0.0003	1083.10	0.0000
150	19.45	0.25	0.11	0.0002	718.69	0.0000
200	13.97	0.18	0.08	0.0001	516.25	0.0000
250	10.61	0.14	0.06	0.0001	391.81	0.0000
500	4.18	0.05	0.02	4.2E-05	154.56	0.0000
1000	1.58	0.02	0.01	1.6E-05	58.40	0.0000

Total Health Impacts

Distance [m] Envelope	Cancer Risk [x/million] Resident	Cancer Risk [x/million] Worker	Harzard Index Chronic	Hazard Index Acute
20	0.95	0.40	0.0007	0.0000
30	0.83	0.35	0.0006	0.0000
40	0.72	0.31	0.0006	0.0000
50	0.64	0.27	0.0005	0.0000
60	0.57	0.24	0.0004	0.0000
80	0.46	0.19	0.0004	0.0000
100	0.38	0.16	0.0003	0.0000
150	0.25	0.11	0.0002	0.0000
200	0.18	0.08	0.0001	0.0000
250	0.14	0.06	0.0001	0.0000
500	0.05	0.02	4.2E-05	0.0000
1000	0.02	0.01	1.6E-05	0.0000

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Averaged Multicomponent Health Impacts from General Degreasers for Facility G-03

Weightings:		
	1 24% Perc	5.3%
	2 41% Perc/55% MeCl	1.1%
	3 46% MeCl	7.2%
	4 97% TCE	86.0%

Total Health Impacts

Distance [m]	Cancer Risk [x/million]		Harzard Index	Hazard Index
Envelope	Resident	Worker	Chronic	Acute
20	0.89	0.38	0.0009	0.0006
30	0.77	0.33	0.0008	0.0006
40	0.67	0.29	0.0007	0.0005
50	0.60	0.25	0.0006	0.0004
60	0.53	0.23	0.0005	0.0004
80	0.43	0.18	0.0004	0.0003
100	0.35	0.15	0.0004	0.0002
150	0.23	0.10	0.0002	0.0002
200	0.17	0.07	0.0002	0.0001
250	0.13	0.05	0.0001	0.0001
500	0.05	0.02	0.0001	3.6E-05
1000	0.02	0.01	1.9E-05	1.3E-05

E. Memorandum. Modeling of Perchloroethylene, Methylene Chloride, and Trichloroethylene Emissions from Automotive Maintenance and Repair Facilities

(memo starts on the following page)

'inston H. Hickox
gency Secretary

Air Resources Board

Alan C. Lloyd, Ph.D.
Chairman
2020 L Street • P.O. Box 2815 • Sacramento, California 95812 • www.arb.ca.gov

Gray Davis
Governor

MEMORANDUM

TO: Todd Wong, Manager
Emissions Evaluation Section
Stationary Source Division

FROM: Andrew Ranzieri, Manager
Modeling Support Section
Planning and Technical Support Division

DATE: January 11, 2000

SUBJECT: MODELING RESULTS FOR PERCHLOROETHYLENE (PERC), METHYLENE CHLORIDE (MECI), AND TRICHLOROETHYLENE (TCE) EMISSIONS FROM AUTOMOTIVE MAINTENANCE AND REPAIR FACILITIES (AMR)

Perchloroethylene (Perc), methylene chloride (MeCl), and trichloroethylene (TCE) are common constituents of automotive consumer products used for Automotive Maintenance and Repair (AMR) activities. Per your request, refined air dispersion modeling has been performed to estimate downwind concentrations from AMR facilities. Specifically, this memo addresses the following requests:

1. Estimate the overall maximum hourly and overall maximum annual concentrations of Perc, MeCl, and TCE attributable to specific AMR facilities;

2. Estimate the maximum hourly and maximum annual concentrations of Perc, MeCl, and TCE attributable to specific AMR facilities experienced by the nearest business receptor (NBR), nearest residential receptor (NRR), maximum exposed individual worker (MEIW), and maximum exposed individual resident (MEIR);

3. Estimate the population exposure to Perc, MeCl, and TCE concentrations attributable to specific AMR facilities; and

4. Estimate the range of hourly and annual Perc, MeCl, and TCE concentrations that might result from the individual operation of three hypothetical, generic facilities in several locations throughout the State of California.

Your staff provided information on thirteen specific facilities. This information is based on site visits that your staff performed. In addition, your staff provided information on three generic facilities that were designed to broadly represent the range of facilities that are in operation in California. Generic facilities are labeled G-01, G-02, and G-03. Table 1A provides the coordinates and general location of each specific facility while Table 1B gives the dimensions and operating schedule for each specific facility. Above-ambient, hourly and annual concentration estimates are provided at locations surrounding each of the facilities. This refined modeling is an enhancement to the screening analyses performed by your staff using the SCREEN3 dispersion model.

Discussion of Model Application

The ISCST3 (Version 97363) air dispersion model was utilized in this project. The model estimates concentrations at specified receptor locations around each facility, directly caused by each facility's emissions. The receptors can be defined as individual locations, a gridded network of locations (defined by a number of rows and columns), or a polar network of locations (defined by a number of points along multiple radials, separated by an angular distance). Table 2 provides a description of the receptor networks used in this analysis. The closest receptor utilized for specific facility modeling is approximately 32 meters from the centroid of the source. Concentrations closer than 32 meters to the source centroid could be higher. This distance was selected based upon the size of the largest of the thirteen facilities to eliminate the chance of receptors falling inside the perimeter of each facility. In addition, discrete receptors were used to identify businesses and residences located nearby each of the facilities by your staff. These receptors are discussed in more detail later. Your staff requested the specific polar distances used for generic facility modeling. These distances are provided in the footnotes of Table 2.

The ISCST model assumes that emissions are totally inert. That is, there are no chemical reactions involving the emissions that occur between the source and receptor. In addition, the modeling options selected for this project are based on the assumption that pollutant deposition, where emissions can fall-out or deposit on the ground or other surfaces, does not occur. These assumptions keep the total mass of facility-specific Perc, MeCl, and TCE emissions constant, which implies a linear relationship between the magnitude of the brake cleaner emissions and the associated concentration at each receptor.

Facility-wide Perc, MeCl, and TCE emissions of 1 gram per second was used. This is referred to as a unit emission rate, which produces corresponding unit concentrations at all modeled receptors. Coupled with the use of a unit emission rate, the linear relationship between emissions released at the source and the directly related

concentrations at receptors surrounding the source allows the effects of multiple facility emission magnitudes to be determined directly. This is done by multiplying the unit concentration estimated at any receptor (using unit emissions) by the specific emission rate for each scenario. Reporting unit concentration results was determined to be most beneficial because a single set of modeling results can be utilized by your staff to estimate the effects of multiple emission-rate scenarios. Thus, your staff must adjust all the concentration estimates reported in this document using facility-specific emissions scenarios in the following manner:

$$\begin{pmatrix} Unit \\ Concentration \end{pmatrix} \times \begin{pmatrix} Scenario \\ Emission \\ Rate \end{pmatrix} = \begin{pmatrix} Scenario \\ Concentration \end{pmatrix} \quad (1)$$

There are a number of plausible routes through which emissions can exit a facility. Site visits and surveys indicate that AMR facilities can have a variety of different ventilation systems, including forced-air systems, passive vents, and fans as well as open doors and windows. However, it is assumed that service bay doors are the overwhelming avenues by which Perc, MeCl, and TCE emissions mix with outdoor air. There are several reasons for this assumption. Most notable is that service bay doors are usually left open. This practice is due to both the comfortable California climate and the practicality of leaving the doors open to allow entrance and exit of automobiles. Also, doors are typically left open because closed doors give the appearance that the facility is closed. Service bay doors are typically the car-width, roll-up variety and, as such, provide a large exit area once they are opened. With respect to facility design, there is a desire to maximize the number of service bays per facility, and, as such, service bay doors typically account for the greatest surface area along the front and/or back of a facility.

When Perc, MeCl, and TCE emissions immediately leave the facility from the service bay door openings, building-induced wind flow and turbulence patterns affect the dispersion of the emissions as the Perc, MeCl, and TCE mixes with the outside air passing by the structure. The effects on the air flowing immediately around the building are caused by higher pressure at the windward side of the building and lower pressure at the leeward side of the building. The magnitude of these effects is a function of wind speed, building dimensions and building orientation.

Based on the processes described above, the facilities were modeled as ISCST3 volume sources using the facility dimensions provided by your staff. Minor adjustments were made to the facility dimensions that were provided in order to adhere to the input requirements of the model. That is, the ISCST3 model is designed to simulate the

dispersion of volume source emissions using volume sources having a square base (i.e., equal length and width). As a result, rectangular buildings, like most of the facilities modeled, are simulated as a series of adjacent volume sources, each having a square foot print. Only two of the facilities modeled are simulated using one volume source (facilities A-28 and O). In addition, the ISCST3 model simulates volume sources as virtual point sources. The details of this methodology are provided in the ISC3 documentation and require three basic input parameters: an initial lateral dimension (sigma x), an initial vertical dimension (sigma y), and the effective release height. The sigma inputs are based on the height of the volume source and the length of each side of each square volume source. To be consistent with initial modeling analyses, the effective emission plume release height is assumed to be half of the building height. Table 3 provides the ISCST3 volume source input parameters used.

Due to the assumptions made about the reactivity and deposition of emissions (i.e., none of either), concentrations attributable to each facility are assumed to be dependent solely on the dispersion of facility emissions by the effects of meteorological parameters. The terrain is assumed to be urban, and, as such, urban dispersion coefficients are applied. It should be noted that this analysis does not account for regional, background concentrations or overlapping plumes of Perc, MeCl, and TCE from other sources that could impact any of the receptors modeled.

Description of Meteorological Data Used

At a fixed geographical location, measured meteorological parameters are expected to fall within historical ranges and to follow a regular, annual pattern with some year-to-year variability. As a result of this consistency, meteorological data that are collected using EPA approved procedures at a specific location can be used in modeling analyses to represent meteorological conditions that are likely to be experienced at the same location in the future. It is also acceptable to utilize off-site meteorological data that are representative of the conditions at the site of analysis (where representativeness is based on specific EPA guidelines).

Site-specific meteorological data are not available for any of the specific AMR facilities. Therefore, representative, off-site meteorological data were used. Also, since a few of the thirteen facilities are located in the same general geographical area, some of the thirteen facilities are represented by the same meteorological data. As a result, modeling for the thirteen facilities utilizes ten different off-site meteorological data collection sites, each of which are representative of the meteorological conditions experienced at one or more facilities. To account for year-to-year variability in meteorological conditions experienced in a region, multiple years of meteorological data were used, where available. In total, forty-five meteorological data sets were used,

comprised of one to six years of data per each of the ten meteorological sites. Only one year of meteorological data were available for facility U while three to six years of data were used for the remaining facilities.

Table 4 lists the representative meteorological data that were used for each of the thirteen specific facilities. Each generic facility was modeled using all of the specific facility meteorological data sets (i.e., all forty-five meteorological data sets). This was done to broadly assess the level of pollutant concentrations that could be associated with different sizes of service facilities located in the different regions around the state that are represented by the ten different meteorological data collection sites. In addition to using all of the specific facility meteorological data, each generic facility was modeled with default meteorological data (i.e., default meteorological data from the SCREEN model). Three default data sets were used, corresponding to wind directions of 0, 45, and 90 degrees- where zero degrees corresponds to the radial parallel to the longest side of each facility and would yield the highest modeled concentrations.

Method for Determination of Hourly Concentrations

One purpose of this analysis is to determine the maximum hourly concentration that might be experienced in the area surrounding an AMR facility. Using the ISCST3 model this is determined with facility-specific inputs such as the facility emissions rate, the hourly operating schedule, and the range of observed meteorological conditions that have historically occurred during each facility's hours of operation. As mentioned earlier, this analysis assumes the facility emission rate to be 1 gram/second (unit emission rate).

All of the facilities modeled in this project operate on a consistent weekly schedule, comprised of a combination of the hour-of-day that a facility is open (i.e., 12AM-12PM) per each day-of-week (i.e., Monday-Sunday). All of the schedules were similar in that each AMR facility operates on a fixed weekday operating schedule (e.g., 9AM-5PM, Monday through Friday) where the weekend hours fall within the scheduled weekday hours (e.g., 10AM-2PM, Saturday).

An important concept in selecting proper meteorological data inputs for worst-case modeling analyses is that meteorological conditions measured on Saturday at 9AM during year 'X' could occur some other year on any day of the week at 9AM. Thus, if an AMR facility is open for business every Saturday at 9AM, then all meteorological conditions historically experienced during that hour of the day, not day of the week, must be considered to estimate the maximum hourly concentration. With this concept in mind, each annual, 24-hour-per-day meteorological data set can be considered to consist of 24 separate data sets (i.e., one per hour of the day, military time). Each of

these 24 fixed-hour data sets represents the range of meteorological conditions that have occurred during the same hour of the day for the entire year.
Hourly concentrations were estimated by the ISCST3 model using all of the meteorological conditions that were measured during any hour-of-day that is specified in the operating schedules provided by your staff, irrespective of the day of the week. Since all of the facilities have weekend hours of operation that are a subset of the weekday hours of operation, meteorological data coincident with the Monday through Friday operating hours-of-day were used. For example, a facility might operate Monday through Friday from 9AM to 5PM and on Saturday from 9AM to 2PM (45 hours per week). For this facility, hourly concentrations were estimated by the ISCST3 using meteorological conditions measured any day of the year from 9AM to 5PM (56 hours per week, 52 weeks per year) for all the years of meteorological data available.

Method for Determination of Annual Concentrations

Another purpose of this analysis is to determine the maximum annual concentration that might be experienced in the area surrounding a facility. The ISCST model calculates long-term, annual concentrations by averaging all the hourly concentrations determined at each receptor over the year represented by the meteorological data input file. This includes concentrations calculated when the facility is not operating (i.e., null hourly concentrations). Thus, the model averages all of the hourly concentration estimates described in the previous section (Determination of Hourly Concentrations) over all hours of the year. For example, a facility that operates Monday through Friday from 9AM to 5PM and on Saturday from 9AM to 2PM is open 45 hours per week. For this facility, 2340 hourly average concentrations per receptor should be considered in calculating the average concentration per non leap year (45 hours-per-week, 52 weeks per year). However, to account for all possible hourly meteorological conditions associated with each hour of facility operation, more hourly concentrations are calculated than correspond to each facility's operating schedule (described in the previous paragraph). That is, using the above example facility, 56 hours per week are modeled rather than 45 hours per week. This results in 9 additional hourly concentrations per week, which are used in calculating the annual average. Thus, the annual average concentrations determined by the model are overestimated. To alleviate overestimation of the annual average concentration estimates, the annual average concentrations calculated by the model were adjusted using a factor of scheduled hours per week over the modeled hours per week. For the example facility used above this reduction factor is 0.804, which is equal to 45 operating hours divided by 56 modeled hours. This adjustment method assumes that the 9 additional concentrations per week fall within the weekly average concentrations associated with the specific 45 hour-per-week operating schedule. Table 5 provides the annual

adjustment factors used for each facility. All of the annual concentration estimates provided in this memo have already been adjusted by these factors.

Modeling Results for Specific Facilities

Grid-Based Receptor Network Results

For each hour of meteorological data used, hourly concentrations specific to a facility's emissions were estimated at each receptor in a gridded network surrounding each of the specific facilities. The utilized receptor networks are described in Table 2. Receptors representing discrete, off-site residences or businesses that might be located in-between the equally spaced, gridded receptors were modeled separately (these results are described in the following section). As described in the previous sections and in Table 4, hourly meteorological conditions from 1 to 6 annual meteorological data sets were used per facility.

For each facility and for each year of meteorological data used, the maximum hourly and maximum annual concentrations were determined out of all of the hourly and annual concentrations estimated to occur at any of the receptors in the gridded receptor network. Thus, 1 to 6 maximum hourly concentrations and 1 to 6 maximum annual concentrations were determined per site (i.e., one maximum hourly and one maximum annual concentration per year of meteorological data). Tables 6A and 6B summarize the high, average, and low statistics for the 1 to 6 maximum annual concentrations and 1 to 6 maximum hourly concentrations, respectively, determined for each site. For example, if five years of meteorological data were available for a facility, modeling might result in maximum, annual-average concentration estimates of 10, 12, 14, 16 and 18 micrograms per cubic meter. In this case, the high would be 18, the low would be 10, and the average would be 14. Tables 6A and 6B also present the range of distance and direction at which the maximum values occur, since the maximum concentrations could occur at different receptors, depending on the corresponding meteorological conditions that produced each maximum. It should be noted again that facility emissions were limited to each facility's hours of operation (Table 1) and modeling was limited to distances greater than 32 meters from the centroid of each source.

Discrete Receptor Results (Nearest Residence/Business Off-Site Receptor

The locations of the nearest business receptor (NBR), nearest residential receptor (NRR), maximum exposed individual worker (MEIW), and maximum exposed individual resident (MEIR) were determined by your staff. Concentrations at these locations were modeled separately as discrete receptors (i.e., stand-alone points on a map). If the distance from the source centroid to the discrete NBR, NRR, MEIW, or MEIR receptor

was determined to be closer than 32 meters, the concentration at 32 meters in the equivalent direction is reported in lieu of the concentration estimated at the discrete business or residential receptor. This was done to stay consistent with the 32-meter, minimum-modeled distance implemented for the receptor network modeling of specific facilities (covered in the previous section). In order to produce these supplemental data points, concentrations were calculated for a polar network of receptors. This polar network consists of 60 receptors where each receptor is spaced 6 degrees apart and located 32 meters from the source centroid.

Your staff determined the locations of the NBR and NRR during site visits. These receptors represent the nearest business and residence to each of the facilities. At each receptor, a maximum hourly concentration and a maximum annual concentration was calculated using each of the one to six years of meteorological data associated with each specific facility (Table 4). The high, low, and average of these one to six values for the NBR and NRR are provided in Tables 7A and 7B.

The locations of potential MEIW and MEIR receptors were determined by your staff using modeling results for the gridded receptor networks, described in the previous section and identified in Table 2. To estimate the location of potential MEIW and MEIR receptors, your staff utilized plots of modeled concentrations overlaid onto street maps as well as sketches of the residences and businesses in the region surrounding each facility. The sketches were made during site visits. Concentrations at all of the potential MEIW and MEIR locations were modeled as discrete receptors. The business receptor having the highest modeled concentration among all of the identified business receptors delineates it as the maximum exposed individual worker (MEIW). Similarly, the residential receptor having the highest modeled concentration among all of the identified residential receptors delineates that receptor as the maximum exposed individual resident (MEIR). Tables 7C and 7D present the facility-specific annual and hourly concentrations, respectively, at the MEIW and MEIR.

Regional Population Impact Results for Specific Facilities

Assessing the impact of source-specific emissions on the population surrounding a source consists of analyzing model-estimated concentrations that have been spatially paired to population estimates. In order to perform this type of analysis, concentration data and population data must be processed to represent the same grid-cell in a gridded network of areas surrounding a facility in one of the following four ways:

1. No processing is required if both forms of data have the same spatial resolution and the existing resolution is sufficient for analyses;

2. Concentration data may be processed to match the spatial resolution of the population data;

3. Population data may be processed to match the spatial resolution of the concentration data; or
4. Both the concentration data and population data are processed to another, third spatial resolution.

In this analysis, processing option number four was used. Population data from the California Department of Finance (CDF) was used. Specifically, the utilized CDF data is census tract population data for 1990, projected to 1997 using CDF growth factors. Based on previous analyses, the population data were spatially re-allocated from representing census tract populations surrounding each of the facilities to representing populations in 1-kilometer by 1-kilometer areas (square grid-cells) surrounding each facility. In processing the population data, the centroid of each grid-cell was assigned to be coincident with a coarse network modeling receptor (Table 2).

Perc, MeCl, and TCE unit concentration data from the modeling analyses were processed to match the 1-kilometer by 1-kilometer grid-cell resolution of the population data. The average of the modeled concentrations for receptors spaced 100 meters apart (Table 2) was used as a representative concentration for each of the nine central 1-kilometer by 1-kilometer grid cells surrounding a facility. Otherwise, the modeled concentrations for receptors spaced 1-kilometer apart were used (Table 2). The reason for using an average concentration is that the modeling analyses presented in the previous section shows that high concentration gradients occur within 100 meters from a facility and, lower, more uniform concentrations are expected to occur at distances beyond 100 meters. A potential drawback to averaging concentrations in the central, grid-cell that contains the AMR facility is that it could underestimate near-source population exposure. That is, all of the 100-meter-spaced receptor concentrations in this grid cell have the same weight in determining the average 1-kilometer by 1-kilometer grid cell concentration. Because there are more receptors beyond 100 meters than inside of 100 meters, the average of all of the receptor concentrations in this grid cell is significantly lower than modeled concentrations within 100 meters from the facility. As a result, the average concentrations within the center 1-kilometer by 1-kilometer grid cell underestimates exposure to Perc, MeCl, or TCE for the population that might be located coincident with high concentration gradients (i.e., generally located within 100 meters from an AMR facility). To account for this, the maximum-modeled concentration should be considered as an upper bound of exposure within the central grid cell.

After concentration and population data are processed to represent grid-cell areas in the same grid system, concentration thresholds are used to stratify the matched population/km^2 and concentration (ug/m^3) data values. Tables 8A through 8M present the cumulative population exposure for the 31-kilometer by 31-kilometer area surrounding each specific facility. These tables show the number of people estimated to be exposed to a specific annual concentration up to the maximum concentration provided in Tables 6 and 7, exclusively from each facility and based on a unit emission rate. For example, Table 8A represents cumulative population exposure for facility A-07, which was modeled using Oakland meteorological data (see Table 4). Table 8A shows that unit emissions from facility A-07 that are under the influence of Oakland 1960 meteorological conditions cause up to 132,661 people to be exposed to Perc, MeCl, and TCE concentrations that can range between 0.09 and 113.00 micrograms per cubic meter. The maximum concentration is considered to account for the effects of averaging 100-meter-spaced receptor concentrations over areas expected to experience a high concentration gradient (this is discussed in the paragraph above). Each table provides an average for the multiple years of data in the last column.

Modeling Results for Generic Facilities

Descriptions of generic facilities are found in Table 1B and in Table 3. Tables 9A and 9B summarize the generic facility modeling results. Appendix A contains more detailed tables of the maximum concentration per indicated distance for each default meteorological condition and specific facility meteorological site. Summary statistics of maximum values per distance (average, high, and low) are tabulated in the last three columns of Appendix A tables, where the summary values used in Tables 9A and 9B are indicated with boxed borders.

Each generic facility was modeled using meteorological data for all 10 sites that were used in specific facility modeling (Table 4). For modeling with these 45 meteorological data sets, a 360-degree polar receptor grid is utilized where angular distances of 6 degrees separate each radial. Each radial has receptors located between 20 meters and 1000 meters from the source centroid.

As indicated in the first three columns in each of the tables in Appendix A, each table contains hourly or annual modeling results for one of the generic facilities at specified distances. All distances are from the facility center, except for default meteorology (DFLT_00, DFLT_45, and DFLT_90), which is discussed in the paragraph below. Each record, or line, in each of the tables in Appendix A presents a single hourly or annual concentration for each of the ten meteorological data sets (BUR, CND, FAT, LAX, MCC, MHR, OAK, RED, SAC, and STN071) estimated to occur at the specified distance from the facility centroid. In the last three columns of each line the high, low, and average of

these ten values is provided. For example, one model run was made for facility G-03 per year of Oakland (OAK) meteorological data (1960, 1961, 1962, 1963, and 1964). Each of these five model runs resulted in one hourly maximum and one annual maximum concentration per distance from the source centroid. Among the five maximum hourly concentrations modeled for facility G-03 using the five different years of Oakland meteorological data, the overall maximum hourly value is 1716 ug/m^3 and occurs 20 meters from the center of the facility using 1964 OAK data. Similarly the maximum annual value is 47 ug/m^3, which occurs 30 meters from the center of the facility using 1962 OAK data. These two concentration values are underlined in the Appendix A tables (without a reference to the associated year of meteorological data). This same process was performed for the remaining 9 meteorological sites, resulting in 10 overall maximum hourly and 10 overall maximum annual values per generic facility and per distance. Tables 9A and 9B provide the 'high', 'low', and 'average' of the 10 overall maximum hourly (i.e., any distance) and 10 overall maximum annual values for each generic facility. These values are found boxed in the Appendix tables as well. Because generic facility modeling included concentration estimates down to 20 meters from the facility centroid, it should be noted that none of the maximum concentrations for any facility, distance, or met year were found to fall within the building footprint.

In applying the 45 meteorological data sets to the generic facilities, each generic facility was oriented with the building length along the East-West direction (i.e., x-axis). Thus, concentrations could be higher in situations where the length of the building, as modeled, is not oriented parallel with the prevailing wind direction for each meteorological data set. This is the orientation known to result in maximum concentrations. To gain some understanding as to the variability that might occur from building orientation effects, default meteorological conditions were applied to the generic facilities using three building length orientations: parallel to the wind direction (DFLT_00); 45 degrees to the wind (DFLT_45); and perpendicular to the wind direction (DFLT_90). Maximum concentrations were found to vary by ten percent for facility G-01, fifteen percent for facility G-02, and forty percent for facility G-03. The range in variability is dependent upon the facility dimensions.

In closing, it should be noted that all concentrations presented in this memo are concentration estimates above background concentrations. Also, the presented analyses give no consideration to background Perc, MeCl, and TCE concentrations or overlapping plumes of these substances from multiple nearby sources simultaneously utilizing Perc, MeCl, and TCE-based products. The overlapping plume case is plausible with specific facilities A-7 and A-8, for example.

Enclosures

TABLES

TABLE 1. Description of Automotive Maintenance and Repair Facilities.

A. Facility Locations.

ID	General Location	UTM Zone	UTM East (m)	UTM North (m)
A-07	Oakland	10	565380	4186595
A-08	Oakland	10	565363	4186618
A-09	Berkeley	10	562308	4191508
A-28	Sacramento	10	636751	4276869
A-52	Marina Del Rey	11	366347	3761855
A-83	Redding	10	553940	4491121
A-86	Fresno	10	786709	4079569
A-92	Fresno	10	788131	4075093
I	Sacramento	10	636216	4268553
O	Walnut Creek	10	582393	4197375
P	Sacramento	10	642904	4267713
T	Glendale	11	384374	3776603
U	Garden Grove	11	414841	3736229

B. Dimensions and Operating Parameters.

ID	L (m)	W (m)	H (m)	Number of Hrs/Wk	Hours Of Operation	Days of Operation
A-07	30.5	10.7	4.6	58	8.0a- 6.0p 8.0a- 4.0p	M-F Sat
A-08	22.9	9.1	4.6	59	8.0a- 6.0p 8.0a- 5.0p	M-F Sat
A-09	21.3	13.7	7.6	59	8.0a- 6.0p 8.0a- 5.0p	M-F Sat
A-28	15.2	15.2	9.1	122.5	5.0a-10.5p	M-Sun
A-52	15.2	7.6	4.6	51	8.0a- 5.0p 8.0a- 2.0p	M-F Sat
A-83	24.4	9.1	6.1	53	8.0a- 5.0p 8.0a- 4.0p	M-F Sat
A-86	53.3	33.5	10.0	60	7.0a- 6.0p 9.0a- 2.0p	M-F Sat
A-92	15.2	7.6	5.2	47	7.5a- 4.0p 7.5a-12.0p	M-F Sat
I	62.8	22.3	9.5	92.5	6.5a- 1.0a	M-F
O	18.3	15.2	6.1	45	9.0a- 6.0p	M-F
P	18.3	10.7	6.1	60	8.0a- 6.0p	M-Sat
T	21.3	9.1	6.1	56.5	8.0a- 5.5p 8.0a- 5.0p	M-F Sat
U	18.3	9.1	6.1	60	8.0a- 6.0p	M-Sat
G-01*	12.2	7.6	4.9	57	8.0a- 6.0p 8.0a- 3.0p	M-F Sat
G-02*	21.3	13.7	7.6	57	8.0a- 6.0p 8.0a- 3.0p	M-F Sat
G-03*	62.5	21.3	7.6	57	8.0a- 6.0p 8.0a- 3.0p	M-F Sat

* G-01, G-02, and G-03 are 'generic' facilities

TABLE 2. ISCST3 Receptor Networks Used for Non-Discrete Receptor Modeling

Facility Type	Grid Name (Type)	Cell Size	Number of Receptors	Location
Specific	COARSE (Cartesian)	1000m X 1000m	31 X 31 = 961	Centered on Source Centroid
Specific	FINE (Cartesian)	100m X 100m	31 X 31 = 961	Centered on Source Centroid
Specific	VFINE (Cartesian)	20m X 20m	26 X 26 = 676	Centered on Source Centroid
Generic	POLAR[a] (Polar)	Variable. Depends on distance from source.	(360/6) X 36 = 2160	Centered on Source Centroid

The polar network consists of 60 radials, spaced 6 degrees apart, having receptors at the following 36 distances (meters): 20, 30, 40, 50, 60, 70, 80, 90, 100, 120, 140, 150, 160, 180, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000, 2000, 3000, 4000, 5000, 6000, 7000, 8000, 9000, 10000, and 23000.

TABLE 3. ISCST3 Volume Source Input Parameters.

	Facility Parameters MEASURED (Entire Facility)				Facility Parameters USED IN MODELING (Per volume source)				Dispersion Parameters USED IN MODELING (Per volume source)		
ID[a]	L (m)	W (m)	H (m)	Hrs Per Wk	# of L X L Volumes	L (m)	H (m)	Hrs Per Wk	Sigma - Y	Sigma - Z	Release Height[b] (m)
A-07	30.5	10.7	4.6	58	3	10.0	4.6	70	4.7	2.1	2.3
A-08	22.9	9.1	4.6	59	3	8.4	4.6	70	3.9	2.1	2.3
A-09	21.3	13.7	7.6	59	2	12.2	7.6	70	5.7	3.5	3.8
A-28	15.2	15.2	9.1	122.5	1	15.2	9.1	122.5	3.5	4.3	4.5
A-52	15.2	7.6	4.6	51	2	7.6	4.6	63	3.5	2.1	2.3
A-83	24.4	9.1	6.1	53	3	9.1	6.1	63	4.3	2.8	3.0
A-86	53.3	33.5	10.0	60	2	30.0	10.0	77	14.0	4.7	5.0
A-92	15.2	7.6	5.2	47	2	7.6	5.2	63	3.5	2.4	2.6
I	62.8	22.3	9.5	92.5	3	21.3	9.5	133	9.9	4.4	4.7
O	18.3	15.2	6.1	45	1	15.2	6.1	63	3.7	2.8	3.0
P	18.3	10.7	6.1	60	2	9.8	6.1	70	4.5	2.8	3.0
T	21.3	9.1	6.1	56.5	2	9.1	6.1	70	4.2	2.8	3.0
U	18.3	9.1	6.1	60	2	9.1	6.1	70	4.3	2.8	3.0
G-01[a]	12.2	7.6	4.9	57	2	7.0	4.9	70	3.3	2.3	2.5
G-02[a]	21.3	13.7	7.6	57	2	13.0	7.6	70	6.1	3.5	3.8
G-03[a]	62.5	21.3	7.6	57	3	20.0	7.6	70	9.3	3.5	3.8

G-01, G-02, and G-03 are 'generic' facilities

Release height used in modeling is set to half of the building height.

TABLE 4. Meteorological Data Used for Refined Modeling (ISCST3).

Specific Facility ID (13 Facilities)	Meteorological Site Name (10 Sites)	Meteorological Site Abbreviation	Number of Years of Met Data (45 Total)	Meteorological Data Calendar Years Used
A-07, A-08, A09	Oakland	OAK	5	'60-'64
A-28	McClellan AFB	MCC	5	'53-'57
A-52	LAX	LAX	5	'85-'89
A-83	Redding	RED	3	'87-'89
A-86, A-92	Fresno	FAT	5	'85-'89
I	Sac Exec.	SAC	5	'87, '89-'92
O	Concord	CND	6	'91-'96
P	Mather AFB	MHR	5	'53-'57
T	Burbank	BUR	5	'58-'62
U	Anaheim	STN07161	1	'81

TABLE 5. Adjustment Factors for Annual Average Concentrations.

ID	Specific Hours Per Week	Modeled Hours Per Week	Annual Modeled Concentration Adjustment Factor
A-07	58	70	0.829
A-08	59	70	0.843
A-09	59	70	0.843
A-28	122.5	122.5	1.000
A-52	51	63	0.810
A-83	53	63	0.841
A-86	60	77	0.779
A-92	47	63	0.746
I	92.5	133	0.695
O	45	63	0.714
P	60	70	0.857
T	56.5	70	0.807
U	60	70	0.857
G-01[a]	57	70	0.814
G-02[a]	57	70	0.814
G-03[a]	57	70	0.814

a. G-01, G-02, and G-03 are 'generic' facilities

TABLE 6. Specific Facility Impacts on Grid-Based Receptors Per 1 g/s Emission Rate.

A. Maximum **ANNUAL** Perc, MeCl, and TCE Concentrations (ug/m^3).

Facility ID	Site and Years of Met. Data *One max. annual concentration generated per year of met data.*	Direction Range[a] (deg.)	Distance Range (m)	High[b] Max. Conc.	Low[b] Max. Conc.	Avg.[b] Max. Conc.
A-07	Oakland '60-'64	108-108	32-32	120	107	113
A-08	Oakland '60-'64	108-108	32-32	155	140	147
A-09	Oakland '60-'64	108-108	32-32	124	110	118
A-28	McClellan AFB '53-'57	342-342	32-32	322	209	261
A-52	LAX '85-'89	72-108	32-32	104	92	100
A-83	Redding '87-'89	162-162	32-32	100	91	95
A-86	Fresno '85-'89	101-135	42-51	40	34	37
A-92	Fresno '85-'89	108-108	32-32	102	80	88
I	Sac Exec. '87, '89-'92	349- 11	51-51	83	74	79
O	Concord '91-'96	162-162	32-32	97	82	89
P	Mather AFB '53-'57	342- 72	32-32	105	78	91
T	Burbank '58-'62	288-342	32-32	217	108	152
U	Anaheim '81	72-72	32-32	337	337	337

Direction is measured clockwise, from North.

For each facility, one maximum concentration and associated location was determined per year of meteorological data used for modeling (during hours of operation). For example, facility A-7 has five years of Oakland meteorological data (Table 4; 1960,1961,1962,1963, and 1964). Thus, five maximum annual estimates at five locations resulted for facility A-7. The tabulated high, low, and average concentrations are the high, low, and average statistics based on these concentrations. Therefor, if the concentrations were 1, 2, 3, 4, and 5, then the low would be 1, the average would be 3 and the high would be 5 (ug/m^3). The distance and direction ranges indicate the variability in location for the estimated maximum concentrations.

B. Maximum **HOURLY** Perc, MeCl, and TCE Concentrations (ug/m^3).

Facility ID	Site and Years of Met. Data *One maximum hourly concentration is calculated per year of met data.*	Direction Range[a] (deg.)	Distance Range (m)	High[b] Max. Conc.	Low[b] Max. Conc.	Avg.[b] Max. Conc.
A-07	Oakland '60-'64	198- 33	32-42	5027	3799	4614
A-08	Oakland '60-'64	252-288	32-32	5597	4269	5067
A-09	Oakland '60-'64	252-108	32-32	3442	2703	3062
A-28	McClellan AFB '53-'57	288- 18	32-42	5370	3977	5034
A-52	LAX '85-'89	315-342	32-42	5096	4208	4600
A-83	Redding '87-'89	162-198	32-32	6364	4241	5316
A-86	Fresno '85-'89	101-301	51-58	1594	1077	1403
A-92	Fresno '85-'89	135-315	32-42	5990	4383	5015
I	Sac Exec. '87, '89-'92	135-348	42-51	2231	1489	1995
O	Concord '91-'96	342-108	32-32	7335	7323	7329
P	Mather AFB '53-'57	252- 72	32-32	3289	2548	2952
T	Burbank '58-'62	288-108	32-32	5841	5835	5837
U	Anaheim '81	108-108	32-32	5554	5554	5554

a, b. See Table 6A footnote, above. The same method was used here, but for hourly data.

TABLE 7. Facility Impacts on Business/ Residence Receptors (1 g/s Emission Rate).

A. **NEAREST** Business/Residential Receptor Maximum **ANNUAL** Concentrations (ug/m^3).

Type	ID	X (m)	Y (m)	Distance[a] (m)		Direction[b] (deg.)	HIGH[c]	LOW[c]	AVG[c]
Bus.	A-07	-5	20	32	*	348	47	33	41
	A-08	10	-10	32	*	132	114	87	98
(NBR)	A-09	0	10	32	*	0	36	27	32
	A-28	-80	-90	120		222	4	2	3
	A-52	-30	-10	32		252	31	24	29
	A-83	-30	0	32	*	270	23	23	23
	A-86	60	-160	171		159	4	3	3
	A-92	-30	10	32		288	78	70	73
	I	30	90	95		18	33	27	30
	O	0	-26	32	*	180	89	76	82
	P	0	-31	32	*	180	51	27	38
	T	0	-30	32	*	180	20	13	17
	U	91	0	91		90	22	22	22
Res.	A-07	10	0	32	*	90	124	107	115
	A-08	-40	10	41		284	15	7	12
(NRR)	A-09	30	0	32	*	90	145	126	134
	A-28	-90	-10	91		264	6	2	4
	A-52	-35	30	46		311	32	26	28
	A-83	0	-35	35		180	78	72	75
	A-86	250	250	354		45	1	0	1
	A-92	-50	-50	71		225	6	5	5
	I	-130	70	148		298	6	5	6
	O	-100	0	100		270	2	1	1
	P	-35	0	35		270	10	5	7
	T	0	6	32	*	0	190	96	135
	U	0	6	32	*	0	139	139	139

NOTES:

The symbol "*" indicates the receptor is closer than 32 meters from the source centroid. In this case, the concentration is replaced with modeling results for the estimated concentration at 32 meters in the equivalent direction from the source (i.e., +/- 3 degrees).

Direction is measured clockwise, from North.

For each facility and receptor, one maximum concentration was modeled per year of meteorological data indicated in Table 4 (during hours of operation). For example, facility A-7 has five years of Oakland meteorological data (1960,1961,1962,1963, and 1964). Thus, five maximum estimates were made for each A-7 receptor. The tabulated high, low, and average concentrations are the high, low, and average statistics based on these concentrations. Therefor, if the concentrations were 1, 2, 3, 4, and 5, then the low would be 1, the average would be 3 and the high would be 5 (ug/m^3).

TABLE 7 (continued).

B. **NEAREST** Business/Residential Receptor Maximum **HOURLY** Concentrations (ug/m^3).

Type	ID	X (m)	Y (m)	Distance[a] (m)		Direction[b] (deg.)	HIGH[c]	LOW[c]	AVG[c]
Bus.	A-07	-5	20	32	*	348	3818	2724	3021
	A-08	10	-10	32	*	132	5430	3356	4485
(NBR)	A-09	0	10	32	*	0	2333	1752	1937
	A-28	-80	-90	120		222	1404	733	976
	A-52	-30	-10	32		252	2496	1914	2311
	A-83	-30	0	32	*	270	2966	2095	2654
	A-86	60	-160	171		159	439	253	345
	A-92	-30	10	32		288	5903	4006	4467
	I	30	90	95		18	960	721	771
	O	0	-26	32	*	180	7258	6540	7085
	P	0	-31	32	*	180	2261	1462	1862
	T	0	-30	32	*	180	3148	2948	3059
	U	91	0	91		90	2399	2399	2399
Res.	A-07	10	0	32	*	90	3399	2200	2615
	A-08	-40	10	41		284	4340	1836	3605
(NRR)	A-09	30	0	32	*	90	3437	2318	2712
	A-28	-90	-10	91		264	1351	1202	1302
	A-52	-35	30	46		311	4098	3073	3720
	A-83	0	-35	35		180	3972	3742	3865
	A-86	250	250	354		45	155	60	121
	A-92	-50	-50	71		225	1265	1263	1264
	I	-130	70	148		298	746	503	592
	O	-100	0	100		270	2139	1344	1906
	P	-35	0	35		270	2652	2360	2537
	T	0	6	32	*	0	3148	3026	3112
	U	0	6	32	*	0	3107	3107	3107

NOTES:

The symbol "*" indicates the receptor is closer than 32 meters from the source centroid. In this case, the concentration is replaced with modeling results for the estimated concentration at 32 meters in the equivalent direction from the source (i.e., +/- 3 degrees).

Direction is measured clockwise, from North.

For each facility and receptor, one maximum concentration was modeled per year of meteorological data indicated in Table 4 (during hours of operation). For example, facility A-7 has five years of Oakland meteorological data (1960,1961,1962,1963, and 1964). Thus, five maximum estimates were made for each A-7 receptor. The tabulated high, low, and average concentrations are the high, low, and average statistics based on these concentrations. Therefor, if the concentrations were 1, 2, 3, 4, and 5, then the low would be 1, the average would be 3 and the high would be 5 (ug/m^3).

TABLE 7 (continued).

C. MAXIMUM Exposed Resident and Off-Site Worker ANNUAL Concentrations (ug/m^3).

Type	ID	X (m)	Y (m)	Distance[a] (m)	Direction[b] (deg.)	HIGH[c]	LOW[c]	AVG[c]
Bus.	A-07	50	10	51	79	51	41	47
	A-08	30	30	42	45	32	29	30
(MEIW)	A-09	-10	30	32	342	30	20	27
	A-28	0	130	130	0	43	23	32
	A-52	30	-10	32	108	104	81	96
	A-83	-10	30	32	342	73	72	72
	A-86	-160	50	168	287	4	4	4
	A-92	-30	10	32	288	78	70	73
	I	30	90	95	18	33	27	30
	O	0	-20	32 *	180	89	76	82
	P	0	30	32 *	0	90	50	70
	T	0	30	32 *	0	190	96	135
	U	-10	30	32	342	124	124	124
Res.	A-07	30	-10	32	108	124	111	117
	A-08	0	30	32 *	0	45	38	40
(MEIR)	A-09	30	-10	32	108	126	112	120
	A-28	10	-90	91	174	28	17	20
	A-52	-40	30	50	307	28	23	25
	A-83	10	-50	51	169	49	45	46
	A-86	150	-50	158	108	7	6	6
	A-92	-50	-30	58	239	11	8	9
	I	70	140	157	27	14	12	13
	O	-100	0	100	270	2	1	1
	P	-30	-30	42	225	14	5	8
	T	30	110	114	15	26	13	19
	U	30	10	32	72	337	337	337

NOTES:

The symbol "*" indicates the receptor is closer than 32 meters from the source centroid. In this case, the concentration is replaced with modeling results for the estimated concentration at 32 meters in the equivalent direction from the source (i.e., +/- 3 degrees).

Direction is measured clockwise, from North.

For each facility and receptor, one maximum concentration was modeled per year of meteorological data indicated in Table 4 (during hours of operation). For example, facility A-7 has five years of Oakland meteorological data (1960,1961,1962,1963, and 1964). Thus, five maximum estimates were made for each A-7 receptor. The tabulated high, low, and average concentrations are the high, low, and average statistics based on these concentrations. Therefor, if the concentrations were 1, 2, 3, 4, and 5, then the low would be 1, the average would be 3 and the high would be 5 (ug/m^3).

TABLE 7 (continued).

D. MAXIMUM Exposed Resident and Off-Site Worker **HOURLY** Concentrations (ug/m^3).

Type	ID	X (m)	Y (m)	Distance[a] (m)		Direction[b] (deg.)	HIGH[c]	LOW[c]	AVG[c]
Bus.	A-07	50	10	51		79	1964	1502	1674
	A-08	30	30	42		45	3176	1780	2203
(MEIW)	A-09	-10	30	32		342	2506	1797	2118
	A-28	0	130	130		0	1229	822	1002
	A-52	30	-10	32		108	2809	2079	2373
	A-83	-10	30	32		342	3550	2837	3142
	A-86	-160	50	168		287	597	389	436
	A-92	-30	10	32		288	5903	4006	4467
	I	30	90	95		18	960	721	771
	O	0	-20	32	*	180	7258	6540	7085
	P	0	30	32	*	0	2180	1630	1950
	T	0	30	32	*	0	3148	3026	3112
	U	-10	30	32		342	3453	3453	3453
Res.	A-07	30	-10	32		108	3196	2331	2732
	A-08	0	30	32	*	0	3076	2639	2911
(MEIR)	A-09	30	-10	32		108	3089	2335	2609
	A-28	10	-90	91		174	2019	1320	1606
	A-52	-40	30	50		307	3630	2525	3283
	A-83	10	-50	51		169	3739	2467	3016
	A-86	150	-50	158		108	425	407	418
	A-92	-50	-30	58		239	1808	1514	1604
	I	70	140	157		27	665	417	483
	O	-100	0	100		270	2139	1344	1906
	P	-30	-30	42		225	2537	1689	2009
	T	30	110	114		15	1166	994	1124
	U	30	10	32		72	4600	4600	4600

NOTES:

The symbol "*" indicates the receptor is closer than 32 meters from the source centroid. In this case, the concentration is replaced with modeling results for the estimated concentration at 32 meters in the equivalent direction from the source (i.e., +/- 3 degrees).

Direction is measured clockwise, from North.

For each facility and receptor, one maximum concentration was modeled per year of meteorological data indicated in Table 4 (during hours of operation). For example, facility A-7 has five years of Oakland meteorological data (1960,1961,1962,1963, and 1964). Thus, five maximum estimates were made for each A-7 receptor. The tabulated high, low, and average concentrations are the high, low, and average statistics based on these concentrations. Therefor, if the concentrations were 1, 2, 3, 4, and 5, then the low would be 1, the average would be 3 and the high would be 5 (ug/m^3).

TABLE 8. Specific Facility ANNUAL Population Exposure Estimates.

A. Facility A-07

ug/m³ >=	OAK60	OAK61	OAK62	OAK63	OAK64	AVG
0.000	1,300,824	1,300,824	1,300,824	1,300,824	1,300,824	1,300,824
0.001	593,781	610,692	638,801	610,352	618,981	614,521
0.003	377,141	385,071	401,672	391,357	423,603	395,769
0.004	268,996	281,562	283,035	268,881	312,438	282,982
0.006	192,742	203,315	220,437	216,063	234,450	213,401
0.007	176,510	174,360	181,645	165,209	194,184	178,382
0.009	132,661	143,847	149,503	143,106	142,784	142,380
0.010	112,796	115,642	119,774	119,184	131,794	119,838
0.011	103,975	106,927	105,949	105,949	119,588	108,478
0.013	95,571	90,808	99,529	100,217	95,886	96,402
0.014	87,623	86,550	91,753	78,587	87,623	86,427
0.016	80,258	69,719	87,623	70,114	79,699	77,483
0.017	59,443	61,804	61,804	66,517	67,676	63,449
0.020	56,185	58,546	54,494	63,259	55,002	57,497
0.024	52,133	52,133	52,133	56,185	44,033	51,323
0.031	38,289	42,785	38,289	42,785	38,289	40,087
0.041	29,615	33,907	33,907	33,907	29,615	32,190
0.047	25,101	25,101	25,101	25,101	25,101	25,101
0.054	12,008	12,008	20,702	16,407	20,702	16,365
0.163	4,302	4,302	12,008	4,302	4,302	5,843

B. Facility A-08

ug/m³ >=	OAK60	OAK61	OAK62	OAK63	OAK64	AVG
0.000	1,298,421	1,298,421	1,298,421	1,298,421	1,298,421	1,298,421
0.002	590,998	609,064	642,256	600,990	614,831	611,628
0.003	372,900	377,214	399,569	385,651	420,565	391,180
0.005	261,893	274,300	275,762	261,797	307,484	276,247
0.007	184,887	194,806	212,897	209,257	228,425	206,054
0.008	169,370	166,343	174,693	159,288	187,052	171,349
0.010	126,558	138,071	142,244	138,443	136,695	136,402
0.012	108,318	110,608	115,203	114,991	125,842	114,992
0.013	99,571	102,518	101,459	101,459	114,377	103,877
0.015	91,942	87,863	95,049	96,524	92,286	92,733
0.017	84,017	84,323	87,735	76,691	84,017	83,357
0.019	77,735	68,209	84,017	68,395	76,686	75,008
0.022	58,222	60,385	60,385	65,271	65,342	61,921
0.027	55,503	57,666	53,927	62,552	53,285	56,587
0.030	51,764	51,764	51,764	55,503	43,504	50,860
0.039	38,296	43,057	38,296	43,057	38,296	40,200
0.051	29,753	33,482	33,482	33,482	29,753	31,990
0.059	25,126	25,126	25,126	25,126	25,126	25,126
0.069	11,295	11,295	20,723	15,698	20,723	15,947
0.194	4,211	4,211	11,295	4,211	4,211	5,628

Table 8 (continued)

C. Facility A-09

ug/m³ >=	OAK60	OAK61	OAK62	OAK63	OAK64	AVG
0.000	1,312,711	1,312,711	1,312,711	1,312,711	1,312,711	1,312,711
0.002	461,066	490,388	553,210	496,290	538,802	507,951
0.003	238,173	254,190	260,944	250,042	284,618	257,593
0.005	180,277	185,757	184,326	176,966	204,019	186,269
0.007	141,163	139,784	149,326	149,895	154,487	146,931
0.008	129,661	123,896	131,211	119,883	136,115	128,153
0.010	100,604	107,792	108,405	106,942	108,725	106,494
0.012	88,336	92,591	97,057	94,838	103,117	95,188
0.013	81,759	87,248	87,159	87,159	91,990	87,063
0.015	74,224	78,410	84,116	82,351	74,512	78,723
0.017	70,551	68,201	81,316	55,115	70,551	69,147
0.019	64,602	53,233	66,237	55,034	59,604	59,742
0.022	40,825	45,646	45,646	48,401	52,148	46,533
0.025	36,270	41,091	40,945	41,091	41,992	40,278
0.030	36,043	36,124	36,124	36,270	29,165	34,745
0.039	24,938	25,019	24,938	24,938	24,938	24,954
0.051	18,565	24,038	24,038	24,038	18,565	21,849
0.061	12,930	8,709	12,930	8,709	12,930	11,242
0.067	7,013	7,013	11,234	8,709	11,234	9,041
0.743	2,155	2,155	2,155	2,155	2,155	2,155

D. Facility A-28

ug/m³ >=	MCC53	MCC54	MCC55	MCC56	MCC57	AVG
0.000	853,095	853,095	853,095	853,095	853,095	853,095
0.005	336,956	244,734	258,971	261,167	304,476	281,261
0.010	152,153	130,058	111,712	118,223	153,537	133,137
0.015	101,215	91,732	74,343	85,137	103,752	91,236
0.020	74,472	72,513	60,757	60,643	80,683	69,814
0.025	56,940	60,365	48,257	51,498	60,060	55,424
0.030	51,002	52,680	44,621	43,235	55,228	49,353
0.035	46,583	46,926	38,132	37,554	47,649	43,369
0.040	42,005	42,711	33,432	35,676	44,600	39,685
0.045	33,304	39,721	30,784	30,490	36,312	34,122
0.050	29,854	36,606	29,768	27,816	32,714	31,352
0.055	28,045	30,502	26,357	25,693	29,550	28,029
0.065	27,308	24,391	21,311	20,938	26,277	24,045
0.075	26,644	24,059	16,667	19,865	23,407	22,128
0.090	18,016	19,815	14,885	13,206	21,023	17,389
0.115	15,591	13,124	9,246	11,339	13,018	12,464
0.190	9,246	9,990	7,821	6,655	9,246	8,592
0.245	6,053	7,478	4,887	4,887	7,821	6,225
0.300	3,520	6,053	3,520	3,520	6,655	4,654
0.890	2,246	3,520	2,246	2,246	2,246	2,501

Table 8 (continued)

E. Facility A-52

ug/m³ >=	LAX85	LAX86	LAX87	LAX88	LAX89	AVG
0.000	1,911,577	1,911,577	1,911,577	1,911,577	1,911,577	1,911,577
0.002	1,130,443	1,228,549	1,037,868	1,014,739	1,036,357	1,089,591
0.003	854,499	937,504	765,428	738,152	725,801	804,277
0.005	652,146	743,174	599,519	569,739	579,928	628,901
0.007	532,602	568,336	432,623	437,277	458,270	485,822
0.008	424,140	392,907	319,160	324,663	367,086	365,591
0.010	345,824	261,121	208,983	234,383	283,070	266,676
0.012	267,884	189,198	148,624	166,623	205,039	195,474
0.013	190,073	135,967	115,113	113,764	146,519	140,287
0.015	148,053	119,347	94,304	98,527	118,533	115,753
0.017	128,942	99,260	87,609	92,729	95,507	100,809
0.019	97,016	89,290	73,257	76,942	86,713	84,644
0.022	82,073	74,752	68,307	66,778	72,393	72,861
0.025	73,257	63,594	58,959	64,584	65,565	65,192
0.027	70,515	61,003	47,844	51,106	60,778	58,249
0.030	56,104	46,885	43,994	43,994	47,038	47,603
0.035	37,278	43,035	34,180	33,428	39,926	37,569
0.040	33,428	35,507	27,682	27,682	27,682	30,396
0.050	27,682	18,396	24,941	24,941	24,941	24,180
0.074	13,494	16,516	13,494	13,494	13,494	14,098
0.084	11,614	10,461	5,559	5,559	7,439	8,126
0.178	5,559	2,912	2,912	2,912	5,559	3,971

F. Facility A-83

ug/m³ >=	RED87	RED88	RED89	AVG
0.000	112,941	112,941	112,941	112,941
0.002	89,292	89,242	89,142	89,225
0.003	52,432	52,712	52,779	52,641
0.005	37,020	37,554	37,304	37,293
0.006	30,812	30,816	29,777	30,468
0.008	26,178	24,850	26,095	25,708
0.010	21,145	20,579	22,341	21,355
0.011	19,024	16,358	15,791	17,058
0.013	14,959	14,732	13,303	14,331
0.015	12,290	13,610	11,994	12,631
0.018	11,095	11,483	11,095	11,224
0.019	10,441	10,584	10,584	10,536
0.021	9,238	9,930	9,930	9,699
0.024	8,627	9,238	8,627	8,831
0.031	7,773	7,773	7,773	7,773
0.034	6,208	6,971	7,010	6,730
0.037	5,514	5,636	6,369	5,840
0.041	4,873	4,873	4,873	4,873
0.044	4,148	3,041	2,869	3,353
0.099	2,144	2,144	2,144	2,144
0.126	1,460	1,460	1,460	1,460
0.784	732	732	732	732

Table 8 (continued)

G. Facility A-86

ug/m³ >=	FAT85	FAT86	FAT87	FAT88	FAT89	AVG
0.000	477,274	477,274	477,274	477,274	477,274	477,274
0.002	337,850	357,191	365,419	345,969	360,539	353,394
0.005	189,459	195,914	190,852	193,009	198,355	193,518
0.007	122,495	115,982	113,292	127,364	125,293	120,885
0.009	88,155	90,536	89,186	94,273	93,712	91,172
0.012	69,045	65,932	69,097	71,003	67,033	68,422
0.014	61,387	56,575	51,317	57,462	57,647	56,878
0.016	50,274	42,812	43,953	52,206	51,786	48,206
0.019	42,477	36,961	40,079	45,061	42,363	41,388
0.021	36,262	34,734	32,810	38,542	34,233	35,316
0.023	32,264	32,120	30,583	34,166	30,017	31,830
0.026	27,712	29,380	26,620	31,954	25,851	28,303
0.028	24,594	26,532	25,123	26,688	23,237	25,235
0.030	21,993	25,277	21,267	23,495	21,982	22,803
0.035	19,341	18,784	18,086	18,733	18,733	18,735
0.042	14,427	16,132	16,132	16,132	14,427	15,450
0.068	11,486	11,486	11,486	11,486	11,486	11,486
0.079	8,179	10,025	10,025	10,025	9,826	9,616
0.093	6,519	8,179	6,519	8,365	8,365	7,589
0.110	4,654	4,654	4,654	6,519	6,519	5,400
0.150	3,334	1,473	1,473	1,473	1,473	1,845

H. Facility A-92

ug/m³ >=	FAT85	FAT86	FAT87	FAT88	FAT89	AVG
0.000	480,503	480,503	480,503	480,503	480,503	480,503
0.001	440,557	449,563	444,538	441,142	419,626	439,085
0.003	303,217	322,739	314,524	320,171	298,091	311,748
0.004	215,408	229,536	226,347	243,631	220,907	227,166
0.006	161,621	166,135	164,117	185,768	171,039	169,736
0.007	128,853	126,454	123,923	138,497	121,661	127,878
0.009	104,696	96,909	97,175	97,329	96,405	98,503
0.010	87,407	82,324	74,577	82,633	85,664	82,521
0.012	65,065	62,702	60,778	68,515	74,858	66,384
0.015	51,490	50,656	50,265	57,420	51,468	52,260
0.016	47,845	48,257	46,086	49,518	45,757	47,493
0.018	43,470	44,243	44,612	46,086	43,217	44,326
0.021	28,911	36,404	30,128	34,940	36,658	33,408
0.024	26,364	28,911	26,379	29,584	29,125	28,073
0.028	23,685	21,598	24,277	25,835	23,156	23,710
0.036	19,513	18,656	18,656	18,656	18,656	18,827
0.046	16,571	16,571	16,571	16,571	16,571	16,571
0.061	14,070	14,070	14,070	14,070	14,070	14,070
0.073	7,238	9,135	9,135	11,103	12,173	9,757
0.109	4,648	2,566	2,566	2,566	4,648	3,399

Table 8 (continued)

I. Facility I

ug/m³ >=	SAC87	SAC89	SAC90	SAC91	SAC92	AVG
0.000	835,067	835,067	835,067	835,067	835,067	835,067
0.003	616,863	583,043	595,798	660,226	593,897	609,965
0.007	407,925	392,503	382,010	389,060	337,401	381,780
0.010	255,630	260,975	259,979	264,887	243,465	256,987
0.014	190,772	189,272	188,723	195,665	162,879	185,462
0.017	147,049	148,575	140,133	145,184	128,760	141,940
0.021	111,221	114,656	107,673	104,389	93,765	106,341
0.024	92,233	95,042	90,766	91,046	79,814	89,780
0.028	80,336	86,746	74,401	73,027	64,357	75,773
0.031	70,194	67,152	61,781	66,766	58,729	64,924
0.035	61,109	53,007	54,003	59,492	46,362	54,795
0.042	48,541	43,005	45,882	45,436	42,865	45,146
0.049	38,818	38,765	39,701	32,807	34,241	36,866
0.052	36,030	37,839	34,785	31,187	33,037	34,576
0.056	35,420	36,030	30,311	28,527	30,377	32,133
0.063	26,718	30,316	25,514	25,514	24,090	26,430
0.076	24,090	24,090	22,656	20,641	20,641	22,424
0.097	16,129	18,144	18,560	18,210	18,560	17,921
0.132	14,071	10,543	14,330	10,209	10,233	11,877
0.153	6,681	8,744	8,744	4,699	6,681	7,110
0.226	4,699	3,066	3,066	3,066	3,066	3,393
1.685	1,408	1,408	1,408	1,408	1,408	1,408

Table 8 (continued)

J. Facility O

ug/m³ >=	CND91	CND92	CND93	CND94	CND95	CND96	AVG
0.000	603,481	603,481	603,481	603,481	603,481	603,481	603,481
0.002	508,112	540,788	554,104	544,946	548,281	455,248	525,247
0.004	365,435	383,659	433,291	398,513	378,358	372,090	388,558
0.006	292,785	310,334	320,173	320,625	299,405	297,826	306,858
0.009	228,054	235,912	258,210	250,769	231,755	241,739	241,073
0.011	188,290	202,250	215,623	209,214	195,479	195,075	200,989
0.013	149,185	165,981	174,375	176,230	163,935	157,113	164,470
0.015	122,756	132,596	141,095	142,698	135,401	124,679	133,204
0.017	102,917	108,755	116,198	124,379	115,768	108,810	112,805
0.019	81,179	89,284	96,943	110,316	99,212	91,766	94,783
0.021	72,324	79,092	79,257	91,625	78,914	74,137	79,225
0.024	59,163	65,619	65,330	72,069	71,828	64,869	66,480
0.026	49,965	53,890	61,623	62,927	56,756	52,949	56,352
0.028	46,466	48,922	45,717	57,013	48,922	46,521	48,927
0.030	44,601	37,355	44,323	49,977	44,618	44,200	44,179
0.032	37,397	34,965	40,283	41,412	38,565	33,361	37,664
0.034	31,722	33,778	37,662	36,192	31,403	30,051	33,468
0.039	24,115	27,615	31,369	31,689	28,782	23,657	27,871
0.043	20,369	17,453	23,501	23,659	19,845	22,015	21,140
0.054	15,428	15,379	17,453	17,453	17,453	15,428	16,432
0.064	13,354	11,717	11,717	15,428	13,354	13,354	13,154
0.084	7,553	7,553	9,644	9,626	7,483	7,553	8,235
0.099	5,410	5,410	7,553	5,410	5,410	5,410	5,767
0.122	3,468	3,468	3,468	5,410	3,468	3,468	3,792
0.827	1,930	1,930	1,930	1,930	1,930	1,930	1,930

K. Facility P

ug/m³ >=	MHR53	MHR54	MHR55	MHR56	MHR57	AVG
0.000	850,528	850,528	850,528	850,528	850,528	850,528
0.002	336,898	369,410	391,227	399,119	386,840	376,699
0.003	122,354	145,148	147,265	180,129	185,226	156,024
0.005	70,818	82,345	81,595	94,854	111,053	88,133
0.007	54,021	58,867	61,688	62,010	68,499	61,017
0.009	44,268	47,769	47,770	49,509	53,389	48,541
0.010	41,246	41,139	40,973	41,324	41,643	41,265
0.012	31,912	35,589	34,948	37,060	37,633	35,428
0.014	30,062	32,358	33,715	33,200	32,912	32,449
0.015	26,538	29,676	27,840	27,586	31,519	28,632
0.019	23,174	26,333	24,904	26,112	28,926	25,890
0.021	21,735	23,951	23,465	23,432	27,197	23,956
0.024	19,615	22,489	20,989	20,956	24,546	21,719
0.033	15,310	13,848	13,848	18,930	18,930	16,173
0.045	12,060	12,060	12,060	12,060	14,839	12,616
0.070	9,053	10,827	9,053	5,517	5,517	7,993
0.747	2,369	2,369	2,369	2,369	2,369	2,369

Table 8 (continued)

L. Facility T

ug/m³ >=	BUR58	BUR59	BUR60	BUR61	BUR62	AVG
0.000	3,024,643	3,024,643	3,024,643	3,024,643	3,024,643	3,024,643
0.003	739,728	942,735	632,531	511,097	475,138	660,246
0.006	347,090	418,212	292,115	224,567	225,716	301,540
0.010	229,804	266,095	192,544	151,565	153,430	198,688
0.013	176,395	183,100	157,425	120,645	118,033	151,120
0.016	144,802	159,209	118,996	89,994	99,606	122,521
0.019	128,284	138,963	103,654	81,619	86,028	107,710
0.023	103,748	104,316	75,682	64,699	67,048	83,099
0.026	87,841	94,759	71,483	60,264	63,812	75,632
0.029	77,493	91,123	67,048	54,321	60,086	70,014
0.036	71,483	71,483	53,982	47,020	44,547	57,703
0.039	60,264	67,048	47,783	34,745	34,745	48,917
0.045	48,273	54,555	44,547	28,894	32,255	41,705
0.052	44,547	48,612	28,894	20,072	26,404	33,706
0.065	34,745	34,745	20,072	16,128	16,128	24,364
0.090	16,128	20,072	17,387	7,303	13,443	14,867
0.252	7,303	7,303	7,303	3,802	7,303	6,603

Table 8 (continued)

M. Facility U

ug/m³ >=	STN0718	AVG
0.000	1,961,694	1,961,694
0.003	1,219,573	1,219,573
0.007	805,311	805,311
0.010	543,541	543,541
0.014	383,889	383,889
0.017	260,905	260,905
0.021	196,552	196,552
0.024	163,914	163,914
0.027	136,273	136,273
0.031	114,592	114,592
0.034	105,462	105,462
0.038	81,959	81,959
0.041	79,952	79,952
0.045	70,117	70,117
0.048	64,952	64,952
0.051	63,818	63,818
0.058	57,422	57,422
0.062	54,507	54,507
0.065	49,921	49,921
0.069	43,111	43,111
0.086	39,043	39,043
0.089	35,161	35,161
0.093	31,650	31,650
0.103	23,210	23,210
0.106	19,585	19,585
0.209	15,611	15,611
0.237	10,965	10,965
0.254	7,225	7,225
1.714	3,683	3,683

TABLE 9. Generic Facility Concentration Estimates Per 1 g/s Emission Rate.

A. Maximum **ANNUAL** Perc, MeCl, and TCE Concentrations (ug/m^3).

ID	Met. Data Used	Direction Range (deg.)	Distance Range (m)	High Max. Conc.	Low Max. Conc.	Avg. Max. Conc.
G-01	10 Sites, Multi-Year	N/A	20	617	198	327
G-02	10 Sites, Multi-Year	N/A	20	397	121	198
G-03	10 Sites, Multi-Year	N/A	30	154	47	72

NOTE: *All met data indicated in Table 9A is used per generic facility. High, low, and average statistics are based on the single highest concentrations estimated per met site (i.e., a sample size of ten, per generic facility). Direction is omitted due to assuming an arbitrary facility orientation (length along X-axis).*

B. Maximum **HOURLY** Perc, MeCl, and TCE Concentrations (ug/m^3).

ID	Met. Data Used	Direction Range (deg.)	Distance Range [1] (m)	High Max. Conc.	Low Max. Conc.	Avg. Max. Conc.
G-01	10 Sites, Multi-Year	N/A	20	12,418	8,383	10,938
	Default 'screening'		*20*	*11,343*	*10,449*	*10,757*
G-02	10 Sites, Multi-Year	N/A	20	5,533	3,794	4,986
	Default 'screening'		*20*	*5,277*	*4,628*	*4,864*
G-03	10 Sites, Multi-Year	N/A	50	2,644	1,713	2,079
	Default 'screening'		*20*	*2,745*	*1,955*	*2,281*

NOTE:
Building orientation was set up in two different ways. For default, 'screening' runs distances are measured from each facility's leading edge. For all other runs distances are measured from the facility centroid. Thus, default, 'screening' distances can be adjusted for comparison by adding half of each facility's length to these distances and to distance in Appendix A (6, 10, and 30 meters, respectively, for G-01, G-02, and G-03). Thus, the adjusted distances for the indicated maximum hourly screening concentrations for G-01, G-02, and G-03 would be 26 meters, 30 meters, and 50 meters, respectively.
All met data indicated in Table 9A is used per generic facility. High, low, and average statistics are based on the single highest concentrations estimated per met site (i.e., a sample size of ten, per generic facility). Direction is omitted due to assuming an arbitrary facility orientation (length along X-axis).

Appendix A

Generic Facility
Maximum Hourly and Maximum Annual
Modeling Results

IMPORTANT NOTE:

Building orientation was set up in two different ways. For default, 'screening' runs distances are measured from each facility's leading edge. For all other runs, distances are measured from the facility centroid. This difference has not been accounted for in the following tables. Thus, default, 'screening' concentrations at specific distances reported in the following tables can be adjusted for comparison to other concentrations (i.e. from the facility center) by adding half of each facility's length to the indicated distances (6, 10, and 30 meters, respectively, for G-01, G-02, and G-03).

Appendix A: ISCST3 Generic Facility Concentration Results vs. Distance Using Default and Regional Met Data

SITENAME	PERIOD	DISTANCE	DFLT 00	DFLT 45	DFLT 90	BUR	CND	FAT	LAX	MCC	MHR	OAK	RED	SAC	STN071	AVERAGE	LOW	HIGH
G01	1-HR	20	11343	10449	10480	12418	12418	11156	8383	11008	8471	10520	11400	11199	12413	10938	8383	12418
G01	1-HR	30	8496	7887	8249	9255	9255	8403	5997	8490	5762	8021	9621	8535	9249	8159	5762	9255
G01	1-HR	40	6579	6106	6464	7115	7115	6522	4610	6666	4465	6282	6687	6652	7110	6322	4465	7115
G01	1-HR	50	5239	4934	5112	5625	5625	5186	3645	5344	3546	5030	5317	5307	5620	5025	3546	5625
G01	1-HR	60	4265	4064	4114	4555	4555	4215	2952	4368	2879	4106	4323	4324	4551	4083	2879	4555
G01	1-HR	70	3547	3404	3460	3764	3764	3490	2439	3634	2382	3411	3581	3588	3760	3381	2382	3764
G01	1-HR	80	2996	2892	2947	3164	3164	2938	2050	3070	2004	2877	3016	3026	3160	2847	2004	3164
G01	1-HR	90	2565	2488	2539	2698	2698	2507	1748	2628	1710	2460	2576	2587	2694	2430	1710	2698
G01	1-HR	100	2223	2165	2210	2329	2329	2166	1509	2275	1478	2127	2226	2238	2326	2100	1478	2329
G01	1-HR	120	1720	1684	1720	1791	1791	1665	1160	1757	1141	1639	1714	1725	1788	1617	1141	1791
G01	1-HR	140	1373	1350	1378	1423	1423	1323	1011	1400	909	1304	1364	1374	1421	1295	909	1423
G01	1-HR	150	1239	1220	1245	1282	1282	1192	953	1262	820	1174	1228	1238	1280	1171	820	1282
G01	1-HR	160	1125	1109	1131	1161	1161	1079	902	1145	743	1064	1113	1122	1159	1065	743	1161
G01	1-HR	180	940	929	947	967	967	899	815	955	621	886	929	936	966	894	621	967
G01	1-HR	200	799	791	805	820	820	761	744	810	527	751	789	794	819	764	527	820
G01	1-HR	250	564	559	568	576	576	533	612	570	371	526	556	558	574	545	371	612
G01	1-HR	300	422	420	426	430	430	398	521	426	278	392	416	417	429	414	278	521
G01	1-HR	350	330	329	333	335	335	310	454	332	217	306	325	326	335	328	217	454
G01	1-HR	400	267	266	269	271	271	250	403	268	175	246	262	263	270	268	175	403
G01	1-HR	450	222	221	223	224	224	206	363	222	145	203	217	218	224	225	145	363
G01	1-HR	500	188	187	189	189	189	174	331	188	123	172	184	184	189	192	123	331
G01	1-HR	600	141	140	142	142	142	130	282	141	92	128	138	138	142	147	92	282
G01	1-HR	700	111	111	111	112	112	102	246	111	72	100	108	108	111	118	72	246
G01	1-HR	800	90	90	91	91	91	83	220	90	59	81	88	88	91	98	59	220
G01	1-HR	900	75	75	76	76	76	69	198	75	49	68	74	74	76	83	49	198
G01	1-HR	1000	64	64	64	65	65	59	181	64	42	58	63	63	65	72	42	181
G01	1-HR	2000	24	24	24	24	24	21	103	23	15	21	23	23	24	30	15	103
G01	1-HR	3000	14	14	14	14	14	12	75	14	9	12	13	13	14	19	9	75
G01	1-HR	4000	10	10	10	10	10	8	61	9	6	8	9	9	10	14	6	61
G01	1-HR	5000	7	7	7	7	7	6	52	7	5	6	7	7	7	11	5	52
G01	1-HR	6000	6	6	6	6	6	5	46	6	4	5	6	6	6	9	4	46
G01	1-HR	7000	5	5	5	5	5	4	41	5	3	4	5	5	5	8	3	41
G01	1-HR	8000	4	4	4	4	4	3	37	4	3	3	4	4	4	7	3	37
G01	1-HR	9000	4	4	4	4	4	3	34	4	2	3	4	4	4	6	2	34
G01	1-HR	10000	3	3	3	3	3	2	32	3	2	2	3	3	3	6	2	32
G01	1-HR	23000	1	1	1	1	1	1	18	1	1	1	1	1	2	3	1	18

SITENAME	PERIOD	DISTANCE	DFLT 00	DFLT 45	DFLT 90	BUR	CND	FAT	LAX	MCC	MHR	OAK	RED	SAC	STN071	AVERAGE	LOW	HIGH
G02	1-HR	20	5277	4688	4628	5528	5533	5151	4438	4940	3794	4686	5263	5079	5444	4986	3794	5533
G02	1-HR	30	4359	3967	3997	4845	4845	4330	3329	4201	3374	4028	4406	4307	4844	4251	3329	4845
G02	1-HR	40	3649	3368	3418	4048	4048	3636	2623	3603	2579	3439	3722	3661	4047	3541	2579	4048
G02	1-HR	50	3095	2869	2982	3418	3418	3085	2215	3101	2119	2942	3169	3130	3416	3001	2119	3418
G02	1-HR	60	2656	2459	2596	2918	2918	2652	1891	2687	1819	2532	2722	2698	2916	2575	1819	2918
G02	1-HR	70	2304	2128	2263	2518	2518	2300	1631	2345	1576	2209	2360	2345	2516	2232	1576	2518
G02	1-HR	80	2018	1881	1979	2194	2194	2012	1421	2062	1378	1941	2064	2055	2192	1951	1378	2194
G02	1-HR	90	1782	1674	1739	1928	1928	1774	1249	1825	1214	1717	1820	1815	1926	1720	1214	1928
G02	1-HR	100	1586	1500	1536	1708	1708	1575	1162	1627	1077	1530	1616	1615	1707	1533	1077	1708
G02	1-HR	120	1282	1224	1241	1370	1370	1267	1021	1316	865	1235	1301	1302	1368	1242	865	1370
G02	1-HR	140	1059	1019	1037	1124	1124	1042	911	1088	711	1019	1070	1073	1123	1029	711	1124
G02	1-HR	150	970	936	953	1026	1026	952	865	995	650	932	978	981	1025	943	650	1026
G02	1-HR	160	892	863	879	941	941	873	823	915	596	855	898	901	940	868	596	941
G02	1-HR	180	762	741	755	801	801	743	751	781	507	729	765	768	800	744	507	801
G02	1-HR	200	660	644	657	691	691	641	690	675	439	630	660	664	690	647	439	691
G02	1-HR	250	482	474	483	501	501	464	576	492	319	457	479	483	500	477	319	576
G02	1-HR	300	370	365	372	382	382	354	495	377	245	349	366	369	382	370	245	495
G02	1-HR	350	295	292	297	303	303	281	435	299	195	277	291	294	303	298	195	435
G02	1-HR	400	242	240	243	248	248	229	389	245	159	226	239	240	247	247	159	389
G02	1-HR	450	203	201	204	207	207	191	352	205	134	189	200	201	207	209	134	352
G02	1-HR	500	173	172	174	177	177	163	321	175	114	160	171	171	176	181	114	321
G02	1-HR	600	132	131	133	134	134	123	275	133	87	121	130	130	134	140	87	275
G02	1-HR	700	105	104	105	106	106	97	241	105	69	96	103	103	106	113	69	241
G02	1-HR	800	86	86	86	87	87	80	216	86	56	78	84	84	87	94	56	216
G02	1-HR	900	72	72	73	73	73	67	195	72	47	65	71	71	73	81	47	195
G02	1-HR	1000	62	62	62	62	62	57	179	62	40	56	61	61	62	70	40	179
G02	1-HR	2000	23	23	23	23	23	21	102	23	15	20	23	23	23	30	15	102
G02	1-HR	3000	14	14	14	14	14	12	75	13	9	12	13	13	14	19	9	75
G02	1-HR	4000	9	9	9	9	9	8	61	9	6	8	9	9	9	14	6	61
G02	1-HR	5000	7	7	7	7	7	6	52	7	5	6	7	7	7	11	5	52
G02	1-HR	6000	6	6	6	6	6	5	46	6	4	5	6	6	6	9	4	46
G02	1-HR	7000	5	5	5	5	5	4	41	5	3	4	5	5	5	8	3	41
G02	1-HR	8000	4	4	4	4	4	3	37	4	3	3	4	4	4	7	3	37
G02	1-HR	9000	4	4	4	4	4	3	34	4	2	3	4	4	4	6	2	34
G02	1-HR	10000	3	3	3	3	3	2	32	3	2	2	3	3	3	6	2	32
G02	1-HR	23000	1	1	1	1	1	1	18	1	1	1	1	1	2	3	1	18

SITENAME	PERIOD	DISTANCE	DFLT 00	DFLT 45	DFLT 90	BUR	CND	FAT	LAX	MCC	MHR	OAK	RED	SAC	STN071	AVERAGE	LOW	HIGH
G03	1-HR	20	2745	2144	1958	1344	1345	1266	993	1325	958	1242	1204	1296	1344	1232	958	1345
G03	1-HR	30	2385	1902	1899	1965	1965	1668	1273	1554	1290	1457	1727	1644	1964	1651	1273	1965
G03	1-HR	40	2088	1703	1724	1702	1702	1473	1103	1492	1241	1456	1518	1452	1702	1484	1103	1702
G03	1-HR	50	1841	1533	1510	2641	2644	1934	1713	1765	1735	1716	2116	1885	2644	2079	1713	2644
G03	1-HR	60	1636	1387	1375	2498	2498	1747	1619	1582	1547	1622	1858	1691	2497	1916	1547	2498
G03	1-HR	70	1463	1252	1259	2180	2180	1553	1413	1382	1268	1416	1678	1516	2179	1676	1268	2180
G03	1-HR	80	1316	1139	1153	1916	1916	1403	1241	1215	1058	1244	1511	1379	1915	1480	1058	1916
G03	1-HR	90	1191	1048	1062	1695	1695	1280	1099	1118	896	1101	1361	1252	1695	1319	896	1695
G03	1-HR	100	1083	967	986	1511	1511	1168	979	1034	791	981	1227	1135	1510	1185	791	1511
G03	1-HR	120	909	827	843	1223	1223	977	833	882	667	824	1006	937	1222	980	667	1223
G03	1-HR	140	774	713	723	1012	1012	825	761	754	569	717	837	805	1011	830	569	1012
G03	1-HR	150	719	664	681	927	927	761	729	699	527	670	777	750	927	769	527	927
G03	1-HR	160	669	619	642	853	853	703	699	654	490	627	722	700	852	715	490	853
G03	1-HR	180	585	542	571	730	730	606	645	580	426	551	630	614	730	624	426	730
G03	1-HR	200	516	477	509	633	633	528	601	517	374	487	554	543	633	550	374	633
G03	1-HR	250	392	357	388	464	464	396	517	399	280	368	416	411	464	418	280	517
G03	1-HR	300	310	287	303	358	358	311	454	318	218	292	326	324	357	331	218	454
G03	1-HR	350	252	237	242	286	286	252	404	260	176	238	263	263	285	271	176	404
G03	1-HR	400	210	200	199	235	235	209	365	217	145	199	218	218	235	228	145	365
G03	1-HR	450	179	171	171	198	198	176	333	185	123	169	184	185	197	195	123	333
G03	1-HR	500	155	149	149	169	169	151	306	159	105	146	158	159	169	169	105	306
G03	1-HR	600	120	116	117	129	129	116	265	123	80	113	122	122	129	133	80	265
G03	1-HR	700	96	94	95	103	103	93	234	99	64	90	97	98	102	108	64	234
G03	1-HR	800	80	78	79	84	84	76	210	82	53	74	80	81	84	91	53	210
G03	1-HR	900	68	67	67	71	71	64	191	69	45	63	67	68	71	78	45	191
G03	1-HR	1000	58	58	58	61	61	55	175	59	39	54	58	59	61	68	39	175
G03	1-HR	2000	23	23	23	23	23	21	101	23	15	20	22	22	23	29	15	101
G03	1-HR	3000	13	13	13	14	14	12	74	13	9	11	13	13	14	19	9	74
G03	1-HR	4000	9	9	9	9	9	8	60	9	6	8	9	9	9	14	6	60
G03	1-HR	5000	7	7	7	7	7	6	52	7	5	6	7	7	7	11	5	52
G03	1-HR	6000	6	6	6	6	6	5	45	6	4	5	6	6	6	9	4	45
G03	1-HR	7000	5	5	5	5	5	4	41	5	3	4	5	5	5	8	3	41
G03	1-HR	8000	4	4	4	4	4	3	37	4	3	3	4	4	4	7	3	37
G03	1-HR	9000	4	4	4	4	4	3	34	4	2	3	4	4	4	6	2	34
G03	1-HR	10000	3	3	3	3	3	2	32	3	2	2	3	3	3	6	2	32
G03	1-HR	23000	1	1	1	1	1	1	18	1	1	1	1	1	2	3	1	18

Appendix A: ISCST3 Generic Facility Concentration Results vs. Distance Using Default and Regional Met Data

SITENAME	PERIOD	DISTANCE	DFLT_00 DFLT_45 DFLT_90	BUR	CND	FAT	LAX	MCC	MHR	OAK	RED	SAC	STN071	AVERAGE	LOW	HIGH
G01	ANNUAL	20	Not Applicable w/ Annual	617	266	262	358	291	209	272	198	206	588	327	198	617
G01	ANNUAL	30	Not Applicable w/ Annual	353	150	147	216	169	119	151	117	115	328	186	115	353
G01	ANNUAL	40	Not Applicable w/ Annual	227	96	94	144	109	76	96	77	73	209	120	73	227
G01	ANNUAL	50	Not Applicable w/ Annual	158	68	66	102	76	53	67	54	50	145	84	50	158
G01	ANNUAL	60	Not Applicable w/ Annual	116	50	48	76	56	39	49	40	37	106	62	37	116
G01	ANNUAL	70	Not Applicable w/ Annual	88	39	37	59	43	30	38	31	28	81	47	28	88
G01	ANNUAL	80	Not Applicable w/ Annual	70	31	29	47	34	23	30	25	22	64	37	22	70
G01	ANNUAL	90	Not Applicable w/ Annual	56	25	24	39	28	19	24	20	18	52	30	18	56
G01	ANNUAL	100	Not Applicable w/ Annual	47	21	20	32	23	16	20	17	15	43	25	15	47
G01	ANNUAL	120	Not Applicable w/ Annual	33	15	14	23	16	11	14	12	10	30	18	10	33
G01	ANNUAL	140	Not Applicable w/ Annual	25	11	11	18	12	8	11	9	8	23	14	8	25
G01	ANNUAL	150	Not Applicable w/ Annual	22	10	9	16	11	7	9	8	7	20	12	7	22
G01	ANNUAL	160	Not Applicable w/ Annual	19	9	8	14	10	7	8	7	6	18	11	6	19
G01	ANNUAL	180	Not Applicable w/ Annual	15	7	7	11	8	5	7	6	5	14	8	5	15
G01	ANNUAL	200	Not Applicable w/ Annual	13	6	5	9	6	4	5	5	4	12	7	4	13
G01	ANNUAL	250	Not Applicable w/ Annual	8	4	4	6	4	3	4	3	3	8	5	3	8
G01	ANNUAL	300	Not Applicable w/ Annual	6	3	2	4	3	2	3	2	2	5	3	2	6
G01	ANNUAL	350	Not Applicable w/ Annual	4	2	2	3	2	1	2	2	1	4	2	1	4
G01	ANNUAL	400	Not Applicable w/ Annual	3	2	1	3	2	1	1	1	1	3	2	1	3
G01	ANNUAL	450	Not Applicable w/ Annual	3	1	1	2	1	1	1	1	1	2	1	1	3
G01	ANNUAL	500	Not Applicable w/ Annual	2	1	1	2	1	1	1	1	1	2	1	1	2
G01	ANNUAL	600	Not Applicable w/ Annual	2	1	1	1	1	1	1	1	0	1	1	0	2
G01	ANNUAL	700	Not Applicable w/ Annual	1	1	0	1	1	0	1	0	0	1	1	0	1
G01	ANNUAL	800	Not Applicable w/ Annual	1	0	0	1	0	0	0	0	0	1	0	0	1
G01	ANNUAL	900	Not Applicable w/ Annual	1	0	0	1	0	0	0	0	0	1	0	0	1
G01	ANNUAL	1000	Not Applicable w/ Annual	1	0	0	0	0	0	0	0	0	1	0	0	1
G01	ANNUAL	2000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G01	ANNUAL	3000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G01	ANNUAL	4000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G01	ANNUAL	5000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G01	ANNUAL	6000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G01	ANNUAL	7000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G01	ANNUAL	8000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G01	ANNUAL	9000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G01	ANNUAL	10000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G01	ANNUAL	23000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0

SITENAME	PERIOD	DISTANCE	DFLT_00 DFLT_45 DFLT_90	BUR	CND	FAT	LAX	MCC	MHR	OAK	RED	SAC	STN071	AVERAGE	LOW	HIGH
G02	ANNUAL	20	Not Applicable w/ Annual	397	173	155	181	178	135	138	121	135	370	198	121	397
G02	ANNUAL	30	Not Applicable w/ Annual	257	114	113	148	121	88	118	82	88	251	138	82	257
G02	ANNUAL	40	Not Applicable w/ Annual	177	77	75	106	84	61	79	58	59	168	94	58	177
G02	ANNUAL	50	Not Applicable w/ Annual	129	55	54	79	62	44	56	43	42	120	69	42	129
G02	ANNUAL	60	Not Applicable w/ Annual	98	42	41	61	47	33	42	33	32	91	52	32	98
G02	ANNUAL	70	Not Applicable w/ Annual	76	33	32	49	37	26	33	26	25	71	41	25	76
G02	ANNUAL	80	Not Applicable w/ Annual	61	27	26	40	30	21	26	21	20	57	33	20	61
G02	ANNUAL	90	Not Applicable w/ Annual	50	22	21	33	25	17	22	18	16	46	27	16	50
G02	ANNUAL	100	Not Applicable w/ Annual	42	18	18	28	21	14	18	15	13	39	23	13	42
G02	ANNUAL	120	Not Applicable w/ Annual	31	14	13	21	15	10	13	11	10	28	16	10	31
G02	ANNUAL	140	Not Applicable w/ Annual	23	10	10	16	11	8	10	8	7	21	13	7	23
G02	ANNUAL	150	Not Applicable w/ Annual	20	9	9	14	10	7	9	7	6	19	11	6	20
G02	ANNUAL	160	Not Applicable w/ Annual	18	8	8	13	9	6	8	7	6	17	10	6	18
G02	ANNUAL	180	Not Applicable w/ Annual	15	7	6	10	7	5	6	5	5	13	8	5	15
G02	ANNUAL	200	Not Applicable w/ Annual	12	6	5	9	6	4	5	4	4	11	7	4	12
G02	ANNUAL	250	Not Applicable w/ Annual	8	4	3	6	4	3	3	3	2	7	4	2	8
G02	ANNUAL	300	Not Applicable w/ Annual	6	3	2	4	3	2	2	2	2	5	3	2	6
G02	ANNUAL	350	Not Applicable w/ Annual	4	2	2	3	2	1	2	2	1	4	2	1	4
G02	ANNUAL	400	Not Applicable w/ Annual	3	2	1	2	2	1	1	1	1	3	2	1	3
G02	ANNUAL	450	Not Applicable w/ Annual	3	1	1	2	1	1	1	1	1	2	1	1	3
G02	ANNUAL	500	Not Applicable w/ Annual	2	1	1	2	1	1	1	1	1	2	1	1	2
G02	ANNUAL	600	Not Applicable w/ Annual	1	1	1	1	1	1	1	1	0	1	1	0	1
G02	ANNUAL	700	Not Applicable w/ Annual	1	1	0	1	1	0	1	0	0	1	1	0	1
G02	ANNUAL	800	Not Applicable w/ Annual	1	0	0	1	0	0	0	0	0	1	0	0	1
G02	ANNUAL	900	Not Applicable w/ Annual	1	0	0	1	0	0	0	0	0	1	0	0	1
G02	ANNUAL	1000	Not Applicable w/ Annual	1	0	0	0	0	0	0	0	0	1	0	0	1
G02	ANNUAL	2000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G02	ANNUAL	3000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G02	ANNUAL	4000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G02	ANNUAL	5000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G02	ANNUAL	6000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G02	ANNUAL	7000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G02	ANNUAL	8000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G02	ANNUAL	9000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G02	ANNUAL	10000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G02	ANNUAL	23000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0

SITENAME	PERIOD	DISTANCE	DFLT_00 DFLT_45 DFLT_90	BUR	CND	FAT	LAX	MCC	MHR	OAK	RED	SAC	STN071	AVERAGE	LOW	HIGH
G03	ANNUAL	20	Not Applicable w/ Annual	71	40	41	45	25	30	32	26	31	90	43	25	90
G03	ANNUAL	30	Not Applicable w/ Annual	154	67	52	59	63	54	47	47	54	128	72	47	154
G03	ANNUAL	40	Not Applicable w/ Annual	140	64	47	45	57	49	38	44	49	119	65	38	140
G03	ANNUAL	50	Not Applicable w/ Annual	113	57	57	77	43	44	55	38	42	126	65	38	126
G03	ANNUAL	60	Not Applicable w/ Annual	80	41	48	64	34	37	53	27	31	96	51	27	96
G03	ANNUAL	70	Not Applicable w/ Annual	62	31	35	50	28	27	39	21	23	72	39	21	72
G03	ANNUAL	80	Not Applicable w/ Annual	51	24	27	40	24	21	30	17	18	56	31	17	56
G03	ANNUAL	90	Not Applicable w/ Annual	42	20	22	33	20	16	24	15	15	45	25	15	45
G03	ANNUAL	100	Not Applicable w/ Annual	36	17	18	28	17	13	20	12	13	37	21	12	37
G03	ANNUAL	120	Not Applicable w/ Annual	27	12	13	20	13	9	14	9	9	27	15	9	27
G03	ANNUAL	140	Not Applicable w/ Annual	21	9	10	16	10	7	10	7	7	20	12	7	21
G03	ANNUAL	150	Not Applicable w/ Annual	19	8	8	14	9	6	9	7	6	18	10	6	19
G03	ANNUAL	160	Not Applicable w/ Annual	17	8	8	12	8	6	8	6	6	16	9	6	17
G03	ANNUAL	180	Not Applicable w/ Annual	14	6	6	10	7	5	6	5	4	13	8	4	14
G03	ANNUAL	200	Not Applicable w/ Annual	11	5	5	8	6	4	5	4	4	11	6	4	11
G03	ANNUAL	250	Not Applicable w/ Annual	8	4	3	6	4	3	3	3	2	7	4	2	8
G03	ANNUAL	300	Not Applicable w/ Annual	5	3	2	4	3	2	2	2	2	5	3	2	5
G03	ANNUAL	350	Not Applicable w/ Annual	4	2	2	3	2	1	2	2	1	4	2	1	4
G03	ANNUAL	400	Not Applicable w/ Annual	3	2	1	2	2	1	1	1	1	3	2	1	3
G03	ANNUAL	450	Not Applicable w/ Annual	3	1	1	2	1	1	1	1	1	2	1	1	3
G03	ANNUAL	500	Not Applicable w/ Annual	2	1	1	2	1	1	1	1	1	2	1	1	2
G03	ANNUAL	600	Not Applicable w/ Annual	1	1	1	1	1	1	1	1	0	1	1	0	1
G03	ANNUAL	700	Not Applicable w/ Annual	1	1	0	1	1	0	0	0	0	1	1	0	1
G03	ANNUAL	800	Not Applicable w/ Annual	1	0	0	1	0	0	0	0	0	1	0	0	1
G03	ANNUAL	900	Not Applicable w/ Annual	1	0	0	1	0	0	0	0	0	1	0	0	1
G03	ANNUAL	1000	Not Applicable w/ Annual	1	0	0	0	0	0	0	0	0	1	0	0	1
G03	ANNUAL	2000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G03	ANNUAL	3000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G03	ANNUAL	4000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G03	ANNUAL	5000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G03	ANNUAL	6000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G03	ANNUAL	7000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G03	ANNUAL	8000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G03	ANNUAL	9000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G03	ANNUAL	10000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0
G03	ANNUAL	23000	Not Applicable w/ Annual	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix E

Statewide Population Exposure Estimate Modeling Memorandums

Memorandum 1. Analysis and Population Exposure Estimates for Perchloroethylene Needs Assessment for Brake Cleaning Products, Updated With 1997 Data (April 7, 1999)

Air Resources Board

Alan C. Lloyd, Ph.D.
Chairman
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Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

MEMORANDUM

TO: Todd Wong, Manager
Emissions Evaluation Section
Stationary Source Division

FROM: Bob Effa, Manager
Client Support Services Section
Planning & Technical Support Division

DATE: April 7, 1999

SUBJECT: ANALYSIS AND POPULATION EXPOSURE ESTIMATES FOR PERCHLOROETHYLENE NEEDS ASSESSMENT FOR BRAKE CLEANING PRODUCTS, **UPDATED WITH 1997 DATA**

This memorandum is in response to your request for an update of an additional year of data to our March 26, 1998, memo of the same subject regarding an analysis of ambient perchloroethylene data and population-weighted exposure. All remarks regarding data and methods used in the previous memo apply to this work. Due to time constraints, we did not attempt to refine the previous analyses. All tables of results follow the same format as those in the March 26, 1998, memo, with the addition of 1997 statistics. The same information for 1990-1996 are reprinted for ease of comparison. In addition, a table displaying site names and their site numbers is part of the new Appendix. The following highlights some additional information.

ADDITIONAL DATA

This analysis is based on ambient data collected by the Air Resources Board (ARB) and compiled in the ARB Air Toxics database. The 1997 data were extracted on March 29, 1999. Thus, this analysis does not reflect any changes that may have occurred since that time. In 1997, one site in the San Francisco Bay Area (Richmond) closed and was replaced by a site in San Pablo. Also, the addition of the Salton Sea Air Basin added Calexico to the monitoring network. Since this site only has data from July 1995 to December 1997, and this analysis examines perchloroethylene exposure trends from 1990 to 1997, the data from this site were not used in the calculation of population exposure.

Missing data points in 1997

During the analysis of 1997 data, we encountered 5 sites with missing data as shown in Table 1. To develop the population-weighted perchloroethylene exposure estimates, we had to populate the data set with the most accurate data estimates available for the calculation of the mean of monthly means. In the case of Richmond being replaced by San Pablo in the San Francisco Bay Area, we simply combined the data into one set for one site (Richmond). For the other sites with missing 1997 data, we incorporated 1996 data in the same manner used in our previous memo. Riverside-Rubidoux had only one value for 1997; therefore, we used its 1996 data completely in the calculation of population-weighted exposure.

TABLE 1

Perchloroethylene Data Analysis
Missing Values in 1997 Data Set and
the Mean of Monthly Means Based on Replaced Data

Site Name	Year	Month(s) Missing	Calculated Mean of Monthly Means
Richmond-13th St	1997	May-Dec	0.040 ppbv
San Pablo-El Portal	1997	Jan-April	(replaces Richmond)
Chico-Manzanita Ave	1997	May	0.040 ppbv
Fremont-Chapel Way	1997	March-September	0.044 ppbv
Los Angeles-N. Main St	1997	Aug-September	0.324 ppbv
Riverside-Rubidoux	1997	February-Dec	0.175 ppbv

There were no unusual observations in 1997, hence no need for an update to Table 2 of our previous memo.

CLARIFICATION ON METHODOLOGY

Although we used the same methodology as that in the March 26, 1998 memo, some clarification is in order.

On page 5 of the previous memo, in the second paragraph of the "Methodology" section, the calculation of population exposure estimates for basins other than the South Coast and San Francisco Bay reduces to using the basin-wide mean of monthly mean concentrations, with missing values handled as described above.

On page 6 of the previous memo, the second sentence should state that "the overall statewide population-weighted exposure was calculated by multiplying the estimated annual average perchloroethylene exposure for a given air basin by its population, added across all

basins, then divided by the total population of the state". In other words, the statewide exposure estimate is a weighted average of the basin exposures, with weights determined by the basin populations.

On page 8 of the previous memo, the last paragraph should detail the calculation of basin-specific summary statistics as follows. The minimum, maximum, arithmetic mean, standard deviation and the number of sites are calculated from all values from all sites within the basin. For the basin mean of monthly means, the basin monthly mean is first calculated for each month based on site means for the month. Then the twelve basin monthly means are averaged to obtain the basin-wide annual mean of monthly means. Missing 1997 data have been estimated using 1996 information in the calculation of basin-wide mean of monthly means.

UNCERTAINTY AND LIMITATIONS OF ANALYSIS

There are a number of factors that contribute to uncertainty in the data and in the conclusions drawn from the data. These are not necessarily easy to quantify. Three such factors are discussed below, and they underscore the need to use caution when drawing conclusions from a limited set of data.

One source of uncertainty in our results is attributable to having a very limited number of sites throughout the state and to the infrequency of sampling. As discussed in the March 26, 1998, memo, the statewide population-weighted perchloroethylene exposure is calculated based on a limited data set derived from a statewide network of only 21 or 22 sites that collect one 24-hour sample every twelve days.

MLD conducts performance audits of the toxics program through both laboratory and field audits. Laboratory audits test the analytical methods and are conducted semi-annually. Field audits test the accuracy of the full toxics sampling procedure through a method referred to as "through-the-probe" (TTP) performance audits. These audits test the sample collection, transport, storage and analytical integrity of the toxics sampling effort. TTP audits are quite time consuming and are only conducted annually at each site. MLD publishes the results on the Internet. For perchloroethylene, the latest TTP audit information on the ARB web site indicates an average accuracy for the 20-plus sites to range from -21.5% to +7.2% between 1993 and 1997.

Yet another assumption to keep in mind is that the ambient concentrations of perchloroethylene we used in our analysis represent only outdoor exposures. Essentially, the exposure estimates assume 24 hours a day of outdoor exposure, without considering indoor exposure to this compound. Therefore, caution should be exercised when using these population exposure estimates.

RESULTS

The results of the exposure analysis are summarized in Table 3, with 1997 results added to the far-right column. The estimated statewide population-weighted perchloroethylene

exposure, shown at the bottom of the table, decreases from 0.203 ppb-year/person in 1996 to 0.168 ppb-year/person in 1997. The general trend for statewide perchloroethylene population-weighted exposure is downward in all basins, with the exception occurring in San Francisco Air Basin (slight increase from 0.068 in 1996 to 0.071 ppb-year/person in 1997).

TABLE 3

Estimated Air Basin Population-Weighted* Perchloroethylene Exposure
based on 1990 Census (ppb-year/person)**

Air Basin	1990	1991	1992	1993	1994	1995	1996	1997
South Coast	0.590	0.542	0.430	0.472	0.410	0.392	0.330	0.264
South Central Coast	0.181	0.160	0.124	0.095	0.110	0.100	0.104	0.081
San Diego	0.280	0.261	0.262	0.193	0.204	0.244	0.133	0.124
San Francisco	0.196	0.223	0.158	0.124	0.082	0.091	0.068	0.071
San Joaquin Valley	0.121	0.131	0.105	0.410	0.067	0.070	0.064	0.056
Sacramento Valley	0.070	0.075	0.058	0.051	0.181	0.053	0.054	0.053

Air Basin Population Data Used in Calculating Statewide Perchloroethylene Exposure

Air Basin	1990	1991	1992	1993	1994	1995	1996	1997
South Coast	10684933	10910823	11124105	11206222	11298530	11372003	11441517	11608906
South Central Coast	1041100	1055600	1072600	1080800	1092900	1104100	1108500	1128000
San Diego	2511400	2560800	2611500	2625100	2650700	2669200	2694900	2763400
San Francisco	4324700	4377500	4451700	4511100	4543300	4569800	4649400	4743500
San Joaquin Valley	1977876	2040876	2097395	2130385	2158376	2192027	2226921	2260164
Sacramento Valley	1377350	1413279	1440859	1458943	1469597	1482705	1502236	1524248
SUM	21917359	22358878	22798159	23012550	23213403	23389835	23623474	24028218

Estimated Statewide Population-Weighted Perchloroethylene Exposure
ppb-year/person**

Statewide WTD AVG	0.382	0.362	0.290	0.322	0.262	0.251	0.203	0.168

* Only air basins with perchloroethylene monitoring included in this table. Air basin population-weighted exposure is calculated using mean of monthly means for all sites within basin.

** Population exposure units are a concentration for a given duration per person; For this analysis, the units are ppb-year/person.

In summary, this exposure analysis was developed with data from the six air basins listed above. The South Coast and San Francisco Bay basins were population-weighted using census tract data, and the rest of the basins were estimated using basin-wide annual mean of monthly mean concentrations. The six areas represent approximately 72% of the statewide population. Details of the analysis methods can be found in the March 26, 1998, memo.

SUMMARY TABLES IN APPENDIX

The site and air basin annual summary statistics have been updated with 1997 results. Table A-3 has also been added to aid in identifying the sites.

cc: Bart Croes, PTSD
Hien Tran, PTSD

APPENDIX

TABLE A-1

Site Summary Table

Annual Site Specific Summary Statistics

ARB SITE	YEAR	Air Basin	County	NO_ OBS	Site Mean (ppbv)	Standard Deviation (ppbv)	Mean of Monthly Mean (ppbv)	Site Maximum (ppbv)	Site Minimum (ppbv)
7000069	1990	SC	LA	31	1.193	1.087	1.191	5.000	0.200
7000069	1991	SC	LA	29	0.761	0.615	0.785	2.400	0.070
7000069	1992	SC	LA	30	0.615	0.305	0.609	1.500	0.110
7000069	1993	SC	LA	33	0.601	0.472	0.620	1.700	0.040
7000069	1994	SC	LA	29	0.641	0.530	0.663	2.100	0.040
7000069	1995	SC	LA	31	0.494	0.360	0.487	1.700	0.030
7000069	1996	SC	LA	30	0.428	0.230	0.440	1.400	0.090
7000069	1997	SC	LA	29	0.379	0.234	0.356	1.200	0.100
7000072	1990	SC	LA	31	0.475	0.359	0.477	1.500	0.090
7000072	1991	SC	LA	29	0.341	0.292	0.355	1.100	0.040
7000072	1992	SC	LA	30	0.353	0.247	0.349	1.200	0.100
7000072	1993	SC	LA	32	0.384	0.462	0.433	1.500	0.010
7000072	1994	SC	LA	30	0.301	0.335	0.321	1.300	0.010
7000072	1995	SC	LA	31	0.317	0.346	0.318	1.600	0.030
7000072	1996	SC	LA	25	0.241	0.266	0.226	1.100	0.010
7000072	1997	SC	LA	30	0.228	0.182	0.225	0.500	0.020
7000087	1990	SC	LA	29	0.545	0.256	0.551	1.100	0.240
7000087	1991	SC	LA	28	0.608	0.540	0.604	2.800	0.070
7000087	1992	SC	LA	31	0.519	0.209	0.536	1.000	0.200
7000087	1993	SC	LA	26	0.535	0.326	0.588	1.100	0.050
7000087	1994	SC	LA	30	0.522	0.425	0.503	2.000	0.030
7000087	1995	SC	LA	31	0.581	0.380	0.574	1.400	0.060
7000087	1996	SC	LA	28	0.492	0.315	0.502	1.500	0.120
7000087	1997	SC	LA	22	0.339	0.150	0.337	0.700	0.060
3300144	1990	SC	RIV	28	0.235	0.127	0.237	0.440	0.030
3300144	1991	SC	RIV	29	0.266	0.200	0.276	0.870	0.060
3300144	1992	SC	RIV	30	0.200	0.119	0.201	0.420	0.020
3300144	1993	SC	RIV	29	0.199	0.167	0.198	0.700	0.020
3300144	1994	SC	RIV	31	0.184	0.181	0.191	0.950	0.020
3300144	1995	SC	RIV	31	0.183	0.146	0.177	0.530	0.030
3300144	1996	SC	RIV	31	0.178	0.200	0.176	1.100	0.040
3300144	1997	SC	RIV	1	0.050	n/a	0.050	0.050	0.050
3600175	1990	SC	SBD	27	0.434	0.201	0.423	1.000	0.210

ARB SITE	YEAR	Air Basin	County	NO_ OBS	Site Mean (ppbv)	Standard Deviation (ppbv)	Mean of Monthly Mean (ppbv)	Site Maximum (ppbv)	Site Minimum (ppbv)
3600175	1991	SC	SBD	28	0.675	1.233	0.717	6.800	0.150
3600175	1992	SC	SBD	27	0.360	0.180	0.364	0.680	0.070
3600175	1993	SC	SBD	29	0.392	0.286	0.398	1.100	0.040
3600175	1994	SC	SBD	31	0.284	0.165	0.286	0.820	0.030
3600175	1995	SC	SBD	31	0.265	0.143	0.263	0.550	0.060
3600175	1996	SC	SBD	28	0.203	0.122	0.199	0.530	0.050
3600175	1997	SC	SBD	30	0.198	0.090	0.193	0.400	0.070
4200388	1990	SCC	SBA	27	0.171	0.117	0.176	0.540	0.040
4200388	1991	SCC	SBA	34	0.133	0.093	0.124	0.420	0.040
4200388	1992	SCC	SBA	28	0.098	0.057	0.095	0.310	0.020
4200388	1993	SCC	SBA	31	0.075	0.055	0.075	0.280	0.020
4200388	1994	SCC	SBA	30	0.092	0.118	0.095	0.490	LOD
4200388	1995	SCC	SBA	29	0.075	0.062	0.082	0.280	0.020
4200388	1996	SCC	SBA	30	0.120	0.253	0.120	1.400	0.010
4200388	1997	SCC	SBA	29	0.103	0.088	0.095	0.300	0.010
5600434	1990	SCC	VEN	29	0.190	0.115	0.199	0.520	0.030
5600434	1991	SCC	VEN	28	0.186	0.136	0.192	0.670	0.040
5600434	1992	SCC	VEN	29	0.149	0.097	0.152	0.450	0.020
5600434	1993	SCC	VEN	28	0.116	0.108	0.111	0.580	0.020
5600434	1994	SCC	VEN	29	0.129	0.124	0.122	0.490	0.010
5600434	1995	SCC	VEN	31	0.126	0.110	0.125	0.440	0.020
5600434	1996	SCC	VEN	30	0.087	0.058	0.088	0.300	0.030
5600434	1997	SCC	VEN	29	0.061	0.046	0.068	0.200	0.010
8000114	1990	SD	SD	31	0.235	0.107	0.236	0.480	0.080
8000114	1991	SD	SD	30	0.228	0.129	0.229	0.530	0.060
8000114	1992	SD	SD	30	0.213	0.130	0.208	0.650	0.060
8000114	1993	SD	SD	31	0.141	0.110	0.144	0.530	0.020
8000114	1994	SD	SD	31	0.123	0.121	0.132	0.510	LOD
8000114	1995	SD	SD	29	0.147	0.133	0.146	0.540	0.020
8000114	1996	SD	SD	27	0.124	0.100	0.129	0.450	0.020
8000114	1997	SD	SD	29	0.111	0.099	0.102	0.400	0.010
8000131	1990	SD	SD	31	0.324	0.258	0.329	1.100	0.050
8000131	1991	SD	SD	29	0.293	0.268	0.308	1.300	0.040
8000131	1992	SD	SD	29	0.311	0.222	0.319	0.800	0.060
8000131	1993	SD	SD	28	0.245	0.200	0.256	0.890	0.020
8000131	1994	SD	SD	29	0.285	0.321	0.291	1.600	0.010
8000131	1995	SD	SD	29	0.342	0.585	0.352	3.200	0.040
8000131	1996	SD	SD	30	0.142	0.149	0.168	0.580	0.020
8000131	1997	SD	SD	26	0.147	0.127	0.146	0.500	0.010

ARB SITE	YEAR	Air Basin	County	NO_ OBS	Site Mean (ppbv)	Standard Deviation (ppbv)	Mean of Monthly Mean (ppbv)	Site Maximum (ppbv)	Site Minimum (ppbv)
6000336	1990	SFBA	ALA	30	0.187	0.137	0.189	0.550	0.040
6000336	1991	SFBA	ALA	30	0.210	0.146	0.210	0.540	0.020
6000336	1992	SFBA	ALA	30	0.136	0.119	0.134	0.630	0.030
6000336	1993	SFBA	ALA	30	0.114	0.103	0.114	0.450	0.010
6000336	1994	SFBA	ALA	31	0.095	0.072	0.086	0.290	LOD
6000336	1995	SFBA	ALA	30	0.121	0.077	0.118	0.290	0.030
6000336	1996	SFBA	ALA	31	0.068	0.043	0.069	0.210	0.010
6000336	1997	SFBA	ALA	13	0.062	0.066	0.063	0.200	0.010
0700433	1990	SFBA	CC	29	0.121	0.070	0.121	0.300	0.030
0700433	1991	SFBA	CC	29	0.148	0.077	0.147	0.310	0.030
0700433	1992	SFBA	CC	29	0.097	0.055	0.094	0.240	0.020
0700433	1993	SFBA	CC	30	0.092	0.081	0.092	0.420	0.020
0700433	1994	SFBA	CC	31	0.057	0.057	0.056	0.260	LOD
0700433	1995	SFBA	CC	30	0.043	0.025	0.043	0.100	0.010
0700433	1996	SFBA	CC	31	0.030	0.023	0.031	0.090	LOD
0700433	1997	SFBA	CC	9	0.068	0.060	0.066	0.200	0.010
0700440	1990	SFBA	CC	28	0.325	0.248	0.337	1.000	0.040
0700440	1991	SFBA	CC	29	0.438	0.450	0.419	1.700	0.030
0700440	1992	SFBA	CC	31	0.391	0.404	0.390	1.600	0.040
0700440	1993	SFBA	CC	30	0.207	0.254	0.204	1.100	0.010
0700440	1994	SFBA	CC	32	0.102	0.099	0.098	0.390	LOD
0700440	1995	SFBA	CC	30	0.157	0.242	0.147	1.100	0.020
0700440	1996	SFBA	CC	31	0.082	0.112	0.082	0.600	0.010
0700440	1997	SFBA	CC	29	0.097	0.130	0.102	0.400	0.010
0700445	1997	SFBA	CC	20	0.030	0.044	0.028	0.200	0.005
4300382	1990	SFBA	SCL	27	0.163	0.127	0.161	0.530	0.050
4300382	1991	SFBA	SCL	28	0.152	0.098	0.153	0.410	0.040
4300382	1992	SFBA	SCL	31	0.100	0.073	0.100	0.370	0.030
4300382	1993	SFBA	SCL	30	0.096	0.088	0.094	0.310	0.010
4300382	1994	SFBA	SCL	31	0.072	0.091	0.064	0.440	LOD
4300382	1995	SFBA	SCL	30	0.074	0.070	0.069	0.350	0.020
4300382	1996	SFBA	SCL	31	0.069	0.079	0.068	0.310	LOD
4300382	1997	SFBA	SCL	27	0.099	0.122	0.097	0.500	0.005
9000306	1990	SFBA	SF	28	0.191	0.103	0.199	0.390	0.040
9000306	1991	SFBA	SF	26	0.226	0.182	0.229	0.810	0.030
9000306	1992	SFBA	SF	31	0.133	0.081	0.131	0.360	0.030
9000306	1993	SFBA	SF	28	0.133	0.108	0.133	0.480	0.010
9000306	1994	SFBA	SF	30	0.105	0.100	0.105	0.390	0.010
9000306	1995	SFBA	SF	29	0.097	0.083	0.092	0.380	0.020

ARB SITE	YEAR	Air Basin	County	NO_ OBS	Site Mean (ppbv)	Standard Deviation (ppbv)	Mean of Monthly Mean (ppbv)	Site Maximum (ppbv)	Site Minimum (ppbv)
9000306	1996	SFBA	SF	31	0.084	0.085	0.084	0.420	0.010
9000306	1997	SFBA	SF	29	0.065	0.054	0.064	0.200	0.010
1000246	1990	SJV	FRE	27	0.117	0.095	0.119	0.470	0.040
1000246	1991	SJV	FRE	30	0.140	0.128	0.142	0.690	0.020
1000246	1992	SJV	FRE	30	0.103	0.055	0.102	0.270	0.040
1000246	1993	SJV	FRE	30	0.098	0.091	0.100	0.450	0.020
1000246	1994	SJV	FRE	31	0.063	0.067	0.062	0.250	LOD
1000246	1995	SJV	FRE	30	0.068	0.071	0.065	0.310	0.020
1000246	1996	SJV	FRE	31	0.040	0.029	0.041	0.150	0.010
1000246	1997	SJV	FRE	29	0.044	0.028	0.042	0.100	0.010
1500203	1990	SJV	KER	32	0.093	0.058	0.087	0.290	0.030
1500203	1991	SJV	KER	29	0.126	0.112	0.127	0.520	0.030
1500203	1992	SJV	KER	31	0.077	0.043	0.075	0.200	0.030
1500203	1993	SJV	KER	30	1.299	5.306	1.481	28.000	0.010
1500203*	1993	SJV	KER	29	0.378	1.678	0.317	9.100	0.010
1500203	1994	SJV	KER	9	0.059	0.060	0.050	0.210	0.020
1500255	1994	SJV	KER	23	0.054	0.072	0.055	0.330	LOD
1500255	1995	SJV	KER	32	0.098	0.182	0.092	1.000	0.010
1500255	1996	SJV	KER	32	0.104	0.264	0.119	1.500	LOD
1500255	1997	SJV	KER	32	0.036	0.035	0.036	0.200	0.005
3900252	1990	SJV	SJ	30	0.129	0.068	0.129	0.300	0.040
3900252	1991	SJV	SJ	29	0.115	0.050	0.113	0.220	0.040
3900252	1992	SJV	SJ	28	0.120	0.076	0.120	0.380	0.040
3900252	1993	SJV	SJ	34	0.125	0.173	0.120	0.860	0.020
3900252	1994	SJV	SJ	31	0.066	0.062	0.066	0.240	LOD
3900252	1995	SJV	SJ	30	0.063	0.044	0.061	0.220	0.020
3900252	1996	SJV	SJ	31	0.069	0.075	0.068	0.350	0.010
3900252	1997	SJV	SJ	28	0.096	0.114	0.095	0.400	0.005
5000568	1990	SJV	STA	31	0.144	0.097	0.145	0.370	0.040
5000568	1991	SJV	STA	30	0.142	0.173	0.150	0.870	0.020
5000568	1992	SJV	STA	31	0.120	0.140	0.118	0.790	0.030
5000568	1993	SJV	STA	30	0.116	0.178	0.109	0.850	0.020
5000568	1994	SJV	STA	31	0.093	0.198	0.087	1.100	LOD
5000568	1995	SJV	STA	30	0.052	0.053	0.053	0.230	0.010
5000568	1996	SJV	STA	31	0.043	0.042	0.044	0.220	0.010
5000568	1997	SJV	STA	29	0.049	0.061	0.050	0.300	0.005
1300698	1997	SS	IMP	30	0.105	0.161	0.099	0.800	0.005
0400628	1992	SV	BUT	16	0.053	0.033	0.051	0.120	LOD
0400628	1993	SV	BUT	30	0.056	0.046	0.057	0.190	LOD

* Site 1500203 without 28 ppbv value included

ARB SITE	YEAR	Air Basin	County	NO_ OBS	Site Mean (ppbv)	Standard Deviation (ppbv)	Mean of Monthly Mean (ppbv)	Site Maximum (ppbv)	Site Minimum (ppbv)
0400628	1994	SV	BUT	31	0.299	1.376	0.266	7.700	LOD
0400628	1995	SV	BUT	30	0.052	0.052	0.047	0.210	0.010
0400628	1996	SV	BUT	31	0.048	0.054	0.049	0.260	LOD
0400628	1997	SV	BUT	28	0.041	0.058	0.039	0.300	0.005
0400633	1990	SV	BUT	29	0.047	0.016	0.047	0.080	0.020
0400633	1991	SV	BUT	28	0.055	0.025	0.054	0.110	0.020
0400633	1992	SV	BUT	15	0.047	0.024	0.046	0.090	0.020
3100822	1993	SV	PLA	23	0.045	0.024	0.045	0.090	0.010
3100822	1994	SV	PLA	31	0.062	0.080	0.065	0.440	LOD
3100822	1995	SV	PLA	30	0.054	0.034	0.051	0.160	0.010
3100822	1996	SV	PLA	30	0.060	0.070	0.061	0.340	0.010
3100822	1997	SV	PLA	29	0.065	0.061	0.065	0.200	0.010
3400293	1990	SV	SAC	28	0.092	0.049	0.095	0.260	0.040
3400293	1991	SV	SAC	29	0.095	0.047	0.094	0.230	0.030
3400293	1992	SV	SAC	31	0.075	0.039	0.076	0.180	0.020
3400293	1993	SV	SAC	6	0.053	0.010	0.054	0.070	0.040

TABLE A-2
Air Basin Summary Table
Air Basin Annual Summary Statistics

Air Basin	Year	Number of Sites	Air Basin Arithmetic Mean (ppbv)	Standard Deviation (ppbv)	Air Basin Mean of Monthly Means (ppbv)	Air Basin Maximum (ppbv)	Air Basin Minimum (ppbv)
SC	1990	5	0.588	0.636	0.576	5.000	0.030
SC	1991	5	0.529	0.694	0.530	6.800	0.040
SC	1992	5	0.411	0.263	0.409	1.500	0.020
SC	1993	5	0.424	0.389	0.422	1.700	0.010
SC	1994	5	0.383	0.387	0.386	2.100	0.010
SC	1995	5	0.368	0.327	0.368	1.700	0.030
SC	1996	5	0.309	0.264	0.309	1.500	0.010
SC	1997	5	0.279	0.187	0.255	1.200	0.020
SCC	1990	2	0.181	0.115	0.181	0.540	0.030
SCC	1991	2	0.157	0.116	0.160	0.670	0.040
SCC	1992	2	0.124	0.084	0.124	0.450	0.020
SCC	1993	2	0.094	0.086	0.095	0.580	0.020
SCC	1994	2	0.110	0.121	0.110	0.490	0.005
SCC	1995	2	0.101	0.093	0.100	0.440	0.020
SCC	1996	2	0.104	0.183	0.104	1.400	0.010
SCC	1997	2	0.082	0.073	0.082	0.300	0.010
SD	1990	2	0.280	0.201	0.280	1.100	0.050
SD	1991	2	0.260	0.210	0.261	1.300	0.040
SD	1992	2	0.261	0.186	0.262	0.800	0.060
SD	1993	2	0.190	0.166	0.193	0.890	0.020
SD	1994	2	0.201	0.251	0.204	1.600	0.005
SD	1995	2	0.244	0.432	0.244	3.200	0.020
SD	1996	2	0.134	0.128	0.133	0.580	0.020
SD	1997	2	0.128	0.114	0.124	0.500	0.010
SFBA	1990	5	0.197	0.162	0.197	1.000	0.030
SFBA	1991	5	0.235	0.255	0.235	1.700	0.020
SFBA	1992	5	0.173	0.225	0.172	1.600	0.020
SFBA	1993	5	0.128	0.147	0.128	1.100	0.010
SFBA	1994	5	0.086	0.086	0.086	0.440	0.005
SFBA	1995	5	0.098	0.129	0.098	1.100	0.010
SFBA	1996	5	0.067	0.077	0.067	0.600	0.005
SFBA	1997	5	0.074	0.095	0.070	0.500	0.005
SJV	1990	4	0.121	0.082	0.121	0.470	0.030

Air Basin	Year	Number of Sites	Air Basin Arithmetic Mean (ppbv)	Standard Deviation (ppbv)	Air Basin Mean of Monthly Means (ppbv)	Air Basin Maximum (ppbv)	Air Basin Minimum (ppbv)
SJV	1991	4	0.131	0.123	0.131	0.870	0.020
SJV	1992	4	0.104	0.088	0.105	0.790	0.030
SJV	1993	4	0.400	2.630	0.410	28.000	0.010
SJV*	1993	4	0.176	0.823	0.179	9.100	0.010
SJV	1994	5	0.069	0.113	0.067	1.100	0.005
SJV	1995	4	0.071	0.105	0.070	1.000	0.010
SJV	1996	4	0.064	0.142	0.064	1.500	0.005
SJV	1997	4	0.055	0.070	0.056	0.400	0.005
SS	1997	1	0.105	0.161	0.099	0.800	0.005
SV	1990	2	0.069	0.042	0.070	0.260	0.020
SV	1991	2	0.075	0.043	0.075	0.230	0.020
SV	1992	3	0.063	0.036	0.058	0.180	0.005
SV	1993	3	0.051	0.036	0.051	0.190	0.005
SV	1994	2	0.181	0.974	0.181	7.700	0.005
SV	1995	2	0.053	0.043	0.053	0.210	0.010
SV	1996	2	0.054	0.062	0.054	0.340	0.005
SV	1997	2	0.053	0.061	0.053	0.300	0.005

* SJV value with 28 ppbv value excluded

TABLE A-3
Site Identification Table
Site Number and Site Name, by Basin and County

ARB Site	Site Name	Air Basin	County
7000069	Burbank-W Palm Avenue	SC	LA
7000072	North Long Beach	SC	LA
7000087	Los Angeles-North Main Street	SC	LA
3300144	Riverside-Rubidoux	SC	RIV
3600175	Upland-San Bernardino Road	SC	SBD
4200388	Santa Barbara-W Carillo Street	SCC	SBA
5600434	Simi Valley-Cochran Street	SCC	VEN
8000114	Chula Vista	SD	SD
8000131	El Cajon-Redwood Avenue	SD	SD
6000336	Fremont-Chapel Way	SFBA	ALA
0700433	Richmond-13th Street	SFBA	CC
0700440	Concord-2975 Treat Blvd	SFBA	CC
0700445	San Pablo-El Portal	SFBA	CC
4300382	San Jose-4th Street	SFBA	SCL
9000306	San Francisco-Arkansas Street	SFBA	SF
1000246	Fresno-1st Street	SJV	FRE
1500255	Bakersfield-5558 California Avenue	SJV	KER
3900252	Stockton-Hazelton Street	SJV	SJ
5000568	Modesto-14th Street	SJV	STA
1300698	Calexico-Ethel Street	SS	IMP
0400628	Chico-Manzanita Avenue	SV	BUT
3100822	Roseville-N Sunrise Blvd	SV	PLA

Memorandum 2. Analysis and Population Exposure Estimates for Perchloroethylene Needs Assessment for Brake Cleaning Products (March 26, 1998)

Cal/EPA

California Environmental Protection

Air Resources Board

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Pete Wilson
Governor

Peter M. Rooney
Secretary for Environmental Protection

MEMORANDUM

TO: Todd Wong
Stationary Source Division

FROM: Bob Effa
Technical Support Division

DATE: March 26, 1998

SUBJECT: ANALYSIS AND POPULATION EXPOSURE ESTIMATES FOR PERCHLOROETHYLENE NEEDS ASSESSMENT FOR BRAKE CLEANING PRODUCTS

This memorandum is in response to your request for an analysis of ambient perchlorethylene data and population-weighted exposure. It is our understanding that this analysis is to be used for a perc needs assessment of brake repair facilities to serve as the basis for determining whether an airborne toxic control measure (ATCM) is needed for these products. This analysis is based on ambient data, and as such, includes perchlorethylene emissions from all sources. There is no way to differentiate in the ambient air between perchloroethylene emissions from one source versus another. If the potential risk from brake cleaning products alone is to be assessed, the contribution from other sources would need to be quantified and subtracted from the ambient data.

BACKGROUND

This analysis is based on ambient data collected by the Air Resources Board (ARB) and compiled in the ARB Air Toxics database. The data used in this analysis cover the time period from January 2, 1990 to December 29, 1996. All data used in this analysis were extracted on November 14, 1997. As of February 25, 1998, there have been no changes to the data. This analysis does not reflect any changes that may have occurred since that time. The data used in this analysis are available on CD (*California Ambient Air Quality Data CD# TSD-97-008*) from the Technical Support Division (TSD).

DATA

Ambient Sampling and Analysis

Perchloroethylene data are collected by the ARB toxics sampling network, which currently consists of 21 monitoring sites located throughout the state. All data used in this analysis were collected during routine toxics pollutant monitoring. They come from a total of 24 sites. Seventeen of these sites have been in operation from 1990 to 1996. Three sites have been closed and replaced by three new sites in the same general area (Bakersfield-Chester Ave with Bakersfield-California Ave, Citrus Heights-Sunrise Blvd with Roseville N. Sunrise Blvd, and Chico-Salem St with Chico-Manzanita Ave). The 24th site, in Calexico, has been in operation since July, 1995. Since this site only has data for one complete year (1996), and this analysis examines perchloroethylene trends over 7 years, the data from this site were not used in this analysis. There is also a 25th site at Fresno-Olive St., but this site has only one observation and is being discarded. As noted, some sites have moved within air basin boundaries, and this move did not pose a problem for the purpose of our analysis.

The data analysis and population exposure estimates presented below are based on data collected from the ARB toxics sampling network. These data are collected over a 24 hour period every twelve days by the Monitoring and Laboratory Division (MLD). The data are analyzed by MLD staff using Method MLD052 (Cryogenic Trap Preconcentration with Capillary Column Gas Chromatography-PID/ECD Detectors). Perchloroethylene concentrations are measured using Electron Capture Detector (ECD).

The number of samples available per site during the study period ranged from 42 to 213 observations. Of the 4206 observations collected during this time, 35 were below the limit of detection (LOD) of 0.01 ppbv for the study period. These values pose a problem to the analysis but they cannot be ignored since a mean calculated without these observations would overestimate the true mean. To account for these below LOD values, we estimated their values to be ½ of the LOD.

Missing data points

In the course of analyzing the data for this analysis, we found that some data points were missing. This is to be expected, but it can pose problems to the analysis. If the pollutant being measured has seasonal patterns, and several points are missing from the same season, the analysis results could be skewed either high or low. If there are no data collected at a given site during a month, a mean of monthly means cannot be calculated for that year and the rest of the data for that site/year must be thrown out.

During this analysis, we encountered 8 sites with missing data as shown in Table 1. To develop the population-weighted perchloroethylene exposure estimates, we had to populate the data set with the most accurate data estimates available. We

used two different methods to estimate the missing data. The first method applied to five sites where data were missing for only one month, with data from adjacent months available. For these sites, we simply took the average of the monthly means from the two adjacent months to impute the missing values. The second method was applied to the remaining three sites. One site was missing only one month of data, but it did not have a value for the previous month available as it was the first month of our sample period (January 1990). The other two sites were missing a three month block of data. All three sites used the same methodology to estimate the missing data. For these sites, we took the mean of monthly means for the months of data available, and for the same months of data in an adjacent (following) year. From this data we calculated the ratio of the mean of monthly means. To complete the data set, we took the months with missing data and populated them with data from an adjacent (following) year. To correct for different magnitudes of emissions from the two years, this data was then adjusted using the ratio of mean of monthly means. For example, we will look at the January 1990 value. To estimate the missing value, we calculated a mean of monthly means using the remaining months of the year (1990) from the site with missing data. We then calculated a mean of monthly means for the following year (1991) using the same months of data. The next step was to calculate the ratio of means of monthly means to account for the difference in air quality for the two years of interest. The January (1990) monthly mean was then imputed by multiplying the January (1991) value by the ratio of the means of monthly means to more accurately describe the missing value.

A simpler approach would have been to calculate a mean value from the existing data. The problem with this approach is that you would effectively be populating the missing data with the average site value for the year. Thus, this would not reflect any seasonal patterns the data may possess, and would result in a less accurate estimate that could skew the analysis results.

TABLE 1

Perchloroethylene Data Analysis Missing Values in Data Set			
Site Name	Year	Month(s) Missing	Calculated Value(s)
Chula Vista	1996	September	0.127 ppbv
El Cajon-Redwood Ave	1994	December	0.458 ppbv
Richmond-13th St	1990	January	0.145 ppbv
San Francisco-Arkansas St	1990	May	0.174 ppbv

Perchloroethylene Data Analysis Missing Values in Data Set			
San Francisco-Arkansas St	1993	December	0.176 ppbv
Stockton-Hazelton St	1993	January	0.108 ppbv
Fresno-1st St	1990	January-March	0.140, 0.157, 0.077 ppbv
North Long Beach	1996	August-October	0.116, 0.168, 0.155 ppbv

Unusual Observation

The highest concentration reported during the study period was 28 ppbv at the Bakersfield-Chester St. site in the San Joaquin Valley Air Basin on February 12, 1993. The second highest concentration was 9.1 ppbv at the Bakersfield-Chester St. site on January 31, 1993. The 28 ppbv value is much higher than the remaining data collected and is subject to scrutiny. The Monitoring and Laboratory Division (MLD) checked and confirmed the value. There is no valid reason to discard the value, so it remains in our database. To assess the sensitivity of our estimates to such high concentrations, we performed two analyses by including or excluding the data point. When this value is compared to the remaining values at the Chester St. site, it is more than 21 times higher than the average for that site. A brief summary of the effects of this data point are shown in Table 2.

TABLE 2

Results of Perchloroethylene Data Analysis Bakersfield-Chester St Site for 1993			
	with 28 ppbv value	without 28 ppbv value	Percent Change
Site Arithmetic Mean Concentration	1.299 ppbv	0.378 ppbv	-71%
Air Basin Arithmetic Mean Concentration	0.400 ppbv	0.176 ppbv	-56%

Results of Perchloroethylene Data Analysis Bakersfield-Chester St Site for 1993			
Statewide Arithmetic Mean Concentration	0.253 ppbv	0.207 ppbv	-18%
Statewide Population-Weighted Exposure	0.322 ppb/year	0.301 ppb/year	-7%

Unless otherwise noted, all results presented in this report are calculated with the 28 ppbv value included.

Population Data

Population data used in the exposure analysis come from two sources: the 1990 census and the California Department of Finance (DOF). The census data is used in the South Coast and San Francisco Air Basins as an input to the population exposure weighting program, while the DOF data is used in all areas to represent the actual population. The study area for this analysis covers six air basins, and approximately 72% of the statewide population.

METHODOLOGY

The population exposure estimate consists of two parts. The first part is an estimate of the pollutant exposure in a given air basin. This will yield an average exposure for each air basin in the study. Due to data limitations, population exposure estimates were calculated differently for different air basins. For the South Coast Air Basin and the San Francisco Air Basin, the exposure estimates are calculated using a population exposure weighting program that interpolates site-specific mean of monthly mean perchloroethylene concentrations to population values assigned to census tract centroids (a census tract centroid is the approximate center of a United States Census Bureau census tract). The population exposure weighting program used 1990 census data in the South Coast and San Francisco Air Basins. There are no growth factors available by census tract, so 1990 census data was used for the population estimate for all years of the analysis.

For the other air basins for which we have data, the number of monitors are too limited to represent the entire air basin. For those areas, we limited our analysis to the counties which had monitors. First, we computed a "basin wide" mean concentration from the mean of monthly means of the basin. Then, we assumed that all people in counties with monitoring sites are exposed to this estimated mean annual concentration (i.e., if an air basin contains four counties, and only two of the counties

had monitors, the population of the two counties with monitors would be used in the exposure analysis). The population estimates for these areas of the study used DOF data for this step.

The results of this first step are presented in the top portion of Table 3. This is the population-weighted perchloroethylene exposure by air basin. For example, the per capita average concentration to which the population in the South Coast Air Basin were exposed during 1990 was 0.590 ppb. This declined to 0.330 ppb for 1996. For the San Joaquin Valley Air Basin, the average concentration for the population represented by the four counties included in the analysis was 0.121 ppb in 1990, dropping to 0.064 ppb in 1996.

The second step of the exposure calculation was the same for all air basins. The overall statewide population-weighted exposure was calculated by multiplying the estimated annual average perchloroethylene concentration for a given air basin by its population (represented as a fraction of the total of the air basin populations in this study). This value was calculated for each air basin in the study, and the results are summed to create an estimated overall statewide population-weighted exposure estimate. The DOF population figures are shown in the middle portion of Table 3.

RESULTS

The results of the exposure analysis are summarized in Table 3. The estimated statewide perchloroethylene exposure, shown at the bottom of the table, decreases from 0.382 to 0.203 ppbv from 1990 to 1996. The highest air basin concentrations (shown at the top of the table) occurred in the South Coast, where the annual mean perchloroethylene concentrations decreased from 0.590 ppbv in 1990 to 0.330 ppbv in 1996. The general trend for statewide is decreasing, except for a slight increase from 1992 to 1993 due to the 28 ppbv value in the San Joaquin Valley. If the 28 ppbv value is not included in the analysis, the trend decreases for all years.

TABLE 3

Estimated Air Basin Population-Weighted* Perchloroethylene Exposure ppb-year/person**							
Air Basin	1990	1991	1992	1993	1994	1995	1996
South Coast	0.590	0.542	0.430	0.472	0.410	0.392	0.330
South Central Coast	0.181	0.160	0.124	0.095	0.110	0.100	0.104
San Diego	0.280	0.261	0.262	0.193	0.204	0.244	0.133
San Francisco	0.196	0.223	0.158	0.124	0.082	0.091	0.068
San Joaquin Valley	0.121	0.131	0.105	0.410	0.067	0.070	0.064
Sacramento Valley	0.070	0.075	0.058	0.051	0.181	0.053	0.054
Air Basin Population Data Used in Calculating Statewide Perchloroethylene Exposure							
Air Basin	1990	1991	1992	1993	1994	1995	1996
South Coast	10684933	10910823	11124105	11206222	11298530	11372003	11441517
South Central Coast	1041100	1055600	1072600	1080800	1092900	1104100	1108500
San Diego	2511400	2560800	2611500	2625100	2650700	2669200	2694900
San Francisco	4324700	4377500	4451700	4511100	4543300	4569800	4649400
San Joaquin Valley	1977876	2040876	2097395	2130385	2158376	2192027	2226921
Sacramento Valley	1377350	1413279	1440859	1458943	1469597	1482705	1502236
SUM	21917359	22358878	22798159	23012550	23213403	23389835	23623474
Estimated Statewide Population-Weighted Perchloroethylene Exposure ppb-year/person**							
Statewide WTD AVG	0.382	0.362	0.290	0.322	0.262	0.251	0.203

* Only air basins with perchloroethylene monitoring included in this table. Air basin population-weighted exposure is calculated using mean of monthly means for all sites within basin.

** Population exposure units are a concentration for a given duration per person; For this analysis, the units are ppb-year/person.

In summary, this exposure analysis was developed with data from the six areas listed above. The South Coast and San Francisco Bay Area were population-weighted using census tract data, and the rest of the areas were population-weighted

using county (with monitoring data) population data. The six areas represent approximately 72% of the statewide population.

LIMITATIONS OF ANALYSIS

This analysis was designed to produce a statewide population-weighted perchloroethylene exposure. Ideally, to complete such an analysis, daily perchloroethylene concentrations from all areas of the state would be available. Unfortunately, this is not the case. Currently, our monitoring network operates on a one in twelve day sampling schedule, at only 21 sites within six air basins throughout California. At this time, the minimum number of sites and frequency of sampling required to accurately represent the true statewide exposure are uncertain. Therefore, caution should be exercised when using these exposure estimates.

SUMMARY TABLES IN APPENDIX

Annual summary statistics for each site during the study period are listed in the appendix in the Site Summary Table. These statistics include the annual site minimum, maximum, arithmetic mean, standard deviation, mean of monthly means, and number of observations. The annual mean concentration for the site is calculated as the mean of monthly means for the site. The standard deviation is calculated using all values rather than the monthly means. When a site contains a reading below the LOD for a particular year, the mean concentration and standard deviation are calculated using ½ LOD as an estimate for the below LOD value.

Basin-specific summary statistics are calculated on an annual basis and are listed in the Appendix in the Air Basin Summary Table. These statistics are calculated using the values from each site within an air basin. These statistics include the minimum and maximum, the arithmetic mean, standard deviation of values from all sites within the air basin, the mean of monthly site means, and the number of sites in the air basin.

cc: Bart Croes, TSD
Tom Lusk , TSD

APPENDIX

Site Summary Table
Annual Site Specific Summary Statistics

ARB SITE	YEAR	Air Basin	County	NO_ OBS	Site Mean (ppbv)	Standard Deviation (ppbv)	Mean of Monthly Mean (ppbv)	Site Maximum (ppbv)	Site Minimum (ppbv)
7000069	1990	SC	LA	31	1.193	1.087	1.191	5.000	0.200
7000069	1991	SC	LA	29	0.761	0.615	0.785	2.400	0.070
7000069	1992	SC	LA	30	0.615	0.305	0.609	1.500	0.110
7000069	1993	SC	LA	33	0.601	0.472	0.620	1.700	0.040
7000069	1994	SC	LA	29	0.641	0.530	0.663	2.100	0.040
7000069	1995	SC	LA	31	0.494	0.360	0.487	1.700	0.030
7000069	1996	SC	LA	30	0.428	0.230	0.440	1.400	0.090
7000072	1990	SC	LA	31	0.475	0.359	0.477	1.500	0.090
7000072	1991	SC	LA	29	0.341	0.292	0.355	1.100	0.040
7000072	1992	SC	LA	30	0.353	0.247	0.349	1.200	0.100
7000072	1993	SC	LA	32	0.384	0.462	0.433	1.500	0.010
7000072	1994	SC	LA	30	0.301	0.335	0.321	1.300	0.010
7000072	1995	SC	LA	31	0.317	0.346	0.318	1.600	0.030
7000072	1996	SC	LA	25	0.241	0.266	0.226	1.100	0.010
7000087	1990	SC	LA	29	0.545	0.256	0.551	1.100	0.240
7000087	1991	SC	LA	28	0.608	0.540	0.604	2.800	0.070
7000087	1992	SC	LA	31	0.519	0.209	0.536	1.000	0.200
7000087	1993	SC	LA	26	0.535	0.326	0.588	1.100	0.050
7000087	1994	SC	LA	30	0.522	0.425	0.503	2.000	0.030
7000087	1995	SC	LA	31	0.581	0.380	0.574	1.400	0.060
7000087	1996	SC	LA	28	0.492	0.315	0.502	1.500	0.120
3300144	1990	SC	RIV	28	0.235	0.127	0.237	0.440	0.030
3300144	1991	SC	RIV	29	0.266	0.200	0.276	0.870	0.060
3300144	1992	SC	RIV	30	0.200	0.119	0.201	0.420	0.020
3300144	1993	SC	RIV	29	0.199	0.167	0.198	0.700	0.020
3300144	1994	SC	RIV	31	0.184	0.181	0.191	0.950	0.020
3300144	1995	SC	RIV	31	0.183	0.146	0.177	0.530	0.030
3300144	1996	SC	RIV	31	0.178	0.200	0.176	1.100	0.040
3600175	1990	SC	SBD	27	0.434	0.201	0.423	1.000	0.210
3600175	1991	SC	SBD	28	0.675	1.233	0.717	6.800	0.150
3600175	1992	SC	SBD	27	0.360	0.180	0.364	0.680	0.070
3600175	1993	SC	SBD	29	0.392	0.286	0.398	1.100	0.040
3600175	1994	SC	SBD	31	0.284	0.165	0.286	0.820	0.030
3600175	1995	SC	SBD	31	0.265	0.143	0.263	0.550	0.060

ARB SITE	YEAR	Air Basin	County	NO_ OBS	Site Mean (ppbv)	Standard Deviation (ppbv)	Mean of Monthly Mean (ppbv)	Site Maximum (ppbv)	Site Minimum (ppbv)
3600175	1996	SC	SBD	28	0.203	0.122	0.199	0.530	0.050
4200388	1990	SCC	SBA	27	0.171	0.117	0.176	0.540	0.040
4200388	1991	SCC	SBA	34	0.133	0.093	0.124	0.420	0.040
4200388	1992	SCC	SBA	28	0.098	0.057	0.095	0.310	0.020
4200388	1993	SCC	SBA	31	0.075	0.055	0.075	0.280	0.020
4200388	1994	SCC	SBA	30	0.092	0.118	0.095	0.490	LOD
4200388	1995	SCC	SBA	29	0.075	0.062	0.082	0.280	0.020
4200388	1996	SCC	SBA	30	0.120	0.253	0.120	1.400	0.010
5600434	1990	SCC	VEN	29	0.190	0.115	0.199	0.520	0.030
5600434	1991	SCC	VEN	28	0.186	0.136	0.192	0.670	0.040
5600434	1992	SCC	VEN	29	0.149	0.097	0.152	0.450	0.020
5600434	1993	SCC	VEN	28	0.116	0.108	0.111	0.580	0.020
5600434	1994	SCC	VEN	29	0.129	0.124	0.122	0.490	0.010
5600434	1995	SCC	VEN	31	0.126	0.110	0.125	0.440	0.020
5600434	1996	SCC	VEN	30	0.087	0.058	0.088	0.300	0.030
8000114	1990	SD	SD	31	0.235	0.107	0.236	0.480	0.080
8000114	1991	SD	SD	30	0.228	0.129	0.229	0.530	0.060
8000114	1992	SD	SD	30	0.213	0.130	0.208	0.650	0.060
8000114	1993	SD	SD	31	0.141	0.110	0.144	0.530	0.020
8000114	1994	SD	SD	31	0.123	0.121	0.132	0.510	LOD
8000114	1995	SD	SD	29	0.147	0.133	0.146	0.540	0.020
8000114	1996	SD	SD	27	0.124	0.100	0.129	0.450	0.020
8000131	1990	SD	SD	31	0.324	0.258	0.329	1.100	0.050
8000131	1991	SD	SD	29	0.293	0.268	0.308	1.300	0.040
8000131	1992	SD	SD	29	0.311	0.222	0.319	0.800	0.060
8000131	1993	SD	SD	28	0.245	0.200	0.256	0.890	0.020
8000131	1994	SD	SD	29	0.285	0.321	0.291	1.600	0.010
8000131	1995	SD	SD	29	0.342	0.585	0.352	3.200	0.040
8000131	1996	SD	SD	30	0.142	0.149	0.168	0.580	0.020
6000336	1990	SFBA	ALA	30	0.187	0.137	0.189	0.550	0.040
6000336	1991	SFBA	ALA	30	0.210	0.146	0.210	0.540	0.020
6000336	1992	SFBA	ALA	30	0.136	0.119	0.134	0.630	0.030
6000336	1993	SFBA	ALA	30	0.114	0.103	0.114	0.450	0.010
6000336	1994	SFBA	ALA	31	0.095	0.072	0.086	0.290	LOD
6000336	1995	SFBA	ALA	30	0.121	0.077	0.118	0.290	0.030
6000336	1996	SFBA	ALA	31	0.068	0.043	0.069	0.210	0.010
0700433	1990	SFBA	CC	29	0.121	0.070	0.121	0.300	0.030
0700433	1991	SFBA	CC	29	0.148	0.077	0.147	0.310	0.030
0700433	1992	SFBA	CC	29	0.097	0.055	0.094	0.240	0.020
0700433	1993	SFBA	CC	30	0.092	0.081	0.092	0.420	0.020

ARB SITE	YEAR	Air Basin	County	NO_ OBS	Site Mean (ppbv)	Standard Deviation (ppbv)	Mean of Monthly Mean (ppbv)	Site Maximum (ppbv)	Site Minimum (ppbv)
0700433	1994	SFBA	CC	31	0.057	0.057	0.056	0.260	LOD
0700433	1995	SFBA	CC	30	0.043	0.025	0.043	0.100	0.010
0700433	1996	SFBA	CC	31	0.030	0.023	0.031	0.090	LOD
0700440	1990	SFBA	CC	28	0.325	0.248	0.337	1.000	0.040
0700440	1991	SFBA	CC	29	0.438	0.450	0.419	1.700	0.030
0700440	1992	SFBA	CC	31	0.391	0.404	0.390	1.600	0.040
0700440	1993	SFBA	CC	30	0.207	0.254	0.204	1.100	0.010
0700440	1994	SFBA	CC	32	0.102	0.099	0.098	0.390	LOD
0700440	1995	SFBA	CC	30	0.157	0.242	0.147	1.100	0.020
0700440	1996	SFBA	CC	31	0.082	0.112	0.082	0.600	0.010
4300382	1990	SFBA	SCL	27	0.163	0.127	0.161	0.530	0.050
4300382	1991	SFBA	SCL	28	0.152	0.098	0.153	0.410	0.040
4300382	1992	SFBA	SCL	31	0.100	0.073	0.100	0.370	0.030
4300382	1993	SFBA	SCL	30	0.096	0.088	0.094	0.310	0.010
4300382	1994	SFBA	SCL	31	0.072	0.091	0.064	0.440	LOD
4300382	1995	SFBA	SCL	30	0.074	0.070	0.069	0.350	0.020
4300382	1996	SFBA	SCL	31	0.069	0.079	0.068	0.310	LOD
9000306	1990	SFBA	SF	28	0.191	0.103	0.199	0.390	0.040
9000306	1991	SFBA	SF	26	0.226	0.182	0.229	0.810	0.030
9000306	1992	SFBA	SF	31	0.133	0.081	0.131	0.360	0.030
9000306	1993	SFBA	SF	28	0.133	0.108	0.133	0.480	0.010
9000306	1994	SFBA	SF	30	0.105	0.100	0.105	0.390	0.010
9000306	1995	SFBA	SF	29	0.097	0.083	0.092	0.380	0.020
9000306	1996	SFBA	SF	31	0.084	0.085	0.084	0.420	0.010
1000246	1990	SJV	FRE	27	0.117	0.095	0.119	0.470	0.040
1000246	1991	SJV	FRE	30	0.140	0.128	0.142	0.690	0.020
1000246	1992	SJV	FRE	30	0.103	0.055	0.102	0.270	0.040
1000246	1993	SJV	FRE	30	0.098	0.091	0.100	0.450	0.020
1000246	1994	SJV	FRE	31	0.063	0.067	0.062	0.250	LOD
1000246	1995	SJV	FRE	30	0.068	0.071	0.065	0.310	0.020
1000246	1996	SJV	FRE	31	0.040	0.029	0.041	0.150	0.010
1500203	1990	SJV	KER	32	0.093	0.058	0.087	0.290	0.030
1500203	1991	SJV	KER	29	0.126	0.112	0.127	0.520	0.030
1500203	1992	SJV	KER	31	0.077	0.043	0.075	0.200	0.030
1500203	1993	SJV	KER	30	1.299	5.306	1.481	28.000	0.010
1500203*	1993	SJV	KER	29	0.378	1.678	0.317	9.100	0.010
1500203	1994	SJV	KER	9	0.059	0.060	0.050	0.210	0.020
1500255	1994	SJV	KER	23	0.054	0.072	0.055	0.330	LOD
1500255	1995	SJV	KER	32	0.098	0.182	0.092	1.000	0.010
1500255	1996	SJV	KER	32	0.104	0.264	0.119	1.500	LOD

* Site 1500203 without 28 ppbv value included

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ARB SITE	YEAR	Air Basin	County	NO_ OBS	Site Mean (ppbv)	Standard Deviation (ppbv)	Mean of Monthly Mean (ppbv)	Site Maximum (ppbv)	Site Minimum (ppbv)
3900252	1990	SJV	SJ	30	0.129	0.068	0.129	0.300	0.040
3900252	1991	SJV	SJ	29	0.115	0.050	0.113	0.220	0.040
3900252	1992	SJV	SJ	28	0.120	0.076	0.120	0.380	0.040
3900252	1993	SJV	SJ	34	0.125	0.173	0.120	0.860	0.020
3900252	1994	SJV	SJ	31	0.066	0.062	0.066	0.240	LOD
3900252	1995	SJV	SJ	30	0.063	0.044	0.061	0.220	0.020
3900252	1996	SJV	SJ	31	0.069	0.075	0.068	0.350	0.010
5000568	1990	SJV	STA	31	0.144	0.097	0.145	0.370	0.040
5000568	1991	SJV	STA	30	0.142	0.173	0.150	0.870	0.020
5000568	1992	SJV	STA	31	0.120	0.140	0.118	0.790	0.030
5000568	1993	SJV	STA	30	0.116	0.178	0.109	0.850	0.020
5000568	1994	SJV	STA	31	0.093	0.198	0.087	1.100	LOD
5000568	1995	SJV	STA	30	0.052	0.053	0.053	0.230	0.010
5000568	1996	SJV	STA	31	0.043	0.042	0.044	0.220	0.010
0400628	1992	SV	BUT	16	0.053	0.033	0.051	0.120	LOD
0400628	1993	SV	BUT	30	0.056	0.046	0.057	0.190	LOD
0400628	1994	SV	BUT	31	0.299	1.376	0.266	7.700	LOD
0400628	1995	SV	BUT	30	0.052	0.052	0.047	0.210	0.010
0400628	1996	SV	BUT	31	0.048	0.054	0.049	0.260	LOD
0400633	1990	SV	BUT	29	0.047	0.016	0.047	0.080	0.020
0400633	1991	SV	BUT	28	0.055	0.025	0.054	0.110	0.020
0400633	1992	SV	BUT	15	0.047	0.024	0.046	0.090	0.020
3100822	1993	SV	PLA	23	0.045	0.024	0.045	0.090	0.010
3100822	1994	SV	PLA	31	0.062	0.080	0.065	0.440	LOD
3100822	1995	SV	PLA	30	0.054	0.034	0.051	0.160	0.010
3100822	1996	SV	PLA	30	0.060	0.070	0.061	0.340	0.010
3400293	1990	SV	SAC	28	0.092	0.049	0.095	0.260	0.040
3400293	1991	SV	SAC	29	0.095	0.047	0.094	0.230	0.030
3400293	1992	SV	SAC	31	0.075	0.039	0.076	0.180	0.020
3400293	1993	SV	SAC	6	0.053	0.010	0.054	0.070	0.040

Air Basin Summary Table

Air Basin Annual Summary Statistics

Air Basin	Year	Number of Sites	Air Basin Arithmetic Mean (ppbv)	Standard Deviation (ppbv)	Air Basin Mean of Monthly Means (ppbv)	Air Basin Maximum (ppbv)	Air Basin Minimum (ppbv)
SC	1990	5	0.588	0.636	0.576	5.000	0.030
SC	1991	5	0.529	0.694	0.530	6.800	0.040
SC	1992	5	0.411	0.263	0.409	1.500	0.020
SC	1993	5	0.424	0.389	0.422	1.700	0.010
SC	1994	5	0.383	0.387	0.386	2.100	0.010
SC	1995	5	0.368	0.327	0.368	1.700	0.030
SC	1996	5	0.309	0.264	0.309	1.500	0.010
SCC	1990	2	0.181	0.115	0.181	0.540	0.030
SCC	1991	2	0.157	0.116	0.160	0.670	0.040
SCC	1992	2	0.124	0.084	0.124	0.450	0.020
SCC	1993	2	0.094	0.086	0.095	0.580	0.020
SCC	1994	2	0.110	0.121	0.110	0.490	0.005
SCC	1995	2	0.101	0.093	0.100	0.440	0.020
SCC	1996	2	0.104	0.183	0.104	1.400	0.010
SD	1990	2	0.280	0.201	0.280	1.100	0.050
SD	1991	2	0.260	0.210	0.261	1.300	0.040
SD	1992	2	0.261	0.186	0.262	0.800	0.060
SD	1993	2	0.190	0.166	0.193	0.890	0.020
SD	1994	2	0.201	0.251	0.204	1.600	0.005
SD	1995	2	0.244	0.432	0.244	3.200	0.020
SD	1996	2	0.134	0.128	0.133	0.580	0.020
SFBA	1990	5	0.197	0.162	0.197	1.000	0.030
SFBA	1991	5	0.235	0.255	0.235	1.700	0.020
SFBA	1992	5	0.173	0.225	0.172	1.600	0.020
SFBA	1993	5	0.128	0.147	0.128	1.100	0.010
SFBA	1994	5	0.086	0.086	0.086	0.440	0.005
SFBA	1995	5	0.098	0.129	0.098	1.100	0.010
SFBA	1996	5	0.067	0.077	0.067	0.600	0.005
SJV	1990	4	0.121	0.082	0.121	0.470	0.030
SJV	1991	4	0.131	0.123	0.131	0.870	0.020
SJV	1992	4	0.104	0.088	0.105	0.790	0.030
SJV	1993	4	0.400	2.630	0.410	28.000	0.010
SJV*	1993	4	0.176	0.823	0.179	9.100	0.010
SJV	1994	5	0.069	0.113	0.067	1.100	0.005
SJV	1995	4	0.071	0.105	0.070	1.000	0.010
SJV	1996	4	0.064	0.142	0.064	1.500	0.005
SV	1990	2	0.069	0.042	0.070	0.260	0.020

* SJV value with 28 ppbv value excluded

Air Basin	Year	Number of Sites	Air Basin Arithmetic Mean (ppbv)	Standard Deviation (ppbv)	Air Basin Mean of Monthly Means (ppbv)	Air Basin Maximum (ppbv)	Air Basin Minimum (ppbv)
SV	1991	2	0.075	0.043	0.075	0.230	0.020
SV	1992	3	0.063	0.036	0.058	0.180	0.005
SV	1993	3	0.051	0.036	0.051	0.190	0.005
SV	1994	2	0.181	0.974	0.181	7.700	0.005
SV	1995	2	0.053	0.043	0.053	0.210	0.010
SV	1996	2	0.054	0.062	0.054	0.340	0.005

* SJV value with 28 ppbv value excluded

Appendix F

Selection of Specific and Generic Facilities for ISCST3 Modeling

Appendix F. Selection of Specific and Generic Facilities for ISCST3 Modeling

The majority of the modeling performed was done using the SCREEN3 air dispersion model because it is easy to use and allows the consideration of many modeling scenarios in a relatively short period of time. The ISCST3 air dispersion models offers the opportunity to perform a more refined analysis of a facility's potential risk; however, modeling scenarios considered under this model are more resource intensive. As a result, only a limited number of facilities could be selected for modeling using ISCST3. Thirteen specific facilities from the site visits as well as 3 generic facilities that were developed to represent a broad range of facilities statewide, were selected. This appendix outlines how the specific facilities were selected, how the generic facilities were developed, and how representative product formulations for the generic facilities were derived.

A. Selection of the 13 Specific Facilities

The main goal in selecting the 13 specific facilities was to obtain good representation of the five facility types (general automotive, fleets, service stations, dedicated brake shops, and dealerships) defined in the Status Report (ARB, 1997a) in several locations throughout the state with good population densities. In order to conduct this type of analysis, meteorological (met) and census data needs to be available for any selected area; therefore, facilities located in areas without met data or good census information could not be candidates for selection.

Another goal was to select facilities representing five key population areas revealed by the site visits. Those areas are: Sacramento, Los Angeles, the San Francisco Bay Area, San Joaquin Valley, and the North State area. Combined, these regions represent mostly urban areas which is appropriate because the majority of California's population lives in largely urban areas. Additionally, potential residential and business receptors in these areas tend to be located nearby the automotive maintenance and repair facilities.

The site visits showed that 55 facilities were using chlorinated products, all of which were modeled using the SCREEN3 air dispersion model. Thirty-two of these facilities showed potential risks greater than 10 chances per million (based on Perc usage and modeling using SCREEN3). The 10 chances per million level was selected because it is a common public risk notification level used in many local air districts; it should not be construed as any sort of regulatory guideline. Since public health protection is a major concern, the higher risk facilities were selected as candidates for ISCST3 modeling so long as the above criteria was able to be satisfied. As a result, facilities with lower risk values were selected in some cases to ensure that all the facility types and the five population areas were represented. Using these criteria, 13 specific facilities were selected. Table F-1 summarizes the five regions, the selected met sets for each region, and the represented facility types.

Table F-1. Met Data Sets and Facility Types per Region

Geographic Region	Met Data Sets	Facility Types
Los Angeles	Anaheim 1981 Burbank 1958-62 LAX 1985-89	General Automotive
North State	Redding 1987-89	General Automotive
Sacramento	Sac Exec 1987, 1989-92 Mather AFB 1953-57 McClellan AFB 1953-57	Brake Shop Fleet
San Francisco Bay Area	Concord 1991-96 Oakland 1960-64	General Automotive
San Joaquin Valley	Fresno 1985-89	Dealership Service Station

B. Development of the 3 Generic Facilities

The purpose of developing the 3 generic facilities was to provide a mechanism for estimating potential health impacts for all facilities statewide, including facilities located in areas where met data is not available. The basis for the generic facilities came from the 137 site visits, the statewide survey of automotive maintenance and repair facilities, as well as follow-up visits and telephone calls used to verify collected information. Using this information, the universe of facilities was separated into three representative groups: generic facility G-01 (small), generic facility G-02 (medium), and generic facility G-03 (large).

The site visit data was analyzed to determine the source characteristics of the generic facilities. Several approaches were considered including averaging the facility volumes over a specified range and focusing on the smaller facility volumes. These approaches were rejected because they would have either underestimated or overestimated potential health impacts. The data revealed that product usage was not related to facility size which means that both low and high usage rates can be found at small and large facilities. Additionally, a comparison of the facility volumes showed gaps that naturally separated the facilities into five groupings or facility size ranges. The very smallest group and largest group of facilities were excluded to avoid unnecessarily underestimating or overestimating potential health impacts. This approach created a rough cut of facility sizes for each generic facility.

Due to the limited availability of modeling resources, one representative building size needed to be selected for each of the three facility size ranges. Before selecting the discrete building size, however, the number of brake jobs that were being performed in each facility size

range was examined (note: a typical brake job can consist of either one-axle or two-axle jobs). The data showed that the overall number of brake jobs ranged from 1 to 160 jobs per week and that facilities doing more brake work (and therefore using more chlorinated product) populated all three size ranges. An interesting observation was that the facility with the greatest number of brake jobs was at the lower end of each size range (in terms of facility volume) which indicates that facilities at the higher end of the size range would most likely be able to handle the same throughput. It also means that setting the building size for each generic facility at the lower end of the range would not overestimate potential health impacts. As a result, the building dimensions were set at the lower end of each facility size range. The throughput of brake jobs was then set to approximate the throughput at the lower end facilities. While the throughput of brake jobs for these facilities is higher than others in the range, it creates a health-protective facility that can effectively handle the variations in usage rates. It also allows for the capture of product use on other activities and, therefore, is a more realistic model of total product usage that minimizes the frequency that a generic facility would underestimate potential health impacts. Table F-2 summarizes what had been developed at this point.

Table F-2. Proposed Generic Facilities

Facility	Facility Size Range (by volume)	Proposed Representative Volume	Number of Brake Jobs at Proposed Volume [per week]
G-01	453 m^3 to 2140 m^3	453 m^3	18
G-02	2230 m^3 to 8494 m^3	2230 m^3	58
G-03	9241 m^3 to 37167 m^3	10157 m^3	54

Now that the generic facilities had been roughly identified, several quality control checks were employed to verify that the building dimensions and throughput of brake jobs were set properly and could adequately characterize automotive service and repair facilities statewide. Sales by facility size and number of service bays reported in the May 1996 Brake & Front End Brake Repair Survey (MarketScope, 1996) were compared to site visit data to check for consistency. This check underscores that the facility size ranges for the generic facilities are consistent with trends that have been observed nationwide. Additionally, the number of bays that were dedicated to brake work were compared with site visit data to determine if they were consistent with the generic volumes and reported number of jobs per week. This comparison was necessary to minimize the possibility that a generic facility would assume that a facility would be doing more work than it was physically capable of doing. Finally, a random selection of respondents to the Automotive Service Facility Questionnaire (Facility Survey) were polled to verify the accuracy of the reported data (a copy of the survey form can be found in Appendix B). Additional site visits were then made to several of these facilities to obtain source characteristic information. The information obtained from these additional site visits confirmed that the

building dimensions and throughput of brake jobs for the generic facilities was reasonable.

In order to gain an idea of the statewide representativeness of the generic facilities, the sales/service bay distribution reported in the May 1996 Brake & Front End Brake Repair Survey (MarketScope, 1996) and the distribution of the number of service bays per facility reported in the Norton study (Norton, 1993) was compared to the ARB data. With this information, it was estimated that generic facility G-01 represents approximately 37% of California automotive service facilities, G-02 represents approximately 43%, and G-03 represents approximately 20%. Table F-2 summarizes the generic facility characteristics that were used in the modeling scenarios under ISCST3. A summary of the generic facility modeling results, including modeling input parameters and assumptions, are presented in Appendix D.

Table F-3. Summary of Generic Facility Characteristics

Facility	Brake Job Range [per week]	Facility Volume [m^3]	Height [m]	Length [m]	Width [m]	Number of Brake Jobs [per week]	Represented Facility Types
G-01	1 to 75	453	4.9	12.2	7.6	20	Brake Shop Dealership General Automotive Service Station
G-02	1 to 115	2230	7.6	21.3	13.7	60	Brake Shop Dealership Fleet General Automotive Service Station
G-03	1 to 160	10157	7.6	62.5	21.3	60	Dealership Fleet General Automotive

C. Development of Perc, MeCl, and TCE Usage Rates in Brake Cleaners, Carburetor Cleaners, Engine Degreasers, and General Degreasers

An important observation made during the site visits was that products labeled as brake cleaners, carburetor cleaners, engine degreasers, and general degreasers were often used on a variety of tasks. For example, several facilities reported using aerosol brake cleaning products to do engine degreasing work while others used general degreasers to clean brake parts. Many technicians indicated that this cross usage occurs because the products in each of these categories are designed to remove grime, grease, oil and dirt and, therefore, are suitable for tasks for which they may not be labeled.

Since products from these categories represent a varying range of compositions with regard to Perc, MeCl, and TCE, each category was separated into representative formulations based on available data. The data sources for this exercise where the Facility Survey and the 1997 Consumer and Commercial Products Survey. The Facility Survey provided information on product usage rates and was used to estimate the average cans per week of product usage in each category. Formulation information was also extracted from this database. The 1997 Consumer and Commercial Products Survey also contained formulation information as well as sales information. The sales information was used to weight the relative contributions of the formulations into one composite. The site visits also provided usage and formulation information on brake cleaning products.

In order to simplify the presentation of data associated with this task, the contributions to total generic facility risk from carburetor cleaners, engine degreasers, and general degreasers is combined into two health impact estimates for each generic facility: one estimate for default meteorology and another which is the average of the health impacts for the 10 specific met locations. Since more information was available for brake cleaners than the other three categories, the representative formulations derived for this category are used discretely for each met set including the default. A summary of the representative product formulations used is presented in Table F-4.

Table F-4. Representative Product Formulations Used in Generic Facility Modeling

Product Category			
Brake Cleaners	**Carburetor Cleaners**	**Engine Degreasers**	**General Degreasers**
<u>All met locations:</u> ➜ 94% Perc ➜ 65% Perc <u>Four met locations[1]:</u> ➜ 55% Perc, 25% MeCl ➜ 40% Perc, 30% MeCl, 20% TCE ➜ 55% Perc, 43% TCE	Single composite based on[2]: ➜ 68% Perc ➜ 57% MeCl	Single composite based on[2]: ➜ 47% Perc ➜ 99% TCE	Single composite based on[2]: ➜ 24% Perc ➜ 41% Perc, 55% MeCl ➜ 46% MeCl ➜ 97% TCE

1. Burbank, Anaheim, Oakland and default met for chronic effects; Fresno, Concord, Mather, and default met for acute effects.
2. Composite is based on average of 10 met sets. Default meteorology is considered independently.

In order to estimate the total health impacts (or some desired subset) at a generic facility, the individual contributions must be added. For example, let's assume that we are looking at generic facility G-01 located in the Burbank, California area where a 94% Perc brake product is being used. Let's assume further that this facility also uses products from the other three product categories and that we are interested in estimating potential health impacts at 20 meters from the center of the facility. Using Appendix D, we would look up the corresponding health impact values. Table F-5 summarizes the calculation method and provides give the results.

Table F-5. Facility G-01 Health Impacts at Burbank at 20 Meters Using a 94% Perc Aerosol Brake Cleaning Product and other Automotive Consumer Products

Product Category	Potential Cancer Risk [chances per million]		Hazard Index	
	Resident	Worker	Acute	Chronic
94% Perc Brake Cleaner[1]	47.41	20.18	0.0727	0.2296
Carburetor Cleaner	0.74	0.32	0.0164	0.0017
Engine Degreaser	2.19	0.93	0.0109	0.0061
General Purpose Degreaser	1.37	0.58	0.0040	0.0017
Total Impacts:	**51.71**	**22.01**	**0.1040**	**0.2391**

1. These health values assume a 20 brake job per week throughput and 1 19-oz can per job used. Please see Appendix D for more information.

If we consider the same example but instead assume that a multicomponent brake cleaning product containing 55% Perc and 25% MeCl is being used, Table F-6 would then summarize the calculation method and provide the results for this scenario.

Table F-6. Facility G-01 Health Impacts at Burbank at 20 Meters Using a Multicomponent Aerosol Brake Cleaning Product and other Automotive Consumer Products

Product Category	Potential Cancer Risk [chances per million]		Hazard Index	
	Resident	Worker	Acute	Chronic
55% Perc, 25% MeCl Brake Cleaner[1]	29.87	12.71	0.0701	0.2303
Carburetor Cleaner	0.74	0.32	0.0164	0.0017
Engine Degreaser	2.19	0.93	0.0109	0.0061
General Purpose Degreaser	1.37	0.58	0.0040	0.0017
Total Impacts:	**34.17**	**14.54**	**0.1014**	**0.2398**

1. These health values assume a 20 brake job per week throughput and 1 19-oz can per job used. Please see Appendix D for more information.

Using these examples as a guideline in conjunction with the data in Appendix D, the total potential health impacts at a generic facility under a variety of conditions can be estimated.

It is expected that the usage estimates for carburetor cleaners, engine degreasers, and general degreasers underestimate their contribution to the overall risk. This expectation is based on the limited data available with regard to product usage rates in these categories. Due to this limitation, usage rates were capped at three and one-third (3⅓)14-ounce cans per week for carburetor cleaners, three 18-ounce cans per week for engine degreasers, and three 16-ounce cans for general degreasers. These amounts are the average usage rates for each category found in the Facility Survey supported by sales data in the 1997 Consumer and Commercial Products Survey. While it seems reasonable that these products would most likely be used at a greater rate than indicated here, the ARB currently does not possess sufficient data to justify higher usage rates. As a result, potential health impacts from these three categories may be underestimated by an unknown degree.

REFERENCES FOR APPENDIX F

ARB, 1997a. Perchloroethylene Need Assessment for Automotive Consumer Products: Status Report, California Air Resources Board, June 1997.

MarketScope, 1996. "1996 Brake Repair Study", prepared by MarketScope for Brake and Front End Magazine, May 1996.

Norton, 1993. "Usage of Chemical Brake Cleaners in Automotive Repair Facilities", John Norton, School of Business Administration, George Mason University, Fairfax, VA, November 8, 1993.

Appendix G

Compounds in Products

Appendix G. Compounds in Products

The compounds listed in Table H-1 were compiled from material safety data sheets of brake cleaners, carburetor and air intake cleaners, engine degreasers and general purpose degreasers that are currently being used in California or were stated as being used in responses to the Automotive Service Facility Questionnaire (Automotive Survey).

Table G-1. Compounds Currently Found In Automotive Consumer Products

COMPOUND NAME	CAS No.[1]	VOC [2]	TAC [3]	Candidate TAC [4]	URF [5]	AREL [6]	CREL [7]
Acetone	67641						
Aliphatic Petroleum Distillates (Petroleum Naphtha)	64742898	Yes					
Ammonia	7664417			Yes		3.20e+03	1.00e+02
Aromatic Solvent (petroleum)	68477316	Yes					
Benzene	71432	Yes	Yes		2.90e-05	1.30e+03	7.10e+01
Butane	106978	Yes					
Butanol	78922	Yes		Yes			
2-Butoxyethanol (EGBE; Ethylene Glycol Monobutyl Ether)	111762	Yes				1.40e+04	2.00e+01
1,2 Butylene Oxide (inhibitor) (1,2 Epoxybutane)	106887	Yes	Yes				2.00e+01
Carbon Dioxide	124389						
2-Chlorotoluene	95498	Yes					
Cyclohexane	110827	Yes		Yes			
Diacetone Alcohol	123422	Yes					
Diesel no. 2	68476346	Yes					
Diethylene Glycol Mono-Butyl Ether	112345	Yes					
Dimethoxymethane (inhibitor)	109875	Yes					
1,3-Dioxolane	646060	Yes					
Dipentane	68956569	Yes					
Dipropylene Glycol Methyl Ether	34590948	Yes					

Table G-1. Compounds Currently Found In Automotive Consumer Products (cont.)

COMPOUND NAME	CAS No.[1]	VOC [2]	TAC [3]	Candidate TAC [4]	URF [5]	AREL [6]	CREL [7]
2-Ethanol-1,3-Hexanediol	94962	Yes					
Ethoxylated Alkyl Amine Nonionic Surfactant	9036195	Yes					
Ethyl Acetate	141786	Yes					
Ethyl Benzene	100414	Yes	Yes				1.00e+03
Heavy Aromatic Solvent Naptha	64742945	Yes					
Heptane	142825	Yes					
Hexane	110543	Yes	Yes				2.00e+02
Hydrocarbon Propellant A-46 (Propane/ Isobutane)	68476868	Yes					
Hydrocarbon Propellant A-85	684768857	Yes					
Hydrotreated Heavy Naphtha	64742489	Yes					
Hydrotreated Heavy Paraffinic Distillate (Petroleum)	64742547	Yes					
Hydrotreated Light Petroleum Distillates	64742478	Yes					
Isobutane	75285	Yes					
Isohexane	107835	Yes					
Isopropyl Alcohol	67630	Yes		Yes		3.20e+03	
Kerosene (fuel oil #1)	8008206	Yes					
Light Aromatic Solvent Naphtha	64742956	Yes					
d-Limonene	5989275	Yes					
Medium Aliphatic Solvent Naphtha	64742887	Yes					
Methanol	67561	Yes	Yes			2.80e+04	6.20e+02
Methyl Chloroform (1,1,1-Trichloroethane)	71556		Yes			6.80e+04	3.20e+02
Methyl Ethyl Ketone (2-Butanone)	78933	Yes	Yes			1.30e+04	1.00e+03
Methyl Isobutyl Ketone	108101	Yes	Yes				

Table G-1. Compounds Currently Found In Automotive Consumer Products (cont.)

COMPOUND NAME	CAS No.[1]	VOC[2]	TAC[3]	Candidate TAC[4]	URF[5]	AREL[6]	CREL[7]
4-Methyl-2-Pentanol (Methyl Amyl Alcohol)	108112	Yes					
n-Methyl Pyrrolidone	872504	Yes					
Methylene Chloride	75092		Yes		1.00e-06	1.40e+04	3.00e+03
Mineral Oil	8012951	Yes					
Mineral Spirits; Stoddard Solv.; Petroleum Distillates	8052413	Yes					
Monochlorotoluene	25168052	Yes					
Monoethanolamine	141435	Yes					
Monoisopropylbiphenols	25640782	Yes					
Morpholine	110918	Yes					
Naphtha (Benzin)	8030306	Yes					
Naphthalene	91203	Yes	Yes				1.40e+01
Nonane	111842	Yes					
Nonionic Surfactant NP4/NP9 (p-Nonylphenol Polyethylene Glycol Ether)	26027383	Yes					
9-Octadecenoic Acid (2)-Ammonium Salt	544605	Yes					
Octylphenolpolyethoxylate	9004879	Yes					
Oleic Acid	112801	Yes					
Perchloroethylene	127184		Yes		5.90e-06	2.00e+04	3.50e+01
Petroleum Products Liquified Gas Sweetened	68476868	Yes					
Primary Alcohol Ethoxylate	68131395	Yes					
Propane	74986	Yes					
Propane/ Isobutane/ n-Butane	68476857	Yes					
2-Propanol Titanate	546689	Yes					
Propylene Glycol	5131668	Yes					

Table G-1. Compounds Currently Found In Automotive Consumer Products (cont.)

COMPOUND NAME	CAS No.[1]	VOC [2]	TAC [3]	Candidate TAC [4]	URF [5]	AREL [6]	CREL [7]
Propylene Glycol Monomethyl Ether (Glycol Ether)	107982	Yes					2.00e+03
Propylene Glycol T-Butyl Ether	57018527	Yes					
Sodium Benzoate	532321						
Sodium Metasilicate	10213793						
Tergitol np-40 (Nonylphenoxypoly(ethylene oxy)ethanol)	9016459	Yes					
tert-Butyl Alcohol (inhibitor)	75650	Yes		Yes			
Tetrapotassium Pyrophosphate	7320345						
Toluene	108883	Yes	Yes			3.70e+04	4.00e+02
Trichloroethylene	79016	Yes	Yes		2.00e-06		6.40e+02
1,2,4 Trimethylbezene	95636	Yes		Yes			
Trimethylbenzene	25551137	Yes					
Water	7732185						
Xylene	1330207	Yes	Yes			2.20e+04	3.00e+02

1. Chemical Abstract Service (CAS) number.
2. Volatile Organic Compound as defined in the Glossary (Appendix I).
3. Substances identified as Toxic Air Contaminants by the Air Resources Board, pursuant to the provisions of AB 1807 and AB 2728, including hazardous air pollutants listed in the Federal Clean Air Act Amendments of 1990 (ARB, 1996).
4. Substances which are being evaluated for review as a Toxic Air Contaminant (ARB, 1996).
5. AB 2588 Hot Spots Unit Risk and Cancer Potency Values (OEHHA, 1999b).
6. Acute Reference Exposure Levels (RELs) (OEHHA, 1999a).
7. Noncancer Reference Exposure Levels (Chronic) (CAPCOA, 1993).

REFERENCES FOR APPENDIX G

ARB, 1996. "Toxic Air Contaminant Identification List." California Air Resources Board. June 1996.

OEHHA, 1999a. Part I The Determination of Acute Reference Exposure Levels for Airborne Toxicants, Office of Environmental Health Hazard Assessment (OEHHA), March 1999.

OEHHA, 1999b. Part II Technical Support Document for Describing Available Cancer Potency Factors, Office of Environmental Health Hazard Assessment (OEHHA), April 1999.

CAPCOA, 1993. CAPCOA Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines, Toxics Committee of the California Air Pollution Control Officers Association (CAPCOA), October 1993.

U.S. EPA, 1996. Integrated Risk Information System (IRIS), United States Environmental Protection Agency (U.S. EPA), Washington , D.C., 1996.

Appendix H

Examples of Manufacturer Efficacy Claims for Non-Chlorinated Products

Note: mention of trade names or commercial products does not constitute endorsement or recommendation for use.

553

Berryman Products, Inc. Since 1918

Products

Brake Maintenance

BRAKE CLEANER

Effectively removes brake fluid, grease, oil and other contaminants from all brake parts including brake linings, disc brake pads, drums, cylinders, springs and other related brake parts. Non-flammable, quick drying formula which leaves no residue.

Sizes Available:

Part #1401	**1 Gal. Can**
Part #1405	**5 Gal. Can**
Part #1420	**20 Oz. Aerosol**
Part #1425	**25 Oz. Aerosol PROFESSIONAL**
Part #1455	**55 Gal. Drum**

Material Safety Data Sheet - MS Word Format - HTML Page

Line Art Image

BRAKE CLEANER (Non-Chlorinated)

Specially formulated ro clean as well as chlorinated brake cleaners without the chlorinated solvents. Tackles the toughest oil, brake fluid, grease and grime deposits. Dries quickly leaving no residue.

Sizes Available:

Part #2401	**1 Gal. Can**
Part #2405	**5 Gal. Can**
Part #2407	**5 Gal. Can / Heptane Formula**
Part #2414	**14 Oz. Aerosol / Heptane Formula**
Part #2419	**19 Oz. Aerosol / Heptane Formula / PROFESSIONAL**
Part #2420	**14 Oz. Aerosol**
Part #2421	**19 Oz. Aerosol / PROFESSIONAL**
Part #2455	**55 Gal. Drum**

Material Safety Data Sheet - MS Word Format - HTML Page

Line Art Image

554

AIR BRAKE ANTIFREEZE AND CONDITIONER

Complete winter protection for air brake systems. Eliminates the risk of cold weather airline problems and freeze-ups. Inhibits corrosion and prevents buildup on critical air valves and air strainers. Compatible with all alcohol evaporative air brake, air induction, supercharged and turbocharged systems.

Sizes Available:

Part #2301	**1 Gal. Can**
Part #2305	**5 Oz. Pour Can**
Part #2332	**32 Oz. Pour Can**
Part #2355	**55 Gal. Drum**

Back to Product Index

Berryman PRODUCTS, INC. Products

Parts Cleaners

CHEM-DIP® COLD PARTS CLEANERS

Fast acting immersion cleaner for all metal parts including alloys. Non-corrosive to metal and requires no agitation. Has a chemical seal to retard evaporation and to aid in emulsification. Removes carbon, varnish, paint, sludge and grease fast. Use for cleaning transmissions, carburetors, valves and other hard to clean parts.

Sizes Available:

Part #0901	**1 Gal. Can (Replenisher)**
Part #0902	**1 Gal. w/basket PROFESSIONAL**
Part #0905	**5 Gal. Net Pail PROFESSIONAL**
Part #0996	**3/4 Gal. w/basket**
Part #0950	**Basket for #0905**

Material Safety Data Sheet - MS Word Format - HTML Page

Line Art Image

B-33® ENGINE DEGREASER

Emulsifies road grime, dirt and grease so that they may be rinsed off in an approved facility. Contains no chlorinated solvents and contains less than 50% V.O.C.'s by weight. Excellent for cleaning engines, small engine parts, lawn mowers, hand tools, machinery, fleet, farm and marine equipment.

Part #1116 **16 Oz. Aerosol**

Material Safety Data Sheet - MS Word Format - HTML Page

Line Art Image

556

ELECTRONIC CLEANER

Ideal for cleaning and degreasing printed circuits, switches, relays, rheostats, contact points and diagnostic test equipment. Removes lint, oil and dust from tape heads, tuners, VCR's and other electronic equipment. To clean electrical motors or components including armatures, windings and brushes see Electric Motor Cleaner Part #1520 above.

Part #2206 **4.5 Oz. Aerosol**

Material Safety Data Sheet - MS Word Format - HTML Page

Line Art Image

SURE SHOT SPRAYERS

Provides a uniform spray using Berryman's bulk size cleaners. These sprayers use shop air as the propellant. Refillable and Rechargeable.

Sizes Available:

Part #0960	**16 Oz. Stainless Steel Atomizer**
Part #0961	**16 Oz. Aluminum Plated Atomizer**
Part #0970	**1 Qt. Chrome Plated Brass Atomizer**
Part #0971	**1 Qt. Painted Steel Sprayer**

Line Art Image

Back to Product Index

Products

Carburetor Cleaners

B-12 CHEMTOOL® CARBURETOR AND CHOKE CLEANER / AEROSOL

Quickly dissolves gum and varnish from the carburetor, PCV valve, automatic choke, carburetor linkage and distributor shaft with high energy solvent technology (H.E.S.T.). Improves driveablility by removing deposits that cause rough idle and stalling.

Sizes Available:

Part #0113	**13 Oz. Aerosol w/spray anyway valve**
Part #0117	**16.25 Oz. Aerosol w/spray anyway valve**
Part #0120	**20 Oz. Aerosol PROFESSIONAL**

Large capacity can provide extended use with new spray any way valve to reach those difficult components.

Part #0152	**5.2 Oz. Aerosol**
Part #1110	**9 Oz. Aerosol**

Material Safety Data Sheet - MS Word Format - HTML Page

Line Art Image

B-12 CHEMTOOL® CARBURETOR CLEANER / POUR IN

Cleans petroleum residue and disperses moisture from the fuel system, fuel injector, valves, rings, pistons, oil returns, lifters, PCV valve and oil pump screen with high energy solvent technology (H.E.S.T.). Regular use insures higher compression, fewer repairs, lower operation costs, increased spark plug and injector life.

Sizes Available:

Part #0101	**1 Gal. Can**
Part #0105	**5 Gal. Can**
Part #0116	**16 Oz. Pour Can**
Part #0155	**55 Gal. Drum**
Part #0216	**16 Oz. Squirt Can**

Material Safety Data Sheet - MS Word Format - HTML Page

PRODUCT INFORMATION

NON CHLORINATED BRAKE CLEANER
(AEROSOL)

CODE: **M7-15**

PAGE: **1 of 1**

DATE: **September, 99**

FUNCTION AND APPLICATION: Quickly dissolves and flushes away surface contaminants such as brake fluid, oil, and grease from brake linings, drums, other brake parts and CV joint assemblies. It cleans instantly and can be applied without disassembling the brake unit

OUTSTANDING PROPERTIES: Leaves no residue and helps stop disc brakes squeal and "chatter". Helps retard the release of asbestos dust and other airborne particulate matter. Use SOLDER SEAL® GUNK® BRAKE CLEANER on: conventional brake units, linings and shoes, drums, cylinders, springs, disc brake units C.V. joints, caliper units, brake pads, discs, and related parts. Contains no chlorinated solvents.

USE DIRECTIONS: Protect rubber or plastic brake parts, seals, and painted surfaces from spray. First turn engine off then lightly wet down surfaces to be cleaned by spraying in short bursts from a distance of 18 to 24 inches. **Do not spray on hot metal surfaces like exhaust pipes.** After the surfaces have been wetted, continue spraying at a distance of 12 to 18 inches to flush contaminants from surfaces. Spray brake parts thoroughly, then allow to air dry or wipe with soft clean cloth. If deposits are heavy, repeat application.

PRODUCT LIMITATIONS: **This product will attack painted surfaces and plastic. If sprayed on, do not rub surfaces, flush with water immediately.**

PRECAUTIONS: Contains Xylene (CAS# 1330-20-7), heptane (CAS# 142-82-5), acetone (CAS# 67-64-1), phenyl ethane (CAS#100-41-4) and Carbon Dioxide (CAS# 124-38-9). Contents under pressure. Use only in well-ventilated area away from heat, sparks, and flame. Pilot lights of furnaces, hot water tanks or even static electricity can ignite vapors explosively. Do not breathe asbestos, dust particles, or vapors. Use only in a well-ventilated area, open doors and windows to prevent vapor build up. NIOSH approved respirator recommended; may be required for professional users; consult MSDS for exposure

FIRST AID: For EYE contact: Flush thoroughly with water for 15 minutes lifting upper and lower eyelids occasionally. If irritation persists, consult a physician. For SKIN contact: Wash thoroughly with soap and water. IF SWALLOWED, CALL PHYSICIAN IMMEDIATELY: DO NOT INDUCE VOMITING. Aspiration into lungs can cause chemical pneumonitis, which can be fatal. Never give anything by mouth to an unconscious person. If INHALED, remove to fresh air, give artificial respiration or administer oxygen. Get medical attention.

STORAGE AND HANDLING: Store in a cool, dry, well ventilated area. Do not puncture, crush or incinerate (burn) can. KEEP AWAY FROM CHILDREN.

DISPOSAL: Disposal of product runoff in water courses, sewers, or on the ground is prohibited. Proper disposal includes collecting and recycling. Always use and dispose of product, container, and residue in accordance with all local, state and federal laws and regulations. Emptied containers contain product residue, so follow all warnings even after container is emptied.

CONTAINER DESCRIPTION: This product is available in 15 oz (425g) aerosol container.

Radiator Specialty Company
P.O. BOX 34689 / CHARLOTTE, N.C. 28234 / TELEPHONE 704-377-6555

NOTICE: WHILE THIS INFORMATION IS PRESENTED IN GOOD FAITH AND BELIEVED TO BE ACCURATE, RADIATOR SPECIALTY COMPANY DOES NOT GUARANTEE SATISFACTORY RESULTS FROM RELIANCE THEREON. THE DATA IS OFFERED SOLELY FOR YOUR INFORMATION AND RADIATOR SPECIALTY COMPANY DISCLAIMS ALL LIABILITY FOR ANY LOSS OR DAMAGE FROM ITS USE. THOROUGHLY TEST ANY APPLICATION ACCORDING TO THE PRODUCT DIRECTIONS AND INDEPENDENTLY CONCLUDE SATISFACTORY PERFORMANCE. NOTHING CONTAINED HEREIN IS TO BE CONSTRUED AS A RECOMMENDATION TO USE THE PRODUCT IN VIOLATION OF ANY PATENT.

1997 Radiator Specialty Company

Johnsen's Ultimate Fuel System Cleaner

Johnsen's Ultimate Fuel System Cleaner eliminates the need to purchase different additives and cleaners. It does everything you need to keep your fuel system clean, including injectors, intake valves, combustion chamber and entire emission system. Johnsen's Ultimate Fuel System Cleaner also helps eliminate knock and ping associated with low octane fuels and helps to remove moisture in the fuel system. Johnsen's Ultimate Fuel System Cleaner comes in 16 fluid oz. bottles. Just pour it in your gas tank. Available in twelve each, pre-packed counter top display (#4675) or forty-eight each floor-side stack display (#4675S). Feel the difference or your money back, guaranteed!

Brake Parts Cleaner

Part No. 2420 - 18 oz., 12 per case
Removes brake fluid, grease, oil and other contaminants from brake parts and drums quickly and easily. Stops disc brake squeal. Large 20 oz. pressurized can.

Non-Chlorinated Brake Parts Cleaner

Part No. 2413 - 15 oz., 12 per case
Part No. 2415 - 5 Gal., one each

Non-ozone depleting and non-carcinogen brake parts cleaner works effectively and dries fast. High power spray.

562

Engine Degreaser

Part No. 4644 - 16 oz., 12 per case
A premium degreaser which is self emulsifying. Two active ingredients mix with both oil and water. When sprayed on and washed off, the water actually pulls oil and grease off the surface of the engine. Johnsen's Engine Degreaser also contains a grease cutter to loosen heavier build-ups. A special stream nozzle allows the user to direct the flow exactly where it is needed.

Carburetor Cleaner

Part No. 4642 - 15 oz., 12 per case
Removes varnish, sludge and other deposits from carburetor, linkage, PCV valves and automatic choke. Will not affect oxygen sensor.

Engine Flush

Part No. 4608 - 32oz, 12 per case
Part No. 4609 - Qt, 12 per case

A premium crankcase cleaner. While some products are only a solvent, Johnsen's Engine Flush also contains a special residue solubilizer and a hight quality oil. Use prior to changing oil.

CRC Industries, Inc.

Product Information Sheet

Product Name: BRAKE PARTS CLEANER (NON-CHLORINATED)

Product Description: •Quickly removes brake fluid, grease, oil from brake linings and pads. •Leaves no residue •Degreases instantly •Contains no chlorinated solvents

Product Number	Unit Size	Units Per Case
85A	20 Oz Aerosol	12

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885 Louis Drive, Warminster, PA 18974
Phone: (215) 674-4300 Fax: (215) 674-2196

564

CRC Industries, Inc.

Product Information Sheet

Product Name: CRC BRAKLEEN® BRAKE PARTS CLEANER NON-CHLORINATED

Product Description: Use where compliance calls for a chlorine free product. Quickly removes brake fluid, grease, oil and other contaminants from brake linings and pads. •Cleans fast/Dries fast/No residue •Degreases instantly •Contains no chlorinated solvents

Product Number	Unit Size	Units Per Case
05088	20 Oz Aerosol	12
05085	1 Gal bottle	4
05086	5 Gal bottle	1
05087	55 Gal Dr	1
05150	20 Oz Aerosol	12

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885 Louis Drive, Warminster, PA 18974
Phone: (215) 674-4300 Fax: (215) 674-2196

E-CATALOG

PERMATEX Non-Chlorinated Brake & Parts Cleaner

Permatex® Non-Chlorinated Brake & Parts Cleaner, Penetrates, dissolves and removes dirt and oil from brake systems and metal parts. Safer for aluminum. Leaves no contaminant-attracting residue or chlorinated solvent run-off. Helps manage EPA halide limits. Suggested Applications: All brake systems, C.V. joints, machinery, tools, farm equipment

Product	Description
82220	Non-Chlorinated Brake & Parts Cleaner, 14.75 Oz. Net Wt. Aerosol MSDS

Products/Search • Automotive Cleaners • Aerosol

application assistance. browse catalog. distributor locator. datasheets. whats new
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Automotive Aerosol Products

BG 402 Brake & Contact Cleaner Part No. 402

Improves efficiency of braking systems, aids in elimination of brake squeal and chatter. Fast-acting solvents quickly remove brake fluid, grease, oil, moisture and other residue from both drum and disc type assemblies. Cleans and dries distributor parts, spark plugs, magnetos, electrical contacts and relays.
Net Wt. 19.75 oz. (560 grams) Volume 12.58 fl. oz.

BG 403 Non-Chlorinated Brake Cleaner Part No. 403

Safely, effectively, rapidly degreases brake linings, drums, cylinders, springs, disc brake pads and other brake parts. Easy to use-applied without disassembling the brake unit. Contains no chlorofluorocarbons.
Net Wt. 15 oz. (347.3 grams) Volume 18.16 fl. oz.

BG Air Intake System Cleaner Part No. 406

Safely and rapidly removes accumulated deposits from the butterfly/throttle valve, throttle body and idle air control valves of the air induction system. Contains lubricants and anti-corrosion ingredients. Safe on oxygen sensors and catalytic converters.
Net Wt. 14.75 oz. (600 ml) Volume 19.9 fl. oz.

BG Inject-A-Flush® Injector Cleaner Part No. 408

Used with the BG Inject-A-Flush® Apparatus (PN 908). Quickly and safely cleans the fuel injection system without removing injectors. In minutes, accumulated gums and oxidized fuel residues are dissolved and removed from the system.
Net Wt. 12 oz. (340 grams) Volume 13.8 fl. oz.

BG Carb and Choke Cleaner Part No. 411
BG Hi-Delivery Carb & Choke Cleaner Part No. 412

Both products contain a special blend of solvent fluids that remove harmful carbon, gum and varnish deposits. Cleans carburetors, automatic chokes, PCV valves and lines, and manifold heat control valves. Oxygen sensor safe. Contains no lead, silicone or phosphorus. Special Hi-Delivery spray system (PN 412 only) provides extra pressure to remove deposits.
Net Wt. 15.75 oz. (446 grams) Volume 19.44 fl. oz.

568

BG Silicone Lubricant Part No. 416
Penetrates surface pores and remains fluid without thickening or evaporating through aging. Prevents almost anything from sticking. Extremely long lasting with a wide temperature range.
Net Wt. 12.75 oz. (361 grams) Volume 19.41 fl. oz.

BG Engine Degreaser Part No. 417
Removes grease, oil and dirt from all types of combustion engines, generator engines, industrial machinery, driveways and other applications. Safe on paint, rubber wiring and insulation.
Net Wt. 15.75 oz. (447 grams) Volume 19.99 fl. oz.

BG Fre-It Part No. 435
Seals out and displaces moisture to stop squeaks and improve operation of moving parts, for hundreds of automotive and household uses. Will not harm paints, plastics or rubber. Actuator and 360° valve permit application from any angle in a stream or fine mist.
Net Wt. 11.75 oz. (333 grams) Volume 15.74 fl. oz.

BG In-Force Part No. 438
An ion-activated penetrating oil which stops rust, and lubricates and frees rusted parts. It can also be used in assembly applications. When bonded to metal, it forms a protective coating and lubricating surface which is enhanced by other lubricants and corrosion inhibitors.
Net Wt. 15.75 oz. (446 grams) Volume 20.14 fl. oz.

BG Windshield Defrost'r Part No. 458
Quickly and effectively melts frost and frozen snow on windshields, other glass surfaces and locks. Operates even at -20°F. Will not harm car finishes when used as directed.
Net Wt. 18 oz. (511 grams) Volume 17.59 fl. oz.

BG Glass Cleaner Part No. 460
Cuts through the most stubborn residues such as road film oil, road salt, grease, paint over-spray and bugs. Cleans and brightens all glass surfaces. Won't streak or leave a rainbow. Does not contain silicone.
Net Wt. 18.75 oz. (531 grams) Volume 19.47 fl. oz.

BG Carpet & Upholstery Cleaner Part No. 462
Excellent cleaner, lifts stubborn soil and grime from carpets, rugs, velours and other upholstery materials found in today's automobiles and other vehicles. Does not contain dangerous caustics or abrasives that encourage deterioration.
Net Wt. 14.75 oz. (418 grams) Volume 15.28 fl. oz.

BG White Lithium Grease Part No. 480
Lithium-based lubricant in convenient aerosol container for easy application on hard-to-reach areas. Protects against water and oxidation problems. Outstanding automotive body parts lubricant for door hinges, locks, seat tracks, manual window regulators.
Net Wt. 11.5 oz. (326 grams) Volume 15.91 fl. oz.

BG Battery Cleaner - Acid Detector Part No. 485

Foaming cleaner to remove the power-sapping corrosives that rob battery of power and shorten battery life. Unique acid detecting ingredient turns red in the presence of acid to warn of the need for additional cleaning; also indicates presence of a crack or leak around terminal.
Net Wt. 14 oz. (397 grams) Volume 14.19 fl. oz.

BG Chain Lube Part No. 495

Developed specially for roller chain lubrication; recommended for all applications where an adhesive oil lubricant is needed. Contains moly for added lubrication. Foams on-no messy overspray, resistant to water washout. Highly adhesive to metal surfaces. Lubricates well in extremes of heat and cold. Stays put under friction and heat.
Net Wt. 15 oz. (425 grams) Volume 13.44 fl. oz.

BG All Coat Part No. 497

Tough, adhesive lubricant formulated to protect and lubricate under extreme conditions. Excellent anti-wear properties. Especially effective where resistance to steam, water, dirt and corrosion is a requirement.
Net Wt. 14.25 oz. (404 grams) Volume 15.34 fl. oz.

BG HCF Lubricant Part No. 498

All-purpose spray lubricant. Unbelievably tough and stays where you need lubrication in temperatures as high as 550°F. Under water, it stays where it's exposed to harsh chemicals and in salt water environments. Superior under heavy loads. Highly effective rust protector. Excellent chain lubricant.
Net Wt. 16 oz. (453 grams) Volume 13.8 fl. oz.

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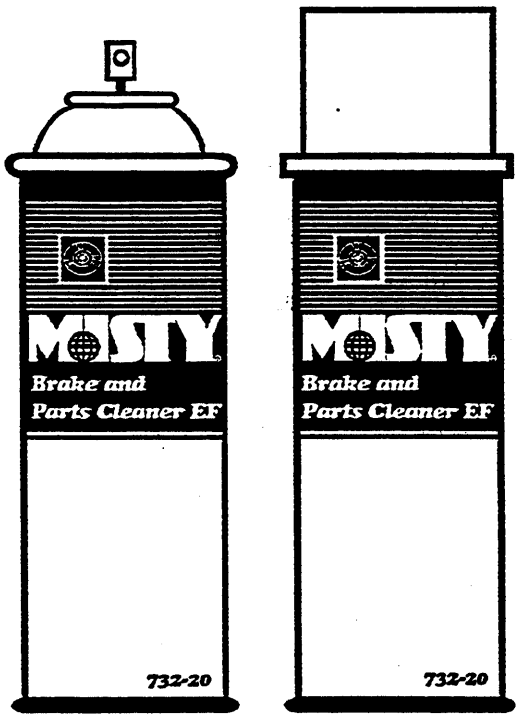
PRODUCT BULLETIN

732-20
BRAKE & PARTS CLEANER EF



- *Blasts Away Deposits*
- *No Chlorinated or Fluorinated Solvents*
- *No Fouled Waste Oil*
- *Removes Brake Fluid, Grease and Oil*
- *Contains No Lead, Phosphorous or Silicone*
- *Meets or exceeds California V.O.C. Limits*

DESCRIPTION

This highly concentrated solvent blend provides maximum performance in a brake parts cleaner without the use of ozone depleters or chlorinated solvents. Powerful blasting spray easily removes brake fluid, grease, oily dirt and contaminants from linings, pads and drums, cylinders and springs without disassembling the unit. Also includes extension tubes for hard to reach areas. Will not foul waste oil. Excellent all around metal parts cleaner. This special formulation meets or exceeds the 1/1/97 V.O.C. requirements for California. 20 ounce can.

MARKETS

Any city or county garage or bus barn, car dealer mechanic, fleet operator mechanic, school maintenance man, hospital, nursing home, or any call where there is equipment and a work bench. This product is used heavily as a parts cleaner. Any golf course, park and recreation department where they do a lot of mowing. Any equipment rental company where they have to repair the equipment when it comes back in.

DIRECTIONS

Remove cap and insert extension tube provided into spray tip. Hold can upright and keep tip pointed at red dot on valve cup. Spray brake parts liberally and allow to run off. Air or towel dry with clean, soft wiper. Repeat as necessary.

DISTRIBUTED BY

MADE IN USA BY

amrep inc.

990 Industrial Park Drive
Marietta, GA 30062

PRODUCT BULLETIN

734-20
BRAKE & PARTS CLEANER II

- *Blasts Away Deposits*
- *No Chlorinated or Fluorinated Solvents*
- *No Fouled Waste Oil*
- *Removes Brake Fluid, Grease and Oil*
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DIRECTIONS

Remove cap and insert extension tube provided into spray tip. Hold can upright and keep tip pointed at red dot on valve cup. Spray brake parts liberally and allow to run off. Air or towel dry with clean, soft wiper. Repeat as necessary. Protect rubber and plastic parts from spray.

DISTRIBUTED BY

MADE IN USA BY

amrep INC.

990 Industrial Park Drive
Marietta, GA 30062

Beginning in 1971 with industry leader BRAKLEEN, the original aerosol brake parts cleaner, CRC has earned its reputation as "The Brake Experts." BRAKLEEN was the very first product of its kind, and for more than 25 years, thousands of professional mechanics and automotive do-it-yourselfers have learned to rely on BRAKLEEN for fast, cost-effective solutions to all brake and clutch servicing problems.

CRC has since expanded its line of quality brake maintenance products to include Disc Brake Quiet and Brake Caliper Synthetic Grease. These products are the result of innovative technology combined with the same dedication to product superiority, regulatory compliance and safety that have made BRAKLEEN #1. Trust "The Brake Experts" for all your brake care needs as CRC continues it's commitment to quality into the 21st century.

CRC Brākleen®
Brake Parts Cleaner

Quickly removes brake fluid, grease, oil and other contaminants from brake linings and pads. Helps brakes last longer and perform more efficiently.

- Cleans fast/Dries fast/No residue
- Degreases instantly
- Non-flammable
- Works without disassembly

Part No.	Net Content	Units Per Case
05089	19 oz.	12
05089T	19 oz.	12
05090	1 gallon	4
05091	5 gallons	1
05093	55 gallons	1

CRC Disc Brake Quiet

Forms a water resistant, high temperature film that instantly absorbs noise and quiets disc brake squeaks and squeals. Easy to apply to new or previously installed pads.

Part No.	Net Content	Units Per Case
05016	4 fl. oz. (polymer)	12
05017*	9 oz. (aerosol)	12
05115	2-.5 oz. (carded)	12

NON-CHLORINATED FORMULA
CRC Brākleen®
Brake Parts Cleaner

Use where compliance calls for a chlorine-free product. Quickly removes brake fluid, grease, oil and other contaminants from brake linings and pads.

- Cleans fast/Dries fast/No residue
- Degreases instantly
- Works without disassembly
- Contains no chlorinated solvents

Part No.	Net Content	Units Per Case
05088*	15 oz.	12
05085*	1 gallon	4
05086*	5 gallons	1
05087*	55 gallons	1

CRC Brake Caliper Synthetic Grease

Synthetic base grease designed for today's high tech braking systems. Prevents caliper binding, sticking, vibration and squeal. Use on components of disc brake systems, caliper assemblies, metal backing plates of the disc brake pad, self-adjusters and drum brake systems.

- Contains molybdenum disulfide, graphite, extreme pressure agents, anti-seize polymers and *TEFLON®*
- Long-lasting, anti-corrosive, anti-fretting, and moisture resistant
- Won't melt and run off
- Eliminates uneven pad wear due to vibration

Part No.	Net Content	Units Per Case
05351	2.5 oz. tube	6
05352	2-5cc units (carded)	12
05353	12 oz. tub w/brush	12
05354	2.5 oz. tube (carded)	12
05355	35 lb. pail	1

CRC
The Brake Experts.

**This product is EXTREMELY FLAMMABLE.*
Read and observe the special usage warning on the label.
Do not apply while equipment is energized.

CRC Lectra-Motive®

Electric Parts Cleaner

- Provides fast, thorough cleaning for non-sensitive electrical equipment
- Dissolves grease, oil, dirt and wax
- Leaves no residue/Non-flammable

Part No.	Net Content	Units Per Case
05018	19 oz.	12
05019	1 gallon	4
05022	5 gallons	1
05024	55 gallons	1

CRC Gasket Remover

- Quickly removes the most stubborn gaskets, even in high-temperature areas
- Removes paint and decals
- Dissolves gasket cement within minutes

Part No.	Net Content	Units Per Case
05021*	12 oz.	12

CRC Engine Degreaser

Heavy Duty Cleaner

- Quickly lifts grease and grime off engines for cooler, more efficient running
- Leaves no residue
- Easy to use; Spray on – rinse off

Part No.	Net Content	Units Per Case
05025	15 oz.	12

CRC Battery Cleaner

- Removes corrosion; neutralizes acid spills
- Reduces voltage leakage
- Assures maximum battery current flow

Part No.	Net Content	Units Per Case
05023	11 oz.	12

CRC Battery Terminal Protector

- Protects terminals from corrosion for improved starting and longer battery life
- Provides lead-free protective coating
- Dries quickly and protects instantly

Part No.	Net Content	Units Per Case
05046*	7.5 oz.	12

CRC Clean-R-Carb™

Carburetor Cleaner

- Maximizes carburetor performance
- Quickly dissolves deposits on chokes, carb linkage, heat risers and PCV system
- Harmless to catalytic converters and oxygen sensors

Part No.	Net Content	Units Per Case
05079*	12 oz.	12
05081*	16 oz.	12

CRC Fuel Injection Air-Intake Cleaner

- Removes gum and varnish from throttle valves and body
- Lubricates butterfly and all moving parts
- Leaves behind a corrosion-resistant film

Part No.	Net Content	Units Per Case
05078*	12 oz.	12

CRC QD™ Electronic Cleaner

- Excellent precision cleaning solvent
- Instantly removes oil, grease, dirt, flux
- No residue/Harmless to most plastics

Part No.	Net Content	Units Per Case
05101*	4.5 oz.	12
05102*	11 oz.	12

CRC Natural Degreaser™

Cleaner/Degreaser

- Removes tough grease, oil, and grime
- All-natural and biodegradable
- Contains no chlorinated solvents or petroleum distillates

Part No.	Net Content	Units Per Case
14005	16 oz.	12

CRC TYME®-1

Carburetor & Cold Parts Cleaner

- Removes carbon, varnish and grease
- Safely cleans aluminum and other metals
- Non-corrosive/Non-flammable

Part No.	Net Content	Units Per Case
14101	1 gallon	4
14104	5 gallons	1

CRC HydroForce™

AQUEOUS CLEANERS

Foaming Citrus All Purpose Cleaner

- Quick, super foaming action with fresh citrus scent
- Non-abrasive; safe on most surfaces

Part No.	Net Content	Units Per Case
14400	18 oz.	12

Butyl-Free All Purpose Cleaner/Degreaser

- Aggressively attacks and removes tough dirt, dust and grime
- Safe for all routine cleaning tasks

Part No.	Net Content	Units Per Case
14401	28 fl. oz.	12
14402	1 gallon	4
14403	5 gallons	1
14404	55 gallons	1
14405	18 oz.	12

All Purpose Cleaner/Degreaser

- Removes grease, oil and dirt on contact
- Cleans up to three times the surface area of leading aqueous-based cleaners

Part No.	Net Content	Units Per Case
14406	18 oz.	12
14407	28 fl. oz.	12
14408	1 gallon	4
14409	5 gallons	1
14410	55 gallons	1

Glass Cleaner Professional Strength

- Streak-free/Residue-free
- Ammonia-fortified formula cuts through tough dirt, dust, haze and fingerprints

Part No.	Net Content	Units Per Case
14411	28 fl. oz.	12
14412	18 oz.	12
14413	1 gallon	4

Industrial Strength Cleaner/Degreaser

- Heavy duty formula rivals performance of traditional solvent-based degreasers
- Cleans up to three times the surface area of leading aqueous-based cleaners

Part No.	Net Content	Units Per Case
14414	18 oz.	12
14415	28 fl. oz.	12
14416	1 gallon	4
14417	5 gallons	1
14418	55 gallons	1

**This product is EXTREMELY FLAMMABLE. Read and observe the special usage warning on the label. Do not apply while equipment is energized.*

- *The number one Brake Parts Cleaner since 1971*
- *Effectively removes brake fluid, grease, oil and other contaminants from all types of brake assemblies and parts*
- *Cleans fast/Dries fast*
- *Leaves no residue*
- *Works without disassembly*
- *Helps brakes last longer and perform more efficiently*
- *Available in 3 formulas: Regular, Non-Chlorinated and Low VOC Non-Chlorinated*

Usage: Apply **CRC Brākleen®** to remove contaminants on component parts including rotors, drums, cylinders, calipers, brake hardware (attaching pins, bushings, sleeves, support keys, bolts and anti-rattle clips/springs), inboard/outboard pads, primary/secondary shoes, springs and adjusters. Use a small stiff brush to help remove caked-on build-up or rust. Allow parts to air dry or wipe with a clean cloth.

Brākleen® Brake Parts Cleaner

Part No.	Net Content	Units per case
05089	19 oz.	12
05089T	19 oz.	12
05090	1 gallon	4
05091	5 gallons	1
05093	55 gallons	1

Brākleen® Non-Chlorinated Brake Parts Cleaner

Part No.	Net Content	Units per case
05088*	15 oz.	12
05084* Low VOC	15 oz.	12
05085*	1 gallon	4
05086*	5 gallons	1
05087*	55 gallons	1

Usage: Remove pads and clean with CRC Brākleen® Brake Parts Cleaner. Liberally and evenly coat entire steel back of each inboard and outboard disc pad with **CRC Disc Brake Quiet™**. (DO NOT apply to brake linings, rotors, or any other moving parts.) Allow to set for 10 minutes and install disc pads; pads may be installed while still tacky.

Disc Brake Quiet™

Part No.	Net Content	Units per case
05016	4 fl. oz. (polymer)	12
05017*	9 oz. (aerosol)	12
05115	2-.5 oz. (carded)	12

- *For use on new and previously installed disc pads*
- *Dampens vibrations that cause disc brake squeaks and squeals*
- *Forms a water-resistant, high-temperature film that instantly absorbs noise*
- *Eliminates time-consuming adjustments*

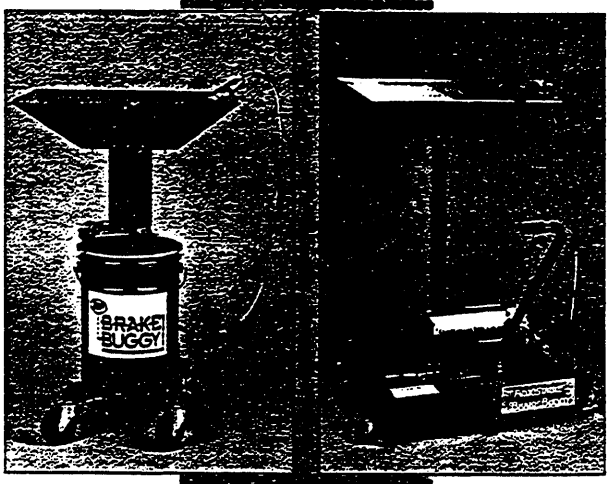
**This product is EXTREMELY FLAMMABLE. Read and observe the special usage warning on the label. Do not apply while equipment is energized.*

Zep aerosols contain No CFCs

ZEP BRAKE BUGGY™
Brake Parts Cleaning System

Portable, pneumatic, brake cleaner uses 5 gallons of recirculating solution to remove grease, dirt and brake dust from car or truck brakes. Height control allows for easy positioning under vehicles on a lift cylinder. The Catch Tray features a fusible, safety-link and spring-loaded lid that activates to close off the unit in the event of a fire. The Brake Buggy utilizes an air-operated pump which has an air-pressure regulator. Cleaning solution is continuously filtered through a Filter canister containing a 50-micron, pleated, paper Filter Element, and a 10-micron, polyester Sock to collect dirt and particulates. Solution is applied through a trigger flow brush. Unit measures 24 1/4" x 36" x 19 3/4".

Brake Buggy Unit
Prod. #9094
Brake Buggy Filter Canister
Prod. #9098
Brake Buggy Filter Element
Prod. #9096
Brake Buggy Sock
Prod. #9093



ZEP ADJUSTABLE BRAKE BUGGY™
Brake Parts Cleaning System

A portable, low-profile, air-operated brake parts washer designed for efficient and quick cleaning of automotive vehicle brake parts. A unique nested post assembly provides adjustable height control, allowing for easy use under vehicles lifted off the floor with a manual floor jack or elevated by a hydraulic lift cylinder. The fluid reservoir accommodates up to 5 gallons of brake wash fluid, such as Zep Brake Wash. The unit's circulating pump is air-operated with a flow-thru brush system adapted for fingertip control. A constant pressure regulator maintains 40 psi of air. The spring-loaded, fuse-linked, fire-protective lid doubles as a drain closure to prevent product evaporation when unit is not in use. Casters attached to outrigger brackets on sides of unit provide excellent portability and stability. The optional Adjustable Brake Buggy 5100 Filter Kit installs onto the unit to filter and remove particulate matter.

Adjustable Brake Buggy Unit
Prod. #9105
Adjustable Brake Buggy Filter Kit
Prod. #9106

ZEP BRAKE WASH™
Non-Chlorinated, Solvent Brake Parts Cleaner

Removes asbestos dust, oil, grease, brake fluid, and other soils from brake parts. Evaporates quickly and leaves no residue. Can be used on any type of brake equipment, assembled or disassembled.

Liquid Prod. #0505
Aerosol Prod. #0287

ZEP BRAKE PARTS CLEANER™
Heavy-Duty Solvent

Effectively removes asbestos dust, oil, grease, brake fluid, and other soils from brake parts. Thoroughly wets and washes away asbestos dust. Evaporates quickly, leaves no residue. Stops disc brake squeal. Non-flammable. (Do not use Brake Parts Cleaner when using the optional 5100 Filter Kit.

Prod. #0194

ZEP BRAKE SOL™
Liquid Brake Parts Cleaner

A blended safety brake cleaning solvent formulated to remove asbestos dust, oil, grease, brake fluid, and dirt from brake parts, plates, springs and shoes. Controls the level of hazardous asbestos dust in the air. Evaporates quickly and completely. Will not adversely affect brake parts and pads.

Prod. #0500

BRAKE SYSTEM PRODUCTS

579

ENVIRONMENTAL BRAKE CLEANER

Formulated to dissolve and remove brake fluid, oil grease and other contaminants from all types of brake assemblies safely and quickly. Contains no carcinogens or silicones.

Part No.	Description	Net Cont.	Case Count
AM7-20/6	Aerosol	18 oz..	6

DISC BRAKE QUIET

Stop disc brake squeal, squeak and chatter that can result in costly labor tie-ups from brake adjustment "comebacks."

Part No.	Description	Net Cont.	Case Count
M6-01V	2 Carded Tubes	¼ oz. each.	10
M6-04	Can	4 oz.	12
M6-09	Aerosol	9 oz.	12

NON-CHLORINATED BRAKE CLEANER

Fast....Effective...No Chlorinated Solvents

High solvency and fast evaporative properties quickly dissolve and flush away brake fluid, oil, and other contaminants from all types of brake and CV Joint assemblies. Spray can be applied without disassembly of the unit. Leaves no residue. Helps to eliminate brake squeal and "chatter".

Part No.	Description	Net Cont.	Case Count
M7-15	Aerosol	15 oz..	12

BRAKE AND CV JOINT CLEANER

High solvency and fast evaporation spray instantly degreases both conventional and disc brake assemblies. Quickly dissolves and flushes away brake fluid, grease, oil and other contaminants without disassembly.

Part No.	Description	Net Cont.	Case Count
M7-20	Aerosol	22 oz..	12
M7-20/6	Aerosol	22 oz.	6
M7-34	Jug	1 gal.	4
M7-49	Drum	54 gal.	1

DOT 3 SUPER HD BRAKE FLUID

Minimum boil point 450° F. Meets and exceeds DOT 3 and all other Federal and SAE specifications and standards for motor vehicle brake fluid. Resists boiling under heavy and constant braking. Mixes with all other approved brake fluids. Suitable for use in ATE, Girling, Lockheed and other systems.

Part No.	Description	Net Cont.	Case Count
M43-12	Bottle	12 oz..	24
M43-32	Bottle	32 oz.	12
M43-34	Can	1 gal.	4

DOT 3 STANDARD HD BRAKE FLUID

Meets and complies with DOT3 Federal Standard No.116. Exceeds Fed. Spec. VV-b680 and SAE Spec. J1703. Designed for U.S. and foreign cars and trucks where DOT 3 fluid is specified.

Part No.	Description	Net Cont.	Case Count
M44-12	Bottle	12 oz..	24
M44-12/12	Bottle	12 oz.	12
M44-32	Can	32 oz..	12
M44-34	Can	1 gal.	4
M44-40	Pail	5 gal.	1
M44-49	Drum	54 gal.	1

Appendix I

Glossary

Appendix I. Glossary

Acute Exposure:	One or a series of short-term exposures generally lasting less than 24 hours.
Air Dispersion Model:	A mathematical model or computer simulation used to estimate the concentration of toxic air pollutants at specific locations as a result of mixing in the atmosphere.
Airborne Toxic Control Measure:	Section 39655 of the Health and Safety Code, defines an"Airborne Toxic Control Measure" means either of the following: 1) Recommended methods, and, where appropriate, a range of methods, that reduce, avoid, or eliminate the emissions of a toxic air contaminant. Airborne toxic control measures include, but are not limited to, emission limitations, control technologies, the use of operational and maintenance conditions, closed system engineering, design equipment, or work practice standards, and the reduction, avoidance, or elimination of emissions through process changes, substitution of materials, or other modifications. 2) Emission standards adopted by the U.S. Environmental Protection Agency pursuant to Section 112 of the federal act (42 U.S.C. Sec. 7412).
AMR Activities:	means any service, repair, restoration, or modification activity to a motor vehicle in which cleaning or degreasing products could be used including, but not limited to, brake work, engine work, machining operations, and general degreasing of engines, motor vehicles, parts, or tools.
AMR Facilities:	means any entity or entities that repairs, rebuilds, reconditions, services, or maintains in any way, motor vehicles. "Facility" includes entities required to be registered by the California Department of Consumer Affairs, Bureau of Automotive Repair, and entities that service or repair a fleet of ten or more motor vehicles. "Facility" does not include private residences or entities that are involved only in motor vehicle body work or painting.
Cancer Risk:	The theoretical probability of contracting cancer when exposed for a lifetime to a given concentration of a substance usually calculated as an upper confidence limit. The maximum estimated risk may be presented as the number of chances in a million of contracting cancer.
Chlorinated Automotive Consumer Product:	means an automotive consumer product (brake cleaner, carburetor cleaner, engine degreaser, or general purpose degreaser) that contains perchloroethylene (Perc), methylene chloride (MeCl), or trichloroethylene (TCE).

Chronic Exposure:	Long-term exposure usually lasting from one year to a lifetime.
Hazardous Air Pollutant or HAP:	Means a substance that the U.S. Environmental Protection Agency has listed in, or pursuant to, Section 112 subsection (b) of the federal Clean Air Act Amendments of 1990 (42 U.S. Code, Section 7412(b)).
Hazard Index:	The ratio of the concentration of a toxic pollutant with non-cancer health effects and the reference exposure level for that pollutant.
Health Risk Assessment (HRA):	A comprehensive analysis of the dispersion of hazardous substances in the environment, the potential for human exposure, and a quantitative assessment of both individual and population-wide health impacts associated with the level of exposure.
Inhalation Reference Concentration (RfC):	An estimate, derived by the U.S. EPA (with an uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population, (including sensitive subgroups) that is likely to be without appreciable risk of deleterious effects during a lifetime of exposure. The RfC is derived from a no or lowest observed adverse effect level from human or animal exposures, to which uncertainty or "safety" factors are applied.
MEIR:	Maximum exposed individual resident. The residential receptor location that receives the estimated maximum exposure from a facility's emissions relative to other residential locations.
MEIW:	Maximum exposed individual worker. The off-site industrial or commercial location that receives the estimated maximum exposure from a facility's emissions relative to other industrial or commercial locations. This receptor is a subset of non-residential receptors.
Near Source Location:	The location closest to a facility where concentrations could be estimated through air dispersion modeling.
Non-cancer Risk:	Refers to non-cancer health effects due to acute and/or chronic exposure. This may be illustrated as an estimate of the hazard index or total hazard index (by endpoint) resulting from exposure to toxic air pollutants.
Non-Residential Location:	A receptor that is not residentially located. This category could include receptors at off-site industrial locations, at on-site locations of public access for acute exposure, or employees at sensitive receptor locations, including but not limited to, schools, hospitals, and care facilities.

Reference Exposure Level (REL):	These are used as indicators of potential non-cancer adverse health effects. An REL is a concentration level at or below which no adverse health effects are anticipated. RELs are designed to protect most sensitive individuals in the population by including safety factors in their development.
Risk:	The possibility of injury or disease, which may result from exposure to toxic air pollutants.
Scientific Review Panel on Toxic Air Contaminants (SRP):	A nine-member panel appointed to advise the Air Resources Board and the Department of Pesticide Regulation in their evaluation of the adverse health effects toxicity of substances being evaluated as Toxic Air Contaminants.
Toxic Air Contaminant (TAC)	Section 39655 of the Health and Safety Code, defines a TAC as an air pollutant which may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health. A substance that is listed as a hazardous air pollutant pursuant to subsection (b) of Section 112 of the federal act (42 U.S.C. Sec. 7412(b)) is a TAC. TACs that are pesticides are regulated in their pesticidal use by the Department of Pesticide Regulation.
Total Hazard Index:	The sum of hazard indices for pollutants with non-cancer health effects that have the same or similar adverse health effects (endpoints).
Unit Risk Factor: (URF):	The estimated upper-confidence limit (usually 95%) probability of a person contracting cancer as a result of a constant exposure to $1 \mu g/m^3$ of a substance over a 70-year lifetime.
Volatile Organic Compound (VOC):	Means any compound containing at least one atom of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, and excluding the following: (1) methane, methylene chloride (dichloromethane), 1,1,1-trichloroethane (methyl chloroform), trichlorofluoromethane (CFC-11), dichlorodifluoromethane (CFC-12), 1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113), 1,2-dichloro-1,1,2,2-tetrafluoroethane (CFC-114), chloropentafluoroethane (CFC-115), chlorodifluoromethane (HCFC-22), 1,1,1-trifluoro-2,2-dichloroethane (HCFC-123), 1,1-dichloro-1-fluoroethane (HCFC-141b), 1-chloro-1,1-difluoroethane (HCFC-142b), 2-chloro-1,1,1,2-tetrafluoroethane (HCFC-124), trifluoromethane (HFC-23), 1,1,2,2-tetrafluoroethane (HFC-134), 1,1,1,2-tetrafluoroethane (HFC-134a), pentafluoroethane (HFC-125), 1,1,1-trifluoroethane (HFC-143a), 1,1-difluoroethane (HFC-152a), cyclic,

branched, or linear completely methylated siloxanes, the following classes of perfluorocarbons: (A) cyclic, branched, or linear, completely fluorinated alkanes; (B) cyclic, branched, or linear, completely fluorinated ethers with no unsaturations; (C) cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations; and (D) sulfur-containing perfluorocarbons with no unsaturations and with the sulfur bonds to carbon and fluorine, and (2) the following low-reactive organic compounds which have been exempted by the U.S. EPA: acetone, ethane, methyl acetate, parachlorobenzotrifluoride (1-chloro-4-trifluoromethyl benzene), perchloroethylene (tetrachloroethylene).

Acronyms

AB	Assembly Bill
ARB	Air Resources Board
AMR Activities	Automotive Maintenance and Repair Activities
AMR Facilities	Automotive Maintenance and Repair Facilities
APCD	Air Pollution Control District
AQMD	Air Quality Management District
ATCM	Airborne Toxic Control Measure
BAR	California Department of Consumer Affairs, Bureau of Automotive Repair
Cal/OSHA	California Occupational Safety and Health Act
DHS	California Departent of Health Services
Districts	Local Air Pollution Control and Air Quality Management Districts
DOF	California Department of Finance
DTSC	California Department of Toxics Substances Control
HAP	Hazardous Air Pollutant
HSC	Health and Safety Code
IARC	International Agency for Research on Cancer
OEHHA	Office of Environmental Health Hazard Assessment
MeCl	Methylene Chloride (dichloromethane)
MEIR	Maximum Exposed Individual Resident
MEIW	Maximum Exposed Individual Worker
MSDS	Material Safety Data Sheet
Perc	Perchloroethylene (tetrachloroethylene)
PMI	Point of Maximum Impact
RfC	Reference Concentration
RfD	Reference Dose
REL	Reference Exposure Level
SB	Senate Bill
SRP	Scientific Review Panel on Toxic Air Contaminants
TAC	Toxic Air Contaminant
TCA	1,1,1-Trichloroethane
TCE	Trichloroethylene
URF	Unit Risk Factor
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

SUMMARY OF BOARD ITEM

ITEM # 00-4-2: **PUBLIC MEETING TO UPDATE THE BOARD ON THE STATUS OF THE PORTABLE FUEL CONTAINER SPILLAGE CONTROL REGULATIONS**

DISCUSSION: Portable fuel containers, commonly known as "gas cans," emit nearly 100 tons per day of reactive organic gas (ROG) emissions statewide. In September 1999, the Air Resources Board (ARB or Board) approved new regulations applicable to new "gas cans" or spouts manufactured and sold after December 31, 2000. These regulations established four performance standards that will reduce refueling spillage, evaporative losses, transport and storage losses, permeation emissions, and displaced vapor emissions. The new regulations will provide a 73 percent (over 70 TPD) reduction in ROG emissions by 2010 statewide. The permeation standard alone will yield emission reductions of nearly 6 TPD of ROG in 2010.

Currently, there are a few gas cans and spouts on the market that meet a majority of the performance standards. The reduction of permeation from plastic gas cans, however, will likely require the use of some type of barrier applied to the interior of the gas cans. The staff tested two-barrier treatment processes, fluorination and sulfonation, and presented results at the September hearing. Both processes are used commercially on other plastic products to create barriers to permeation.

Staff has conducted additional testing and research and informed several "gas can" manufacturers of two possible new strategies to reduce permeation emissions. These strategies include increasing nominal wall thickness or the use of Selar™.

At the September hearing, plastic "gas can" manufacturers expressed concerns about their ability to meet the proposed permeation standard. Although the Board approved the permeation standard, they requested that the staff provide an

update on the manufacturers' progress towards developing fully compliant spill-proof systems.

Portable fuel container manufacturers may request a time delay in the implementation of the approved permeation standard.

SUMMARY AND IMPACTS: The approved regulations will reduce over 70 tons per day of ROG emissions in 2010. These emission reductions are needed in many urban areas to make progress towards attainment or maintenance of the ozone ambient air quality standards.

To provide the Board with an update, staff reviewed the available information and discussed with individual manufacturers their progress in developing compliant spill-proof systems and/or spill-proof spouts. Several manufacturers have indicated that they will have compliant spill-proof spouts by January 1, 2001. Additionally, the majority of the "gas can" manufacturers are making significant progress towards complying with all of the approved performance standards, including the permeation standard.

California Environmental Protection Agency

Air Resources Board

MEETING NOTICE AND STATUS REPORT

PUBLIC MEETING TO UPDATE THE BOARD ON THE STATUS OF THE PORTABLE FUEL CONTAINER SPILLAGE CONTROL REGULATIONS

MARCH 28, 2000

NOTICE OF PUBLIC MEETING TO UPDATE THE BOARD ON THE STATUS OF THE PORTABLE FUEL CONTAINER SPILLAGE CONTROL REGULATIONS

The Air Resources Board (the "Board" or "ARB") will conduct a public meeting at the time and place noted below to consider the ARB staff's update on the status of the Portable Fuel Container Spillage Control Regulations. This item is informational only: no regulatory action will be taken.

DATE: April 27, 2000

TIME: 9:30 a.m.

PLACE: County Administration Center
Supervisors Chambers, Room 310
1600 Pacific Highway
San Diego, California

This item will be considered at a two-day meeting of the Board, which will commence at 9:30 a.m. on April 27, 2000, and may continue at 8:30 a.m. on April 28, 2000. This item may not be considered until April 28, 2000. Please consult the agenda for the meeting, which will be available at least 10 days before April 27, 2000, to determine the day on which this item will be considered.

This facility is accessible to persons with disabilities. If accommodation is needed, please contact Mr. George Lew at (916) 327-0900 or Telecommunications Device for the Deaf (TDD) at (916) 324-9531, or (800) 700-8326 for TDD calls from outside the Sacramento area by April 9, 2000.

INFORMATIVE DIGEST

In September 1999, the ARB approved the Portable Fuel Container Spillage Control Regulations. The regulations will reduce refueling emissions from equipment and engines in the off-road categories that are predominantly refueled with portable fuel containers, or "gas cans." By establishing a set of performance standards to which containers manufactured after January 1, 2001 must adhere, the regulations will replace the current style of portable containers and spouts with spill-proof systems (containers and spouts) and spill-proof spouts.

During the September Board hearing manufacturers expressed concerns about their ability to effectively meet the proposed permeation standard for plastic portable fuel containers. The Board approved the permeation standard and simultaneously directed the ARB staff to provide a status report on the manufacturers' progress towards the development of products necessary to meet the standard.

To assess the status of implementation of the regulations, staff reviewed the available information and discussed with individual manufacturers their progress in the developing spill-proof systems and spill-proof spouts. Staff has also contacted processors of various barrier surface treatments that could be used to meet the approved permeation standard for plastic fuel containers to compare costs reported in staff's original proposal with more current costs. Additionally, staff has conducted tests on the feasibility of increasing average container wall thickness to mitigate the effects of permeation from plastic portable fuel containers and investigated the feasibility of a fourth alternative for achieving the permeation standard.

Staff has concluded that several options exist for can manufacturers to meet the permeation standard and implementation date approved by the Board in September, 1999. All of the identified options are within the cost-effectiveness range presented by staff in the original proposal. Therefore, staff will recommend that the Board determine that no changes to the approved regulations are necessary.

AVAILABILITY OF DOCUMENTS AND AGENCY CONTACT PERSON

The Board staff has prepared a Status Report that includes major findings, conclusions, and recommendations. Copies of the Status Report may be obtained from the Board's Public Information Office, 2020 L Street, Sacramento, CA 95814, (916) 322-2990. To obtain this document in an alternative format, please contact the Air Resources Board's ADA Coordinator at (916) 322-4505, TDD (916) 324-9531, or (800) 700-8326 for TDD calls from outside the Sacramento area.

This notice and the status report are on the ARB Internet site for this program at, *http://www.arb.ca.gov/msprog/spillcon/reg.htm.*

Further inquiries regarding this matter should be directed to Mr. George Lew of the Board's Monitoring and Laboratory Division, P.O. Box 2815, Sacramento, CA 95812, telephone (916) 327-0900.

SUBMITTAL OF COMMENTS

The public may present comments relating to this matter orally or in writing at the hearing, and in writing or by e-mail before the hearing. To be considered by the ARB, written submissions must be addressed to and received by the Clerk of the Board, Air Resources Board, P.O. Box 2815, Sacramento, CA 95812, or 2020 L Street, 4th Floor, Sacramento, CA 95814, no later than 12:00 noon, April 26, 2000, or received by the Clerk of the Board at the meeting. To be considered by the ARB, e-mail submissions must be addressed to upspill@listserv.arb.ca.gov and received at the ARB no later than 12:00 noon Pacific Time, April 26, 2000.

The ARB requests, but does not require 30 copies of any written submission. Also, the ARB requests that written and e-mail statements be filed at least 10 days prior to the hearing so that ARB staff and Board members have time to fully consider each comment. The ARB encourages members of the public to bring to the attention of staff in advance of the meeting any questions or comments concerning this non regulatory item.

CALIFORNIA AIR RESOURCES BOARD

Date: March 28, 2000

Michael P. Kenny
Executive Officer

California Environmental Protection Agency

Air Resources Board

STATUS REPORT:

PUBLIC MEETING TO UPDATE THE BOARD ON THE STATUS OF THE PORTABLE FUEL CONTAINER SPILLAGE CONTROL REGULATIONS

Date of Release: March 28, 2000

Scheduled for Consideration: April 27, 2000
County Administration Center
Supervisors Chambers, Room 310
1600 Pacific Highway
San Diego, California

Air Resources Board
P.O. Box 2815
Sacramento, California 95812

This report has been reviewed by the staff of the California Air Resources Board and approved for publication. Publication does not signify that the contents reflect the views and policies of the Air Resources Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

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EXECUTIVE SUMMARY

In September 1999, the Air Resources Board (ARB or Board) approved new regulations for portable fuel containers, commonly referred to as "gas cans." These new regulations include performance standards that will result in the replacement of conventional gas cans and spouts with spill-proof systems (containers and spouts) and spill-proof spouts. The regulations apply to all new gas cans and spouts sold in California starting January 1, 2001, and will provide a 73 percent (over 70 tons per day) reduction in reactive organic gas (ROG) emissions by 2010.

During the September hearing, gas can manufacturers expressed concerns about their ability to meet the proposed permeation standard for plastic portable fuel containers. While the Board approved the permeation standard, they requested the ARB staff provide a status report on the manufacturers' progress towards the development of fully compliant spill-proof systems. This report is in response to the Board's direction.

Staff reviewed the available information and discussed with individual manufacturers their progress in developing spill-proof systems and spill-proof spouts. Several manufacturers have indicated that they will have compliant spill-proof spouts by January 1, 2001. Additionally, the majority of the gas can manufacturers have made significant progress towards complying with all of the adopted performance standards including the permeation standard.

The report includes updated costs estimates for two types of barrier surface treatments that could be used to meet the permeation standard as discussed in staff's original proposal. Two new methods of reducing permeation emissions from plastic gas cans, increasing nominal wall thickness and the use of Selar RB™ are presented for informational purposes. All of the identified options for meeting the permeation standard are within the cost-effectiveness range presented by staff in the original proposal. Therefore, staff recommends the Board determine that no changes to the original rulemaking are necessary at this time.

I. Background

Portable fuel containers, commonly known as "gas cans," have been determined to be a significant source of reactive organic gas (ROG) emissions. Gas cans are used to refuel a broad range of small off-road engines and other equipment. They are normally made of high-density polyethylene (HDPE) (plastic) and are recognizable by their usual bright red color. While the emissions from a single gas can are small, the additive impact of the total number of these containers results in an emission source that contributes significantly to California's air quality problems. Based on recent survey information, it is estimated that there are 9.8 million gas cans in the state. About 1.9 million new gas cans are sold each year in California. According to the 1998 emissions inventory, portable gas cans account for about 87 tons per day (TPD) of smog-forming ROG escaping into California's air. Emissions from this source category will increase to 96 TPD in 2010 if the action taken by the Board last fall to control gas can emissions is not implemented.

In September 1999, Air Resources Board (ARB or Board) approved new regulations for portable fuel containers. Based on performance standards, the new regulations will result in the replacement of conventional gas cans and spouts with spill-proof systems (containers and spouts) and spill-proof spouts. The new spill-proof systems and spouts will virtually eliminate fueling spills by automatically shutting off before equipment fuel tanks overfill. Spill-proof gas cans will remain closed when not in use helping to reduce evaporative emissions from open spouts, as well as eliminating accidental spills. Secondary venting holes will be eliminated under the new standards since these openings also allow venting of gasoline vapors into the air. The new standards also require manufacturers to reduce permeation through plastic containers' walls to no more than 0.4 grams per gallon per day. The regulations apply to all new gas cans and spouts sold in California starting January 1, 2001, and will provide a 73 percent (over 70 TPD) reduction in reactive organic gas (ROG) emissions from gas cans by 2010.

Although there are a few gas cans and spouts on the market that meet many of the performance standards specified in the new regulations, the reduction of permeation from plastic gas cans will likely require the use of some type of barrier applied to the interior of the gas cans. The staff tested two barrier treatment processes, fluorination and sulfonation, and presented results at the September hearing. Both processes have been successfully used on other plastic products to create barriers to permeation. However, incorporating either of these techniques into the manufacturing of gas cans has never been attempted commercially.

To ensure that our air quality goals are met and that progress towards the implementation of the new regulations continues, the Board requested staff provide an update approximately six months after the proposal was approved. This report is an update in response to the Board's direction and includes the progress made by the gas

can and spout manufacturers to meet performance standards adopted in September, particularly the permeation standard. The report also includes updates on the status of the 15-day changes made to the regulations as directed by the Board, and the activities of the ARB staff following the regulatory package development and adoption.

II. 15-Day Changes

As directed by the Board, several changes have been made to staff's original proposal. A notice of public availability of modified text was made available to the public on November 19, 1999. Changes included modifications to fill levels, flow rates, the addition of labeling requirements, and minor changes to two test methods, Test Method 510 (Automatic Shut-Off Test Procedure for Spill-Proof Systems and Spill-Proof Spouts) and Test Method 513 (Determination of Permeation Rate for Spill-Proof Systems). Three manufacturers submitted written comments. Staff has reviewed these comments and has made changes, where appropriate. The complete regulatory package is now being prepared for filing with the Office of Administrative Law.

III. Progress of Gas Can and Spout Manufacturers

To assess the status towards implementing the regulations, staff reviewed available information and had discussions with individual manufacturers. Manufacturers heavily involved in the public process during the development of the regulations have been forthcoming and candid about their progress in developing compliant products. Several have completed designing the spouts and are ready for production. Following the September Board hearing, several entrepreneurs wishing to share prototype designs of new spouts have approached staff. It appears that several manufacturers will have products compliant with the automatic shut-off, automatic closure, one opening, fill level, flow rate, and warranty performance standards in time for the January 1, 2001 effective date. The remaining issue for manufacturers seems to be choosing the most appropriate control strategy to meet the 0.4 grams per gallon per day permeation standard. Therefore, the following discussions focus exclusively on the permeation standard that represents in 2010 control of approximately 8 percent or nearly 8 TPD of ROG emissions associated with gas cans.

A. Permeation – Testing

Several manufacturers are completing initial tests to determine the effectiveness of barrier surface treatments as applied to their products. One manufacturer has tested containers using both fluorinated and sulfonated barrier surface treatments and submitted the results as part of their 15-day comments. These results, using steady state temperature tests and conducted with the assistance of one of the major resin suppliers, indicate that fluorinated containers achieve a significant reduction in average permeation rates. The average rate for all fluorinated

containers tested was 0.39 grams per gallon per day with several individual containers performing significantly better than the adopted permeation standard of 0.4 grams per gallon per day. It should be noted however, that compliance with the permeation standard is determined using a more rigorous variable temperature profile. A higher level of fluorination treatment may be required to comply with the adopted standard when testing is performed using the approved compliance test procedure. The same data set revealed that two of the three sulfonated containers tested failed to offer any significant reduction in average permeation rates, with the third container performing as anticipated with an average permeation rate of 0.14 grams per gallon per day.

Upon further investigation, staff determined that the sulfonated containers submitted for testing were treated at various levels of barrier integrity per the gas can manufacturers request. After contacting the sulfonation processor, staff was informed that the higher treatment level was the only effective way of controlling permeation from plastic gas cans. According to the process manufacturer, these containers performed as anticipated. The higher level of treatment was the basis for staff's earlier recommendations and cost effectiveness estimates.

The remaining gas can manufacturers are in the process of testing various barrier surface treatments and have yet to report results to staff. Data provided by manufacturers to date closely match results of tests previously conducted by ARB staff and presented to the Board in September.

To assist manufacturers in determining an appropriate control strategy for permeation, staff has agreed to conduct follow-up tests of in-line barrier surface treated containers for one of the manufacturers. In-line barrier surface treatment occurs concurrently with the blow-molding process. Containers have been received and are currently undergoing preconditioning. Results of these tests will be presented to all stakeholders. Staff has contacted several other manufacturers to extend this same offer of assistance. By providing the test results to all stakeholders, manufacturers should be able to make a determination of the most effective strategy for their products without resorting to testing every product they manufacture as results are expected to be predictably similar.

B. Permeation - Costs

Staff's initial proposal contained an estimate of the cost of compliance for the adopted 0.4 grams per gallon per day permeation standard. This estimate was based on the application of one of two types of barrier surface treatments, fluorination or sulfonation. Staff originally reported that the cost of compliance for the permeation standard using either of these technologies was projected to be approximately $0.50 - $1.58 per container. Several gas can manufacturers testified

at the hearing and took issue with these estimates. To assess the outcome of staff's earlier projections regarding fluorination and sulfonation costs, staff again contacted representatives of the barrier coating processors and developed the following cost estimates.

i. Fluorination

Staff contacted a representative of Fluoro-Seal, who provided a cost estimate of on-site barrier surface treating gas cans using fluorination of between $0.31 and $0.36 per gallon of container capacity. This provides the manufacturers with a barrier at level 5, one of the highest treatment levels currently available. Based on high volume, in-house treatment and an average container size of 2.5 gallons, the average cost to fluorinate gas cans in-house is approximately $0.90 per container.

However, several manufacturers initially may choose to have their containers treated off-site instead of in their own manufacturing facilities. Since the costs associated with off-site treatment are generally higher, this will be used as the basis for determining the average cost to fluorinate gas cans. Fluoro-Seal has an off-site treatment facility located in Ontario, California. According to testimony provided by Bill Brown at the September hearing, Fluoro-Seal can treat gas cans at its Ontario facility at a cost of $0.37 per gallon of container capacity. Again, assuming an average container size of 2.5 gallons, the average cost to fluorinate gas cans at the Ontario facility is $0.93 each.

Staff contacted several manufacturers to determine additional costs associated with off-site treatment. Since assembling and packaging the gas cans remains unchanged, the only additional cost would be an increase in product shipping charges. Since most manufacturers are currently shipping conventional gas cans to West Coast distribution centers, the additional shipping charges would be incurred by shipping directly to the treatment site and back to the distribution center. Assuming an average shipping price of $1.45 per mile per shipment, an average can size of 2.5 gallons (approximately 6000 gas cans per shipment), and an increase in mileage of 1,000 miles (500 additional miles to the treatment facility and 500 miles back to the distribution point), the average increase in shipping per container is approximately $0.24. This raises the average cost to fluorinate gas cans to approximately $1.17 per container, which is within the staff's original range of estimated cost.

ii. Sulfonation

Staff contacted a representative of Enviro, Inc., who provided a cost estimate of in-house barrier surface treating gas cans using sulfonation of $0.55 for a one

gallon container, $0.60 for a two gallon, and $0.65 for a five gallon container. At the September, 1999, hearing Mr. Tom Schmoyer testified that his company was prepared to offer sulfonation of gas cans to all manufacturers at a price of approximately $0.93 per container. According to Mr. Schmoyer, this estimate assumed off-site treatment. The cost differential between off-site and in-house treatment of gas cans is $0.33. Therefore, Mr. Schmoyer's current estimates for off-site treatment are as follows: $0.88 for one-gallon cans, $0.93 for two-gallon cans, and $0.98 for five-gallon cans. Based on an average container size of 2.5 gallons, the average cost to sulfonate gas cans off-site is estimated to be $0.95 per container.

However, several gas can manufacturers claimed that unlike fluorination, the sulfonation process lacks the necessary infrastructure to treat a significant amount of gas cans. Staff have investigated this claim and concur. However, Mr. Schmoyer has informed staff that plans have recently been finalized to open a new treatment facility also to be located in Ontario, California. Mr. Schmoyer indicated that the Ontario facility will be operational early this summer and will be able to treat two million gas cans per year per shift. According to Mr. Schmoyer, adding a second shift to the facility can increase its production to four million cans per year, or about twice the amount of gas cans annually sold in California. For off-site treatment costs the average increase for shipping per container would again be approximately $0.24. This raises the average cost to sulfonate gas cans to approximately $1.19 per container for off-site treatment.

iii. Certification and Durability Testing

Other costs associated with the permeation standard are those of ongoing certification and durability testing. Manufacturers have indicated that to determine compliance with the permeation standard it will be necessary to perform initial tests on a minimum of six samples of each size and style of container that they manufacture. Staff believes that while this may be true initially, this testing schedule will undoubtedly be relaxed, as results become predictably similar. However, several manufacturers submitted comments during the 45-day public comment period regarding this issue. Included in these comments was a detailed analysis of the costs associated with ongoing certification and durability testing. According to the analysis provided by the manufacturers, on-going certification and durability testing will initially increase costs by $0.10 per container. This places the final cost estimates to barrier surface treat gas cans using fluorination at $1.27 per unit and $1.29 per unit for barrier surface treatment using sulfonation. This falls well within the range of staff's original estimate of between $0.50 - $1.58 per container. It should also be noted that these estimates are based on the highest fixed costs staff has identified to date, and may be significantly less depending on the individual

manufacturer's processing needs.

IV. Air Resources Board Staff Activities

As previously mentioned, ARB staff has committed to several tasks designed to assist gas can and spout manufacturers in exploring various means of meeting the permeation standard. Along with assisting several manufacturers by performing barrier feasibility tests, staff recently conducted tests to determine the feasibility of developing a correction, or correlation factor, that would allow the manufacturers to use a steady state temperature test in place of the required variable temperature profile. This work is currently underway and staff is awaiting test results from steady state temperature tests performed by both gas can manufacturers and a resin supplier. Staff has also been involved in determining the effectiveness of increasing wall thickness and using alternative materials to HDPE in order to limit permeation. These activities are described below.

A. Effects of Nominal Wall Thickness

Staff conducted tests to determine the effect of increasing nominal wall thickness on average permeation rates from untreated containers. Previous data submitted for review from one of the large resin suppliers suggested that increasing the container wall thickness does mitigate the effects of permeation from plastic containers.

Containers were molded in four different wall thicknesses, from 0.080 to 0.225 inches and preconditioned initially for 12 weeks. Results of gravimetric tests presented in Table 1 show a substantial decrease in average permeation rates as nominal wall thickness increases (Phase I results). To determine if this effect is temporary, staff continued to precondition the same gas cans and again performed gravimetric tests after an additional 12 weeks of preconditioning. After remaining filled with fuel for a total of 24 weeks gravimetric tests still show a substantial decrease in average permeation rates as wall thickness increases (Phase II results).

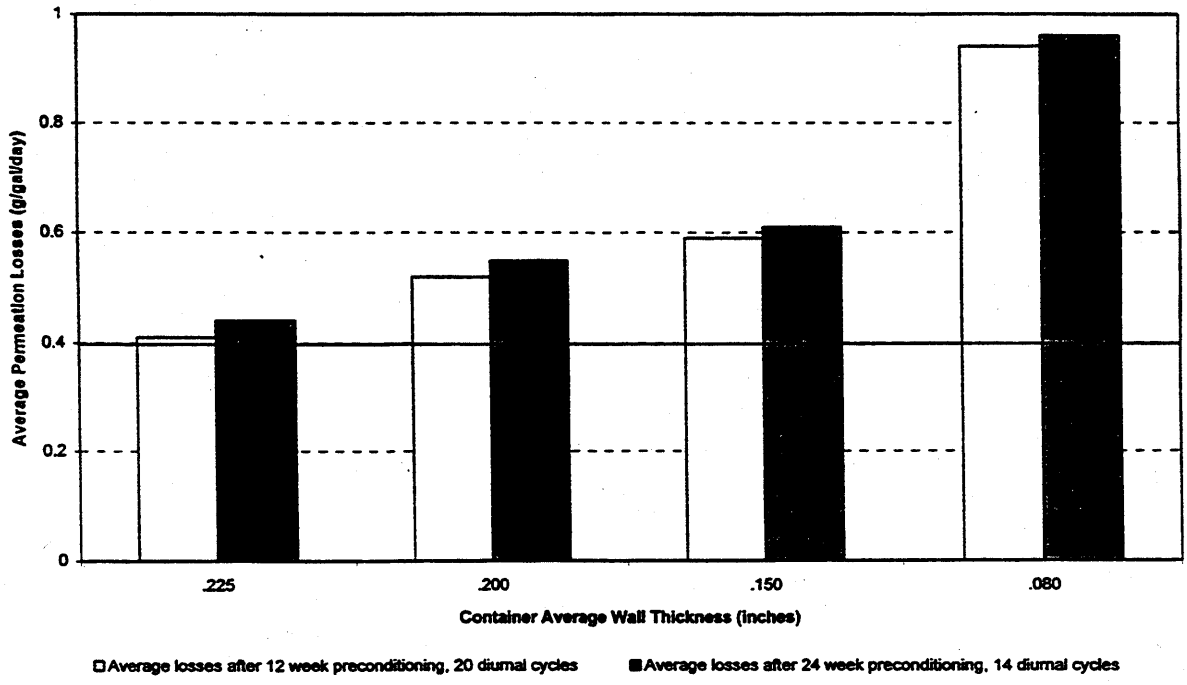
Data from Table 1 is presented graphically in Figure 1 and compared to the permeation standard. As shown in Figure 1, increasing nominal wall thickness does appear to have a significant effect on average permeation rates of HDPE gas cans. At a nominal wall thickness of 0.225 inches, results suggest that several containers tested could meet the permeation standard of 0.4 grams per gallon per day. Tests are still underway to determine if this provides a permanent solution against the effects of permeation. It should be noted that the compliance test procedure for permeation requires only four weeks of preconditioning. However, there is also a concurrent durability test that has not been performed on these containers.

Table 1
Permeation Rates as A Function of Wall Thickness

Phase I (12 weeks)		Phase II (24 weeks)		Overall	
Wall Thickness (inches)	Average Rate (g/gal/day)	Wall Thickness (inches)	Average Rate (g/gal/day)	Combined Average (g/gal/day)	% Difference Phase I vs. Phase II
0.225	0.41	0.225	0.44	0.43	6.8%
0.200	0.52	0.200	0.55	0.54	5.5%
0.150	0.59	0.150	0.61	0.60	3.3%
0.080	0.93	0.080	0.96	0.95	3.1%

Figure 1

Comparision of Permeation Rates vs. Container Wall Thickness
0.225", 0.200"; 0.150", & 0.080" Wall Thickness Containers



To utilize this as a means to ensure compliance with the permeation standard, the data suggest that nominal wall thickness would have to be increased to approximately 0.250 inches. Several manufacturers have indicated that this may be an alternate approach to controlling permeation. According to one manufacturer, an increase in wall thickness to 0.250 inches would represent the upper limit of their production process before problems such as stress cracking and warping threaten to degrade the product. Increasing the wall to 0.250" would necessitate doubling the amount of raw materials per container and decreasing cycle times during production. Both of these changes would mean additional production costs. Another manufacturer indicated that increasing container wall thickness may prove to be an attractive alternative since it causes no logistical problems as found with off site treatment and does not require the installation of any new equipment. Manufacturers that are currently producing heavy wall thickness conventional gas cans could opt for this control strategy at an estimated cost of approximately $1.50 per container. Costs for those manufacturing lighter and thinner wall cans would be significantly higher as new molds would probably be required. In any case, this option appears to provide several manufacturers with at least an interim means of meeting the permeation standard until a more cost-effective control strategy could be put into place.

B. Selar™

Staff has also identified another means of reducing the effects of permeation by changing the raw materials used to mold gas cans. As previously stated, gas cans are routinely molded from HDPE. DuPont Automotive products makes a barrier resin called Selar RB™ that when mixed in small amounts with the HDPE used to mold gas cans, significantly reduces the effects of permeation. Selar RB™ has been effectively used in automotive fuel tanks to achieve a 98% reduction in permeation as compared to HDPE alone. In addition, this level of permeation reduction can be accomplished while using existing mono-layer blow molding equipment as well as existing molds.

By adding a 4 to 8% concentration of Selar™ in line at the blow molding machine and using controlled mixing of the molten HDPE and Selar™ blend, a tank is produced with many large discontinuous and overlapping barrier platelets within the HDPE structure. This provides an effective barrier that significantly reduces the effects of permeation. Over 1.5 million fuel tanks per year are now in production with Selar™. Assuming an average gas can contains two pounds of HDPE and using the full 8% concentration of Selar™, the cost associated with this type of barrier is $0.58 per container. Staff has forwarded this information to the gas can manufacturers for their review.

V. Findings, Conclusions and Recommendations

Staff has reviewed the progress that gas can manufacturers have made to comply with the performance standards the Board approved in September 1999. Staff has found that several manufacturers will have products compliant with the automatic shut-off, automatic closure, one opening, fill level, flow rate, and warranty performance standards in time for the January 1, 2001, effective date. The remaining issue for manufacturers seems to be choosing the most cost-effective control strategy to meet the 0.4 grams per gallon per day permeation standard.

Several manufacturers have requested relaxing the permeation standard since the emissions attributed to permeation only comprise approximately 8% of all the total emissions associated with the normal use of gas cans. The manufacturers assert that additional time will lower costs of compliance. The staff originally estimated that the cost of applying one of two available barrier treatments, fluorination and sulfonation would be approximately $0.50-$1.58 per container. Upon review of these estimated costs with current information, staff finds the original estimates valid. Staff also found that an infrastructure for off-site treatment is rapidly developing.

Additional testing by staff has identified nominal gas can wall thickening as a potentially viable strategy for achieving the permeation standard at least on an interim basis. Test data indicates that a gas can wall thickness of between 0.225 and 0.250 inches will likely result in compliance with the permeation standard. In discussions with manufacturers, staff found that this approach could readily be taken by some manufacturers at a cost of approximately $1.50 per container.

A fourth option of mixing Selar™ with HDPE has also been identified by staff. Staff finds this option potentially very cost effective at an estimated cost of $0.58 per container with minimal capital investment costs.

There is also a sell through provision in the adopted regulations. Any product manufactured before January 1, 2001 may be offered for sale in California for a period of up to one year, provided that the date of manufacture or representative date is clearly displayed on the product. This may provide manufacturers with a means of ensuring they have sufficient products to meet supply during the initial implementation period, while allowing them additional time, if necessary, to develop fully compliant products.

Based on further analysis of the cost effectiveness and technical feasibility of meeting the proposed permeation standard, staff recommends that the Board determine that no changes to the regulations approved in September, 1999, are necessary at this time.

State of California

AIR RESOURCES BOARD

Research Resolutions

Research Division

April 27, 2000

INTRODUCTION

Contained herein for Board review are resolutions and accompanying summaries to fund three projects from the Extramural Research Program recommended to the Board by the Research Screening Committee.

Item 1 is a research proposal from Battelle, entitled, "Refinement and Demonstration of a New Indoor Continuous Nitrogen Dioxide Monitor." The principal investigator will be Dr. Thomas J. Kelly.
Resolution No. 00-12

Item 2 is a research proposal from the University of California, Berkeley, entitled "Development of Reactivity Scales via 3-D Grid Modeling of California Ozone Episodes." The principal investigator will be Dr. Robert Harley.
Resolution No. 00-13

Item 3 is a research proposal from the University of California, Berkeley, entitled, "Demonstration of the High Volume Collection System (HVCS) for Direct Measurement of Mass Emission Rates of Hydrocarbon Leaks." The principal investigator will be Dr. Robert W. Dibble.
Resolution No. 00-14

AGENDA ITEM NO.: 00-4-5

PROPOSED

STATE OF CALIFORNIA
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Refinement and Demonstration of a New Indoor Continuous Nitrogen Dioxide Monitor

Resolution 00-12
April 27, 2000

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a research proposal, number 2450-213, entitled "Refinement and Demonstration of a New Indoor Continuous Nitrogen Dioxide Monitor", has been submitted by Battelle; and

WHEREAS, the Research Division staff have reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

> Proposal Number 2450-213 entitled "Refinement and Demonstration of a New Indoor Continuous Nitrogen Dioxide Monitor", submitted by Battelle, for a total amount not to exceed $89,947.

NOW, THEREFORE BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

> Proposal Number 2450-213 entitled "Refinement and Demonstration of a New Indoor Continuous Nitrogen Dioxide Monitor", submitted by Battelle, for a total amount not to exceed $89,947.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed $89,947.

Refinement and Demonstration of a New Indoor Continuous Nitrogen Dioxide Monitor

Background

The association between exposure to nitrogen dioxide (NO_2) and health impacts in large epidemiology studies is not fully understood, due to the lack of applicable real-time indoor NO_2 measurements. Preliminary results from ARB's Children's Health Study identified NO_2 as a major contributor to respiratory impacts in children; however, the investigators in that study relied on modeled estimates of indoor NO_2 when analyzing exposures. Indoor air quality and epidemiology studies conducted to date have had to rely on modeled results or less accurate, passive NO_2 samplers that collect samples over several days. These samples do not fully reflect the very high indoor levels of NO_2 that can occur during the use of gas stoves and heaters.

A unique, real-time indoor NO_2 and nitrous acid (HONO) sampler was recently developed by Battelle, under contract to the ARB. The monitor has a linear response over the expected range of indoor NO_2 concentrations (20 - 1,800 parts per billion [ppb]), although it has not been tested in California field conditions at concentrations higher than 250 ppb. Refinements to the monitor are needed for improved performance and more straightforward data reduction. Additional field testing in California environments is also needed to confirm the monitor's capabilities at concentrations near and above the one-hour ambient air quality standard of 250 ppb.

Objective

The objectives of this study are to refine indoor NO_2 /HONO monitors recently developed under ARB funding; to build three additional monitors; to document the accuracy, reliability, and ease of use of the improved models by using them in California field studies in progress; and train ARB staff in the use and maintenance of the monitors.

Expected Results

The ARB will receive seven portable indoor real-time NO_2 monitors for use in future health studies. Investigators will gather NO_2 data in several California studies in progress and fully document monitor performance in a variety of California field conditions. ARB staff and California investigators will become proficient in monitor use.

Significance to the Board

Availability of these monitors for use in future studies will enable ARB to measure indoor NO_2 levels and quantify the relationship between exposures to NO_2 and the resultant health impacts, such as asthma and other respiratory effects, in children. They will also enable ARB to quantify the contribution of gas stoves and other indoor sources to NO_2 exposures and better understand the relative contributions of indoor and outdoor NO_2 to total exposure levels.

Contractor:
Battelle

Contract Period
24 months

Principal Investigator (PI):
Thomas J. Kelly, Ph.D.

Contract Amount:
$89,947

Cofunding:
None

Basis for Indirect Cost Rate: A federal audit agency approved the indirect cost rates Battelle is charging on this contract. The audit letter accompanies the cost proposal.

Past Experience with this Principal Investigator: The PI performed the original development work for these monitors, and also conducted a formaldehyde emission study for ARB several years ago. He has extensive experience in NO_2 measurement methods. Staff has been very satisfied with the high quality of his work.

Prior Research Division Funding to Battelle:

Year	1999	1998	1997
Funding	$ 0	$ 0	$ 0

BUDGET SUMMARY

Battelle

Refinement and Demonstration of a New Indoor Continuous Nitrogen Dioxide Monitor

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 26,055	
2.	Subcontractors	$ 2,700	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 3,014[1]	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 0	
7.	Mail and Phone	$ 0	
8.	Supplies	$ 12,480[2]	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 0	
	Total Direct Costs		$ 44,249
INDIRECT COSTS			
1.	Overhead	$ 19,020	
2.	General and Administrative Expenses	$ 11,843	
3.	Other Indirect Costs	$ 8,708	
4.	Fee or Profit	$ 6,127	
	Total Indirect Costs		$ 45,698
TOTAL PROJECT COSTS			**$ 89,947**

[1]Travel:
Two trips from Ohio to California, each 4 days long, to deliver monitors, train California field personnel, and participate in the first few days of field study use.

[2]Supplies
All purchased parts are required for the assembly of the NO_2 monitors.

AGENDA ITEM NO.: 00-4-5

PROPOSED

STATE OF CALIFORNIA
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Development of Reactivity Scales via 3-D Grid Modeling of California Ozone Episodes

Resolution 00-13
April 27, 2000

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a research proposal, number 2448-213, entitled "Development of Reactivity Scales via 3-D Grid Modeling of California Ozone Episodes", has been submitted by the University of California, Berkeley, and

WHEREAS, the Research Division staff have reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

> Proposal Number 2448-213, entitled "Development of Reactivity Scales via 3-D Grid Modeling of California Ozone Episodes", submitted by the University of California, Berkeley, for a total amount not to exceed $20,000.

NOW, THEREFORE BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

> Proposal Number 2448-213, entitled "Development of Reactivity Scales via 3-D Grid Modeling of California Ozone Episodes", submitted by the University of California, Berkeley, for a total amount not to exceed $20,000.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed $20,000.

Development of Reactivity Scales via 3-D Grid Modeling of California Ozone Episodes

Background

The relative reactivity of a hydrocarbon describes how effective a hydrocarbon is at making ozone. A hydrocarbon's reactivity is not constant and can depend on several factors (e.g., hydrocarbon to NO_x ratio) that can vary throughout an airshed. A reactivity scale useful for regulatory purposes must reasonably describe the ozone-forming potential at any location in the airshed. However, in the first days of incorporating reactivity into regulation, computer computation limitations forced the use of a relatively simple air quality box model. The representativeness of the reactivity value calculated with the box model is a concern because the box model is not as complete as an airshed model in modeling the various factors that affect the reactivity of a hydrocarbon compound. Acquiring a more robust value would require the use of an airshed model with a chemical mechanism of similar detail.

Very recently, with the advancement of computer computational power and airshed modeling techniques, an airshed model was used to calculate reactivities of several hydrocarbon compounds. The calculated reactivity values compared well with the values derived with the box model, apparently indicating that the box model derived values from previous studies appropriately describe hydrocarbon compounds ozone-forming behavior throughout the entire airshed. However, only one episode has been investigated, in the Los Angeles area, and other episodes and areas in the state need to be analyzed to ensure that results are consistent.

Objective

The objective of this proposal is to augment ARB Contract No. 98-309, "Development of Reactivity Scales via 3-D Grid Modeling of California Ozone Episodes," by incorporating the most recent version of the chemical mechanism into the urban airshed models. The original contract was to determine hydrocarbon reactivity values using a urban airshed model, and to compare the calculated reactivity values to the maximum incremental reactivity values used in existing California regulation. A formal sensitivity and uncertainty analysis will also be performed for reactivity values derived with the urban airshed model. These results will be used to improve our current and future hydrocarbon reactivity-based regulations.

Expected Results

The expected results would be more technically defensible reactivity values for some hydrocarbons, a determination of the appropriateness of the current hydrocarbon reactivity methods, and a better understanding of the uncertainties associated with hydrocarbon reactivity values.

Significance to the Board
The next generation of hydrocarbon control strategies will utilize a more advanced concept of hydrocarbon reactivity. The results of this proposal would further the understanding of this more advanced concept and ensure the technical validity and defensibility of the hydrocarbon control plans and strategies developed to attain the ozone ambient air quality standard in California.

Contractor:
University of California, Berkeley

Contract Period:
12 months

Principal Investigator (PI):
Robert Harley, Ph.D.

Contract Amount:
$20,000

Cofunding:
None

Basis for Indirect Cost Rate: The indirect cost rate of 10 percent is a negotiated rate between the University of California campuses and the Air Resources Board.

Past Experience with this Principal Investigator: Professor Harley's performance on previous ARB's contracts has been excellent. He has provided the ARB with research of the highest quality, within the needed time frame and within budget. He consistently goes beyond the letter of the contract to give ARB a better product.

Prior Research Division Funding to UCB:

Year	1999	1998	1997
Funding	$3,883,029*	$ 390,524	$0

*Children's Asthma projects funded under the Vulnerable Populations Program.

BUDGET SUMMARY

University of California, Berkeley

Development of Reactivity Scales via 3-D Grid Modeling of California Ozone Episodes

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 4,589	
2.	Subcontractors	$ 12,000	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 2,660 [1]	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 0	
7.	Mail and Phone	$ 0	
8.	Supplies	$ 0	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 24	
	Total Direct Costs		$19,273
INDIRECT COSTS			
1.	Overhead	$ 727	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$ 727
TOTAL PROJECT COSTS			**$20,000**

[1] Travel to present results at a conference $2,660

Attachment A

SUBCONTRACTORS' BUDGET SUMMARY

University of Colorado, Boulder
Jana Milford

This subcontractor will provide computer programming and mathematical uncertainty analysis.

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 7,863	
2.	Subcontractors	$ 0	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 0	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 0	
7.	Mail and Phone	$ 0	
8.	Supplies	$ 0	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 385[1]	
	Total Direct Costs		$ 8,248
INDIRECT COSTS			
1.	Overhead	$ 3,752	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 3,752	
	Total Indirect Costs		$ 3,752
TOTAL PROJECT COSTS			**$ 12,000**

[1] Computer Maintenance

AGENDA ITEM NO.: 00-4-5

PROPOSED

STATE OF CALIFORNIA
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Demonstration of the High Volume Collection System (HVCS) for Direct Measurement of Mass Emission Rates of Hydrocarbon Leaks

Resolution 00-14
April 27, 2000

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a research proposal, number 2449-213, entitled "Demonstration of the High Volume Collection System (HVCS) for Direct Measurement of Mass Emission Rates of Hydrocarbon Leaks", has been submitted by the University of California, Berkeley; and

WHEREAS, the Research Division staff have reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

> Proposal Number 2449-213 entitled "Demonstration of the High Volume Collection System (HVCS) for Direct Measurement of Mass Emission Rates of Hydrocarbon Leaks", submitted by the University of California, Berkeley, for a total amount not to exceed $109,000.

NOW, THEREFORE BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

> Proposal Number 2449-213 entitled "Demonstration of the High Volume Collection System (HVCS) for Direct Measurement of Mass Emission Rates of Hydrocarbon Leaks", submitted by the University of California, Berkeley, for a total amount not to exceed $109,000.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed $109,000.

Demonstration of the High Volume Collection System (HVCS) for Direct Measurement of Mass Emission Rates of Hydrocarbon Leaks

Background

Fugitive hydrocarbon emissions from leaking pipelines, valves, flanges, and seals associated with natural gas, petroleum, and chemical production and processing facilities are an important source of volatile organic compound (VOC) emissions to the atmosphere. Current inspection and maintenance programs to control these sources are based on the United States Environmental Protection Agency (U.S. EPA) reference Test Method 21, a screening technique that is used to locate and assess the concentrations of such leaks. However, measuring the mass emission rate of leaking components would be a better indicator of the significance of leaks and the urgency of repairs.

Recently, a new measurement technique, called the High Volume Collection System (HVCS), was developed to directly measure mass emission rates of fugitive hydrocarbon leaks. A 1995 U.S. EPA study assessed the performance of the HVCS at various U.S. natural gas production facilities. Results from this study indicate that the HVCS is a workable mass emission rate measurement technique. The HVCS has not been evaluated at other sources such as petroleum production and processing facilities and chemical plants.

Objective

The study will demonstrate the HVCS as an acceptable method for direct measurement of mass emission rates of fugitive hydrocarbon leaks.

Expected Results

The study will demonstrate the HVCS to be intrinsically safe in operation and reliable in providing accurate and consistent measurements of mass emission rates of fugitive hydrocarbon leaks at various production and processing facilities.

Significance to the Board

The results from this study would provide the ARB and the air quality districts with additional information to use in considering whether the HVCS is an acceptable method for measuring mass emission rates from component leaks. The results from this study will also be used to better understand existing methodologies that estimate fugitive hydrocarbon emissions.

Contractor:
University of California, Berkeley

Contract Period:
24 months

Principal Investigator (PI):
Robert W. Dibble, Ph. D.

Contract Amount:
$109,000

Cofunding:
U.S. Department of Energy - $40,000; Gas Research Institute - $69,000 (in-kind)

Basis for Indirect Cost Rate: The indirect cost rate of 10 percent is a negotiated rate between the University of California campuses and the Air Resources Board.

Past Experience with this Principal Investigator: Dr. Dibble is a highly respected professor at UCB.

Prior Research Division Funding to UCB:

Year	1999	1998	1997
Funding	$3,883,029*	$390,524	$ 0

*Children's Asthma Projects funded under the Vulnerable Populations Program.

BUDGET SUMMARY

University of California, Berkeley

Demonstration of the High Volume Collection System (HVCS) for Direct Measurement of Mass Emission Rates of Hydrocarbon Leaks

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 83,520	
2.	Subcontractors	$ 0	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 6,000[1]	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 0	
7.	Mail and Phone	$ 0	
8.	Supplies	$ 4,201	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 5,433[2]	
	Total Direct Costs		$ 99,154
INDIRECT COSTS			
1.	Overhead	$ 9,846	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$ 9,846
TOTAL PROJECT COSTS			**$109,000**

[1]

One trip to Chicago	$1,500
One trip to North Carolina and to Oklahoma	2,000
Field measurements trips	2,500
	$6,000

[2] Safety certification fee paid to independent certification laboratory ($5,000); General, auto, employer, and liability fee ($433)