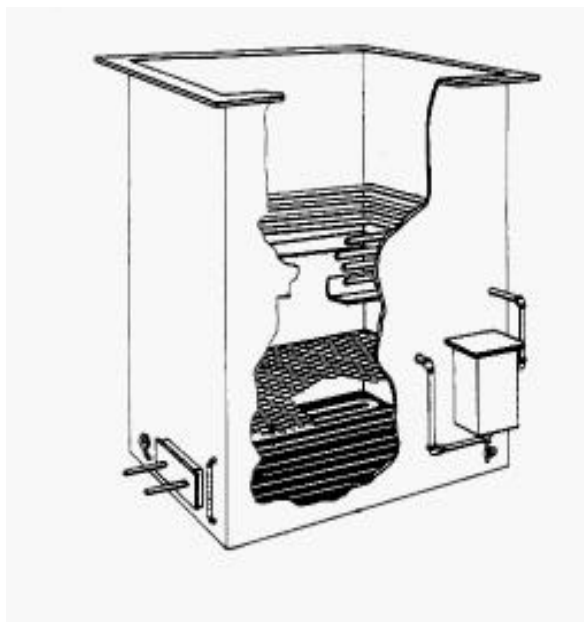


Senate Bill (SB) 1731 Risk Reduction Audits and Plans



Guidelines for Halogenated Solvents Degreasing Operations

Stationary Source Division
Emissions Assessment Branch

California Environmental Protection Agency
 **Air Resources Board**

November 1997

Acknowledgments

In appreciation for their participation in the development of these guidelines, the Air Resources Board staff extends their thanks to the following members of the workgroup for the Guidelines for Halogenated Solvent Degreasing Operations:

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Mike Fitzgibbon	Air Resources Board
Katherine Fortney	Bay Area Air Quality Management District
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Kelly Hughes	Air Resources Board
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Kim O'Rourke	Rockwell Rocketdyne Division
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Josh Scott	Armstrong Laboratories
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Richard Stedman	Santa Barbara County Air Pollution Control District
Peggy Taricco	Air Resources Board
Leland Villalvazo	San Joaquin Valley Unified Air Pollution Control District
Mark Williams	Air Resources Board
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Disclaimer

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Table of Contents

Description	Page
Introduction	1
Chapter 1 How to Develop a Risk Reduction Audit and Plan	5
A. STEP 1: How to Complete a Risk Reduction Audit	5
B. STEP 2: How to Develop a Risk Reduction Plan	6
C. STEP 3: How to Submit a Risk Reduction Audit and Plan to the District for Approval	7
D. STEP 4: How to Implement the Risk Reduction Audit and Plan and Reduce Your Risk Below the Significant Risk Level	7
E. Completing the Risk Reduction Audit and Plan for an Example Facility	7
Chapter 2 Risk Reduction Guidelines for Halogenated Solvent Cleaning Operations	19
A. Is Your Facility's Risk Greater Than the Significant Risk Level?	20
B. Is Cleaning Necessary?	21
C. Can Process Modifications be used to Reduce the Risk?	22
Chapter 3 Emissions and Risk Reduction Options from the Degreasing NESHAP ...	29
A. Overall Emission Limits	29
B. Control Combinations and Work Practice Standards for Vapor Cleaners	30
C. Idling Emission Limits for Vapor Cleaners	31
D. Requirements for Batch Cold Solvent Cleaning Machines	33
References	34
Appendix A Senate Bill 1731	A-1
Appendix B SB 1731 Risk Reduction Audit and Plans Worksheets and Instructions ...	B-1
Appendix C The National Emission Standard for Hazardous Air Pollutants: Halogenated Solvent Cleaning	C-1
Appendix D Alternatives to Halogenated Solvent Cleaning	D-1
Appendix E Department of Toxic Substances Control Publication List	E-1
Appendix F Some Helpful Information and Contacts	F-1

Description	Page
Appendix G Sample District Notification of Facility Risk Letter 	G-1

List of Tables

Table	Title	Page
Table 1-1	Currently Used Risk Reduction Options by Facility Operators	6
Table 2-1	Health and Environmental Effects of Halogenated Solvents	19
Table 2-2	Risk Reduction Options and Their Emission Reduction Potentials	23
Table 2-3	Percent Emission Reductions Due to Reductions in Room Draft Velocities	26
Table 2-4	Percent Emission Reductions Due to Reductions in Hoist Speeds to 11 ft/min	27
Table 3-1	Degreasing NESHAP Overall Emission Limits for Halogenated Solvent Cleaning Equipment	29
Table 3-2	Control Combinations for In-line Vapor Machines	30
Table 3-3	Control Combinations for Batch Vapor Machines	31
Table 3-4	Degreasing NESHAP Idling Emission Limits for Halogenated Solvent Cleaning Equipment	32
Table 3-5	Design and Work Practice Requirements for Batch and In-line Solvent Cleaning Machines	32
Table 3-6	Requirements for Batch Cold Solvent Cleaning Machines	33

List of Figures

Figure	Title	Page
Figure 1-1	Example Copy of Worksheet 1 for Machines A, B, and C	9
Figure 1-2	Example Copy of Worksheet 2 for Machine A	10
Figure 1-3	Example Copy of Worksheet 2 for Machine B	11
Figure 1-4	Example Copy of Worksheet 2 for Machine C	12
Figure 1-5	Example Copy of Worksheet 3 for Machine A	14
Figure 1-6	Example Copy of Worksheet 4 for Machine B	15
Figure 1-7	Example Copy of Worksheet 5 for Machine A	16
Figure 1-8	Example Copy of Worksheet 5 for Machine B	17
Figure 1-9	Example Copy of Worksheet 6 for Machines A, B, and C	18

INTRODUCTION

Why am I receiving these guidelines?

You are receiving these guidelines because Senate Bill (SB) 1731 requires the air pollution control and air quality management districts (districts) to notify facilities that have been identified as a significant risk or unreasonable risk facility. This notification is based, in part, on your facility's toxic air contaminant (TAC) emissions from solvent cleaning operations. The halogenated solvents that can be used in solvent cleaning operations include methylene chloride, trichloroethylene, perchloroethylene, carbon tetrachloride, 1,1,1-trichloroethane, chloroform, and 1,1,2-trichloro-1,2,2-trifluoroethane. Some of these solvents have the potential to cause adverse health effects in humans, such as cancer and other acute and chronic illnesses, while others can contribute to stratospheric ozone depletion. If the district has notified you that your facility exceeds their significant risk level due to TAC emissions from solvent cleaning operations, you must comply with the requirements of SB 1731. This document is designed to assist those solvent degreasing facilities that have a potential risk greater than the district's significant risk level.

What is SB 1731?

In 1987, Governor George Deukmejian signed into law Assembly Bill (AB) 2588, the Air Toxics "Hot Spot" Information and Assessment Act of 1987. This law established a statewide program for the inventory of air toxics emissions from individual facilities as well as requirements for risk assessment and public notification of potential risks. In 1992, Governor Pete Wilson signed into law SB 1731, which added a risk reduction element to the Air Toxic "Hot Spots" Information and Assessment Act of 1987. SB 1731 specifies the roles of industry, the districts, and the California Air Resources Board (ARB) with regard to facilities with emissions that may result in significant impacts on public health. The following explains the requirements of SB 1731. Appendix A contains a copy of SB 1731.

What does SB 1731 require?

SB 1731 requires facility operators to conduct a risk reduction audit of their facility and to develop a risk reduction plan if a district has identified the facility as having a significant or unreasonable risk. The risk reduction plan must identify the actions a facility operator will take to reduce the facility's risk below the significant risk level within five years.

What are these guidelines?

These guidelines will assist you in complying with the requirements of SB 1731. The guidelines contain a self conducted audit and checklist and will help you determine possible actions to reduce risk. The self conducted audit and checklist, which when completed, may serve as a risk reduction plan if approved by the district.

What is a significant risk?

Significant risk levels are risk levels above which emissions from a facility can potentially have adverse impacts on the health of the neighboring community. Any facility above the significant risk level is considered a "significant risk facility." Significant risk levels are established by the district. For example, some districts have identified significant risk levels of 10 per million cancer risk, or a noncancer total acute or chronic hazard index of 1.0. Please contact your district to determine the significant risk level for your area.

What is an unreasonable risk?

Unreasonable risk levels may be considered to be more severe than significant risk levels. They are risk levels above which emissions from your facility potentially pose an unreasonable risk to the neighboring community. Unreasonable risk levels are also established by the district. For example, some districts have identified unreasonable risk levels of 100 per million cancer risk with significant risk levels of 10 per million cancer risk. Other districts have identified unreasonable risk levels that are identical to the significant risk levels. The requirements for facilities with an unreasonable risk are slightly different than the requirements for facilities with a significant risk. A facility with an unreasonable risk must reduce the risk as soon as possible. Please contact your district to determine the unreasonable risk level for your area.

How do I know if I am a significant risk facility?

Your district will notify you if you are a significant risk facility. In general, the district will let you know the following:

what your risk is,
and
what chemicals you are emitting cause the risk,
and
what process is emitting these chemicals.

How is the risk from my facility determined?

Either the district will determine your facility's risk based on an industry-wide risk assessment and inform you of the result, or the district will approve the risk assessment you conducted for the Hot Spots Program. If the district performed an industry-wide risk assessment for your facility and you believe your facility's risk is different from the typical facility used, you may have a facility-specific emission inventory and risk assessment performed at your own expense.

What am I required to do to comply if I am an unreasonable or significant risk facility?

The four basic steps to complying with SB 1731 are listed below:

STEP 1: Complete a Risk Reduction Audit. Upon notification, you should conduct a risk reduction audit of your facility. The risk reduction audit will help you to identify various risk reduction options available for your current operation. A risk reduction audit contains a summary of the emission control and risk reduction equipment and practices performed in your solvent cleaning operations. Chapter 1 will assist you in completing an audit for your facility. Blank copies of Worksheets 1 and 2 and instructions on how to complete the worksheets can be found in Appendix B.

STEP 2: Develop a Risk Reduction Plan. A risk reduction plan maps out how you intend to reduce the risk from your solvent cleaning operation below the significant risk level. Once you have identified the risk reduction options that are available for your operation, you need to evaluate them based on:

- * Risk reduction potential
- * Technological feasibility
- * Economic practicability

Technical feasibility and economic practicability are dependent upon your specific facility. For example, increasing your stack height may not be feasible because of local building codes or unreasonable costs. Chapters 2 and 3 will assist you in developing a risk reduction plan for your solvent cleaning operation. Worksheets 3, 4, 5, and 6 can be used to develop your risk reduction plan if the district has indicated they will accept them. Developing several draft plans may help you determine the best combination of options that will produce the greatest risk reduction. In developing a risk reduction plan, the options you choose should also help you to meet the requirements of the Degreasing NESHAP, which is discussed in Chapter 3.

STEP 3: Submit a Risk Reduction Audit and Plan to the District for Approval. Once you have been notified by the district that your facility is an unreasonable or significant risk facility, you have six months to submit your risk reduction audit and plan to the district for approval. The district then has three months to notify you whether or not the plan was approved. If your plan was disapproved, you have ninety days to revise and resubmit a risk reduction plan to the district.

STEP 4: Implement the Risk Reduction Audit and Plan and Reduce Your Risk Below the Significant Risk Level. Once your plan is approved, you have up to five years to implement the plan to reduce your facility's risk below the district's significant risk level. The district has the option to reduce the five year compliance time to a shorter period. Worksheet 5 can be used to indicate your expected schedule for implementing the chosen option of the risk reduction plan.

How were the risk reduction options chosen?

The ARB, districts, and industry representatives formed a workgroup. The goal of the workgroup was to research and identify risk reduction options available to facilities to reduce toxic air contaminant emissions from solvent cleaning operations. The risk reductions options that the workgroup identified and their emission reduction potentials are listed in Table 1-2. If you want to implement risk reduction options not identified in Table 1-2, you can submit these alternative risk reduction options and supporting documentation with your risk reduction audit and plan to the district for approval.

What if the options I have chosen do not get me below the significant risk level?

If the options you have selected from Table 1-2 do not reduce your risk below the significant risk level, there are several things that you can do.

- You can perform a facility specific risk assessment to obtain a more detailed analysis of your facility risk. This risk assessment may indicate that your facility's risk is different than previously determined.
- You can propose control options that will result in greater emission reductions.
- If you are unable to implement the plan that would reduce your risk to below the significant risk level within five years, contact the district for further guidance.

What is the relationship between SB 1731 and the Degreasing NESHAP?

In developing a risk reduction audit and plan, you should also consider the requirements for complying with the United States Environmental Protection Agency's (U.S. EPA) National Emission Standard for Hazardous Air Pollutants: Halogenated Solvent Cleaning (Degreasing NESHAP). The Degreasing NESHAP is the State airborne toxic control measure for halogenated solvent cleaning operations and, as such, facilities are required to comply with those requirements. The risk reduction options presented in this document can be used to help you comply with not only the SB 1731 risk reduction audit and plan, but also with the requirements of the Degreasing NESHAP. Compliance with the Degreasing NESHAP is mandatory; however, it does not guarantee that your facility's risk will be below the significant risk level in your district. Therefore, you may have to implement additional risk reduction measures.

CHAPTER 1

HOW TO DEVELOP A RISK REDUCTION AUDIT AND PLAN

This chapter provides instruction on how to complete a risk reduction audit and plan to comply with SB 1731. This chapter also describes how to complete six worksheets that are the basis for developing the risk reduction audit and plan for your facility. These worksheets are located in Appendix B along with instructions on how to complete them. The worksheets summarize the risk reduction options that you have chosen to reduce emissions and risk from your facility. This chapter also contains an example on how to complete these worksheets for a hypothetical facility, XYZ Industrial Cleaners. However, if your facility has other process operations that contribute to your overall risk, you may have to develop a more comprehensive risk reduction audit and plan to account for all the process operations. To assist you in this effort, please refer to the report entitled Senate Bill (SB) 1731 Risk Reduction Audits and Plans - General Guidance for Preparing Risk Reduction Plans, available through the ARB.

A. STEP 1: HOW TO COMPLETE A RISK REDUCTION AUDIT

Completing a risk reduction audit is the first step in complying with the requirements of SB 1731. A risk reduction audit is an inventory of the emission control and risk reduction equipment and practices currently used in your solvent cleaning operations. You should do an audit for each solvent cleaning machine currently operated at your facility. This audit allows you to determine which control options remain available for evaluation. Use Worksheet 1 to list each solvent cleaning machine in operation at your facility and the solvent used in each machine. Use this worksheet to estimate the risk contribution of each machine based on the amount of solvent used by each machine.

Table 1-1 lists some of the emission controls and risk reduction equipment and practices that you may be using at this time. These are also listed on Worksheet 2, "Risk Reduction Audit Worksheet for Halogenated Solvents Degreasing Equipment." Using Worksheet 2, place a check mark next to each control option currently used in your solvent cleaning operation. NOTE: You may include risk reduction options implemented subsequent to your facility's risk assessment on Worksheet 3, "Risk Reduction Plan Worksheet for Halogenated Solvents Degreasing Operations." If you operate more than one solvent cleaning machine, complete Worksheet 1 for your entire facility. In addition, you will have to complete Worksheet 2 for each solvent cleaning machine at your facility. Chapter 2 contains information that can assist you in completing an audit for your facility. For example, "Appropriate Dwell" is defined in Chapter 2 as no less than 35 percent of the time needed for a part to cease dripping once placed in the vapor zone. If your operation currently has a dwell time that meets the appropriate dwell time requirement, you should check the box for "Appropriate Dwell" on Worksheet 2.

Table 1-1
Currently Used Risk Reduction Options By Facility Operators

Risk Reduction Options
Working mode cover
Freeboard ratio of 0.75
Freeboard ratio of 1.0
Freeboard ratio of 1.25
Above- or below-freezing freeboard chillers
Room drafts \leq 30 feet per minute
Lip exhausts ducted to a carbon adsorber
Hoist speed \leq 11 ft/min
Appropriate dwell time
Superheated vapor
Closed-loop equipment
Aqueous cleaning system

Source: EPA, 1993

B. STEP 2: HOW TO DEVELOP A RISK REDUCTION PLAN

A risk reduction plan maps out how you intend to reduce the risk from your solvent cleaning operation(s). To develop a risk reduction plan, you must choose a control strategy or strategies that will reduce the risk from your facility below the significant risk level. There are several ways to achieve the needed risk reductions. One approach to reduce risk is to limit the emissions of the toxic solvents through the implementation of various control options. In assessing these control options, you will also need to insure that these options can comply with the Degreasing NESHAP.

Another approach is to stop using the solvent that creates (or drives) the risk. To do this, you could either convert your solvent cleaning operation to an alternative aqueous cleaning system or switch to a more benign solvent. In choosing an alternative solvent, the solvent must meet the requirements of both the Degreasing NESHAP and the U.S. EPA's Significant New Alternatives Policy (SNAP) program. The SNAP program was developed by the U.S. EPA to approve alternative solvents for those solvents that are listed as stratospheric ozone depleters (ODC). Although perchloroethylene, methylene chloride, and trichloroethylene are not considered ODCs, any alternative chosen to replace them must comply with the Degreasing NESHAP and be approved under the SNAP program.

The information in Chapters 2 and 3 will assist you in evaluating the various methods that can be used to reduce your risk. Chapter 2 discusses various emission reduction techniques and Chapter 3 contains a description of the Degreasing NESHAP, which includes summaries of the various equipment and control combinations listed as compliance options in the Degreasing NESHAP. Appendix C contains a copy of the Degreasing NESHAP as it appeared in the Federal Register. A summary of the SNAP program are provided in Appendix D. The options presented in Chapter 2 can be used in specific combinations to comply with the equipment and work practice requirements of the Degreasing NESHAP.

C. STEP 3: HOW TO SUBMIT A RISK REDUCTION AUDIT AND PLAN TO THE DISTRICT FOR APPROVAL

Once you have completed the risk reduction audit and plan, it must be reviewed and certified as meeting the requirements of SB 1731 by one of the following:

- 1) an engineer who is registered as a professional engineer pursuant to Section 6762 of the Business and Professions Code;
- 2) by an individual who is responsible for the processes and operations of the site; or
- 3) by an environmental assessor registered pursuant to Section 25570.3.

After this, your risk reduction audit and plan can be submitted to the district for approval.

D. STEP 4: HOW TO IMPLEMENT THE RISK REDUCTION AUDIT AND PLAN AND REDUCE YOUR RISK BELOW THE SIGNIFICANT RISK LEVEL

Once your risk reduction audit and plan has been approved by the district, you must implement the approved plan and reduce your facility's risk in the time frame outlined in the plan. If, however, you find that you are having difficulty in meeting the schedule requirements, you must notify the district and work with them in revising your risk reduction audit and plan to satisfy the requirements of SB 1731.

E. COMPLETING THE RISK REDUCTION AUDIT AND PLAN FOR AN EXAMPLE FACILITY

The following example illustrates how to complete your risk reduction audit and plan. XYZ Industrial Cleaners operates three solvent cleaning machines that use perchloroethylene (Perc) as the cleaning solvent. Machines A, B, and C annually consume 250, 100, and 50 gallons of Perc, respectively. In this example, Machines A, B, and C currently operate with a freeboard ratio of 0.75 (75 percent), and use an automatic hoist with a maximum speed of 11 feet per minute. Machine C also operates with a superheated vapor system. The owner of the facility, Mr. John Smith, decides to comply with SB 1731 by modifying Machine A, converting the operation of Machine B to an aqueous system, and to continue operation of Machine C as usual.

In completing the various worksheets, you need to refer to the instructions for each worksheet. Also, Chapter 2 contains a more detailed discussion on how to estimate the risk reductions associated with each control option.

Completing a Risk Reduction Audit

To comply with SB 1731, the first step is to complete a risk reduction audit of each machine. Because the facility operates more than one machine, both Worksheets 1 and 2 must be completed. Copies of Worksheet 2 must be completed for each of the three machines. Figures 1-1, 1-2, 1-3, and 1-4 show how the completed worksheets should appear when completed.

Figure 1-1
Example Copy of Worksheet 1 for Machines A, B, and C

WORKSHEET 1 Risk Reduction Audit Worksheet for Degreasing Equipment Estimation of Risk Contributions			
Facility Name:	XYZ Industrial Cleaners		
Facility Address:	456 Main Street		
	Any Town, California		
Contact Person:	John Smith		
Facility ID Number:	K-123	Health Risk Assessment Value: 200	
DISCONTINUED USE OF SOLVENT <input type="checkbox"/> GO TO WORKSHEET 4			
Facility risk due to solvent cleaning: 200 per million (provide by the risk assessment)			
Solvent Name	Annual Solvent Consumption (gallons)	Risk Due to Solvent Consumed (per million)	
Perc	400	200	
Risk Contribution of Each Machine: $\text{Risk contribution of Machine A} = \text{Facility Risk} \times (\text{Solvent A} \div \text{Total Solvent})$			
Machine	Machine Permit Number (if any)	Annual Solvent Consumption (gallons)	Risk Contribution (per million)
A	A12345	250	125
B	B12345	100	50
C	C12345	50	25
D			
E			

Figure 1-2
Example Copy of Worksheet 2 for Machine A

WORKSHEET 2 Risk Reduction Audit Worksheet for Halogenated Solvents Degreasing Equipment																									
Facility Name:	XYZ Industrial Cleaners																								
Facility Address:	456 Main Street																								
	Any Town, California																								
Contact Person:	John Smith																								
Facility ID Number:	K-123	Machine Permit Number:	A12345																						
Health Risk Assessment Value:	200	Risk Contribution:	125																						
		(If you operate two or machines.)																							
DISCONTINUED USE OF SOLVENT		<input type="checkbox"/>	GO TO WORKSHEET 4																						
Summary of Existing Control Options:																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">RISK REDUCTION OPTIONS</th> </tr> </thead> <tbody> <tr><td align="center"><input checked="" type="checkbox"/></td><td>Working Mode Cover</td></tr> <tr><td align="center"><input checked="" type="checkbox"/></td><td>Freeboard Ratio of 0.75</td></tr> <tr><td align="center"><input type="checkbox"/></td><td>Freeboard Ratio of 1.0</td></tr> <tr><td align="center"><input type="checkbox"/></td><td>Freeboard Ratio of 1.25</td></tr> <tr><td align="center"><input type="checkbox"/></td><td>Increased Dwell</td></tr> <tr><td align="center"><input type="checkbox"/></td><td>Above or below freezing refrigerated freeboard chillers</td></tr> <tr><td align="center"><input type="checkbox"/></td><td>Lip exhausts ducted to a carbon adsorber</td></tr> <tr><td align="center"><input checked="" type="checkbox"/></td><td>Hoist speed of 11 feet per minute or less.</td></tr> <tr><td align="center"><input type="checkbox"/></td><td>Superheated Vapor</td></tr> </tbody> </table>				RISK REDUCTION OPTIONS		<input checked="" type="checkbox"/>	Working Mode Cover	<input checked="" type="checkbox"/>	Freeboard Ratio of 0.75	<input type="checkbox"/>	Freeboard Ratio of 1.0	<input type="checkbox"/>	Freeboard Ratio of 1.25	<input type="checkbox"/>	Increased Dwell	<input type="checkbox"/>	Above or below freezing refrigerated freeboard chillers	<input type="checkbox"/>	Lip exhausts ducted to a carbon adsorber	<input checked="" type="checkbox"/>	Hoist speed of 11 feet per minute or less.	<input type="checkbox"/>	Superheated Vapor		
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	Operate closed-loop system																								

Figure 1-3
Example Copy of Worksheet 2 for Machine B

WORKSHEET 2 Risk Reduction Audit Worksheet for Halogenated Solvents Degreasing Equipment			
Facility Name:	<u>XYZ Industrial Cleaners</u>		
Facility Address:	<u>456 Main Street</u>		
	<u>Any Town, California</u>		
Contact Person:	<u>John Smith</u>		
Facility ID Number:	<u>K-123</u>	Machine Permit Number:	<u>B12345</u>
Health Risk Assessment Value:	<u>200</u>	Risk Contribution:	<u>50</u>
		(If you operate two or machines.)	
DISCONTINUED USE OF SOLVENT		<input type="checkbox"/> GO TO WORKSHEET 4	
Summary of Existing Control Options:			
RISK REDUCTION OPTIONS		RISK REDUCTION OPTIONS	
X	Working Mode Cover		Automated Process
X	Freeboard Ratio of 0.75		Enclosed Equipment
	Freeboard Ratio of 1.0		Surface drafts of 30 feet per minute or less
	Freeboard Ratio of 1.25		Operate closed-loop system
	Increased Dwell		
	Above or below freezing refrigerated freeboard chillers		
	Lip exhausts ducted to a carbon adsorber		
X	Hoist speed of 11 feet per minute or less.		
	Superheated Vapor		

Figure 1-4
Example Copy of Worksheet 2 for Machine C

WORKSHEET 2 Risk Reduction Audit Worksheet for Halogenated Solvents Degreasing Equipment																					
Facility Name:	XYZ Industrial Cleaners																				
Facility Address:	456 Main Street																				
	Any Town, California																				
Contact Person:	John Smith																				
Facility ID Number:	K-123																				
Machine Permit Number:	C12345																				
Health Risk Assessment Value:	200																				
Risk Contribution:	25																				
	(If you operate two or machines.)																				
DISCONTINUED USE OF SOLVENT <input type="checkbox"/> GO TO WORKSHEET 4																					
Summary of Existing Control Options:																					
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X	Hoist speed of 11 feet per minute or less.																				
X	Superheated Vapor																				
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center; padding: 5px;">RISK REDUCTION OPTIONS</th> </tr> </thead> <tbody> <tr> <td style="width: 5%;"></td> <td>Automated Process</td> </tr> <tr> <td></td> <td>Enclosed Equipment</td> </tr> <tr> <td></td> <td>Surface drafts of 30 feet per minute or less</td> </tr> <tr> <td></td> <td>Operate closed-loop system</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table>		RISK REDUCTION OPTIONS			Automated Process		Enclosed Equipment		Surface drafts of 30 feet per minute or less		Operate closed-loop system										
RISK REDUCTION OPTIONS																					
	Automated Process																				
	Enclosed Equipment																				
	Surface drafts of 30 feet per minute or less																				
	Operate closed-loop system																				

Completing a Risk Reduction Plan

Completing the risk reduction plan for this facility requires that Worksheet 3 be completed for Machine A and Worksheet 4 for Machine B. A risk reduction plan for Machine C is not necessary because there will be no changes in the operation of Machine C. Worksheet 5 must also be completed to summarize the changes and report the implementation dates for the entire facility and to estimate the final risk of the facility once the plan is implemented. Figures 1-5, 1-6, 1-7, 1-8, and 1-9 are examples of completed copies of Worksheets 3, 4, 5, and 6 for XYZ Industrial Cleaners.

Figure 1-5
Example Copy of Worksheet 3 for Machine A

WORKSHEET 3 Risk Reduction Plan Worksheet for Halogenated Solvents Degreasing Operations			
Facility Name:	XYZ Industrial Cleaners		
Facility ID Number:	K-123	Facility Risk:	200 per million
Machine Permit No.:	A12345	Risk Contribution:	125 per million
Summary of Potential Risk Reduction Options: Equipment Modifications			
A	B RISK REDUCTION OPTIONS	C EP	D
	Working Mode Cover	0.4	
X	Increase Freeboard Ratio from 0.75 to 1.0.	0.8	0.8
	Increase Freeboard Ratio from 1.0 to 1.25 or more.	0.9	
X	Increase dwell time to 15 seconds or more.	0.7	0.7
	Add above or below refrigerated freeboard chillers.	0.6	
	Add lip exhausts ducted to a carbon adsorber.	0.4	
X	Reduce surface drafts to 30 feet per minute or less (see Table 2-3).	0.5	0.5
	Reduce hoist speed to 11 feet per minute or less (see Table 2-4).	0.7	
	Employ superheated vapor.	0.5	
	Enclose process and duct vapor with enhanced ventilation.	0.3	
	Enclose process and duct vapor to a carbon adsorber with enhanced ventilation.	0.1	
	Install closed-loop equipment (Equipment Replacement)	0.05	
Combination Emission Potential (CEP)			0.28
CEP <u>0.28</u> x Risk Contribution <u>125</u> = Estimated Final Risk (Contribution)			
			35

Figure 1-6
Example Copy of Worksheet 4 for Machine B

WORKSHEET 4	
Risk Reduction Plan Worksheet for	
Halogenated Solvents Degreasing Operations	
Replacement Summary	
Facility Name:	XYZ Industrial Cleaners
Facility ID Number:	K-123
Summary of Potential Risk Reduction Options: Process Replacement	
Machine Permit Number	B12345
Annual Solvent Used by the replaced machine	100 gallons
The type of aqueous cleaning agent (attach material safety data sheets if they are available)	Alkaline Detergent pH = 11
The VOC content of the cleaning agent;	0.5 %
The type of cleaning apparatus used	Immersion bath cleaner
The solvent savings for the replacement of the solvent cleaning	100 gallons

Figure 1-7
Example Copy of Worksheet 5 for Machine A

WORKSHEET 5 Risk Reduction Plan Worksheet for Halogenated Solvents Degreasing Operations: Facility Summary of Risk Reduction Plans		
Facility Name:	XYZ Industrial Cleaners	
Facility ID Number:	K-123	
Fill in permit number and the risk contribution for each solvent cleaning machine at your facility and place a check mark in the box for each selected option from Worksheets 3 and 4 .		
Risk Reduction Option Implementation Schedule for Machine <u>A12345</u> <small>(Permit number)</small>		
	RISK REDUCTION OPTIONS	Expected Implementation Date
	Working Mode Cover	
X	Increase Freeboard Ratio from 0.75 to 1.0.	01 Jan 03
	Increase Freeboard Ratio from 1.0 to 1.25 or more.	
X	Increase dwell time to 15 seconds or more.	01 Jan 03
	Add above or below refrigerated freeboard chillers.	
	Add lip exhausts ducted to a carbon adsorber.	
X	Reduce surface drafts to 30 feet per minute or less.	01 Jan 00
	Reduce hoist speed to 11 feet per minute or less.	
	Employ superheated vapor.	
	Enclose process and duct vapor with enhanced ventilation.	
	Enclose process and duct vapor to a carbon adsorber with enhanced ventilation.	
	Install closed-loop equipment.	
	Convert to alternative cleaning process (see Worksheet 4).	

Figure 1-8
Example Copy of Worksheet 5 for Machine B

WORKSHEET 5 Risk Reduction Plan Worksheet for Halogenated Solvents Degreasing Operations: Facility Summary of Risk Reduction Plans		
Facility Name:	XYZ Industrial Cleaners	
Facility ID Number:	K-123	
Fill in permit number and the risk contribution for each solvent cleaning machine at your facility and place a check mark in the box for each selected option from Worksheets 3 and 4 .		
Risk Reduction Option Implementation Schedule for Machine <u>B12345</u> <small>(Permit number)</small>		
	RISK REDUCTION OPTIONS	Expected Implementation Date
	Working Mode Cover	
	Increase Freeboard Ratio from 0.75 to 1.0.	
	Increase Freeboard Ratio from 1.0 to 1.25 or more.	
	Increase dwell time to 15 seconds or more.	
	Add above or below refrigerated freeboard chillers.	
	Add lip exhausts ducted to a carbon adsorber.	
	Reduce surface drafts to 30 feet per minute or less.	
	Reduce hoist speed to 11 feet per minute or less.	
	Employ superheated vapor.	
	Enclose process and duct vapor with enhanced ventilation.	
	Enclose process and duct vapor to a carbon adsorber with enhanced ventilation.	
	Install closed-loop equipment.	
<input checked="" type="checkbox"/>	Convert to alternative cleaning process (see Worksheet 4).	01 Jan 03

Figure 1-9
Example Copy of Worksheet 6 for Machines A, B, and C

WORKSHEET 6 Risk Reduction Plan Worksheet for Halogenated Solvents Degreasing Operations: Facility Summary of Risk Reduction Plans			
Facility Name:	XYZ Industrial Cleaners		
Facility ID Number:	K-123		
Facility risk due to solvent cleaning:	200 per million		
Fill in permit number and the risk contribution for each solvent cleaning machine at your facility from Worksheet 1.			
Machine	Machine Permit Number	Original Risk Contribution (per million)	Final Risk Contribution (per million)
A	A12345	125	35
B	B12345	50	0
C	C12345	23	25
D			
E			
F			
Final Facility Risk (per million)			<div style="border: 2px solid black; padding: 5px; display: inline-block;">60</div>
These audit and plans must be reviewed and certified as meeting the requirements of Health and Safety Code (HSC) Sections 44390 - 44394 by an engineer who is registered as a professional engineer pursuant to Section 6762 of the Business and Professions Code, by an individual who is responsible for the processes and operations of the site, or by an environmental assessor registered pursuant to Section 25570.3.			
Signature: _____		Date: _____	
I certify that this plan meets the requirements of HSC Sections 44390 - 44394.			

CHAPTER 2

RISK REDUCTION GUIDELINES FOR

HALOGENATED SOLVENT CLEANING OPERATIONS

This chapter provides information on solvents and the various emission reduction options for solvent cleaning. Also included in this chapter is a discussion of how to approximate your facility's potential risk reduction from implementing the various options. The options listed can be used to comply with the equipment and work practice requirements of the Degreasing NESHAP .

The halogenated solvents that are primarily used for solvent cleaning operations are perchloroethylene (Perc), methylene chloride (MeCl_2), 1,1,1-trichloroethane (TCA), trichloroethylene (TCE), and 1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113). Chloroform and carbon tetrachloride have been used in solvent cleaning in the past, but are not known to be used in California today. These solvents have the potential to cause adverse health effects in humans, such as cancer and other acute and chronic illnesses and other environmental impacts, such as ozone formation or stratospheric ozone depletion. The ARB has identified all but CFC-113 as toxic air contaminants (TACs). Similarly, the U.S. EPA has listed all but CFC-113 as hazardous air pollutants (HAPs). Because of these health and environmental impacts, various federal, state, and local governmental agencies regulate their emissions to the air, discharges to the sewer, ground water, and soil, disposal, and worker exposure to these solvents. Table 2-1 summarizes various health and environmental effects of these compounds.

Table 2-1
Health and Environmental Effects of Halogenated Solvents

Solvent	TAC^a	HAP^b	VOC^c	PEL^d	ODP^e	Potency Factor ($\times 10^{-6}$)^f
Perc	yes	yes	no	25	--	6
MeCl_2	yes	yes	no	25	--	1
TCE	yes	yes	yes	50	--	2
TCA	yes	yes	no	350	0.1	--
CFC-113	no	no	no	1000	0.8	--
Chloroform	yes	yes	yes	2	--	5
Carbon Tetrachloride	yes	yes	yes	2	--	42

- a. TAC: Identified by the ARB as a toxic air contaminant. (ARB, 1993)
- b. HAP: Listed by the U.S. EPA as a hazardous air pollutant. (ARB, 1993)
- c. VOC: Listed by the U.S. EPA as a volatile organic compound.
- d. PEL: Permissible exposure limit (in parts per million) established by the California Occupational Safety and Health Administration which is the maximum concentration that an employee can be exposed to continuously for eight hours. (Cal/OSHA, 1993)
- e. ODP: Ozone depletion potential, which is the compound's relative ability to deplete the ozone layer based on an ODP of unity for CFC-11 (trichlorofluoromethane). (IRTA, 1994)
- f. This is the potential number of cancer cases expected per million individuals continuously exposed to a concentration of 1.0 micrograms per cubic meter over 70 years. (CAPCOA, 1993)

A. IS YOUR FACILITY'S RISK GREATER THAN THE SIGNIFICANT RISK LEVEL?

Calculating the Risk Reduction Necessary

The notice you received from the district should indicate that your facility's risk is greater than the significant risk level set by the district. If your facility's risk is above the significant risk level, you can use the following equation to calculate the percentage of risk reduction needed to get below the significant risk level.

$$\text{Risk Reduction Required (\%)} = \frac{\text{Facility Risk} - \text{Significant Risk}}{\text{Facility Risk}} \times 100$$

This value can help indicate the type of options you should choose to reduce your risk. A small risk reduction percentage can indicate the need for minor changes, such as operation and maintenance modifications. A large percentage can indicate the potential need for major equipment modification or process changes like switching to an aqueous cleaning system.

Calculating the Risk Contributions of Multiple Machines

If a facility operates more than one solvent cleaning machine, then each machine's contribution to the risk must be estimated. If only one solvent is used in all the solvent cleaning machines, the risk contribution of each machine is closely proportional to the relative amounts of solvent used by each machine. Therefore, the risk contribution of each machine can be estimated as follows:

$$R_X = R_T \left(\frac{S_X}{S_T} \right)$$

Where R_X = Risk contribution of machine X

R_T = Total risk for the facility

S_X = Solvent consumed annually by machine X

S_T = Total annual solvent consumption of the facility

When using this equation, you will need to know the amount of each solvent used annually by each machine. For example, a facility uses 400 gallons of Solvent Q annually and has a risk of 200 per million. This facility has three solvent vapor cleaning machines. Machine A consumes 250 gallons of solvent Q annually, Machine B uses 100 gallons, and Machine C uses 50 gallons.

The risk contribution of each machine would be calculated as follows using the above equation:

$$R_A = 200 \left(\frac{250}{400} \right) = 125$$

$$R_B = 200 \left(\frac{100}{400} \right) = 50$$

$$R_C = 200 \left(\frac{50}{400} \right) = 25$$

Therefore, the risk contribution of Machine A is 125 per million; Machine B is 50 per million, and Machine C is 25 per million.

B. IS CLEANING NECESSARY?

This is an important question in evaluating potential emissions reduction options for solvent cleaning. The process performed immediately prior to cleaning and the subsequent processes must be evaluated to determine if these processes can be altered to allow for one of the “no clean” processes. The resulting solvent savings from not having to clean the parts would lead to emission and risk reductions for that process. Modifications to your processes can eliminate the need for solvent cleaning. Examples of these processes are as follows:

Milled Metal Products

Milled metal products are coated in oil to provide a short term barrier between the metal and corrosive effects of atmospheric oxygen. Oil formulations can be evaluated to find those that are compatible with the metal and subsequent processing in an effort to eliminate the need for cleaning. Some examples of these products include oils that can be welded over, oils that vaporize (i.e.: vanishing oils), and water-based lubricants. Some water-based lubricants can be painted over without cleaning or can be put through welding and brazing systems without cleaning. There are also waterborne paint systems that are compatible with water-based lubricants that do not have to be cleaned.

Printed Circuit Boards

For printed circuit (PC) boards, typical fluxes that are rosin-based contain 25 to 30 percent solids. There are "no clean fluxes" available which contain three to five percent solids. The remaining solids do not have to be removed for subsequent processing, thus eliminating the cleaning step. (IRTA, 1994)

A fluxless process called reduce oxide soldering activation (ROSA) is being investigated by the electronics industry to eliminate the need for cleaning flux from PC boards. Processing the PC boards in a solution containing reducing vanadous ions removes the oxides making cleaning unnecessary. (IRTA, 1994)

Another new technology being researched is called plasma assisted dry soldering. This process uses fluorine radicals to remove surface oxides. The source of fluorine is either carbon tetrafluoride or sulfur hexafluoride. The fluorine radicals react with the oxides to form a passivation film, which breaks apart upon soldering and exposes the clean metal substrate. (IRTA, 1994)

C. CAN PROCESS MODIFICATIONS BE USED TO REDUCE THE RISK?

There are many process modifications that can be made to solvent cleaning equipment that would help to reduce emissions and risk. Many of these modifications are options that can be used in your risk reduction plans and are able to comply with the Degreasing NESHAP. The options and the estimated risk reduction potential are shown in Table 2-2.

Equipment Design Changes to Reduce Risk

There are several equipment design modifications that can reduce emissions and/or risk from vapor cleaning. These include increasing the freeboard ratio and (for smaller equipment) the freeboard height, adding refrigerated freeboard chillers, adding lip exhausts ducted to carbon adsorbers, automating the process, and operating closed-loop solvent cleaning equipment. (Note: The values listed in the following paragraphs and tables are best estimates from ranges of test result values. They are intended to be used for comparative purposes in estimating emissions and risk reductions. The actual emission and risk reductions from implementing these options at your facility may be different from the estimates obtained using these values.)

Covers

Covers are one of the most effective methods of reducing emissions from vapor solvent cleaning operations. Because of this, manual covers are usually provided as standard equipment on solvent cleaning machines. Covers reduce emissions by reducing the diffusion of solvent from the machine by eliminating drafts in the freeboard area. Covers are usually flat-hinged, sliding, or roll-top. Hinged covers can cause disturbances to the solvent vapor through opening and closing and, therefore are, not recommended for use.

Working-mode covers operate during the cleaning cycle and open to allow the entrance and exit of parts. Biparting covers close around the cables hold the parts basket during the cleaning cycle and allow complete enclosure of the solvent cleaning machine. Covers working during idling and working conditions can reduce emissions by 40 percent. (U.S. EPA, 1993)

Table 2-2
Risk Reduction Options and Their Emission Reduction Potentials

Risk Reduction Option	Emission Reduction Potential^a	Emission Potential (EP)^a
Install working mode cover	40%	0.60
Increase freeboard ratio from 0.75 to 1.0	20%	0.80
Increase freeboard ratio from 1.0 to 1.25	10%	0.90
Increase freeboard ratio from 0.75 to 1.25	25%	0.75
Add above- or below-freezing freeboard chillers	40% ^b	0.60 ^b
Reduce room drafts	50% ^c	0.50 ^c
Add lip exhausts ducted to a carbon adsorber	40%	0.60
Reduce hoist speed from 60 to 11 ft/min	35% ^c	0.65 ^c
Increase dwell time	30%	0.70
Superheated vapor	50%	0.50
Operate closed-loop equipment	95%	0.05
Aqueous cleaning system	100%	0.00

- a. The values listed are best estimates from ranges of test values and are for comparison and for estimating approximate emission and risk reductions. The actual emission/risk reductions realized may be substantially different from the estimates obtained from using these values.
- b. These efficiencies are based on the freeboard chillers are in combination with a water-cooled primary condenser. A refrigerant-cooled primary condenser would result in lower efficiencies.
- c. Maximum reduction achievable, percent reduction dependent upon the amount of relative reduction of the hoist speed or the room drafts.

Source: EPA, 1993

Increase Freeboard Ratio and Height

One of the main sources of solvent loss from a vapor degreaser is air disturbances of the solvent-air mixture above the vapor zone due to drafts and solvent carry out. To reduce these losses, most vapor cleaning machines should have a freeboard ratio of 0.75. This is also the minimum freeboard ratio required by the federal Degreasing NESHAP. The distance from the top of the vapor zone to the top of wall of the cleaning machine is called the absolute freeboard height. The ratio of the freeboard height to the minimum width of the tank is called the freeboard ratio.

The freeboard is a volume of calm air that creates a barrier to diffusion of the solvent vapors out of the solvent cleaning machine. Increasing the freeboard ratio would help to minimize losses even further. An increase in the freeboard ratio from 0.75 to 1.0 would reduce solvent losses approximately 12 to 24 percent; an increase from 1.0 to 1.25 would further reduce losses about 6 to 14 percent. Increasing the freeboard ratio from 0.75 to 1.25 would achieve approximately a 25 percent reduction in vapor loss. (U.S. EPA, 1993)

Another factor in the reducing vapor loss is the absolute freeboard height. On small machines, the freeboard ratio has less effect on solvent losses once the absolute freeboard height falls below twelve inches. Below this height, the solvent loss rate can increase substantially. To minimize losses, machines should have an absolute freeboard height greater than twelve inches.

Changing the dimensions of the opening of the solvent cleaning machine can also effect vapor losses. Long and narrow rectangular openings will have less emissions than square openings with the same area. A long and narrow rectangular opening is less susceptible to room drafts than a square area; especially if the machine is oriented such that drafts are directed across the narrow direction of the opening of the machine.

Add Freeboard Refrigeration Devices

An effective control for diffusional vapor losses is freeboard refrigerated devices. There are two primary types of freeboard refrigeration devices: above freezing and below freezing. Above freezing refrigeration devices operate at approximately 41° F (5° C). Below freezing refrigeration devices operate in the temperature range of -22° to -4° F (-30° to -20° C). (U.S. EPA, 1993) Below freezing devices would be expected to perform better than above freezing devices because of the colder condensing temperatures. Below freezing refrigeration devices must be operated with a defrost cycle to melt the solvent/water ice that forms on the coils. If this solvent/water ice is allowed to accumulate unchecked on the refrigerated coils, it would insulate the coils and reduce the effectiveness of the devices. However, the defrost cycle may reduce the operational advantage of the below freezing refrigeration devices because the degreasing machine would be unavailable for cleaning periodically to defrost the coils. When combined with a water-cooled primary condenser, both types of freeboard refrigeration devices will achieve approximately 40 percent reduction in solvent vapor loss. (U.S. EPA, 1993)

Both above and below freezing refrigeration devices should be equipped with a separate water separator due to the additional water vapor that is condensed. Water strips stabilizers added to the solvents. A separate water separator helps to reduce the contact between condensed water vapor and the stabilized solvent. (U.S. EPA, 1993)

Reduce Room Draft Velocities

Reducing room drafts is another method of reducing emissions from vapor cleaning machines. Room drafts cause turbulence within the freeboard volume of the solvent cleaning machine, which increases the mixing of the solvent vapors and the room air. The room drafts then sweep the solvent vapor from the solvent cleaning machine and emit the vapors to the atmosphere. The higher the draft velocities the greater the emissions. Reducing room draft velocities from the typical 160 to 30 feet per minute (ft/min) can reduce emissions up to 60 percent. (U.S. EPA, 1993)

Linear interpolation (comparing the ratio of differences) can be used to estimate an approximate emission reduction that would be achieved for draft velocity reductions between 160 and 30 ft/min. The following example illustrates how to calculate the percent emission reduction for a draft velocity reduction from 100 to 50 ft/min—a difference of 50 ft/min. Divide the difference of the draft velocities of concern (100 ft/min and 50 ft/min) by the difference of the reference draft velocities (160 ft/min and 30 ft/min) as shown:

$$(100 \text{ ft/min} - 50 \text{ ft/min}) \div (160 \text{ ft/min} - 30 \text{ ft/min}) =$$

$$50 \text{ ft/min} \div 130 \text{ ft/min} = 0.4$$

Then multiply the maximum 50 percent reduction by 0.4 to achieve the approximate emission reduction of 20 percent. Table 2-3 presents the results of the above equation in a tabular manner.

There are many ways to reduce draft velocities within a facility. Several of these include relocation of solvent cleaning equipment to a less drafty area, erecting screens or baffles around the solvent cleaning area, closing doors and windows, ventilate through the roof instead of wall fans or windows, and reroute moving equipment that can cause air disturbances, like forklifts, cranes, and carts.

Table 2-3
Percent Emission Reductions Due to Reductions in Room Draft Velocities

Velocity Difference* (ft/min)	130	120	110	100	90	80	70	60	50	40	30	20	10
Percent Emission Reduction	50%	46%	43%	40%	36%	32%	28%	24%	20%	16%	12%	8%	4%

* Room draft velocity difference must be 130 ft/min or less and the starting velocity must be no greater than 160 ft/min and the final velocity should be less than 30 ft/min.

Lip Exhausts with Carbon Adsorbers

Some vapor cleaning machines are equipped with lip exhausts. Lip exhaust are ducts located at the lip of the solvent cleaning machine. The ducts draws solvent-laden air from the surface of the solvent machine into the duct and routes the vapors to a carbon adsorber before venting to the atmosphere. These exhausts help to reduce worker exposure. When operating properly, these systems can achieve a 40 percent control efficiency. (U.S. EPA, 1993) However, the carbon must be periodically regenerated with steam and eventually replaced. When regenerated, the solvent is steam stripped or "desorbed" from the activated carbon, condensed, and sent to a water separator. One disadvantage of this system is that steam desorption can strip the solvent of its stabilizers. Another is that the solvent composition may change as a result of adsorption if solvent blends are used in a machine.

Mechanically Reduce Hoist Speed and Addition of an Appropriate Dwell Time

Reducing hoist speeds when entering and removing parts helps to reduce turbulence and the carry-out of solvent, thus, reducing a large fraction of the working emissions. Reduction of the hoist speed from typical manually operated speeds of 60 ft/min to 11 ft/min can reduce working emissions at least 35 percent. (U.S. EPA, 1993) A mechanically operated hoist can help to ensure that the parts enter and leave the vapor machine at a consistent speed. Table 2-4 provides the emission reduction potentials for reducing various hoist speeds to 11 ft/min.

Table 2-4
Percent Emission Reductions Due to Reductions in
Hoist Speeds to 11 ft/min

Initial Hoist Speed* (ft/min)	60	55	50	45	40	35	30	25	20	15
Percent Emission Reduction	35%	32%	28%	25%	21%	18%	14%	11%	7%	4%

* Final hoist speeds must be 11 ft/min or less and the initial hoist speed must be no greater than 60 ft/min.

The hoist can also be adjusted to pause for a precise dwell time. An appropriate dwell time will greatly reduce carry out emissions because it will allow the solvent to evaporate off from the parts before they are removed from the cleaning machine. If the part is removed from the vapor zone before its temperature reaches that of the solvent vapor, condensation will continue while the part is being removed from the equipment and increase carry-out emissions. Dwell time is the period of time that the part is held in the freeboard zone after the part stops dripping and is raised from the vapor zone. An appropriate dwell time must be determined on a case-by-case basis for each type of part. The Degreasing NESHAP defines an appropriate dwell time as no less than 35 percent of the time needed for a part to cease dripping once placed in the vapor zone. The part must be at room temperature before it is placed in the vapor zone. (CFR, 1994) In limited testing, the addition of an appropriate dwell time reduce working emissions up to 30 percent. (U.S. EPA, 1993)

Rotate the Parts

Rotating parts with blind or recessed holes in the vapor zone would help to ensure solvent drainage before removal. This practice can substantially reduce solvent carry-out and spills from the cleaned parts; however, there is insufficient information to quantify the emissions reduction because of the differences between operations.

Superheated Vapor

This technique employs superheated solvent vapor to enhance the evaporation of the solvent film from the surface of the parts before they leave the vapor zone. In this process, solvent vapor from the vapor zone is drawn into heating ducts where the vapor is heated to approximately 1.5 times its boiling point. The superheated vapor is routed back into the vapor zone to speed drying of the parts as they are withdrawn from the vapor zone. Because the

process results in disturbances to the vapor zone, this process must use baffles or be enclosed to minimize emissions. Superheated vapor can be used with both in-line and batch cleaning operations to achieve emission reductions up to 50 percent. (U.S. EPA, 1993)

Room Enclosure

Room enclosures can be installed around degreasing equipment that will reduce solvent emissions. Room enclosures are constructed of materials that are impervious to solvent vapors. These rooms have the exhaust vapors ducted to the outside air with enhanced ventilation in order to increase the dispersion of the solvent vapors in the air above the top of the building. The dispersion of solvent vapors reduces exposure to individuals downwind from the facility. The exhaust from the room enclosure can be captured using a carbon adsorber, which results in lower emission and exposure concentrations. Room enclosures also provide an environment in which there are virtually no air disturbances. Currently, the amount of risk reduction achievable with room enclosures has not been quantified.

Install Closed-Loop Equipment

Closed-loop solvent cleaning systems are currently available that can greatly reduce solvent emission. These system are constructed similarly to dishwashing systems. Parts are placed inside an air tight vacuum chamber. Vapor or liquid solvent is pumped in the chamber which cleans the parts. Once cleaned, the solvent is removed and recycled in an internal still with a carbon adsorption system. The parts are dried under vacuum and removed. Because these systems are constructed to maintain a vacuum, they are usually very expensive; as much as five to ten times the cost of the similar sized open-top solvent cleaning machine. (Wolf, 1997) These system have the potential to reduce emission up to 95 percent. (Wolf, 1996)

CHAPTER 3

EMISSIONS AND RISK REDUCTION

OPTIONS FROM THE DEGREASING NESHAP

On December 2, 1994, the U.S. EPA finalized the National Emission Standard for Hazardous Air Pollutants: Halogenated Solvent Cleaning (Degreasing NESHAP). This regulation specifies equipment, operating practices, and emissions limits for halogenated solvent cleaning operations and apply to cold cleaning and vapor cleaning machines with a capacity of two gallons or more. The halogenated solvents that the Degreasing NESHAP cover include Perc, MeCl₂, TCE, TCA, chloroform, CFC-113, and carbon tetrachloride. A copy of the Degreasing NESHAP is provided in Appendix C.

For solvent vapor cleaners, there are three basic ways to comply with the requirements of the Degreasing NESHAP: 1) meet an overall emission limit, 2) meet the equipment standards along with specified work practice standard, or 3) meet an idling emission limit along with specified work practice standards. A summary of the requirements of the Degreasing NESHAP is presented in this chapter.

A. OVERALL EMISSION LIMITS

One way is to comply with the Degreasing NESHAP is to meet one of the overall emission limits as shown in Table 3-1 for the different vapor machine types. For example, a batch vapor cleaning machine is limited to 30.7 pounds of solvent per square foot of solvent interface area per month. Similarly, existing and new in-line vapor cleaning machines can not emit more than 31.4 pounds of solvent per square foot of surface area per month or 20.0 pounds of solvent per square foot of surface area per month, respectively.

Table 3-1
Degreasing NESHAP Overall Emission Limits for
Halogenated Solvent Cleaning Equipment

Vapor Machine Type	Average Monthly Emission Limit (lb/ft²*month)*
Batch	30.7
Existing In-Line	31.4
New In-Line	20.0

* The amount of solvent in pounds emitted per square foot of solvent surface area per month. Monthly limits are based on a three-month rolling average.

Source: U.S. EPA, 1995a

B. CONTROL COMBINATIONS AND WORK PRACTICE STANDARDS FOR VAPOR CLEANERS

In-line Vapor Machines

Another way to comply with the Degreasing NESHAP is to meet the equipment and operating requirements and comply with the design and work practice requirements. For in-line vapor cleaning machine, there are four control combinations for existing machines and three control combinations for new machines. These requirements are summarized in Table 3-2.

Table 3-2
Control Combinations for In-Line Vapor Machines

OPTIONS	CONTROL COMBINATIONS						
	Existing In-Line				New In-Line		
	1	2	3	4	1	2	3
1.0 Freeboard Ratio			X	X	X	X	X
Super Heated Vapor		X	X	X		X	
Freeboard Refrigeration Device	X			X			X
Carbon Adsorber	X	X	X		X		
Dwell	X	X			X	X	X

Source: U.S. EPA, 1995a

A facility can implement a control combination that is marked by an “X” in the column beneath each combination. For example, in Table 3-2, the first control combination for existing in-line vapor machines includes a freeboard refrigeration device, a carbon adsorption system, and an adequate dwell time.

Batch Vapor Machines

For batch vapor machines, there are ten control combinations for machines with a solvent surface area less than or equal to 13 square feet and seven control combinations greater than 13 square feet. These control combinations are summarized in Table 3-3.

Table 3-3
Control Combinations for Batch Vapor Machines

OPTIONS	CONTROL COMBINATIONS																
	Solvent surface area $\leq 13 \text{ ft}^2$										Solvent surface area $> 13 \text{ ft}^2$						
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7
Working Mode Cover		X		X	X	X	X	X	X	X	X	X		X	X	X	X
1.0 Freeboard Ratio		X	X		X		X		X			X	X		X		X
Super Heated Vapor			X		X	X	X	X	X			X				X	
Freeboard Refrigeration Device	X			X				X		X				X			
Reduced Room Draft	X	X	X			X	X		X	X	X		X				X
Carbon Adsorber	X	X	X	X	X	X	X	X			X	X	X	X	X	X	
Dwell	X	X	X	X	X	X			X	X	X		X	X	X	X	X

Source: U.S. EPA, 1995a

C. IDLING EMISSION LIMITS FOR VAPOR CLEANERS

The Degreasing NESHAP prescribes a third method of compliance. Using this compliance method, you would demonstrate that your solvent cleaning machine can meet and maintain the idling mode emissions limits shown in Table 3-4. The method for determining the idling emission rate is contained in the Degreasing NESHAP. The method is based on measuring the rate at which the solvent liquid level changes. This change corresponds directly to the amount of solvent lost from the solvent cleaning machine. (U.S. EPA, 1993)

Table 3-4
Degreasing NESHAP Idling Emission Limits for
Halogenated Solvent Cleaning Equipment

Machine Type	Hourly Emission Limit (lb/ft ² *hour) ^a
Batch Vapor	0.045
In-Line Vapor	0.021

a. The amount of solvent in pounds emitted per square foot of solvent surface area per hour.

Source: U.S. EPA, 1995a

Design and Work Practice Requirements for Batch and In-line Vapor Machines

In complying with the control combinations, you must also comply with the equipment design requirements and the specific work practices that are listed in Table 3-5.

Table 3-5
Design and Work Practice Requirements for
Batch Vapor and In-Line Solvent Cleaning Machines

Design Requirements:	Work Practices:
<ol style="list-style-type: none"> 1. Cover of reduced room draft. 2. 0.75 freeboard ratio or greater 3. Hoist required: maximum speed 3.4 (11 feet) meter per minute. 4. Liquid and vapor level indicators that shut off sump heat. 5. Primary condenser. 6. If lip exhaust, use carbon adsorber. 	<ol style="list-style-type: none"> 1. Minimize air disturbances. 2. Minimize solvent loss from spraying operations. 3. Rotate parts with holes or cavities. 4. Hold parts in freeboard area until dripping stops (15 second minimum). 5. During startup, turn primary condenser on before sump heater 6. During shutdown, turn sump heater off before primary condenser. 7. Maintain equipment as recommended by the manufacturer. 8. Store solvent waste in closed containers. 9. Do not clean adsorbent materials. 10. Pass an operator test upon request. 11. Transfer solvent using leak proof couplings.

Source: U.S. EPA, 1995a

Operator Test

The Degreasing NESHAP also requires operators of vapor cleaning machines to pass a short test on operating procedure requirement. Any operator of a batch vapor or in-line solvent cleaning machine can be asked to take the test by the U.S. EPA or the U.S. EPA's designee during any inspection. Operators of batch cold cleaning machines are not required to take the test. The test asks questions concerning the specific requirement of Degreasing NESHAP that apply to various equipment, including control equipment. To pass the test, an operator must score 100 percent. The complete test and answers are included in Appendix B of the Degreasing NESHAP.

D. REQUIREMENTS FOR BATCH COLD SOLVENT CLEANING MACHINES

The Degreasing NESHAP has specific requirements for batch cold solvent cleaning machines. These requirements are listed in Table 3-6. If the machine has a one-inch water layer, the machine is exempt from the work practice requirements.

Table 3-6
Requirements for Batch Cold Solvent Cleaning Machines

Controls	Work Practices
<u>Immersion Cold Cleaning Machines</u> Cover and 2.5 cm (1 in.) water layer, or Cover and at least a 0.75 freeboard ratio or greater.	1. Store solvent waste in closed containers 2. Flush parts in freeboard area. 3. Reduce the solvent pooling on and in parts. 4. Do not fill cleaning machine above fill line.
<u>Remote Reservoir Cold Cleaning Machines</u> Cover	5. Clean up spills immediately. 6. Store wipe rags in closed containers. 7. Do not cause splashing. 8. Control room drafts when cover is open. 9. Do not clean adsorbent materials.

Source: U.S. EPA, 1995a

REFERENCES

1. ARB, 1993: "The Identification of Federal Hazardous Air Pollutants as Toxic Air Contaminants," California Air Resources Board, June 1993.
2. Cal/OSHA, 1993: "Airborne Contaminants," Reprinted from "General Industry Safety Orders," Section 5155, Title 8, California Code of Regulations, Department of Industrial Relations, Division of Occupational Safety and Health, October 1993.
3. CAPCOA, 1993: "CAPCOA Air Toxics 'Hot Spots' Program — Revised 1992 Risk Assessment Guidelines," Toxic Committee of the California Air Pollution Control Officer Association (CAPCOA), October 1993.
4. CEC, 1992: "Solvent Cleaning (Degreasing), An Assessment of Emission Control Options," Center for Emissions Control, November 1992.
5. CFR, 1994: 40 Code of Federal Regulations, Part 63, Subpart T--National Emission Standards for Halogenated Solvent Cleaning, Federal Register Notice 61801.
6. IRTA, 1994: "Alternatives to Chlorinated Solvents in Cleaning Applications," Institute for Research and Technical Assistance (IRTA), December 1994.
7. Merck, 1984: "The Merck Index," Tenth Edition, Merck & Co., Inc. October, 1984.
8. NDC, 1991: "Industrial Solvents Handbook," Fourth Edition, Ernest W. Flick, Noyes Data Corporation, 1991.
9. SRRP, 1990: "Source Reduction of Chlorinated Solvents," Source Reduction Research Partnership, June 1990.
10. U.S. EPA, 1993: "National Emission Standards for Hazardous Air Pollutants: Halogenated Solvent Cleaning--Background Document," United States Environmental Protection Agency (U.S. EPA), EPA-53/R-93-054, November 1993.
11. U.S. EPA, 1995a: "New Regulation Controlling Air Emissions from Solvent Cleaning Machines (Degreasers)," U.S. EPA, EPA-453/F-94-083, March 1995.
12. U.S. EPA, 1995b: "Qs & As On Ozone-Depleting Solvents and Their Substitutes," U.S. EPA, October 1995.
13. U.S. EPA, 1996: "Significant New Alternatives Policy (SNAP) Program Decisions on Acceptability of Substitutes for Class I Ozone Depleting Chemicals: Solvent Cleaning," U.S. EPA, May 1996.
14. Wolf, 1996: Telephone conversation with Katy Wolf, Ph.D. of IRTA on April 11, 1996.
15. Wolf, 1997: Telephone conversation with Katy Wolf, Ph.D. of IRTA on April 18, 1997.

APPENDIX A

Senate Bill 1731

Senate Bill No. 1731

CHAPTER 1162

An act to amend Section 44360 of, to add Section 44380.5 to, and to add Chapter 6 (commencing with Section 44390) to Part 6 of Division 26 of, the Health and Safety Code, relating to toxic air contaminants, and making an appropriation therefor.

[Approved by Governor September 29, 1992.
Filed with Secretary of State September 30, 1992.]

LEGISLATIVE COUNSEL'S DIGEST

SB 1731, Calderon. Toxic air contaminants.

(1) Existing law required each air quality management district and each air pollution control district, within 90 days of completion of the review of emissions inventory data, but not later than December 1, 1990, to prioritize and categorize facilities for purposes of health risk assessment into high, intermediate, and low priority categories, taking specified matters into account. Existing law further requires the operator of every high-priority category facility, within 150 days of categorization, to prepare and submit to the district a health risk assessment utilizing scientific methodologies, as specified, and specifies what the health risk assessment is to contain and how it is to be prepared.

This bill would require health risk assessments to be prepared in accordance with described guidelines established by the Office of Environmental Health Hazard Assessment, as specified.

The bill would require facility operators to conduct an airborne toxic risk reduction audit and develop a plan to implement airborne toxic risk reduction measures, and would require the facility operator to implement the measures set forth in the plan, as specified. By imposing new duties on the districts with respect to the review of those plans and assisting small businesses with compliance, the bill would impose a state-mandated local program. The bill would authorize the district, the State Air Resources Board, or the office to assess a specified supplemental fee on a facility operator. The bill would subject the facility operator to specified civil penalties for failure to submit a complete audit and plan or to implement the measures set forth in the plan, and for knowingly submitting a false statement or representation in connection with the audit or plan.

(2) The California Constitution requires the state to reimburse local agencies and school districts for certain costs mandated by the state. Statutory provisions establish procedures for making that reimbursement.

This bill would provide that no reimbursement is required by this act for a specified reason.

(3) The bill would appropriate \$948,000 from the Air Toxics Inventory and Assessment Account in the General Fund for purposes of the bill, with \$188,000 to be allocated to the state board and \$760,000 to be allocated to the Office of Environmental Health Hazard Assessment

Appropriation: yes.

The people of the State of California do enact as follows:

SECTION 1. Section 44360 of the Health and Safety Code is amended to read:

44360. (a) Within 90 days of completion of the review of all emissions inventory data for facilities specified in subdivision (a) of Section 44322, but not later than December 1, 1990, the district shall, based on examination of the emissions inventory data and in consultation with the state board and the State Department of Health Services, prioritize and then categorize those facilities for the purposes of health risk assessment. The district shall designate high, intermediate, and low priority categories and shall include each facility within the appropriate category based on its individual priority. In establishing priorities pursuant to this section, the district shall consider the potency, toxicity, quantity, and volume of hazardous materials released from the facility, the proximity of the facility to potential receptors, including, but not limited to, hospitals, schools, day care centers, worksites, and residences, and any other factors that the district finds and determines may indicate that the facility may pose a significant risk to receptors. The district shall hold a public hearing prior to the final establishment of priorities and categories pursuant to this section.

(b) (1) Within 150 days of the designation of priorities and categories pursuant to subdivision (a), the operator of every facility that has been included within the highest priority category shall prepare and submit to the district a health risk assessment pursuant to Section 44361. The district may, at its discretion, grant a 30-day extension for submittal of the health risk assessment.

(2) Health risk assessments required by this chapter shall be prepared in accordance with guidelines established by the Office of Environmental Health Hazard Assessment. The office shall prepare draft guidelines which shall be circulated to the public and the regulated community and shall adopt risk assessment guidelines after consulting with the state board and the Risk Assessment Committee of the California Air Pollution Control Officers Association and after conducting at least two public workshops, one in the northern and one in the southern part of the state. The adoption of the guidelines is not subject to Chapter 3.5 (commencing with Section 11340) of Part 1 of Division 3 of Title 2 of the Government Code. The scientific review panel established pursuant to Section 39670 shall evaluate the guidelines adopted under this paragraph and shall recommend changes and additional criteria to reflect new scientific data or empirical studies.

(3) The guidelines established pursuant to paragraph (2) shall impose only those requirements on facilities subject to this subdivision that are necessary to ensure that a required risk assessment is accurate and complete and shall specify the type of site-specific factors that districts may take into account in determining when a single health risk assessment may be allowed under subdivision (d). The guidelines shall, in addition, allow the operator of a facility, at the operator's option, and to the extent that valid and reliable data are available, to include for consideration by the district in the health risk assessment any or all of the following supplemental information:

(A) Information concerning the scientific basis for selecting risk parameter values that are different than those required by the guidelines and the likelihood distributions that result when alternative values are used.

(B) Data from dispersion models, microenvironment characteristics, and population distributions that may be used to estimate maximum actual exposure.

(C) Risk expressions that show the likelihood that any given risk estimate is the correct

risk value.

(D) A description of the incremental reductions in risk that occur when exposure is reduced.

(4) To ensure consistency in the use of the supplemental information authorized by subparagraphs (A), (B), (C), and (D) of paragraph (3), the guidelines established pursuant to paragraph (2) shall include guidance for use by the districts in considering the supplemental information when it is included in the health risk assessment.

(c) Upon submission of emissions inventory data for facilities specified in subdivisions (b) and (c) of Section 44322, the district shall designate facilities for inclusion within the highest priority category, as appropriate, and any facility so designated shall be subject to subdivision (b). In addition, the district may require the operator of any facility to prepare and submit health risk assessments, in accordance with the priorities developed pursuant to subdivision (a).

(d) The district shall, except where site specific factors may affect the results, allow the use of a single health risk assessment for two or more substantially identical facilities operated by the same person.

(e) Nothing contained in this section, Section 44380.5, or Chapter 6 (commencing with Section 44390) shall be interpreted as requiring a facility operator to prepare a new or revised health risk assessment using the guidelines established pursuant to paragraph (2) of subdivision (a) of this section if the facility operator is required by the district to begin the preparation of a health risk assessment before those guidelines are established.

SEC. 2. Section 44380.5 is added to the Health and Safety Code, to read:

44380.5. In addition to the fee assessed pursuant to Section 44380, a supplemental fee may be assessed by the district, the state board, or the Office of Environmental Health Hazard Assessment upon the operator of a facility that, at the operator's option, includes supplemental information authorized by paragraph (3) of subdivision (b) of Section 44360 in a health risk assessment, if the review of that supplemental information substantially increases the costs of reviewing the health risk assessment by the district, the state board, or the office. The supplemental fee shall be set by the state board in the regulation required by subdivision (a) of Section 44380 and shall be set in an amount sufficient to cover the direct costs to review the information supplied by an operator pursuant to paragraph (3) of subdivision (b) of Section 44360.

SEC 3. Chapter 6 (commencing with Section 44390) is added to Part 6 of Division 26 of the Health and Safety Code, to read:

CHAPTER 6. FACILITY TOXIC AIR CONTAMINANT RISK REDUCTION AUDIT AND PLAN

44390. For purposes of this chapter, the following definitions apply:

(a) "Airborne toxic risk reduction measure" or "ATRRM" means those in-plant changes in production processes or feedstocks that reduce or eliminate toxic air emissions subject to this part. ATRRM's may include:

- (1) Feedstock modification.
- (2) Product reformulations.
- (3) Production system modifications.
- (4) System enclosure, emissions control, capture, or conversion.
- (5) Operational standards and practices modification.

(b) Airborne toxic risk reduction measures do not include measures that will increase risk from exposure to the chemical in another media or that increase the risk to workers or consumers.

(c) "Airborne toxic risk reduction audit and plan" or "audit and plan" means the audit and plan specified in Section 44392.

44391. (a) Whenever a health risk assessment approved pursuant to Chapter 4 (commencing with Section 44360) indicates, in the judgment of the district, that there is a significant risk associated with the emissions from a facility, the facility operator shall conduct an airborne toxic risk reduction audit and develop a plan to implement airborne toxic risk reduction measures that will result in the reduction of emissions from the facility to a level below the significant risk level within five years of the date the plan is submitted to the district. The facility operator shall implement measures set forth in the plan in accordance with this chapter.

(b) The period to implement the plan required by subdivision (a) may be shortened by the district if it finds that it is technically feasible and economically practicable to implement the plan to reduce emissions below the significant risk level more quickly or if it finds that the emissions from the facility pose an unreasonable health risk.

(c) A district may lengthen the period to implement the plan required by subdivision (a) by up to an additional five years if it finds that a period longer than five years will not result in an unreasonable risk to public health and that requiring implementation of the plan within five years places an unreasonable economic burden on the facility operator or is not technically feasible.

(d) (1) The state board and districts shall provide assistance to smaller businesses that have inadequate technical and financial resources for obtaining information, assessing risk reduction methods, and developing and applying risk reduction techniques.

(2) Risk reduction audits and plans for any industry subject to this chapter which is comprised mainly of small businesses using substantially similar technology may be completed by a self-conducted audit and checklist developed by the state board. The state board, in coordination with the districts shall provide a copy of the audit and checklist to small businesses within those industries to assist them to meet the requirements of this chapter.

(e) The audit and plan shall contain all the information required by Section 44392.

(f) The plan shall be submitted to the district, within six months of a district's determination of significant risk for review of completeness. Operators of facilities that have been notified prior to January 1, 1993, that there is a significant risk associated with emissions from the facility shall submit the plan by July 1, 1993. The district's review of completeness shall include a

substantive analysis of the emission reduction measures included in the plan, and the ability of those measures to achieve emission reduction goals as quickly as feasible as provided in subdivisions (a) and (b).

(g) The district shall find the audit and plan to be satisfactory within three months if it meets the requirements of this chapter, including, but not limited to, the requirements of subdivision (f). If the district determines the audit and plan does not meet those requirements, the district shall remand the audit and plan to the facility specifying the deficiencies identified by the district. A facility operator shall submit a revised audit and plan addressing the deficiencies identified by the district within 90 days of receipt of a deficiency notice.

(h) Progress on the emission reductions achieved by the plan shall be reported to the district in the biennial updates of emission inventories required pursuant to Section 44344.

(i) If new information becomes available after the initial risk reduction audit and plan, on air toxics risks posed by a facility, or emission reduction technologies that may be used by a facility that would significantly impact risks to exposed persons, the district may require the plan to be updated and resubmitted to the district.

(j) This section does not authorize the emission of a toxic air contaminant in violation of an airborne toxic control measure adopted pursuant to Chapter 3.5 (commencing with Section 39650) or in violation of Section 41700.

44392. A facility operator subject to this chapter shall conduct an airborne toxic risk reduction audit and develop a plan which shall include at a minimum all of the following:

- (a) The name and location of the facility.
- (b) The SIC code for the facility.
- (c) The chemical name and the generic classification of the chemical.
- (d) An evaluation of the ATRRM's available to the operator.
- (e) The specification of, and rationale for, the ATRRMs that will be implemented by the operator. The audit and plan shall document the rationale for rejecting ATRRMs that are identified as infeasible or too costly.

(f) A schedule for implementing the ATRRMs. The schedule shall meet the time requirements of subdivision (a) of Section 44391 or the time period for implementing the plan set by the district pursuant to subdivision (b) or (c) of Section 44391, whichever is applicable.

(g) The audit and plan shall be reviewed and certified as meeting this chapter by an engineer who is registered as a professional engineer pursuant to Section 6762 of the Business and Professions Code, by an individual who is responsible for the processes and operations of the site, or by an environmental assessor registered pursuant to Section 25570.3.

44393. The plan prepared pursuant to Section 44391 shall not be considered to be the equivalent of a pollution prevention program or a source reduction program, except insofar as the audit and plan elements are consistent with source reduction, as defined in Section 25244.14, or subsequent statutory definitions of pollution prevention.

49394. Any facility operator who does not submit a complete airborne toxic risk reduction audit and plan or fails to implement the measures set forth in the plan as set forth in this chapter is subject to the civil penalty specified in subdivision (a) of Section 44381, and any facility operator who, in connection with the audit or plan, knowingly submits any false statement or representation is subject to the civil penalty specified in subdivision (b) of Section 44381.

SEC. 4. No reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution because the local agency or school district has the authority to levy service

charges, fees, or assessments sufficient to pay for the program or level of service mandated by this act. Notwithstanding Section 17580 of the Government Code, unless otherwise specified in this act, the provisions of this act shall become operative on the same date that the act takes effect pursuant to the California Constitution.

SEC. 5. The sum of nine hundred forty-eight thousand dollars (\$948,000) is hereby appropriated from the Air Toxics Inventory and Assessment Account in the General Fund for the purposes of this act, to be allocated as follows:

- (a) One hundred eighty-eight thousand dollars (\$188,000) to the State Air Resources Board.
- (b) Seven hundred sixty thousand dollars (\$760,000) to the Office of Environmental Health Hazard Assessment.

APPENDIX B

**Senate Bill 1731 Risk Reduction Audit and
Plans Worksheets and Instructions**

INSTRUCTIONS

Risk Reduction Audit Worksheet for Halogenated Solvents Degreasing Operations Worksheet 1

PLEASE READ ALL INSTRUCTIONS THOROUGHLY BEFORE COMPLETING THIS
WORKSHEET!

WORKSHEET 1

Complete a copy of **Worksheet 1** for each type of solvent used at your facility for solvent cleaning to estimate the risk contribution of each machine using that solvent.

1. Complete the first table on **Worksheet 1** with the type of solvent used, the amount of that solvent used annually at your facility, and the amount of risk contributed to that solvent. The amount of risk due to each solvent and the total risk due to solvent cleaning will be determined by your district. Fill in permit number and the amount of solvent used annually by each solvent cleaning machine at your facility in the column labeled "Annual Solvent Consumption." Please complete a separate copy of Worksheet 1 for each type of solvent used at your facility for solvent cleaning.
2. To estimate the risk contribution of each machine, divide the amount of solvent used annually by Machine A (Solvent A) by the total amount of solvent used annually (Total Solvent), then multiply this amount by the total risk due to solvent cleaning. As shown in the equation below.

$$\text{Risk contribution of Machine A} = \text{Facility Risk} \times (\text{Solvent A} \div \text{Total Solvent})$$

3. Complete the second table. Using the above formula, complete the column labeled "Risk Contribution." If you add the amounts of solvent used by each machine, the sum should equal the total amount of solvent used annually for solvent cleaning operations.

Use the information from **Worksheet 1** to help you complete **Worksheet 2** if you have multiple machines or use more than one solvent for solvent cleaning.

WORKSHEET 1

Risk Reduction Audit Worksheet for Degreasing Equipment

Estimation of Risk Contributions

Facility Name: _____

Facility Address: _____

Contact Person: _____

Facility ID Number: _____ Health Risk Assessment Value: _____

DISCONTINUED USE OF SOLVENT

☐

GO TO WORKSHEET 4

Facility risk due to solvent cleaning: _____ per million (provide by the risk assessment)

Solvent Name	Annual Solvent Consumption (gallons)	Risk Due to Solvent Consumed (per million)

Risk Contribution of Each Machine:

Risk contribution of Machine A = Facility Risk x (Solvent A ÷ Total Solvent)

Machine	Machine Permit Number (if any)	Annual Solvent Consumption (gallons)	Risk Contribution (per million)
A			
B			
C			
D			
E			

INSTRUCTIONS

Risk Reduction Audit Worksheets for Halogenated Solvents Degreasing Operations Worksheet 2

PLEASE READ ALL INSTRUCTIONS THOROUGHLY BEFORE COMPLETING THIS WORKSHEET!

WORKSHEET 2

For each solvent cleaning machine, complete a separate copy of **Worksheet 2**. If you need additional assistance in completing this form, you can contact your air pollution control district or air quality management district (district).

1. Fill in the information for your facility at the top of **Worksheet 2**. If you have stopped using halogenated solvents in your operation (such as you've switched to an aqueous or semi-aqueous process or have shut down your degreasing unit) then mark the box for "Discontinued use of solvent" and complete **Worksheet 4**.
2. Review the list of risk/emission reduction options for halogenated solvents degreasing operations provided in the table titled "Summary of Current Risk Reduction Options." Place an "X" in the box in front of each risk/emission reduction option that is currently used in your degreasing operation. **IMPORTANT! Risk/emission reduction options currently in use cannot be included in your risk reduction plan.**
3. If you have decided to replace your current degreasing equipment with closed-loop equipment, go to the bottom of **Worksheet 3** and place an "X" in the box provided "Summary of Potential Risk Reduction Options: Equipment Replacement."
4. If you have decided to switch to an aqueous/semi-aqueous process, place an "X" in the box provided, skip to **Worksheet 4**.
5. Review the remaining risk/emission reduction options listed on **Worksheet 2**. Chapter 2 of this document will assist you in evaluating the various risk reduction options available for solvent cleaning operations. Once you have evaluated and made selection from the remaining risk reduction options available for your operation, go on to **Worksheet 3**.

WORKSHEET 2

Risk Reduction Audit Worksheet for Halogenated Solvents Degreasing Equipment

Facility Name: _____

Facility Address: _____

Contact Person: _____

Facility ID Number: _____ Machine Permit Number: _____

Health Risk
Assessment Value: _____ Risk Contribution: _____
(If you operate two or machines.)

DISCONTINUED USE OF SOLVENT

☐

GO TO WORKSHEET 4

Summary of Existing Control Options:

RISK REDUCTION OPTIONS	
	Working Mode Cover
	Freeboard Ratio of 0.75
	Freeboard Ratio of 1.0
	Freeboard Ratio of 1.25
	Increased Dwell
	Above or below freezing refrigerated freeboard chillers
	Lip exhausts ducted to a carbon adsorber
	Hoist speed of 11 feet per minute or less.
	Superheated Vapor

RISK REDUCTION OPTIONS	
	Automated Process
	Enclosed Equipment
	Surface drafts of 30 feet per minute or less
	Operate closed-loop system

INSTRUCTIONS

Risk Reduction Plan Worksheet for Halogenated Solvents Degreasing Operations Worksheet 3

PLEASE READ ALL INSTRUCTIONS THOROUGHLY BEFORE COMPLETING THIS
WORKSHEET!

WORKSHEET 3

If your facility exceeds the significant or unreasonable risk level, you must submit a risk reduction audit and plan to the district as required by SB 1731. Completing **Worksheet 3** will assist you in developing a Risk Reduction Plan that your district will accept as your submittal for your halogenated solvent cleaning facility. Read the following instructions on how to complete this worksheet properly. For each solvent cleaning machine, complete a separate copy of Worksheet 2.

1. Once you have the remaining risk reductions available for your operation, under **Column A** place an "X" in the box directly left of each option you believe can be implemented into your current solvent degreasing operation. **Column B** lists the suggested risk reduction options that can help reduced the risk and emissions from your solvent cleaning operation.
2. **Column C** lists the emission potential for each of the risk reduction options (unless indicated otherwise). For each risk/emission reduction option you have chosen, write the emission potential (EP) listed in **Column C** in the box under **Column D**.
3. Once you have selected all of the options that you can and have placed the EP values into the spaces provided in Column D, take each of those EP values and multiply them all together. For example, if you've selected to increase the freeboard ratio from 0.75 to 1.0, increase the dwell time, and reduce surface drafts to 11 feet per second, you would multiply the EP values for each of those options like so: 0.8 times 0.7 times 0.5, which equals 0.28. This value is the "combination emission potential" or CEP.
4. To obtain an estimate of the resulting risk due to your solvent cleaning operation after implementing the selecting options, multiply the CEP by your facility's current health risk value (or machine risk contribution).
5. Record the estimated Final Risk value in the table on Worksheet 4 for each machine.

WORKSHEET 3

Risk Reduction Plan Worksheet for Halogenated Solvents Degreasing Operations

Facility Name: _____

Facility ID Number: _____ Facility Risk: _____ per million

Machine Permit No.: _____ Risk Contribution: _____ per million

Summary of Potential Risk Reduction Options: Equipment Modifications

A	B	C	D
	RISK REDUCTION OPTIONS	EP	
	Working Mode Cover	0.4	
	Increase Freeboard Ratio from 0.75 to 1.0.	0.8	
	Increase Freeboard Ratio from 1.0 to 1.25 or more.	0.9	
	Increase dwell time to 15 seconds or more.	0.7	
	Add above or below refrigerated freeboard chillers.	0.6	
	Add lip exhausts ducted to a carbon adsorber.	0.4	
	Reduce surface drafts to 30 feet per minute or less (see Table 2-3).	0.5	
	Reduce hoist speed to 11 feet per minute or less (see Table 2-4).	0.7	
	Employ superheated vapor.	0.5	
	Enclose process and duct vapor with enhanced ventilation.	0.3	
	Enclose process and duct vapor to a carbon adsorber with enhanced ventilation	0.1	
	Install closed-loop equipment (Equipment Replacement)	0.05	
Combination Emission Potential (CEP)			

CEP _____ x Risk Contribution _____ = Estimated Final Risk (Contribution)

INSTRUCTIONS

Risk Reduction Audit and Plan Worksheets for Halogenated Solvents Degreasing Operations Worksheet 4

PLEASE READ ALL INSTRUCTIONS THOROUGHLY BEFORE COMPLETING THIS WORKSHEET!

WORKSHEET 4

If you have replaced or intend to replace your halogenated solvent cleaning process with an aqueous or semi-aqueous cleaning process, the risk contribution for the replaced machine becomes zero. You must record this change in risk contribution for each machine in the table on **Worksheet 5** summarize to the changes to your process on **Worksheet 4**. Included the following information in the summary:

- the type of aqueous cleaning agent or substitute solvent (attach material safety data sheets if they are available);
- the VOC content of the cleaning agent;
- the type of cleaning apparatus used; and
- the solvent savings for the replacement of the solvent cleaning.

WORKSHEET 4

Risk Reduction Plan Worksheet for Halogenated Solvents Degreasing Operations Replacement Summary

Facility Name: _____

Facility ID Number: _____

Summary of Potential Risk Reduction Options: Process Replacement

Machine Permit Number	
Annual Solvent Used by the replaced machine	
The type of aqueous cleaning agent (attach material safety data sheets if they are available)	
The VOC content of the cleaning agent;	
The type of cleaning apparatus used	
The solvent savings for the replacement of the solvent cleaning	

INSTRUCTIONS

Risk Reduction Audit and Plan Worksheets for Halogenated Solvents Degreasing Operations Worksheets 5 and 6: Facility Summary of Risk Plans

PLEASE READ ALL INSTRUCTIONS THOROUGHLY BEFORE COMPLETING THE WORKSHEETS!

WORKSHEETS 5 & 6:

1. Complete the facility information at the top of both Worksheets 5 and 6, including the **Facility risk due to solvent cleaning**.
2. Fill in the permit numbers and the risk contributions for each solvent cleaning machine at your facility from **Worksheet 1**.
3. Report the expected schedule of implementation for each solvent cleaning machine by completing a copy of **Worksheet 5** for each solvent cleaning machine. Use your final copies of **Worksheets 3 and 4** to help complete the implementation schedule in **Worksheet 5**.
4. On **Worksheet 6**, in the column labeled “**Final Risk Contribution**” fill in the estimated final risk value for each machine from **Worksheets 3 and 4**.
5. To get the final estimated risk for your facility due to solvent cleaning, add all the risk values together and write the result in the box mark “**Final Facility Risk**.” This value is your facility’s estimated risk after implementation of all the option chosen in **Worksheets 3 and 4** which comprise your risk reduction plan. If this value is greater than your district’s significant risk, then you need to find other options you can implement at your facility to reduce the facility risk below the significant level.
6. Once you have developed a plan that reduces your facility’s risk below the significant risk level, sign and return all completed worksheets to your district for approval.

These audit and plans must be reviewed and certified as meeting the requirements of Health and Safety Code (HSC) Sections 44390 - 44394 by an engineer who is registered as a professional engineer pursuant to Section 6762 of the Business and Professions Code, by an individual who is responsible for the processes and operations of the site, or by an environmental assessor registered pursuant to Section 25570.3.

WORKSHEET 5

Risk Reduction Plan Worksheet for Halogenated Solvents Degreasing Operations: Facility Summary of Risk Reduction Plans

Facility Name: _____

Facility ID Number: _____

Fill in permit number and the risk contribution for each solvent cleaning machine at your facility and place a check mark in the box for each selected option from **Worksheets 3 and 4**.

Risk Reduction Option Implementation Schedule for Machine _____

(Permit number)

	RISK REDUCTION OPTIONS	Expected Implementation Date
	Working Mode Cover	
	Increase Freeboard Ratio from 0.75 to 1.0.	
	Increase Freeboard Ratio from 1.0 to 1.25 or more.	
	Increase dwell time to 15 seconds or more.	
	Add above or below refrigerated freeboard chillers.	
	Add lip exhausts ducted to a carbon adsorber.	
	Reduce surface drafts to 30 feet per minute or less.	
	Reduce hoist speed to 11 feet per minute or less.	
	Employ superheated vapor.	
	Enclose process and duct vapor with enhanced ventilation.	
	Enclose process and duct vapor to a carbon adsorber with enhanced ventilation	
	Install closed-loop equipment.	
	Convert to alternative cleaning process (see Worksheet 4).	

WORKSHEET 6

Risk Reduction Plan Worksheet for Halogenated Solvents Degreasing Operations: Facility Summary of Risk Reduction Plans

Facility Name: _____

Facility ID Number: _____

Facility risk due to solvent cleaning: _____ per million

Fill in permit number and the risk contribution for each solvent cleaning machine at your facility from Worksheet 1.

Machine	Machine Permit Number	Original Risk Contribution (per million)	Final Risk Contribution (per million)
A			
B			
C			
D			
E			
F			

Final Facility Risk
(per million)

--

These audit and plans must be reviewed and certified as meeting the requirements of Health and Safety Code (HSC) Sections 44390 - 44394 by an engineer who is registered as a professional engineer pursuant to Section 6762 of the Business and Professions Code, by an individual who is responsible for the processes and operations of the site, or by an environmental assessor registered pursuant to Section 25570.3.

Signature: _____ Date: _____

I certify that this plan meets the requirements of HSC Sections 44390 - 44394.

APPENDIX C
National Emission Standard
for Hazardous Air Pollutants:
Halogenated Solvent Cleaning

[Federal Register: December 2, 1994]

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 9 and 63

[AD-FRL-5111-3]

RIN 2060-AC31

**National Emission Standards for Hazardous Air Pollutants:
Halogenated Solvent Cleaning**

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule and test method.

SUMMARY: This final rule promulgates national emission standards for hazardous air pollutants for halogenated solvent cleaners. These standards implement section 112 of the Clean Air Act (Act) and are based on the Administrator's determination that halogenated solvent cleaning machines emit halogenated organic chemicals identified in the Act list of 189 hazardous air pollutants (HAP). The halogenated solvent cleaner NESHAP requires batch vapor solvent cleaning machines and in-line solvent cleaning machines to meet emission standards reflecting the application of the maximum achievable control technology for major and area sources; area source batch cold cleaning machines are required to achieve generally available control technology. The rule regulates the emissions of the following halogenated HAP solvents: methylene chloride (MC), perchloroethylene (PCE), trichloroethylene (TCE), 1,1,1-trichloroethane (TCA), carbon tetrachloride (CT), and chloroform (C).

The EPA is also finalizing Method 307 with the standard. This method can be used to demonstrate compliance with the idling standard.

EFFECTIVE DATE: December 2, 1994. See Supplementary Information section concerning judicial review.

ADDRESSES: Background Information Document. The background information document (BID) for the promulgated standards may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to "National Emission Standards for Hazardous Air Pollutants, Halogenated Solvent Cleaning--Background Information for Final Standards," EPA No. 453/R-94-071. The BID contains: (1) a summary of all the public comments made on the proposed standards and the Administrator's response to the comments; and (2) a summary of the changes made to the standards since

proposal. A reasonable fee may be charged for copying.

Docket. A docket, No. A-92-39, containing information considered by the EPA in development of the promulgated standards, is available for public inspection between 8:00 a.m. and 4:00 p.m., Monday through Friday, at the following address: U.S. Environmental Protection Agency, Air and Radiation Docket and Information Center (formerly known as the Air Docket) (MC-6102), 401 M Street SW., Washington, DC 20460 [phone: (202) 260-7548]. The docket is located at the above address in Room M-1500, Waterside Mall (ground floor). A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: For information concerning the final standard, contact Mr. Paul Almodovar, Coatings and Consumer Products Group, Emission Standards Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina, 27711, telephone number (919) 541-0283.

SUPPLEMENTARY INFORMATION: National emission standards for hazardous air pollutants (NESHAP) for halogenated solvent cleaners were proposed in the Federal Register on November 29, 1993 (58 FR 62566). This Federal Register action announces the EPA's final decisions on the rule. Under section 307(b)(1) of the Act, judicial review of the NESHAP is available only by the filing of a petition for review in the U.S. Court of Appeals for the District of Columbia Circuit within 60 days of today's publication of this rule. Under section 307(b)(2) of the Act, the requirements that are the subject of today's notice may not be challenged later in civil or criminal proceedings brought by the EPA to enforce these requirements.

I. The Standards

National emission standards for major sources of hazardous air pollutants established under section 112 of the Act reflect:

“* * * the maximum degree of reduction in emissions of the HAP * * * that the Administrator, taking into consideration the cost of achieving such emission reduction, and any nonair quality health and environmental impacts and energy requirements, determine is achievable for new or existing sources in the category or subcategory to which such emission standards applies * * *” (the Act section 112(d)(2)).

Area sources are regulated with a MACT standard, unless there is justification for regulating them under GACT.

The promulgated standard includes multiple alternatives to allow owners or operators maximum compliance flexibility. These alternatives include an equipment standard, in conjunction with work practice requirements, and an alternative overall solvent emissions standard. The idling emission limit and the alternative overall solvent emission standard are not available to owners or operators of batch cold cleaning machines.

If an owner or operator of a batch vapor or in-line cleaning machine elects to comply with the equipment standard, they must install one of the control combinations listed in the regulation, use an automated parts handling system to process all parts, and follow multiple work practices. As an alternative to selecting one of the equipment control combinations listed in the regulation, an owner or operator may demonstrate that the batch vapor or in-line cleaning machine can meet the idling mode emission limit specified in the standards. In addition to maintaining this idling mode emission limit, the owner or operator of a batch vapor or in-line solvent cleaning machine must use an automated parts handling system to process all parts and comply with the work practice standards. A third alternative for complying with these standards is to comply with the overall solvent emissions limit. An owner or operator complying with the overall solvent emissions limit is required to ensure that the emissions from each solvent cleaning machine are less than or equal to the solvent emission levels specified in the standard. Under this alternative standard, an owner or operator is not required to use an automated parts handling system or to comply with the work practice standards.

The batch cold cleaning machine standard is an equipment standard. However, those owners or operators choosing the equipment options without the water layer must also comply with work practice requirements. There is no idling standard or overall solvent emissions standard for batch cold cleaning machines. Batch cold cleaning machines located at nonmajor sources are exempt from title V permit requirements.

Section 114(a)(3) of the amended CAA requires enhanced monitoring and compliance certification of all major stationary sources. The annual compliance certifications certify whether compliance has been continuous or intermittent. Enhanced monitoring shall be capable of detecting deviations from each applicable emission limit or standard with sufficient representativeness, accuracy, precision, reliability, frequency and timeliness to determine if compliance is continuous during a reporting period. The monitoring in this regulation satisfies the requirements of enhanced monitoring.

II. Summary of Impacts

These standards will reduce nationwide emissions of hazardous air pollutants (HAP) from halogenated solvent cleaning machines by 77,400 Mg/yr (85,300 tons per year), or 63 percent by 1997 compared to the emissions that would result in the absence of the standards. No adverse secondary air impacts, water or solid waste impacts are anticipated from the promulgation of these standards.

The national annual energy usage due to the installation of the required control devices is expected to increase from 12.9 million KWH/yr to 66.9 million KWH/yr, which is equivalent to approximately 29.3 thousand barrels of oil. These estimates do not include energy savings from reduced solvent use.

The implementation of this regulation is expected to result in an overall annual national net savings of \$19 million. This includes a net annualized savings from installation of control devices of \$30.5 million and a total monitoring, reporting, and recordkeeping costs of \$11.6 million. These savings will come from the significant decrease in solvent emissions and, therefore, solvent consumption, which outweigh the overall cost of air pollution control equipment and monitoring and recordkeeping costs.

The economic impact analysis done at proposal showed that the economic impacts from the proposed standard would be insignificant. The economic impact analysis has not been revised for promulgation because the changes in costs are not expected to have any effect on the results of the analysis. While the estimated annual costs for the regulation have increased since proposal, there are still cost savings for most affected entities. Only entities with small or medium-sized cleaning machines will not have cost savings, and the costs for the selected regulatory alternatives for these entities have changed very little since proposal. Since those entities that do not have cost savings were the only ones analyzed in the proposal, and these costs have changed little, the results from the economic impact analysis at proposal should still hold for promulgation.

III. Significant Changes to the Proposed Standards

A. Public Participation

Prior to proposal of the standards, interested parties were advised by public notice in the Federal Register (57 FR 46854), of a meeting of the National Air Pollution Control Techniques Advisory Committee to discuss the halogenated solvent cleaner source recommended for proposal. This meeting was held on November 17 and 18, 1992. The meeting was open to the public and each attendee was given an opportunity to comment on the standards recommended for proposal.

The standards were proposed and published in the Federal Register on November 29, 1993 (58 FR 62566). The preamble to the proposed standards discussed the availability of the BID, which described the regulatory alternatives considered and the impacts of those alternatives. Public comments were solicited at the time of proposal, and copies of the BID were distributed to interested parties.

To provide interested persons the opportunity for oral presentation of data, views, or arguments concerning the proposed standards, a public hearing was offered at proposal; however, one was not requested. The public comment period was from November 29, 1993 to January 28, 1994. Fifty-seven comment letters were received. The comments have been carefully considered, and changes have been made in the proposed standards when determined by the Administrator to be appropriate.

B. Comments on the Proposed Standards

Comments on the proposed standards were received from 57 commenters composed mainly of States, solvent cleaning machine users, solvent cleaning machine vendors, industry and industry trade associations. A detailed discussion of these comments and responses can be found in the promulgation BID, which is referenced in the ADDRESSES section of this preamble. The summary of comments and response in the BID serve as the basis for the revisions that have been made to the standards between proposal and promulgation. Most of the comment letters contained multiple comments. The comments have been divided into the following areas:

- Selection of pollutants and source categories for regulation.
- Emission control options.
- Regulatory alternatives.
- Benefits analysis/economics.
- Equipment, idling, work practice and overall solvent emission limit standards.
- Modification and reconstruction considerations.
- Monitoring requirements.
- Recordkeeping and reporting requirements.
- Operating permit program.
- Clarifications.
- Miscellaneous.

C. Significant Changes

Several changes have been made since the proposal of these standards. The majority of the changes have been made to clarify portions of the rule that were unclear to the commenters. Other changes include adding additional control combinations and an equation that allows cleaning machines that do not have a solvent vapor/air interface area to comply with the standard by meeting a solvent emission limit based on cleaning capacity. A summary of the major changes is presented below.

(1) Several comments were made about the complexity of the rule, with many commenters offering suggested changes to clarify different sections. Many of these recommendations have been incorporated into the final rule. For example, the standards for batch cold cleaning machines have been moved to a separate section, the operator test has been included as appendix B, and a table summarizing the applicability of the General Provisions to this rule has been included in appendix C.

(2) The applicability section of the rule has been clarified to ensure that the standard regulates only those solvents originally intended for inclusion; namely, MC, PCE, TCE, TCA, CT, and C. Several commenters were concerned that, as proposed, the rule could be interpreted to regulate non-halogenated solvents contaminated by trace amounts of halogenated solvent. The EPA never intended for these solvents to be included in these standards.

(3) An equation and table have been added to allow solvent cleaning machines that do not have a solvent vapor/air interface area to comply with these standards. Several new cleaning machines are currently being developed by industry that cannot install the equipment control devices included in this final rule, do not have an idling mode, and do not have a solvent vapor/air interface area to relate to the solvent emission limit. The equation and table in the rule allow owners or operators of halogenated solvent cleaning machines without a solvent vapor/air interface area to comply with the standard by meeting an overall solvent emissions limit based on cleaning capacity that is equivalent to the overall solvent emissions limit for machines with a solvent vapor/air interface.

(4) The list of equipment combinations has been modified to remove overlapping controls and to add carbon adsorbers to the control combinations.

There are multiple control combinations available for meeting the rule, many of which are pollution prevention measures. Many of these options also reduce worker exposure. However, some sources may rely on lip exhausts instead in order to meet OSHA requirements. Use of a lip exhaust without any controls, while reducing worker exposure on the one hand, would dramatically increase the overall emissions to air. Thus, if lip exhausts are used on solvent cleaning machines, the rule requires carbon adsorption controls (which have been added explicitly as a control option in the final rule). Although the lip exhaust-carbon adsorption combination reduces worker exposure and overall emissions to air, it may impose additional cost and burden on sources as well as on the environment for a number of reasons. First, carbon adsorption units are generally more expensive than other controls listed in the options. Second, these units may present cross-media impacts such as effluent discharges if not properly operated and maintained, and spent carbon beds that have to be disposed of as hazardous waste. Thus, when making decisions about what controls to install on halogenated solvent cleaning machines to meet the requirements of this rule, all of these factors should be weighed and pollution prevention measures are encouraged wherever possible.

The EPA acknowledges that data show little additional benefit is achieved by the use of a working-mode cover in the presence of reduced room draft. Therefore, these controls are no longer included in the same control combination.

(5) Some changes have also been made to the compliance and reporting schedules. The initial notification report deadline for existing sources has been extended from 90 to 270 days after promulgation. This overrides the 120 day deadline in the final part 63 General Provisions. This was done to allow more time for the delegation of this rule to the States and to allow more time to process the reports from the large number of facilities affected by this rule. The initial statement of compliance report deadline for new and existing sources has been extended from 30 days to 150 days after the compliance date to allow time for owners or operators to determine compliance with the 3-month rolling average emission limit. The compliance time for existing sources has been extended from 2 to 3 years. This extension has been provided to allow sources the maximum flexibility in complying with these standards, including allowing time to consider alternative

cleaning technologies. This change is consistent with the General Provisions (Sec. 63.6(b)(3)). The exceedance report schedule has been changed to include a biannual exceedance report if there is not an exceedance. This change is consistent with the General Provisions (Sec. 63.10(e)). Exceedance reports must still be submitted quarterly if there is an exceedance.

(6) Several commenters stated that the rule was complex and difficult to understand. They stated that additional guidance should be provided, particularly for small businesses. The EPA agrees that guidance would be helpful and has developed a brochure summarizing the rule, and will be developing a guidance manual that is scheduled for publication in January 1995. This guidance manual includes a detailed summary of the rule, example forms that can be used for reporting and recordkeeping, and additional assistance for evaluating alternative cleaning technologies.

(7) Several commenters recommended that the EPA reduce the monitoring frequency of the emission control equipment. The EPA evaluated the monitoring frequencies and has added a provision to the final rule that allows the hoist monitoring frequency to decrease from monthly to quarterly if, the owner or operator has operated the hoist for one year without an exceedance in the hoist speed. The EPA has also changed the reduced room draft (RRD) monitoring frequency from weekly to quarterly with weekly monitoring of the parameters used to obtain the RRD.

(8) Several comments were received on the batch cold cleaning machine equipment requirement provisions. A number of commenters reported the use of TCA, MC, and TCE in noncarburetor batch cold cleaning machine operations. The commenters stated that the proposed water layer control option was not always possible for these cleaning machines, particularly when TCA or TCE solvents are used. In order to address this issue, alternative control equipment options were added to the final rule to allow for the use of an increased freeboard ratio and cover, or remote-reservoir and cover, in lieu of a water layer and cover. An owner or operator complying with these alternative options must also comply with work practice requirements. The final rule also allows an owner or operator of a batch cold cleaning machine to use alternative control equipment, if demonstrated to be equivalent to the equipment requirements cited in the final rule and approved by the Administrator.

IV. Administrative Requirements

A. Docket

The docket is an organized and complete file of all the information considered by the EPA in the development of this rulemaking. The docket is a dynamic file, since material is added throughout the rulemaking development. The docketing system is intended to allow members of the public and industries involved to readily identify and locate documents so that they can effectively participate in the rulemaking process. Along with the statement of basis and purpose of the proposed and promulgated standards and the EPA responses to significant comments, the contents of the docket will serve as the record in case of judicial review (section 307(d)(7)(A)).

B. Paperwork Reduction Act

Information collection requirements associated with this regulation (those included in 40 CFR Part 63, Subpart A and Subpart T) have been approved by the Office of Management and Budget (OMB) under the provisions of the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 et seq. and have been assigned OMB control number (2060-0273). An Information Collection Request (ICR) document has been prepared by the EPA (ICR No. 1652.02) to reflect the changed information requirements of the final rule and has been submitted to OMB for review. A copy may be obtained from Sandy Farmer, Information Policy Branch, EPA 2136, 401 M St., SW, Washington, DC 20460, or by calling (202) 260-2740.

The annual respondent burden and costs averaged over the first 3 years for batch vapor and in-line cleaning machine subcategories are 359,000 hours and \$12.0 million. Since the reporting burden for some of the required activities will be incurred only once, the average annual burden for batch vapor and in-line cleaning machine subcategories will decrease after the first two years of implementation. For the batch cold cleaning machine subcategory, the annual respondent burden and costs averaged over the first 3 years are 33,000 hours and \$1.1 million. The batch cold cleaning machine subcategory is not expected to incur costs after the initial activities.

This collection of information is estimated to have an annual public reporting and recordkeeping burden averaging 42 hours per facility over the first 3 years. These burden estimates include time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

Several commenters to the proposed rule in recognizing this burden noted that the rule was complex and difficult to understand, and suggested that additional guidance be provided, particularly for small businesses. To address these concerns the Emission Standards Division and the Small Business Assistance Program are developing a brochure to summarize this rule, and will be developing a guidance manual scheduled to be published in January 1995. This manual will include a detailed summary of the rule, example forms for reporting and recordkeeping, to alleviate at least in part the paperwork burden, and additional material for evaluating alternative cleaning technologies.

Send comments regarding the burden estimate or any other aspects of this collection of information, including suggestions for reducing this burden to Chief, Information Policy Branch (2/36), U.S. Environmental Protection Agency, 401 M St. SW., Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503, marked "Attention: Desk Officer for the EPA."

C. Executive Order 12866

Under Executive Order 12866 (58 FR 51735 (October 4, 1993)) the Agency must determine whether the regulatory action is "significant" and therefore subject to OMB review and the

requirements of the Executive Order. The Order defines "significant regulatory action" as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local or tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

Pursuant to the terms of the Executive Order, OMB has notified EPA that it considers this a "significant regulatory action" within the meaning of the Executive Order. The EPA has submitted this action to OMB for review. Changes made in response to OMB suggestions or recommendations will be documented in the public record.

D. Regulatory Flexibility Act

The Regulatory Flexibility Act (or RFA, Pub. L. 96-354, September 19, 1980) requires Federal agencies to give special consideration to the impact of regulation on small businesses. The RFA specifies that a final regulatory flexibility analysis must be prepared if a proposed regulation will have a significant economic impact on a substantial number of small entities. To determine whether a final RFA is required, a screening analysis, otherwise known as an initial RFA, is necessary.

Regulatory impacts are considered significant if:

(1) Annual compliance costs increase total costs of production by more than 5 percent; or

(2) Annual compliance costs as a percent of sales are at least 20 percent (percentage points) higher for small entities; or

(3) Capital cost of compliance represents a significant portion of capital available to small entities; or

(4) The requirements of the regulation are likely to result in closures of small entities. A "substantial number" of small entities is generally considered to be more than 20 percent of the small entities in the affected industry. Since the economic analysis deals only with small entities (in

this case, facilities), it is also an initial RFA, and conclusions about the impacts on small entities can be drawn from what was done there already. Each of the criteria for significant impacts will be considered in turn.

The largest increase in total cost of production from increased emission control is 0.61 percent (SIC 359--Industrial Machinery, n.e.c.). This figure is well below the significant-impact threshold of five percent.

Assessing the differential impacts, measured by a comparison of compliance costs as a percent of sales for small and large entities, is more difficult as large model facilities were not analyzed in the economic impact analysis. Treatment of this small business impacts criterion involves creating two large model facilities.

It is assumed that large facilities use large solvent cleaning machines, then compliance costs for large cleaning machines are negative, and are thus savings. To be conservative, it is assumed here that large model facilities possess five very large solvent cleaning machines, so that a "maximum savings" case is modelled. This case is important as it models the maximum cost differential between large and small facilities.

Large model facilities were created for SICs 359 (Industrial Machinery, n.e.c.) and 254 (Partitions and Fixtures). SIC 359 was chosen because the small model facilities in this group experience the highest cost absorption impacts when compared with other small model facilities. SIC 254 was used because it had the smallest average per-facility revenue of facilities with greater than 100 employees. Thus, if they incur the same absolute savings as other large facilities, their relative percentage savings will be the highest, and they will experience the greatest cost savings in percentage terms as a result of the standard. The cost differentials are in no case larger than one percentage point. Thus, by this criterion, small business impacts are not deemed significant.

The third criterion focuses on the amount of capital available to small businesses or facilities. Since the capital costs incurred as a result of investment in control equipment needed for small businesses to meet the standard was less than 10 percent of the businesses' total assets in all 39 affected SIC codes, it was concluded that the total assets of small facilities will not be so adversely affected as to prohibit the procurement of outside financing. (Examining an increase in capital costs as a percentage of total assets is a measure of the ability of a firm or facility to meet this capital costs increase.) The conclusion, then, is that lack of available capital will not be an obstacle for small facilities in complying with the regulation.

Criterion number four stipulates that small business impacts are significant if compliance leads to closure. The only implication of closure in the economic impact analysis is found in the section on earnings impacts. Here it was found that, under worst-case assumptions, closures might occur in only two SIC codes, 254 and 259 (Miscellaneous Furniture and Fixtures), given their low rate of profitability in the baseline. If this indeed occurs, the question of whether or not these closures make up a substantial portion of small entities must be addressed. The actual number of impacted

facilities in the 39 impacted SICs is unknown. If it can be assumed that each SIC is impacted in the same proportion, a proxy for the share of impacted facilities represented by SIC codes 254 and 259 is the total number of facilities in these SIC codes as a share of the total number of potentially impacted firms. SIC codes 254 and 259 hold a combined total 3,194 small facilities. This makes up 3.4 percent of the total 93,121 small facilities in all 39 SIC codes. Thus, in the extreme case that some closures result, the number of closures is estimated to be far less than the amount required to impact a substantial number of facilities.

In conclusion, and pursuant to section 605(b) of the Regulatory Flexibility Act, 5 U.S.C. 605(b), the Administrator certifies that this rule will not have a significant economic impact on a substantial number of small entities. The basis for the certification is that the economic impacts for small entities do not meet or exceed the four criteria in the Guidelines to the Regulatory Flexibility Act of 1980, as shown above. Further information on the initial RFA is available in the background information package (see Background Information Document section near the beginning of this preamble).

List of Subjects in 40 CFR Parts 9 and 63

Environmental Protection, Air pollution control, Hazardous substances, Halogenated solvent cleaning machines, Reporting and recordkeeping requirements.

Dated: November 15, 1994.

Carol M. Browner,
Administrator.

For the reasons set out in the preamble, title 40, chapter I, of the Code of Federal Regulations is amended as set forth below:

PART 9--[AMENDED]

1. The authority citation for part 9 continues to read as follows:

Authority: 7 U.S.C. 135 et seq., 135-136y; 15 U.S.C. 2001, 2003, 2005, 2006, 2601-2671; 21 U.S.C. 331j, 346a, 348; 31 U.S.C. 9701; 33 U.S.C. 1251 et seq., 1311, 1313d, 1314, 1321, 1326, 1330, 1344, 1345(d) and (e), 1361; E.O. 11735, 38 FR 21243, 3 CFR, 1971-1975 Comp. p. 973; 42 U.S.C. 241, 242b, 243, 246, 300f, 300g, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-1, 300j-2, 300j-3, 300j-4, 300j-9, 1857 et seq., 6901-6992k, 7401-7671q, 7542, 9601-9657, 11023, 11048.

2. Section 9.1 is amended by adding in numerical order a new entry to the table under the indicated heading to read as follows:

Sec. 9.1 OMB approvals under the Paperwork Reduction Act.

	*	*	*	*	*
<hr/>					
	40 CFR citation		OMB control No.		
<hr/>					
	*	*	*	*	*
National Emission Standards for Hazardous Air Pollutants for Source Categories:					
	*	*	*	*	*
63.467-63.468.....					
2060-0273					
	*	*	*	*	*
<hr/>					

PART 63--[AMENDED]

1. The authority citation for part 63 continues to read as follows:

Authority: 42 U.S.C. 7401 et seq.

2. Part 63 is amended by adding subpart T to read as follows:

Subpart T--National Emission Standards for Halogenated Solvent Cleaning

Secs.

63.460	Applicability and designation of source.
63.461	Definitions.
63.462	Batch cold cleaning machine standards.
63.463	Batch vapor and in-line cleaning machine standards.
63.464	Alternative standards.
63.465	Test methods.
63.466	Monitoring procedures.
63.467	Recordkeeping requirements.
63.468	Reporting requirements.
63.469	Equivalent methods of control.

Subpart T--National Emission Standards for Halogenated Solvent Cleaning

Sec. 63.460 Applicability and designation of source.

(a) The provisions of this subpart apply to each individual batch vapor, in-line vapor, in-line cold, and batch cold solvent cleaning machine that uses any solvent containing methylene chloride (CAS No. 75-09-2), perchloroethylene (CAS No. 127-18-4), trichloroethylene (CAS No. 79-01-6), 1,1,1-trichloroethane (CAS No. 71-55-6), carbon tetrachloride (CAS No. 56-23-5) or chloroform (CAS No. 67-66-3), or any combination of these halogenated HAP solvents, in a total concentration greater than 5 percent by weight, as a cleaning and/or drying agent. The concentration of these solvents may be determined using EPA test method 18, material safety data sheets, or engineering calculations.

(b) Except as noted in appendix C (General Provisions Applicability to Subpart T) of this subpart, the provisions of subpart A of this part (General Provisions) apply to owners or operators of any solvent cleaning machine meeting the applicability criteria of paragraph (a) of this section.

(c) Each solvent cleaning machine subject to this subpart that commences construction or reconstruction after November 29, 1993, shall achieve compliance with the provisions of this subpart immediately upon startup or by December 2, 1994, whichever is later.

(d) Each solvent cleaning machine subject to this subpart that commenced construction or reconstruction on or before November 29, 1993, shall achieve compliance with the provisions of this subpart no later than.

(e) In delegating implementation and enforcement authority to a State under section 112(d) of the Act, the authority contained in paragraph (f) of this section shall be retained by the Administrator and not transferred to a State.

(f) The authority conferred in Sec. 63.463(d)(9) and Sec. 63.469 will not be delegated to any State.

Sec. 63.461 Definitions.

Unless defined below, all terms used in this subpart are used as defined in the 1990 Clean Air Act, or in subpart A of 40 CFR part 63:

Administrator means the Administrator of the United States Environmental Protection Agency or his or her authorized representative (e.g., State that has been delegated the authority to implement the provisions of this part.)

Air blanket means the layer of air inside the solvent cleaning machine freeboard located above the solvent/air interface. The centerline of the air blanket is equidistant between the sides of the machine.

Automated parts handling system means a mechanical device that carries all parts and parts baskets at a controlled speed from the initial loading of soiled or wet parts through the removal of the cleaned or dried parts. Automated parts handling systems include, but are not limited to, hoists and conveyors.

Batch cleaning machine means a solvent cleaning machine in which individual parts or a set of parts move through the entire cleaning cycle before new parts are introduced into the solvent cleaning machine. An open-top vapor cleaning machine is a type of batch cleaning machine. A solvent cleaning machine, such as a ferris wheel cleaner, that cleans multiple batch loads simultaneously and is manually loaded is a batch cleaning machine.

Carbon adsorber means a bed of activated carbon into which an air-solvent gas-vapor stream is routed and which adsorbs the solvent on the carbon.

Clean liquid solvent means fresh unused solvent, recycled solvent, or used solvent that has been cleaned of soils (e.g., skimmed of oils or sludge and strained of metal chips).

Cleaning capacity means, for a cleaning machine without a solvent/air interface, the maximum volume of parts that can be cleaned at one time. In most cases, the cleaning capacity is equal to the volume (length times width times height) of the cleaning chamber.

Cold cleaning machine means any device or piece of equipment that contains and/or uses liquid solvent, into which parts are placed to remove soils from the surfaces of the parts or to dry

the parts. Cleaning machines that contain and use heated, nonboiling solvent to clean the parts are classified as cold cleaning machines.

Consumption means the amount of halogenated hazardous air pollutant solvent added to the solvent cleaning machine.

Cover means a lid, top, or portal cover that shields the solvent cleaning machine openings from air disturbances when in place and is designed to be easily opened and closed without disturbing the vapor zone. Air disturbances include, but are not limited to, lip exhausts, ventilation fans, and general room drafts. Types of covers include, but are not limited to, sliding, biparting, and rolltop covers.

Downtime mode means the time period when a solvent cleaning machine is not cleaning parts and the sump heating coils, if present, are turned off.

Dwell means the technique of holding parts within the freeboard area but above the vapor zone of the solvent cleaning machine. Dwell occurs after cleaning to allow solvent to drain from the parts or parts baskets back into the solvent cleaning machine.

Dwell time means the required minimum length of time that a part must dwell, as determined by Sec. 63.465(d).

Emissions means halogenated hazardous air pollutant solvent consumed (i.e., halogenated hazardous air pollutant solvent added to the machine) minus the liquid halogenated hazardous air pollutant solvent removed from the machine and the halogenated hazardous air pollutant solvent removed from the machine in the solid waste.

Existing means any solvent cleaning machine the construction or reconstruction of which was commenced on or before November 29, 1993.

Freeboard area means; for a batch cleaning machine, the area within the solvent cleaning machine that extends from the solvent/air interface to the top of the solvent cleaning machine; for an in-line cleaning machine, it is the area within the solvent cleaning machine that extends from the solvent/air interface to the bottom of the entrance or exit opening, whichever is lower.

Freeboard height means; for a batch cleaning machine, the distance from the solvent/air interface, as measured during the idling mode, to the top of the cleaning machine; for an in-line cleaning machine, it is the distance from the solvent/air interface to the bottom of the entrance or exit opening, whichever is lower, as measured during the idling mode.

Freeboard ratio means the ratio of the solvent cleaning machine freeboard height to the smaller interior dimension (length, width, or diameter) of the solvent cleaning machine.

Freeboard refrigeration device (also called a chiller) means a set of secondary coils mounted in the freeboard area that carries a refrigerant or other chilled substance to provide a chilled air blanket above the solvent vapor. A primary condenser capable of meeting the requirements of Sec. 63.463(e)(2)(i) is defined as both a freeboard refrigeration device and a primary condenser for the purposes of these standards.

Halogenated hazardous air pollutant solvent or halogenated HAP solvent means methylene chloride (CAS No. 75-09-2), perchloroethylene (CAS No. 127-18-4), trichloroethylene (CAS No. 79-01-6), 1,1,1-trichloroethane (CAS No. 71-55-6), carbon tetrachloride (CAS No. 56-23-5), and chloroform (CAS No. 67-66-3).

Hoist means a mechanical device that carries the parts basket and the parts to be cleaned from the loading area into the solvent cleaning machine and to the unloading area at a controlled speed. A hoist may be operated by controls or may be programmed to cycle parts through the cleaning cycle automatically.

Idling mode means the time period when a solvent cleaning machine is not actively cleaning parts and the sump heating coils, if present, are turned on.

Idling-mode cover means any cover or solvent cleaning machine design that allows the cover to shield the cleaning machine openings during the idling mode. A cover that meets this definition can also be used as a working-mode cover if that definition is also met.

Immersion cold cleaning machine means a cold cleaning machine in which the parts are immersed in the solvent when being cleaned. A remote reservoir cold cleaning machine that is also an immersion cold cleaning machine is considered an immersion cold cleaning machine for purposes of this subpart.

In-line cleaning machine or continuous cleaning machine means a solvent cleaning machine that uses an automated parts handling system, typically a conveyor, to automatically provide a continuous supply of parts to be cleaned. These units are fully enclosed except for the conveyor inlet and exit portals. In-line cleaning machines can be either cold or vapor cleaning machines.

Leak-proof coupling means a threaded or other type of coupling that prevents solvents from leaking while filling or draining solvent to and from the solvent cleaning machine.

Lip exhaust means a device installed at the top of the opening of a solvent cleaning machine that draws in air and solvent vapor from the freeboard area and ducts the air and vapor away from the solvent cleaning area.

Monthly reporting period means any calendar month in which the owner or operator of a solvent cleaning machine is required to calculate and report the solvent emissions from each solvent cleaning machine.

New means any solvent cleaning machine the construction or reconstruction of which is commenced after November 29, 1993.

Open-top vapor cleaning machine means a batch solvent cleaning machine that has its upper surface open to the air and boils solvent to create solvent vapor used to clean and/or dry parts.

Part means any object that is cleaned in a solvent cleaning machine. Parts include, but are not limited to, discrete parts, assemblies, sets of parts, and continuous parts (i.e., continuous sheets of metal).

Primary condenser means a series of circumferential cooling coils on a vapor cleaning machine through which a chilled substance is circulated or recirculated to provide continuous condensation of rising solvent vapors and, thereby, create a concentrated solvent vapor zone.

Reduced room draft means decreasing the flow or movement of air across the top of the freeboard area of the solvent cleaning machine to meet the specifications of Sec. 63.463(e)(2)(ii). Methods of achieving a reduced room draft include, but are not limited to, redirecting fans and/or air vents to not blow across the cleaning machine, moving the cleaning machine to a corner where there is less room draft, and constructing a partial or complete enclosure around the cleaning machine.

Remote reservoir cold cleaning machine means any device in which liquid solvent is pumped to a sink-like work area that drains solvent back into an enclosed container while parts are being cleaned, allowing no solvent to pool in the work area.

Soils means contaminants that are removed from the parts being cleaned. Soils include, but are not limited to, grease, oils, waxes, metal chips, carbon deposits, fluxes, and tars.

Solvent/air interface means, for a vapor cleaning machine, the location of contact between the concentrated solvent vapor layer and the air. This location of contact is defined as the mid-line height of the primary condenser coils. For a cold cleaning machine, it is the location of contact between the liquid solvent and the air.

Solvent/air interface area means; for a vapor cleaning machine, the surface area of the solvent vapor zone that is exposed to the air; for an in-line cleaning machine, it is the total surface area of all the sumps; for a cold cleaning machine, it is the surface area of the liquid solvent that is exposed to the air.

Solvent cleaning machine means any device or piece of equipment that uses halogenated HAP

solvent liquid or vapor to remove soils from the surfaces of materials. Types of solvent cleaning machines include, but are not limited to, batch vapor, in-line vapor, in-line cold, and batch cold solvent cleaning machines.

Solvent vapor zone means; for a vapor cleaning machine, the area that extends from the liquid solvent surface to the level that solvent vapor is condensed. This condensation level is defined as the midline height of the primary condenser coils.

Sump means the part of a solvent cleaning machine where the liquid solvent is located.

Sump heater coils means the heating system on a cleaning machine that uses steam, electricity, or hot water to heat or boil the liquid solvent.

Superheated vapor system means a system that heats the solvent vapor, either passively or actively, to a temperature above the solvent's boiling point. Parts are held in the superheated vapor before exiting the machine to evaporate the liquid solvent on them. Hot vapor recycle is an example of a superheated vapor system.

Vapor cleaning machine means a batch or in-line solvent cleaning machine that boils liquid solvent generating solvent vapor that is used as a part of the cleaning or drying cycle.

Water layer means a layer of water that floats above the denser solvent and provides control of solvent emissions. In many cases, the solvent used in batch cold cleaning machines is sold containing the appropriate amount of water to create a water cover.

Working mode means the time period when the solvent cleaning machine is actively cleaning parts. *Working-mode cover* means any cover or solvent cleaning machine design that allows the cover to shield the cleaning machine openings from outside air disturbances while parts are being cleaned in the cleaning machine. A cover that is used during the working mode is opened only during parts entry and removal. A cover that meets this definition can also be used as an idling-mode cover if that definition is also met.

Sec. 63.462 Batch cold cleaning machine standards.

(a) Each owner or operator of an immersion batch cold solvent cleaning machine shall comply with the requirements specified in paragraph(a)(1) or (a)(2) of this section.

(1) Employ a tightly fitting cover that shall be closed at all times except during parts entry and removal, and a water layer at a minimum thickness of 2.5 centimeters (1.0 inch) on the surface of the solvent within the cleaning machine, or

(2) Employ a tightly fitting cover that shall be closed at all times except during parts entry and removal and a freeboard ratio of 0.75 or greater.

(b) Each owner or operator of a remote-reservoir batch cold solvent cleaning machine shall employ a tightly fitting cover over the solvent sump that shall be closed at all times except during the cleaning of parts.

(c) Each owner or operator of a batch cold solvent cleaning machine complying with paragraphs (a)(2) or (b) of this section shall comply with the work and operational practice requirements specified in paragraphs (c)(1) through (c)(8) of this section.

(1) All waste solvent shall be collected and stored in closed containers. The closed container may contain a device that allows pressure relief, but does not allow liquid solvent to drain from the container.

(2) If a flexible hose or flushing device is used, flushing shall be performed only within the freeboard area of the solvent cleaning machine.

(3) The owner or operator shall drain solvent cleaned parts for 15 seconds or until dripping has stopped, whichever is longer. Parts having cavities or blind holes shall be tipped or rotated while draining.

(4) The owner or operator shall ensure that the solvent level does not exceed the fill line.

(5) Spills during solvent transfer shall be wiped up immediately. The wipe rags shall be stored in covered containers meeting the requirements of paragraph (c)(1) of this section.

(6) When an air- or pump-agitated solvent bath is used, the owner or operator shall ensure that the agitator is operated to produce a rolling motion of the solvent but not observable splashing against tank walls or parts being cleaned.

(7) The owner or operator shall ensure that, when the cover is open, the cold cleaning machine is not exposed to drafts greater than 40 meters per minute (132 feet per minute), as measured between 1 and 2 meters (3.3 and 6.6 feet) upwind and at the same elevation as the tank lip.

(8) Sponges, fabric, wood, and paper products shall not be cleaned.

(d) Each owner or operator of a batch cold cleaning machine shall submit an initial notification report as described in Sec. 63.468(a) and a compliance report as described in Sec. 63.468(b). No further reporting or recordkeeping is required.

Sec. 63.463 Batch vapor and in-line cleaning machine standards.

(a) Except as provided in Sec. 63.464, each owner or operator of a solvent cleaning machine subject to the provisions of this subpart shall ensure that each existing or new batch vapor or

in-line solvent cleaning machine subject to the provisions of this subpart conforms to the design requirements specified in paragraphs (a)(1) through (a)(7) of this section.

(1) Each cleaning machine shall be designed or operated to meet the control equipment or technique requirements in paragraph (a)(1)(i) or (a)(1)(ii) of this section.

(i) An idling and downtime mode cover, as described in Sec. 63.463(d)(1)(i), that may be readily opened or closed, that completely covers the cleaning machine openings when in place, and is free of cracks, holes, and other defects.

(ii) A reduced room draft as described in Sec. 63.463(e)(2)(ii).

(2) Each cleaning machine shall have a freeboard ratio of 0.75 or greater.

(3) Each cleaning machine shall have an automated parts handling system capable of moving parts or parts baskets at a speed of 3.4 meters per minute (11 feet per minute) or less from the initial loading of parts through removal of cleaned parts.

(4) Each vapor cleaning machine shall be equipped with a device that shuts off the sump heat if the sump liquid solvent level drops to the sump heater coils.

(5) Each vapor cleaning machine shall be equipped with a vapor level control device that shuts off sump heat if the vapor level in the vapor cleaning machine rises above the height of the primary condenser.

(6) Each vapor cleaning machine shall have a primary condenser.

(7) Each cleaning machine that uses a lip exhaust shall be designed and operated to route all collected solvent vapors through a properly operated and maintained carbon adsorber that meets the requirements of paragraph (e)(2)(vii) of this section.

(b) Except as provided in Sec. 63.464, each owner or operator of an existing or new batch vapor cleaning machine shall comply with either paragraph (b)(1) or (b)(2) of this section.

(1) Each owner or operator of a batch vapor cleaning machine with a solvent/air interface area of 1.21 square meters (13 square feet) or less shall comply with the requirements specified in either paragraph (b)(1)(i) or (b)(1)(ii) of this section.

(i) Employ one of the control combinations listed in table 1 of this subpart or other equivalent methods of control as determined using the procedure in Sec. 63.469, equivalent methods of control.

Table 1.--Control Combinations for Batch Vapor Solvent Cleaning Machines With a Solvent/Air Interface Area of 1.21 Square Meters (13 Square Feet) or Less

Option	Control combinations
1.....	Working-mode cover, freeboard ratio of 1.0, superheated vapor.
2.....	Freeboard refrigeration device, superheated vapor.
3.....	Working-mode cover, freeboard refrigeration device.
4.....	Reduced room draft, freeboard ratio of 1.0, superheated vapor.
5.....	Freeboard refrigeration device, reduced room draft.
6.....	Freeboard refrigeration device, freeboard ratio of 1.0.
7.....	Freeboard refrigeration device, dwell.
8.....	Reduced room draft, dwell, freeboard ratio of 1.0.
9.....	Freeboard refrigeration device, carbon adsorber.
10.....	Freeboard ratio of 1.0, superheated vapor, carbon adsorber.

Note: Unlike most of the control techniques available for complying with this rule, carbon adsorbers are not considered to be a pollution prevention measure. Use of such units may impose additional cost and burden for a number of reasons. First, carbon adsorption units are generally more expensive than other controls listed in the options. Second, these units may present cross-media impacts such as effluent discharges if not properly operated and maintained, and spent carbon beds have to be disposed of as hazardous waste. When making decisions about what controls to install on halogenated solvent cleaning machines to meet the requirements of this rule, all of these factors should be weighed and pollution prevention measures are encouraged wherever possible.

(ii) Demonstrate that their solvent cleaning machine can achieve and maintain an idling emission limit of 0.22 kilograms per hour per square meter (0.045 pounds per hour per square foot) of solvent/air interface area as determined using the procedures in Sec. 63.465(a) and appendix A to this part.

(2) Each owner or operator of a batch vapor cleaning machine with a solvent/air interface area greater than 1.21 square meters (13 square feet) shall comply with the requirements specified in either paragraph (b)(2)(i) or (b)(2)(ii) of this section.

(i) Employ one of the control combinations listed in table 2 of this subpart or other equivalent methods of control as determined using the procedure in Sec. 63.469, equivalent methods of control.

Table 2.--Control Combinations for Batch Vapor Solvent Cleaning Machines With a Solvent/Air Interface Area Greater than 1.21 Square Meters (13 Square Feet)

Option	Control combinations
1.....	Freeboard refrigeration device, freeboard ratio of 1.0, superheated vapor.
2.....	Dwell, freeboard refrigeration device, reduced room draft.
3.....	Working-mode cover, freeboard refrigeration device, superheated vapor.
4.....	Freeboard ratio of 1.0, reduced room draft, superheated vapor.
5.....	Freeboard refrigeration device, reduced room draft superheated vapor.
6.....	Freeboard refrigeration device, reduced room draft freeboard ratio of 1.0.
7.....	Freeboard refrigeration device, superheated vapor, carbon adsorber.

Note: Unlike most of the control techniques available for complying with this rule, carbon adsorbers are not considered to be a pollution prevention measure. Use of such units may impose additional cost and burden for a number of reasons. First, carbon adsorption units are generally more expensive than other controls listed in the options. Second, these units may present cross-media impacts such as effluent discharges if not properly operated and maintained, and spent carbon beds have to be disposed of as hazardous waste. When making decisions about what controls to install on halogenated solvent cleaning machines to meet the requirements of this rule, all of these factors should be weighed and pollution prevention measures are encouraged wherever possible.

(ii) Demonstrate that their solvent cleaning machine can achieve and maintain an idling emission limit of 0.22 kilograms per hour per square meter (0.045 pounds per hour per square foot) of solvent/air interface area as determined using the procedures in Sec. 63.465(a) and appendix A of this part.

(c) Except as provided in Sec. 63.464, each owner or operator of an in-line cleaning machine shall comply with paragraph (c)(1) or (c)(2) of this section as appropriate.

(1) Each owner or operator of an existing in-line cleaning machine shall comply with the requirements specified in either paragraph (c)(1)(i) or (c)(1)(ii) of this section.

(i) Employ one of the control combinations listed in table 3 of this subpart or other equivalent methods of control as determined using the procedure in Sec. 63.469, equivalent methods of control.

Table 3.--Control Combinations for Existing In-Line Solvent Cleaning Machines

Option	Control combinations
1.....	Superheated vapor, freeboard ratio of 1.0.
2.....	Freeboard refrigeration device, freeboard ratio of 1.0.
3.....	Dwell, freeboard refrigeration device.
4.....	Dwell, carbon adsorber.

Note: Unlike most of the control techniques available for complying with this rule, carbon adsorbers are not considered to be a pollution prevention measure. Use of such units may impose additional cost and burden for a number of reasons. First, carbon adsorption units are generally more expensive than other controls listed in the options. Second, these units may present cross-media impacts such as effluent discharges if not properly operated and maintained, and spent carbon beds have to be disposed of as hazardous waste. When making decisions about what controls to install on halogenated solvent cleaning machines to meet the requirements of this rule, all of these factors should be weighed and pollution prevention measures are encouraged wherever possible.

(ii) Demonstrate that their solvent cleaning machine can achieve and maintain an idling emission limit of 0.10 kilograms per hour per square meter (0.021 pounds per hour per square foot) of solvent/air interface area as determined using the procedures in Sec. 63.465(a) and appendix A to this part.

(2) Each owner or operator of a new in-line cleaning machine shall comply with the requirements specified in either paragraph (c)(2)(i) or (c)(2)(ii) of this section.

(i) Employ one of the control combinations listed in table 4 of this subpart or other equivalent methods of control as determined using the procedure in Sec. 63.469, equivalent methods of control section.

Table 4.--Control Combinations for New In-Line Solvent Cleaning Machines

Option	Control combinations
1.....	Superheated vapor, freeboard refrigeration device.
2.....	Freeboard refrigeration device, carbon adsorber.
3.....	Superheated vapor, carbon adsorber.

Note: Unlike most of the control techniques available for complying with this rule, carbon adsorbers are not considered to be a pollution prevention measure. Use of such units may impose additional cost and burden for a number of reasons. First, carbon adsorption units are generally more expensive than other controls listed in the options. Second, these units may present cross-media impacts such as effluent discharges if not properly operated and maintained, and spent carbon beds have to be disposed of as hazardous waste. When making decisions about what controls to install on halogenated solvent cleaning machines to meet the requirements of this rule, all of these factors should be weighed and pollution prevention measures are encouraged wherever possible.

(ii) Demonstrate that their solvent cleaning machine can achieve and maintain an idling emission limit of 0.10 kilograms per hour per square meter (0.021 pounds per hour per square foot) of solvent/air interface area as determined using the procedures in Sec. 63.465(a) and appendix A to this part.

(d) Except as provided in Sec. 63.464, each owner or operator of an existing or new batch vapor or in-line solvent cleaning machine shall meet all of the following required work and operational practices specified in paragraph (d)(1) through (d)(12) of this section as applicable.

(1) Control air disturbances across the cleaning machine opening(s) by incorporating the control equipment or techniques in paragraph (d)(1)(i) or (d)(1)(ii) of this section.

(i) Cover(s) to each solvent cleaning machine shall be in place during the idling mode, and during the downtime mode unless either the solvent has been removed from the machine or maintenance or monitoring is being performed that requires the cover(s) to not be in place.

(ii) A reduced room draft as described in Sec. 63.463(e)(2)(ii).

(2) The parts baskets or the parts being cleaned in an open-top batch vapor cleaning machine shall not occupy more than 50 percent of the solvent/air interface area unless the parts baskets or parts are introduced at a speed of 0.9 meters per minute (3 feet per minute) or less.

(3) Any spraying operations shall be done within the vapor zone or within a section of the solvent cleaning machine that is not directly exposed to the ambient air (i.e., a baffled or enclosed area of the solvent cleaning machine).

(4) Parts shall be oriented so that the solvent drains from them freely. Parts having cavities or blind holes shall be tipped or rotated before being removed from any solvent cleaning machine unless an equally effective approach has been approved by the Administrator.

(5) Parts baskets or parts shall not be removed from any solvent cleaning machine until dripping has stopped.

(6) During startup of each vapor cleaning machine, the primary condenser shall be turned on before the sump heater.

(7) During shutdown of each vapor cleaning machine, the sump heater shall be turned off and the solvent vapor layer allowed to collapse before the primary condenser is turned off.

(8) When solvent is added or drained from any solvent cleaning machine, the solvent shall be transferred using threaded or other leakproof couplings and the end of the pipe in the solvent sump shall be located beneath the liquid solvent surface.

(9) Each solvent cleaning machine and associated controls shall be maintained as recommended by the manufacturers of the equipment or using alternative maintenance practices that have been demonstrated to the Administrator's satisfaction to achieve the same or better results as those recommended by the manufacturer.

(10) Each operator of a solvent cleaning machine shall complete and pass the applicable sections of the test of solvent cleaning operating procedures in appendix B to this part if requested during an inspection by the Administrator.

(11) Waste solvent, still bottoms, and sump bottoms shall be collected and stored in closed containers. The closed containers may contain a device that would allow pressure relief, but would not allow liquid solvent to drain from the container.

(12) Sponges, fabric, wood, and paper products shall not be cleaned.

(e) Each owner or operator of a solvent cleaning machine complying with either paragraph (b) or (c) of this section shall comply with the requirements specified in paragraphs (e)(1) through (e)(4) of this section.

(1) Conduct monitoring of each control device used to comply with Sec. 63.463 of this subpart as provided in Sec. 63.466.

(2) Determine during each monitoring period whether each control device used to comply with these standards meets the requirements specified in paragraphs (e)(2)(i) through (e)(2)(vii) of this section.

(i) If a freeboard refrigeration device is used to comply with these standards, the owner or operator shall ensure that the chilled air blanket temperature (in deg.F or deg.C), measured at the center of the air blanket, is no greater than 30 percent of the solvent's boiling point.

(ii) If a reduced room draft is used to comply with these standards, the owner or operator shall comply with the requirements specified in paragraphs (e)(2)(ii)(A) and (e)(2)(ii)(B) of this section.

(A) Ensure that the flow or movement of air across the top of the freeboard area of the solvent cleaning machine or within the solvent cleaning machine enclosure does not exceed 15.2 meters per minute (50 feet per minute) at any time as measured using the procedures in Sec. 63.466(d).

(B) Establish and maintain the operating conditions under which the wind speed was demonstrated to be 15.2 meters per minute (50 feet per minute) or less as described in Sec. 63.466(d).

(iii) If a working-mode cover is used to comply with these standards, the owner or operator shall comply with the requirements specified in paragraphs (e)(2)(iii)(A) and (e)(2)(iii)(B) of this section.

(A) Ensure that the cover opens only for part entrance and removal and completely covers the cleaning machine openings when closed.

(B) Ensure that the working-mode cover is maintained free of cracks, holes, and other defects.

(iv) If an idling-mode cover is used to comply with these standards, the owner or operator shall comply with the requirements specified in paragraphs (e)(2)(iv)(A) and (e)(2)(iv)(B) of this section.

(A) Ensure that the cover is in place whenever parts are not in the solvent cleaning machine and completely covers the cleaning machine openings when in place.

(B) Ensure that the idling-mode cover is maintained free of cracks, holes, and other defects.

(v) If a dwell is used to comply with these standards, the owner or operator shall comply with the requirements specified in paragraphs (e)(2)(v)(A) and (e)(2)(v)(B) of this section.

(A) Determine the appropriate dwell time for each type of part or parts basket, or determine

the maximum dwell time using the most complex part type or parts basket, as described in Sec. 63.465(d).

(B) Ensure that, after cleaning, each part is held in the solvent cleaning machine freeboard area above the vapor zone for the dwell time determined for that particular part or parts basket, or for the maximum dwell time determined using the most complex part type or parts basket.

(vi) If a superheated vapor system is used to comply with these standards, the owner or operator shall comply with the requirements specified in paragraphs (e)(2)(vi)(A) through (e)(2)(vi)(C) of this section.

(A) Ensure that the temperature of the solvent vapor at the center of the superheated vapor zone is at least 10 deg.F above the solvent's boiling point.

(B) Ensure that the manufacturer's specifications for determining the minimum proper dwell time within the superheated vapor system is followed.

(C) Ensure that parts remain within the superheated vapor for at least the minimum proper dwell time.

(vii) If a carbon adsorber in conjunction with a lip exhaust is used to comply with these standards, the owner or operator shall comply with the requirements specified in paragraphs (e)(2)(vii)(A) through (e)(2)(vii)(C) of this section.

(A) Ensure that the concentration of organic solvent in the exhaust from this device does not exceed 100 parts per million of any halogenated HAP compound as measured using the procedure in Sec. 63.466(e). If the halogenated HAP solvent concentration in the carbon adsorber exhaust exceeds 100 parts per million, the owner or operator shall adjust the desorption schedule or replace the disposable canister, if not a regenerative system, so that the exhaust concentration of halogenated HAP solvent is brought below 100 parts per million.

(B) Ensure that the carbon adsorber bed is not bypassed during desorption.

(C) Ensure that the lip exhaust is located above the solvent cleaning machine cover so that the cover closes below the lip exhaust level.

(3) If any of the requirements of paragraph (e)(2) of this section are not met, determine whether an exceedance has occurred using the criteria in paragraphs (e)(3)(i) and (e)(3)(ii) of this section.

(i) An exceedance has occurred if the requirements of paragraphs (e)(2)(ii)(B), (e)(2)(iii)(A), (e)(2)(iv)(A), (e)(2)(v), (e)(2)(vi)(B), (e)(2)(vi)(C), (e)(2)(vii)(B), or (e)(2)(vii)(C) of this section have not been met.

(ii) An exceedance has occurred if the requirements of paragraphs (e)(2)(i), (e)(2)(ii)(A), (e)(2)(iii)(B), (e)(2)(iv)(B), (e)(2)(vi)(A), or (e)(2)(vii)(A) of this section have not been met and are not corrected within 15 days of detection. Adjustments or repairs shall be made to the solvent cleaning system or control device to reestablish required levels. The parameter must be remeasured immediately upon adjustment or repair and demonstrated to be within required limits.

(4) The owner or operator shall report all exceedances and all corrections and adjustments made to avoid an exceedance as specified in Sec. 63.468(h).

(f) Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the idling emission limit standards in paragraphs (b)(1)(ii), (b)(2)(ii), (c)(1)(ii), or (c)(2)(ii) of this section shall comply with the requirements specified in paragraphs (f)(1) through (f)(5) of this section.

(1) Conduct an initial performance test to comply with the requirements specified in paragraphs (f)(1)(i) and (f)(1)(ii) of this section.

(i) Demonstrate compliance with the applicable idling emission limit.

(ii) Establish parameters that will be monitored to demonstrate compliance. If a control device is used that is listed in paragraph (e)(2) of this section, then the requirements for that control device as listed in paragraph (e)(2) of this section shall be used unless the owner or operator can demonstrate to the Administrator's satisfaction that an alternative strategy is equally effective.

(2) Conduct the periodic monitoring of the parameters used to demonstrate compliance as described in Sec. 63.466(f).

(3) Operate the solvent cleaning machine within parameters identified in the initial performance test.

(4) If any of the requirements in paragraphs (f)(1) through (f)(3) of this section are not met, determine whether an exceedance has occurred using the criteria in paragraphs (f)(4)(i) and (f)(4)(ii) of this section.

(i) If using a control listed in paragraph (e) of this section, the owner or operator shall comply with the appropriate parameter values in paragraph (e)(2) and the exceedance delineations in paragraphs (e)(3)(i) and (e)(3)(ii) of this section.

(ii) If using a control not listed in paragraph (e) of this section, the owner or operator shall indicate whether the exceedance of the parameters that are monitored to determine the proper functioning of this control would be classified as an immediate exceedance or whether a 15 day repair period would be allowed. This information must be submitted to the Administrator for approval.

(5) The owner or operator shall report all exceedances and all corrections and adjustments made to avoid an exceedance as specified in Sec. 63.468(h).

Sec. 63.464 Alternative standards.

(a) As an alternative to meeting the requirements in Sec. 63.463, each owner or operator of a batch vapor or in-line solvent cleaning machine can elect to comply with the requirements of Sec. 63.464. An owner or operator of a solvent cleaning machine who elects to comply with Sec. 63.464 shall comply with the requirements specified in either paragraph (a)(1) or (a)(2) of this section.

(1) If the cleaning machine has a solvent/air interface, as defined in Sec. 63.461, the owner or operator shall comply with the requirements specified in paragraphs (a)(1)(i) and (a)(1)(ii) of this section.

(i) Maintain a log of solvent additions and deletions for each solvent cleaning machine.

(ii) Ensure that the emissions from each solvent cleaning machine are equal to or less than the applicable emission limit presented in table 5 of this subpart as determined using the procedures in Sec. 63.465(b) and (c).

Table 5.--Emission Limits for Batch Vapor and In-Line Solvent Cleaning Machines With a Solvent/Air Interface

Solvent cleaning machine	3-month rolling average monthly emission limit (kilograms/ square meters/ month)
Batch vapor solvent cleaning machines.....	150
Existing in-line solvent cleaning machines.....	153
New in-line solvent cleaning machines.....	99

(2) If the cleaning machine is a batch vapor cleaning machine and does not have a solvent/air

interface, the owner or operator shall comply with the requirements specified in paragraphs (a)(2)(i) and (a)(2)(ii) of this section.

(i) Maintain a log of solvent additions and deletions for each solvent cleaning machine.

(ii) Ensure that the emissions from each solvent cleaning machine are equal to or less than the appropriate limits as described in paragraphs (a)(2)(ii)(A) and (a)(2)(ii)(B) of this section.

(A) For cleaning machines with a cleaning capacity, as reported in Sec. 63.468(d), that is less than or equal to 2.95 cubic meters, the emission limit shall be determined using table 6 or equation 1. If using table 6, and the cleaning capacity of the cleaning machine falls between two cleaning capacity sizes, then the lower of the two emission limits applies.

(B) For cleaning machines with a cleaning capacity as reported in Sec. 63.468(d), that is greater than 2.95 cubic meters, the emission limit shall be determined using equation 1.

$$EL = 330 * (Vol)^{0.6} \quad (1)$$

where:

EL = the 3-month rolling average monthly emission limit (kilograms/month).

Table 6.--Emission Limits for Cleaning Machines Without a Solvent/Air Interface

Cleaning capacity (cubic meters)	3-month rolling average monthly emission limit (kilograms/month)
0.00	0
0.05	55
0.10	83
0.15	106
0.20	126
0.25	144
0.30	160
0.35	176
0.40	190
0.45	204
0.50	218
0.55	231
0.60	243

0.65	255
0.70	266
0.75	278
0.80	289
0.85	299
0.90	310
0.95	320
1.00	330
1.05	340
1.10	349
1.15	359
1.20	368
1.25	377
1.30	386
1.35	395
1.40	404
1.45	412
1.50	421
1.55	429
1.60	438
1.65	446
1.70	454
1.75	462
1.80	470
1.85	477
1.90	485
1.95	493
2.00	500
2.05	508
2.10	515
2.15	522
2.20	530
2.25	537
2.30	544
2.35	551
2.40	558
2.45	565
2.50	572
2.55	579
2.60	585
2.65	592
2.70	599
2.75	605

2.80	612
2.85	619
2.90	625
2.95	632

Vol = the cleaning capacity of the solvent cleaning machine (cubic meters).

(b) Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with Sec. 63.464(a) shall demonstrate compliance with the applicable 3-month rolling average monthly emission limit on a monthly basis as described in Sec. 63.465(b) and (c).

(c) If the applicable 3-month rolling average emission limit is not met, an exceedance has occurred. All exceedances shall be reported as required in Sec. 63.468(h).

Sec. 63.465 Test methods.

(a) Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with an idling emission limit standard in Sec. 63.463(b)(1)(ii), (b)(2)(ii), (c)(1)(ii), or (c)(2)(ii) shall determine the idling emission rate of the solvent cleaning machine using Reference Method 307 in appendix A to this part.

(b) Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with Sec. 63.464 shall on the first operating day of every month ensure that the solvent cleaning machine system contains only clean liquid solvent. This includes, but is not limited to, fresh unused solvent, recycled solvent and used solvent that has been cleaned of soils. A fill line must be indicated during the first month the measurements are made. The solvent level within the machine must be returned to the same fill-line each month, immediately prior to calculating monthly emissions as specified in Sec. 63.465(c). The solvent cleaning machine does not have to be emptied and filled with fresh unused solvent prior to the calculations.

(c) Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with Sec. 63.464 shall on the first operating day of the month comply with the requirements specified in paragraphs (c)(1) through (c)(3) of this section.

(1) Using the records of all solvent additions and deletions for the previous monthly reporting period required under Sec. 63.464(a), determine solvent emissions (E_i) using equation 2 for cleaning machines with a solvent/air interface and equation 3 for cleaning machines without a solvent/air interface:

$$E_i = \frac{SA_i - LSR_i - SSR_i}{AREA_i} \quad (2)$$

$$E_n = SA_i - LSR_i - SSR_i \quad (3)$$

where:

E_i = the total halogenated HAP solvent emissions from the solvent cleaning machine during the most recent monthly reporting period i , (kilograms of solvent per square meter of solvent/air interface area per month).

E_n = the total halogenated HAP solvent emissions from the solvent cleaning machine during the most recent monthly reporting period i , (kilograms of solvent per month).

SA_i = the total amount of halogenated HAP liquid solvent added to the solvent cleaning machine during the most recent monthly reporting period i , (kilograms of solvent per month).

LSR_i = the total amount of halogenated HAP liquid solvent removed from the solvent cleaning machine during the most recent monthly reporting period i , (kilograms of solvent per month).

SSR_i = the total amount of halogenated HAP solvent removed from the solvent cleaning machine in solid waste, obtained as described in paragraph (c)(2) of this section, during the most recent monthly reporting period i , (kilograms of solvent per month).

$AREA_i$ = the solvent/air interface area of the solvent cleaning machine (square meters).

(2) Determine SSR_i using the method specified in paragraph (c)(2)(i) or (c)(2)(ii) of this section.

(i) From tests conducted using EPA reference method 25d.

(ii) By engineering calculations included in the compliance report.

(3) Determine the monthly rolling average, EA , for the 3-month period ending with the most recent reporting period using equation 4 for cleaning machines with a solvent/air interface or equation 5 for cleaning machines without a solvent/air interface:

$$EA_i = \frac{\sum_{j=1}^3 E_i}{3} \quad (4)$$

$$EA_n = \frac{\sum_{j=1}^3 E_n}{3} \quad (5)$$

Where:

EA_i = the average halogenated HAP solvent emissions over the preceding 3 monthly reporting periods, (kilograms of solvent per square meter of solvent/air interface area per month).

EA_n = the average halogenated HAP solvent emissions over the preceding 3 monthly reporting periods (kilograms of solvent per month).

E_i = halogenated HAP solvent emissions for each month (j) for the most recent 3 monthly reporting periods (kilograms of solvent per square meter of solvent/air interface area).

E_n = halogenated HAP solvent emissions for each month (j) for the most recent 3 monthly reporting periods (kilograms of solvent per month).

$j=1$ = the most recent monthly reporting period.

$j=2$ = the monthly reporting period immediately prior to $j=1$.

$j=3$ = the monthly reporting period immediately prior to $j=2$.

(d) Each owner or operator of a batch vapor or in-line solvent cleaning machine using a dwell to comply with Sec. 63.463 shall determine the appropriate dwell time for each part or parts basket using the procedure specified in paragraphs (d)(1) and (d)(2) of this section.

(1) Determine the amount of time for the part or parts basket to cease dripping once placed in the vapor zone. The part or parts basket used for this determination must be at room temperature before being placed in the vapor zone.

(2) The proper dwell time for parts to remain in the freeboard area above the vapor zone is no less than 35 percent of the time determined in paragraph (d)(1) of this section.

(e) An owner or operator of a source shall determine their potential to emit from all solvent cleaning operations, using the procedures described in paragraphs (e)(1) through (e)(3) of this section. A facility's total potential to emit is the sum of the HAP emissions from all solvent cleaning operations, plus all HAP emissions from other sources within the facility.

(1) Determine the potential to emit for each individual solvent cleaning using equation 6.

$$PTE_i = H_i \times W_i \times SAI_i \quad (6)$$

Where:

PTE_i = the potential to emit for solvent cleaning machine i (kilograms of solvent per year).
 H_i = hours of operation for solvent cleaning machine i (hours per year).
 = 8760 hours per year, unless otherwise restricted by a Federally enforceable requirement.
 W_i = the working mode uncontrolled emission rate (kilograms per square meter per hour).
 = 1.95 kilograms per square meter per hour for batch vapor and cold cleaning machines.
 = 1.12 kilograms per square meter per hour for in-line cleaning machines.
 SAI_i = solvent/air interface area of solvent cleaning machine i (square meters). Section 63.461 defines the solvent/air interface area for those machines that have a solvent/air interface. Cleaning machines that do not have a solvent/air interface shall calculate a solvent/air interface area using the procedure in paragraph (e)(2) of this section.

(2) Cleaning machines that do not have a solvent/air interface shall calculate a solvent/air interface area using equation 7.

$$SAI = 2.20 * (Vol)^{0.6} \quad (7)$$

Where:

SAI = the solvent/air interface area (square meters).
 Vol = the cleaning capacity of the solvent cleaning machine (cubic meters).

(3) Sum the PTE_i for all solvent cleaning operations to obtain the total potential to emit for solvent cleaning operations at the facility.

Sec. 63.466 Monitoring procedures.

(a) Except as provided in paragraph (g) of this section, each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the equipment standards in Sec. 63.463 (b)(1)(i), (b)(2)(i), (c)(1)(i), or (c)(2)(i) shall conduct monitoring and record the results on a weekly basis for the control devices, as appropriate, specified in paragraphs (a)(1) and (a)(2) of this section.

(1) If a freeboard refrigeration device is used to comply with these standards, the owner or operator shall use a thermometer or thermocouple to measure the temperature at the center of the air blanket during the idling mode.

(2) If a superheated vapor system is used to comply with these standards, the owner or operator shall use a thermometer or thermocouple to measure the temperature at the center of the superheated solvent vapor zone while the solvent cleaning machine is in the idling mode.

(b) Except as provided in paragraph (g) of this section, each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the equipment standards of Sec. 63.463 (b)(1)(i), (b)(2)(i), (c)(1)(i), or (c)(2)(i) shall conduct monitoring and record the results on a

monthly basis for the control devices, as appropriate, specified in paragraphs (b)(1) and (b)(2) of this section.

(1) If a cover (working-mode, downtime-mode, and/or idling-mode cover) is used to comply with these standards, the owner or operator shall conduct a visual inspection to determine if the cover is opening and closing properly, completely covers the cleaning machine openings when closed, and is free of cracks, holes, and other defects.

(2) If a dwell is used, the owner or operator shall determine the actual dwell time by measuring the period of time that parts are held within the freeboard area of the solvent cleaning machine after cleaning.

(c) Except as provided in paragraph (g) of this section, each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the equipment or idling standards in Sec. 63.463 shall monitor the hoist speed as described in paragraphs (c)(1) through (c)(4) of this section.

(1) The owner or operator shall determine the hoist speed by measuring the time it takes for the hoist to travel a measured distance. The speed is equal to the distance in meters divided by the time in minutes (meters per minute).

(2) The monitoring shall be conducted monthly. If after the first year, no exceedances of the hoist speed are measured, the owner or operator may begin monitoring the hoist speed quarterly.

(3) If an exceedance of the hoist speed occurs during quarterly monitoring, the monitoring frequency returns to monthly until another year of compliance without an exceedance is demonstrated.

(4) If an owner or operator can demonstrate to the Administrator's satisfaction in the initial compliance report that the hoist cannot exceed a speed of 3.4 meters per minute (11 feet per minute), the required monitoring frequency is quarterly, including during the first year of compliance.

(d) Except as provided in paragraph (g) of this section, each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the equipment standards in Sec. 63.463 (b)(1)(i), (b)(2)(i), (c)(1)(i), or (c)(2)(i) using a reduced room draft shall conduct monitoring and record the results as specified in paragraph(d)(1) or (d)(2) of this section.

(1) If the reduced room draft is maintained by controlling room parameters (i.e., redirecting fans, closing doors and windows, etc.), the owner or operator shall conduct an initial monitoring test of the windspeed and of room parameters, quarterly monitoring of windspeed, and weekly monitoring of room parameters as specified in paragraphs (d)(1)(i) and (d)(1)(ii) of this section.

(i) Measure the windspeed within 6 inches above the top of the freeboard area of the solvent cleaning machine using the procedure specified in paragraphs (d)(1)(i)(A) through (d)(1)(i)(D) of this section.

(A) Determine the direction of the wind current by slowly rotating a velometer or similar device until the maximum speed is located.

(B) Orient a velometer in the direction of the wind current at each of the four corners of the machine.

(C) Record the reading for each corner.

(D) Average the values obtained at each corner and record the average wind speed.

(ii) Monitor on a weekly basis the room parameters established during the initial compliance test that are used to achieve the reduced room draft.

(2) If an enclosure (full or partial) is used to achieve a reduced room draft, the owner or operator shall conduct an initial monitoring test and, thereafter, monthly monitoring tests of the windspeed within the enclosure using the procedure specified in paragraphs (d)(2)(i) and (d)(2)(ii) of this section and a monthly visual inspection of the enclosure to determine if it is free of cracks, holes and other defects.

(i) Determine the direction of the wind current in the enclosure by slowly rotating a velometer inside the entrance to the enclosure until the maximum speed is located.

(ii) Record the maximum wind speed.

(e) Except as provided in paragraph (g) of this section, each owner or operator using a carbon adsorber to comply with this subpart shall measure and record the concentration of halogenated HAP solvent in the exhaust of the carbon adsorber weekly with a colorimetric detector tube. This test shall be conducted while the solvent cleaning machine is in the working mode and is venting to the carbon adsorber. The exhaust concentration shall be determined using the procedure specified in paragraphs (e)(1) through (e)(3) of this section.

(1) Use a colorimetric detector tube designed to measure a concentration of 100 parts per million by volume of solvent in air to an accuracy of <plus-minus> 25 parts per million by volume.

(2) Use the colorimetric detector tube according to the manufacturer's instructions.

(3) Provide a sampling port for monitoring within the exhaust outlet of the carbon adsorber that is easily accessible and located at least 8 stack or duct diameters downstream from any flow disturbance such as a bend, expansion, contraction, or outlet; downstream from no other inlet;

and 2 stack or duct diameters upstream from any flow disturbance such as a bend, expansion, contraction, inlet or outlet.

(f) Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the idling emission limit standards of Sec. 63.463 (b)(1)(ii), (b)(2)(ii), (c)(1)(ii), or (c)(2)(ii) shall comply with the requirements specified in paragraphs (f)(1) and (f)(2) of this section.

(1) If using controls listed in paragraphs (a) through (e) of this section, the owner or operator shall comply with the monitoring frequency requirements in paragraphs (a) through (e) of this section.

(2) If using controls not listed in paragraphs (a) through (e) of this section, the owner or operator shall establish the monitoring frequency for each control and submit it to the Administrator for approval in the initial test report.

(g) Each owner or operator using a control device listed in paragraphs (a) through (e) of this section can use alternative monitoring procedures approved by the Administrator.

Sec. 63.467 Recordkeeping requirements.

(a) Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the provisions of Sec. 63.463 shall maintain records in written or electronic form specified in paragraphs (a)(1) through (a)(5) of this section for the lifetime of the machine.

(1) Owner's manuals, or if not available, written maintenance and operating procedures, for the solvent cleaning machine and control equipment.

(2) The date of installation for the solvent cleaning machine and all of its control devices. If the exact date for installation is not known, a letter certifying that the cleaning machine and its control devices were installed prior to, or on, November 29, 1993, or after November 29, 1993, may be substituted.

(3) If a dwell is used to comply with these standards, records of the tests required in Sec. 63.465(d) to determine an appropriate dwell time for each part or parts basket.

(4) Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the idling emission limit standards of Sec. 63.463(b)(1)(ii), (b)(2)(ii), (c)(1)(ii), or (c)(2)(ii) shall maintain records of the initial performance test, including the idling emission rate and values of the monitoring parameters measured during the test.

(5) Records of the halogenated HAP solvent content for each solvent used in a solvent cleaning machine subject to the provisions of this subpart.

(b) Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with Sec. 63.463 shall maintain records specified in paragraphs (b)(1) through (b)(4) of this section either in electronic or written form for a period of 5 years.

(1) The results of control device monitoring required under Sec. 63.466.

(2) Information on the actions taken to comply with Sec. 63.463(e) and (f). This information shall include records of written or verbal orders for replacement parts, a description of the repairs made, and additional monitoring conducted to demonstrate that monitored parameters have returned to accepted levels.

(3) Estimates of annual solvent consumption for each solvent cleaning machine.

(4) If a carbon adsorber is used to comply with these standards, records of the date and results of the weekly measurement of the halogenated HAP solvent concentration in the carbon adsorber exhaust required in Sec. 63.466(e).

(c) Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the provisions of Sec. 63.464 shall maintain records specified in paragraphs (c)(1) through (c)(3) of this section either in electronic or written form for a period of 5 years.

(1) The dates and amounts of solvent that are added to the solvent cleaning machine.

(2) The solvent composition of wastes removed from cleaning machines as determined using the procedure described in Sec. 63.465(c)(2).

(3) Calculation sheets showing how monthly emissions and the rolling 3-month average emissions from the solvent cleaning machine were determined, and the results of all calculations.

(d) Each owner or operator of a solvent cleaning machine without a solvent/air interface complying with the provisions of Sec. 63.464 shall maintain records on the method used to determine the cleaning capacity of the cleaning machine.

Sec. 63.468 Reporting requirements.

(a) Each owner or operator of an existing solvent cleaning machine subject to the provisions of this subpart shall submit an initial notification report to the Administrator no later than August 29, 1995. This report shall include the information specified in paragraphs (a)(1) through (a)(6) of this section.

(1) The name and address of the owner or operator.

(2) The address (i.e., physical location) of the solvent cleaning machine(s).

(3) A brief description of each solvent cleaning machine including machine type (batch vapor, batch cold, vapor in-line or cold in-line), solvent/air interface area, and existing controls.

(4) The date of installation for each solvent cleaning machine or a letter certifying that the solvent cleaning machine and its control devices were installed prior to, or after, November 29, 1993.

(5) The anticipated compliance approach for each solvent cleaning machine.

(6) An estimate of annual halogenated HAP solvent consumption for each solvent cleaning machine.

(b) Each owner or operator of a new solvent cleaning machine subject to the provisions of this subpart shall submit an initial notification report to the Administrator. New sources for which construction or reconstruction had commenced and initial startup had not occurred before December 2, 1994, shall submit this report as soon as practicable before startup but no later than January 31, 1995. New sources for which the construction or reconstruction commenced after December 2, 1994, shall submit this report as soon as practicable before the construction or reconstruction is planned to commence. This report shall include all of the information required in Sec. 63.5(d)(1) of subpart A (General Provisions), with the revisions and additions in paragraphs (b)(1) through (b)(3) of this section.

(1) The report shall include a brief description of each solvent cleaning machine including machine type (batch vapor, batch cold, vapor in-line, or cold-line), solvent/air interface area, and existing controls.

(2) The report shall include the anticipated compliance approach for each solvent cleaning machine.

(3) In lieu of Sec. 63.5(d)(1)(ii)(H) of subpart A of this part, the owner or operator must report an estimate of annual halogenated HAP solvent consumption for each solvent cleaning machine.

(c) Each owner or operator of a batch cold solvent cleaning machine subject to the provisions of this subpart shall submit a compliance report to the Administrator. For existing sources, this report shall be submitted to the Administrator no later than 150 days after the compliance date specified in Sec. 63.460(d). For new sources, this report shall be submitted to the Administrator no later than 150 days after startup or May 1, 1995, whichever is later. This report shall include the requirements specified in paragraphs (c)(1) through (c)(4) of this section.

(1) The name and address of the owner or operator.

(2) The address (i.e., physical location) of the solvent cleaning machine(s).

(3) A statement, signed by the owner or operator of the solvent cleaning machine, stating that the solvent cleaning machine for which the report is being submitted is in compliance with the provisions of this subpart.

(4) The compliance approach for each solvent cleaning machine.

(d) Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the provisions of Sec. 63.463 shall submit to the Administrator an initial statement of compliance for each solvent cleaning machine. For existing sources, this report shall be submitted to the Administrator no later than 150 days after the compliance date specified in Sec. 63.460(d). For new sources, this report shall be submitted to the Administrator no later than 150 days after startup or May 1, 1995, whichever is later. This statement shall include the requirements specified in paragraphs (d)(1) through (d)(6) of this section.

(1) The name and address of the owner or operator.

(2) The address (i.e., physical location) of the solvent cleaning machine(s).

(3) A list of the control equipment used to achieve compliance for each solvent cleaning machine.

(4) For each piece of control equipment required to be monitored, a list of the parameters that are monitored and the values of these parameters measured on or during the first month after the compliance date.

(5) Conditions to maintain the wind speed requirements of Sec. 63.463(e)(2)(ii), if applicable.

(6) Each owner or operator of a solvent cleaning machine complying with the idling emission limit standards of Sec. 63.463(b)(1)(ii), (b)(2)(ii), (c)(1)(ii), and (c)(2)(ii) shall submit a test report for tests of idling emissions meeting the specifications in Method 307 of appendix A to this subpart. This report shall comply with the requirements specified in paragraphs (d)(6)(i) through (d)(6)(iv) of this section.

(i) This test must be on the same specific model cleaner used at the source. The test can be done by the owner or operator of the affected machine or can be supplied by the vendor of that solvent cleaning machine or a third party.

(ii) This report must clearly state the monitoring parameters, monitoring frequency and the delineation of exceedances for each parameter.

(iii) If a solvent cleaning machine vendor or third party test report is used to demonstrate compliance, it shall include the following for the solvent cleaning machine tested: Name of person(s) or company that performed the test, model name, the date the solvent cleaning machine

was tested, serial number, and a diagram of the solvent cleaning machine tested.

(iv) If a solvent cleaning machine vendor or third party test report is used, the owner or operator of the solvent cleaning machine shall comply with the requirements specified in either paragraphs (d)(6)(iv)(A) and (d)(6)(iv)(B) of this section.

(A) Submit a statement by the solvent cleaning machine vendor that the unit tested is the same as the unit the report is being submitted for.

(B) Demonstrate to the Administrator's satisfaction that the solvent emissions from the solvent cleaning machine for which the test report is being submitted are equal to or less than the solvent emissions from the solvent cleaning machine in the vendor test report.

(7) If a carbon adsorber is used to comply with these standards, the date and results of the weekly measurement of the halogenated HAP solvent concentration in the carbon adsorber exhaust required in Sec. 63.466(e).

(e) Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the provisions of Sec. 63.464 shall submit to the Administrator an initial statement of compliance for each solvent cleaning machine. For existing sources, this report shall be submitted to the Administrator no later than 150 days after the compliance date specified in Sec. 63.460(d). For new sources, this report shall be submitted to the Administrator no later than 150 days after startup or May 1, 1995, whichever is later. The statement shall include the information specified in paragraphs (e)(1) through (e)(4) of this section.

(1) The name and address of the solvent cleaning machine owner or operator.

(2) The address of the solvent cleaning machine(s).

(3) The solvent/air interface area for each solvent cleaning machine or, for cleaning machines without a solvent/air interface, a description of the method used to determine the cleaning capacity and the results.

(4) The results of the first 3-month average emissions calculation.

(f) Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the provisions of Sec. 63.463 shall submit an annual report by February 1 of the year following the one for which the reporting is being made. This report shall include the requirements specified in paragraphs (f)(1) through (f)(3) of this section.

(1) A signed statement from the facility owner or his designee stating that, "operators of solvent cleaning machines have received training on the proper operation of solvent cleaning machines and their control devices sufficient to pass the test required in Sec. 63.463(d)(10)."

(2) An estimate of solvent consumption for each solvent cleaning machine during the reporting period.

(3) The reports required under paragraphs (f) and (g) of this section can be combined into a single report for each facility.

(g) Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the provisions of Sec. 63.464 shall submit a solvent emission report every year. This solvent emission report shall contain the requirements specified in paragraphs (g)(1) through (g)(4) of this section.

(1) The size and type of each unit subject to this subpart (solvent/air interface area or cleaning capacity).

(2) The average monthly solvent consumption for the solvent cleaning machine in kilograms per month.

(3) The 3-month monthly rolling average solvent emission estimates calculated each month using the method as described in Sec. 63.465(c).

(4) The reports required under paragraphs (f) and (g) of this section can be combined into a single report for each facility.

(h) Each owner or operator of a batch vapor or in-line solvent cleaning machine shall submit an exceedance report to the Administrator semiannually except when, the Administrator determines on a case-by-case basis that more frequent reporting is necessary to accurately assess the compliance status of the source or, an exceedance occurs. Once an exceedance has occurred the owner or operator shall follow a quarterly reporting format until a request to reduce reporting frequency under paragraph (i) of this section is approved. Exceedance reports shall be delivered or postmarked by the 30th day following the end of each calendar half or quarter, as appropriate. The exceedance report shall include the applicable information in paragraphs (h) (1) through (3) of this section.

(1) Information on the actions taken to comply with Sec. 63.463 (e) and (f). This information shall include records of written or verbal orders for replacement parts, a description of the repairs made, and additional monitoring conducted to demonstrate that monitored parameters have returned to accepted levels.

(2) If an exceedance has occurred, the reason for the exceedance and a description of the actions taken.

(3) If no exceedances of a parameter have occurred, or a piece of equipment has not been inoperative, out of control, repaired, or adjusted, such information shall be stated in the report.

(i) An owner or operator who is required to submit an exceedance report on a quarterly (or more frequent) basis may reduce the frequency of reporting to semiannual if the conditions in paragraphs (i)(1) through (i)(3) of this section are met.

(1) The source has demonstrated a full year of compliance without an exceedance.

(2) The owner or operator continues to comply with all relevant recordkeeping and monitoring requirements specified subpart A (General Provisions) and in this subpart.

(3) The Administrator does not object to a reduced frequency of reporting for the affected source as provided in paragraph (e)(3)(iii) of subpart A (General Provisions).

(j) The Administrator has determined, pursuant to the criteria under section 502(a) of the Act, that an owner or operator of any batch cold solvent cleaning machine that is not itself a major source and that is not located at a major source, as defined under 40 CFR 70.2, is exempt from part 70 permitting requirements for that source.

An owner or operator of any other solvent cleaning machine subject to the provisions of this subpart is subject to part 70 permitting requirements, such sources, if not major or located at major sources, may be exempted by the State from applying for a part 70 permit until 42 months after the EPA first approves a part 70 program or such other date established by the permitting authority that assures that such sources obtain a permit by 5 years after the EPA first approves a part 70 program.

(k) Each owner or operator of a solvent cleaning machine requesting an equivalency determination, as described in Sec. 63.469 shall submit an equivalency request report to the Administrator. For existing sources, this report must be submitted to the Administrator no later than June 3, 1996. For new sources, this report must be submitted and approved by the Administrator prior to startup.

Sec. 63.469 Equivalent methods of control.

Upon written application, the Administrator may approve the use of equipment or procedures after they have been satisfactorily demonstrated to be equivalent, in terms of reducing emissions of methylene chloride, perchloroethylene, trichloroethylene, 1,1,1-trichloroethane, carbon tetrachloride or chloroform to the atmosphere, to those prescribed for compliance within a specified paragraph of this subpart. The application must contain a complete description of the equipment or procedure and the proposed equivalency testing procedure and the date, time, and location scheduled for the equivalency demonstration.

3. Appendix A is amended by adding Method 307 to read as follows:

Appendix A to Part 63--Test Methods

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Method 307--Determination of Emissions From Halogenated Solvent Vapor Cleaning Machines Using a Liquid Level Procedure

1. Applicability and Principle

1.1 Applicability. This method is applicable to the determination of the halogenated solvent emissions from solvent vapor cleaners in the idling mode.

1.2 Principle. The solvent level in the solvent cleaning machine is measured using inclined liquid level indicators. The change in liquid level corresponds directly to the amount of solvent lost from the solvent cleaning machine.

2. Apparatus

Note: Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

2.1 Inclined Liquid Level Indicator. A schematic of the inclined liquid level indicators used in this method is shown in figure 307-1; two inclined liquid level indicators having 0.05 centimeters divisions or smaller shall be used. The liquid level indicators shall be made of glass, Teflon, or any similar material that will not react with the solvent being used. A 6-inch by 1-inch slope is recommended; however the slope may vary depending on the size and design of the solvent cleaning machine.

Note: It is important that the inclined liquid level indicators be constructed with ease of reading in mind. The inclined liquid level indicators should also be mounted so that they can be raised or lowered if necessary to suit the solvent cleaning machine size.

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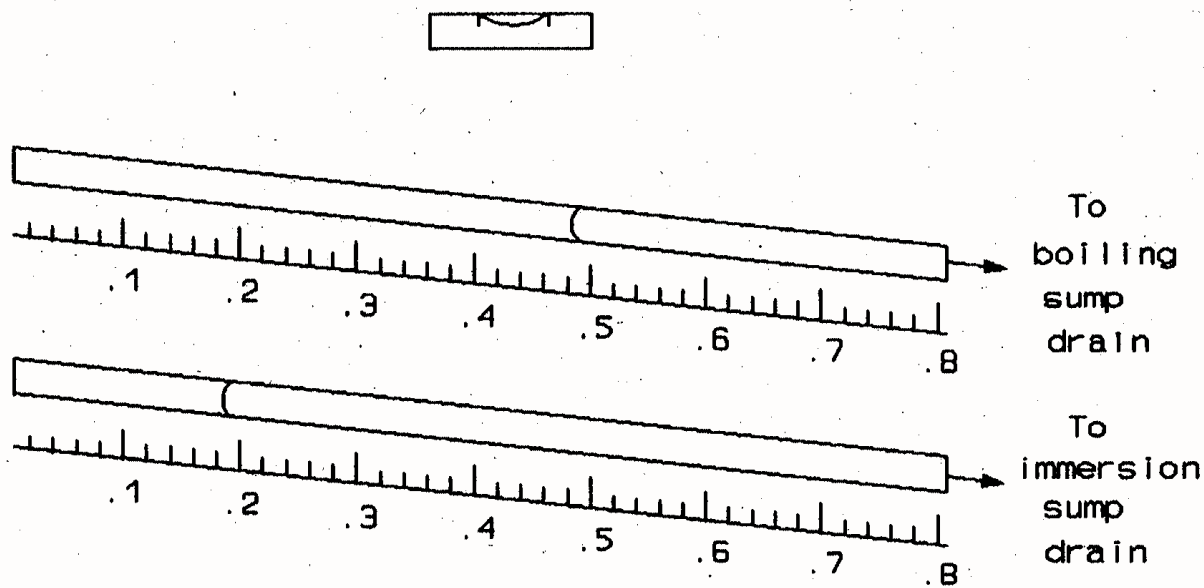


Figure 307-1. Incline Liquid Level Indicator Apparatus

BILLING CODE 6560-50-C

2.2 Horizontal Indicator. Device to check the inclined liquid level indicators orientation relative to horizontal.

2.3 Velocity Meter. Hotwire and vane anemometers, or other devices capable of measuring the flow rates ranging from 0 to 15.2 meters per minute across the solvent cleaning machine.

3. Procedure

3.1 Connection of the Inclined Liquid Level Indicator. Connect one of the inclined liquid level indicators to the boiling sump drain and the other inclined liquid level indicator to the immersion sump drain using Teflon tubing and the appropriate fittings. A schematic diagram is shown in figure 307-2.

BILLING CODE 6560-50-P

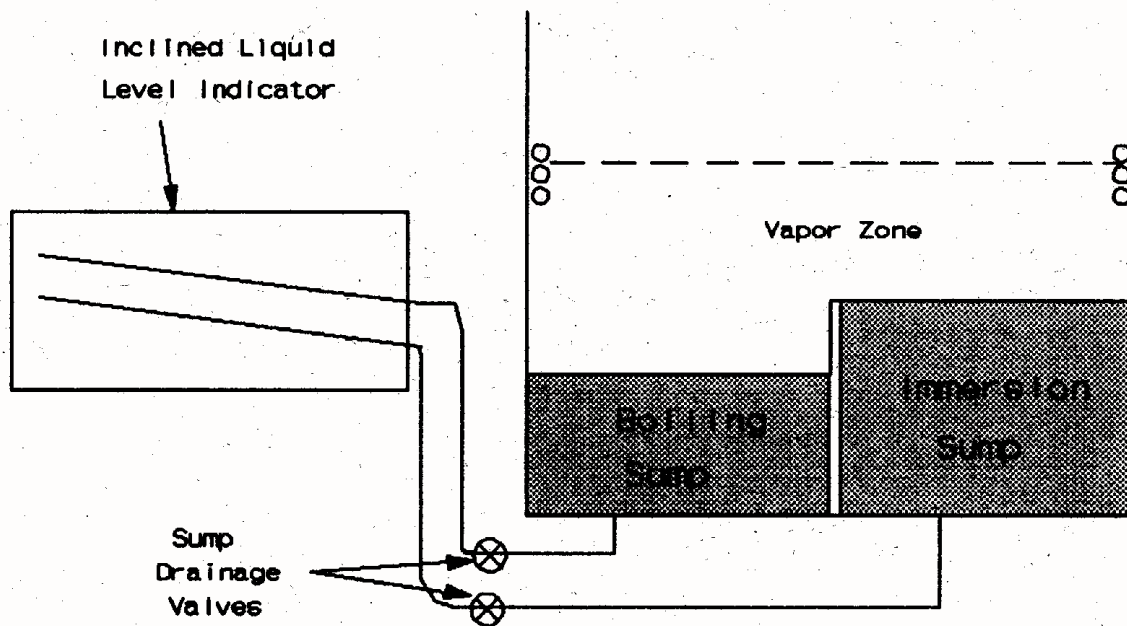


Figure 307.2. Solvent Cleaner Test Setup

BILLING CODE 6560-50-C

3.2 Positioning of Velocity Meter. Position the velocity meter so that it measures the flow rate of the air passing directly across the solvent cleaning machine.

3.3 Level the Inclined Liquid Level Indicators.

3.4 Initial Inclined Liquid Level Indicator Readings. Open the sump drainage valves. Allow the solvent cleaning machine to operate long enough for the vapor zone to form and the system to stabilize (check with manufacturer). Record the inclined liquid level indicators readings and the starting time on the data sheet. A sample data sheet is provided in figure 307-3.

Date _____

Run _____

Solvent type _____

Solvent density, g/m^3 (lb/ft^3) _____

Length of boiling sump (S_B), m (ft) _____

Width of boiling sump (W_B), m (ft)_____

Length of immersion sump (S_I), m (ft)_____

Width of immersion sump (W_I), m (ft)_____

Length of solvent vapor/air interface (S_v), m (ft)_____

Width of solvent vapor/air interface (W_v), m (ft)_____

Clock time	Boiling sump reading	Immersion sump reading	Flow rate reading

Figure 307-3. Data sheet.

3.5 Final Inclined Liquid Level Indicator Readings. At the end of the 16-hour test run, check to make sure the inclined liquid level indicators are level; if not, make the necessary adjustments. Record the final inclined liquid level indicators readings and time.

3.6 Determination of Solvent Vapor/Air Interface Area for Each Sump. Determine the area of the solvent/air interface of the individual sumps. Whenever possible, physically measure these dimensions, rather than using factory specifications. A schematic of the dimensions of a solvent cleaning machine is provided in figure 307-4.

BILLING CODE 6560-50-P

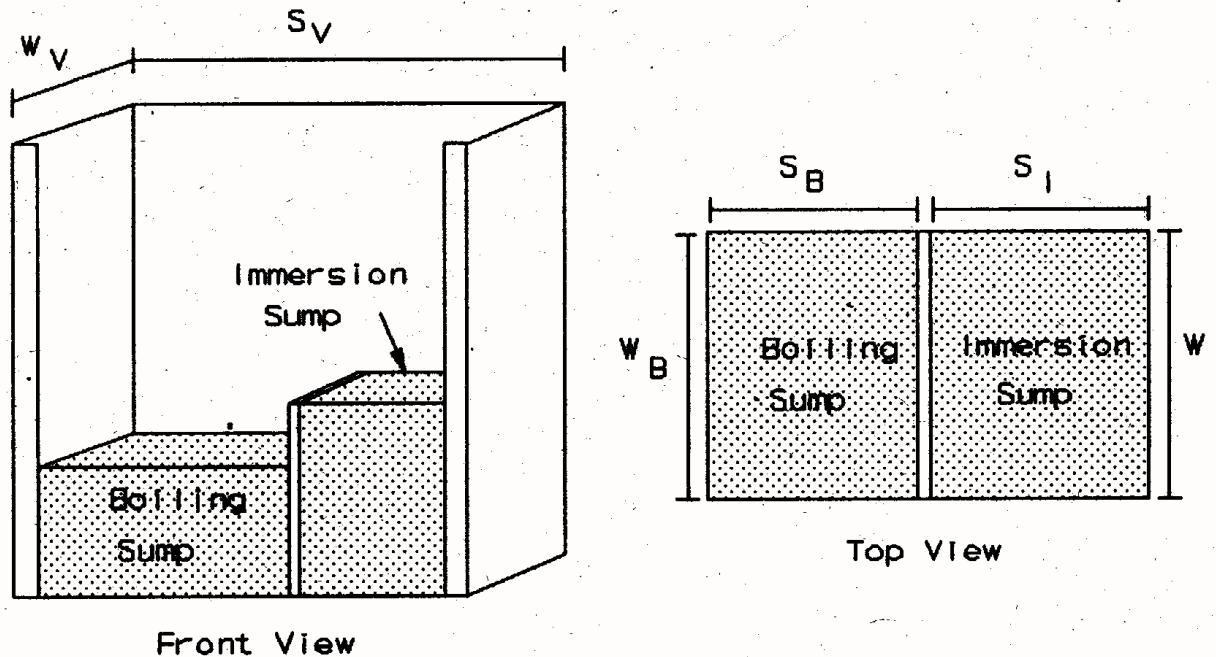


Figure 307-4. Solvent Cleaner Dimensions

BILLING CODE 6560-50-C

4. Calculations

4.1 Nomenclature.

- A_B = area of boiling sump interface, m^2 (ft^2).
- A_I = area of immersion sump interface, m^2 (ft^2).
- A_V = area of solvent/air interface, m^2 (ft^2).
- E = emission rate, kg/m^2 -hr (lb/ft^2 -hr).
- K = 100,000 $cm \cdot g/m \cdot kg$ for metric units.
= 12 in./ft for English units.
- L_{BF} = final boiling sump inclined liquid level indicators reading, cm (in.).
- L_{Bi} = initial boiling sump inclined liquid level indicators reading, cm (in.).
- L_{If} = final immersion sump inclined liquid level indicators reading, cm (in.).
- L_{Ii} = initial immersion sump inclined liquid level indicators reading, cm (in.).
- S_B = length of the boiling sump, m (ft).
- S_I = length of the immersion sump, m (ft).
- S_V = length of the solvent vapor/air interface, m (ft).
- W_B = width of the boiling sump, m (ft).
- W_I = width of the immersion sump, m (ft).

W_v = width of the solvent vapor/air interface, m (ft).
 ρ = density of solvent, g/m³ (lb/ft³).
 Θ = test time, hr.

4.2 Area of Sump Interfaces. Calculate the areas of the boiling and immersion sump interfaces as follows:

$$A_B = S_B W_B \quad \text{Eq. 307-1}$$

$$A_I = S_I W_I \quad \text{Eq. 307-2}$$

4.3 Area of Solvent/Air Interface. Calculate the area of the solvent vapor/air interface as follows:

$$A_v = S_v W_v \quad \text{Eq. 307-3}$$

4.4 Emission Rate. Calculate the emission rate as follows:

$$E = \frac{(L_{B_f} - L_{B_i})\rho A_B + (L_{I_f} - L_{I_i})\rho A_I}{KA_v\theta} \quad \text{Eq. 307-4}$$

4. Appendix B to Part 63 is revised to read as follows:

Appendix B--Test of Solvent Cleaning Procedures

General Questions

- _____ 1.
What is the maximum allowable speed for parts entry and removal?
- A. 8.5 meters per minute (28 feet per minute).
 - B. 3.4 meters per minute (11 feet per minute).
 - C. 11 meters per minute (36 feet per minute).
 - D. No limit.
- _____ 2. How do you ensure that parts enter and exit the solvent cleaning machine at the speed required in the regulation?
- A. Program on computerized hoist monitors speed.
 - B. Can judge the speed by looking at it.
 - C. Measure the time it takes the parts to travel a measured distance.
- _____ 3.
Identify the sources of air disturbances.
- A. Fans
 - B. Open doors
 - C. Open windows
 - D. Ventilation vents
 - E. All of the above
- _____ 4. What are the three operating modes?
- A. Idling, working and downtime
 - B. Precleaning, cleaning, and drying
 - C. Startup, shutdown, off
 - D. None of the above
- _____ 5. When can parts or parts baskets be removed from the solvent cleaning machine?
- A. When they are clean
 - B. At any time
 - C. When dripping stops
 - D. Either A or C is correct
- _____ 6. How must parts be oriented during cleaning?
- A. It does not matter as long as they fit in the parts basket.
 - B. So that the solvent pools in the cavities where the dirt is concentrated.
 - C. So that solvent drains from them freely.

- _____ 7. During startup, what must be turned on first, the primary condenser or the sump heater?
- A. Primary condenser
 - B. Sump heater
 - C. Turn both on at same time
 - D. Either A or B is correct
- _____ 8. During shutdown, what must be turned off first, the primary condenser or the sump heater?
- A. Primary condenser
 - B. Sump heater
 - C. Turn both off at same time
 - D. Either A or B is correct
- _____ 9. In what manner must solvent be added to and removed from the solvent cleaning machine?
- A. With leak proof couplings
 - B. With the end of the pipe in the solvent sump below the liquid solvent surface.
 - C. So long as the solvent does not spill, the method does not matter.
 - D. A and B
- _____ 10.
- What must be done with waste solvent and still and sump bottoms?
- A. Pour down the drain
 - B. Store in closed container
 - C. Store in a bucket
 - D. A or B
- _____ 11.
- What types of materials are prohibited from being cleaned in solvent cleaning machines using halogenated HAP solvents?
- A. Sponges
 - B. Fabrics
 - C. Paper
 - D. All of the above

Control Device Specific Questions

[] Freeboard Refrigeration Device

- _____ 1. What temperature must the FRD achieve?
- A. Below room temperature
 - B. 50 deg.F

- C. Below the solvent boiling point
- D. 30 percent below the solvent boiling point

[] Working-Mode Cover

- _____ 2. When can a cover be open?
- A. While parts are in the cleaning machine
 - B. During parts entry and removal
 - C. During maintenance
 - D. During measurements for compliance purposes
 - E. A and C
 - F. B, C, and D
- _____ 3. Covers must be maintained in what condition?
- A. Free of holes
 - B. Free of cracks
 - C. So that they completely seal cleaner opening
 - D. All of the above

[] Dwell

- _____ 4. Where must the parts be held for the appropriate dwell time?
- A. In the vapor zone
 - B. In the freeboard area above the vapor zone
 - C. Above the cleaning machine
 - D. In the immersion sump

Answers

General Questions

1. B
2. A or C
3. E
4. A
5. C
6. C
7. A
8. B
9. D
10. B
11. D

Control Device Specific Questions

1. D
2. F
3. D
4. B

5. Appendix C is added to Part 63 to read as follows:

Appendix C--General Provisions Applicability to Subpart T

Reference	Applies to subpart T		Comments
	BCC	BVI	
63.1(a)-(3)	Yes	Yes	
63.1(a)(4)	Yes	Yes	Subpart T (this appendix) specifies applicability of each paragraph in subpart A to subpart T.
63.1(a)(5)	No	No	
63.1(a) (6)-(8)	Yes	Yes	
63.1(a)(9)	No	No	
63.1(a)(10)	Yes	Yes	

Reference	Applies to subpart T		Comments
	BCC	BVI	
63.1(a)(11)	No	No	Subpart T allows submittal of notifications and reports through the U.S. mail, fax, and courier. Subpart T requires that the postmark for notifications and reports submitted through the U.S. mail or other non-Governmental mail carriers be on or before deadline specified in an applicable requirement.
63.1(a) (12)-(14)	Yes	Yes	
63.1(b)(1)	No	No	Subpart T specifies applicability.
63.1(b)(2)	No	Yes	
63.1(b)(3)	No	No	Subpart T requires that a record of halogenated cleaning machine applicability determination be kept on site for 5 years, or until the cleaning machine changes its operations. The record shall be sufficiently detailed to allow the Administrator to make a finding about the source's applicability status with regard to subpart T.
63.1(c)(1)	Yes	Yes	
63.1(c)(2)	Yes	Yes	Subpart T, section 63.46(8)(h), indicates a Title V permit exemption for halogenated HAP batch cold solvent cleaning machines that are not major sources and not located at a major source. This section also specifies a deferral from the requirement of a Title V permit for owners or operators of solvent cleaning machines subject to subpart T provisions, other than halogenated HAP batch cold solvent cleaning machines, that are not major sources, and not located at a major source.
63.1(c)(3)	No	No	
63.1(c)(4)	Yes	Yes	
63.1(c)(5)	Yes	Yes	Subpart T does not require continuous monitoring systems (CMS) or continuous opacity monitoring systems. Therefore, notifications and requirements for CMS and COMS specified in subpart A do not apply to subpart T.
63.1(d)	No	No	
63.1(e)	No	Yes	
63.2	Yes	Yes	Subpart T definitions (section 63.461) for existing and new overlap with the definitions for existing source and new source in subpart A (section 63.2). Both subpart A and T also define Administrator.

Reference	Applies to subpart T		Comments
	BCC	BVI	
63.3(a)-(c)	Yes	Yes	
63.4(a) (1)-(3)	Yes	Yes	
63.4(a)(4)	No	No	
63.4(a)(5)	Yes	Yes	
63.4(b)-(c)	Yes	Yes	
63.5(a)(1)	Yes	Yes	
63.5(a)(2)	Yes	Yes	
63.5(b)(1)	Yes	Yes	
63.5(b)(2)	No	No	
63.5(b)(3)	No	No	Subpart T overrides the requirement for approval prior to constructing a new or reconstructing an existing major source.
63.5(b)(4)-(6)	Yes	Yes	
63.5(c)	No	No	
63.5 (d)-(f)	No	No	Subpart T overrides the requirement to submit an application for approval of construction or reconstruction of a halogenated solvent cleaning machine.
63.6(a)	Yes	Yes	
63.6(b) (1)-(5)	Yes	Yes	Subpart T, section 63.460, specifies compliance dates.
63.6(b)(6)	No	No	
63.6(b)(7)	No	No	Subpart T has the same requirements for affected halogenated HAP solvent cleaning machine subcategories that are located at area sources as it does for those located at major sources.
63.6(c)(1)-(2)	Yes	Yes	Subpart T allows 3 years from the date of promulgation for both area and major existing sources to comply.
63.6(c) (3)-(4)	No	No	
63.6(c)(5)	Yes	Yes	Subpart T has the same requirements for affected halogenated HAP solvent cleaning machine subcategories that are located at area sources as it does for those located at major sources. Subpart T allows 3 years from the date of promulgation for both area and major existing sources to comply.

Reference	Applies to subpart T		Comments
	BCC	BVI	
63.6(d)	No	No	
63.6(e)(1)-(2)	Yes.	Yes	
63.6(e)(3)	No	No	Subpart T overrides the requirement of a startup, shutdown, and malfunction plan. Subpart T specifies startup and shutdown procedures to be followed by an owner or operator for batch vapor and in-line cleaning machines.
63.6(f)-(g)	Yes	Yes	
63.6(h)	No	No	Subpart T does not require compliance with an opacity or visible emission standard.
63.6(i) (1)-(14)	Yes	Yes	
63.6(i)(15)	No	No	
63.6(i)(16)	Yes	Yes	
63.6(j)	Yes	Yes	
63.7(a)	No	Yes	Subpart T gives owners or operators the option to perform an idling emission performance test as a way of demonstrating compliance. Other options are also available that do not require a performance test.
63.7(b)	No	Yes	This is only required for those owners or operators that choose the idling emission standard as their compliance option.
63.7(c)(1)	No	Yes	This is only required for those owners or operators that choose the idling emission standard as their compliance option.
63.7(c) (2)-(3)	No	No	Subpart T does not require a site-specific test plan for the idling emission performance test.
63.7(c)(4)	No	No	Subpart T does not require a performance test that involves the retrieval of gas samples, and therefore his does not apply.
63.7(d)	No	No	Requirements do not apply to the idling emission performance test option.
63.7(e)	No	Yes	
63.7(f)	No	Yes	

Reference	Applies to subpart T		Comments
	BCC	BVI	
63.7(g)	No	Yes	Subpart T specifies what is required to demonstrate idling emission standard compliance through the use of the Environmental Protection Agency test method 307 and control device monitoring. Reports and records of testing and monitoring are required for compliance verification. Three runs of the test are required for compliance, as specified in section 63.7(e) of subpart A.
63.7(h)	No	No	Subpart T does not require the use of a performance test to comply with the standard. The idling emission standard option (which requires an idling emission performance test) is an alternative option offered to owners or operators of batch vapor and in-line cleaning machines for compliance flexibility.
63.8 (a)-(b)	Yes	Yes	
63.8 (c)-(e)	No	No	Subpart T does not require the use of continuous monitoring systems to demonstrate compliance.
63.8(f)	Yes	Yes	
63.8(g)	No	No	Subpart T does not require continuous opacity monitoring systems and continuous monitoring systems data.
63.9(a) (1)-(4)	Yes	Yes	
63.9(b)(1)	Yes	Yes	
63.9(b)(2)	Yes	Yes	Subpart T includes all of those requirements stated in subpart A, except that subpart A also requires a statement as to whether the affected source is a major or an area source, and an identification of the relevant standard (including the source's compliance date). Subpart T also has some more specific information requirements specific to the affected source (see subpart T, sections 63.468(a)-(b)).
63.9(b)(3)	Yes	Yes	The subpart A and subpart T initial notification reports differ (see above).
63.9(b)(4)	No	No	Subpart T does not require an application for approval of construction or reconstruction.
63.9(b)(5)	Yes	Yes	
63.9(c)	Yes	Yes	
63.9(d)	Yes	Yes	

Reference	Applies to subpart T		Comments
	BCC	BVI	
63.9(e)	Yes	Yes	Under subpart T, this requirement only applies to owners or operators choosing to comply with the idling emissions standard.
63.9(f)	No	No	Subpart T does not require opacity or visible emission observations.
63.9(g)(1)	No	No	Subpart T does not require the use of continuous monitoring systems or continuous opacity monitoring systems.
63.9(h)	No	No	Section 63.468 of subpart T requires an initial statement of compliance for existing sources to be submitted to the Administrator no later than 150 days after the compliance date specified in section 63.460(d) of subpart T. For new sources, this report is to be submitted to the Administrator no later than 150 days from the date specified in section 63.460(c).
63.9(I)	Yes	Yes	
63.9(j)	Yes	Yes	
63.10(a)	Yes	Yes	
63.10(b)	No	No	Recordkeeping requirements are specified in subpart T.
63.10(c) (1)-(15)	No	No	Subpart T does not require continuous monitoring systems.
63.10(d)(1)	Yes	Yes	
63.10(d)(2)	No	No	Reporting requirements are specified in subpart T.
63.10(e) (1)-(2)	No	No	Subpart T does not require continuous emissions monitoring systems.
63.10(e)(3)	No	No	Subpart T does not require continuous monitoring systems.
63.10(e)(4)	No	No	Subpart T does not require continuous opacity monitoring systems.
63.10(f)	Yes	Yes	
63.11(a)	Yes	Yes	
63.11(b)	No	No	Flares are not a control option under subpart T.
63.12 (a)-(c)	Yes	Yes	
63.13 (a)-(c)	Yes	Yes	

Reference	Applies to subpart T		Comments
	BCC	BVI	
63.14	No	No	Subpart T requirements do not require the use of the test methods incorporated by reference in subpart A.
63.15(a)-(b)	Yes	Yes	

BCC=Batch Cold Cleaning Machines.

BVI=Batch Vapor and In-line Cleaning Machines.

[FR Doc. 94-28974 Filed 12-01-94; 8:45 am]

BILLING CODE 6560-50-P

[Federal Register: December 2, 1994]

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 9 and 63

[AD-FRL-5111-3]

RIN 2060-AC31

**National Emission Standards for Hazardous Air Pollutants:
Halogenated Solvent Cleaning**

Correction

In rule document 94-28974 beginning on page 68101, in the issue of Friday, December 2, 1994, make the following correction:

Sec. 460 [Corrected]

On page 61806, in the first column, in Sec. 63.460 (d), in the sixth line, after the word “than” insert “December 2, 1997.”

BILLING CODE 1505-01-D

[Federal Register: June 5, 1995 (Volume 60, Number 107)]
[Rules and Regulations]
[Page 29482-29483]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]
[DOCID:fr05jn95-9]

ENVIRONMENTAL PROTECTION AGENCY
40 CFR Part 63

[AD-FRL-5209-8]
RIN 2060-AC31

**National Emission Standards for Hazardous Air Pollutants:
Halogenated Solvent Cleaning; Correction**

AGENCY: Environmental Protection Agency (EPA).
ACTION: Corrections to final regulation.

SUMMARY: This action corrects errors and clarifies regulatory text in the final rule published on December 2, 1994 at 59 FR 61801.

EFFECTIVE DATE: These corrections become effective June 5, 1995.

FOR FURTHER INFORMATION CONTACT:

Paul Almodovar, Coatings and Consumer Products Group, Emission Standards Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-0283.

SUPPLEMENTARY INFORMATION: On December 2, 1994 (59 FR 61801), the Environmental Protection Agency (EPA) promulgated in the Federal Register national emission standards for hazardous air pollutants for halogenated solvent cleaning. These standards were promulgated as subpart T in 40 CFR part 63. This document contains corrections to editorial and cross-referencing errors in the final standards. In addition, there are corrections to clarify the applicability of the final rule, and to clarify several definitions.

Paragraph (a) of Sec. 63.460 is revised to reflect the intent of the final rule by clarifying that wipe cleaning activities, such as cleaning using a rag containing halogenated solvent or a spray cleaner containing halogenated solvent are not covered under the scope of this regulation.

Paragraph (d) of Sec. 63.460 and the definition of an existing source under Sec. 63.461 are being revised to clarify that any machine, the construction or reconstruction of which was commenced on or before November 29, 1993, that did not meet the definition of a solvent cleaning machine on December 2, 1994, because it did not, on that date, use halogenated hazardous air pollutant solvent liquid or vapor covered under this subpart to remove soils, becomes an existing source when it commences to use such liquid or vapor. The Agency intended machines that use halogenated hazardous air pollutants solvent liquid or vapor covered under this subpart to be subject to the regulation regardless of when they commenced such use. This correction clarifies an oversight in the drafting of the final rule. In addition, an existing solvent cleaning machine moved within a contiguous facility or to another facility under the same ownership continues to be regulated as an existing machine.

The definition of a batch cleaning machine under Sec. 63.461 is being revised to clarify that cross-rod degreasers are considered batch cleaning machines. A definition of a cross-rod solvent cleaning machine is being added to the final rule.

The definition of a solvent cleaning machine under Sec. 63.461 is being revised to clarify that small buckets, pails, and beakers with capacities of 7.6 liters (2 gallons) or less are not considered solvent cleaning machines for the purpose of this subpart. The Agency did not intend to regulate these small pieces of equipment not specifically designed to carry out cleaning or drying operations using one of the covered halogenated solvents. The size limit is included to ensure that larger vessels not specifically designed to carry out cleaning or drying operations remain subject to this final rule.

Paragraph (e)(2)(i) of Sec. 63.463 is being revised to correct the proper units of measurement for the chilled air blanket temperature that the freeboard refrigeration device shall at least maintain. The chilled air blanket temperature shall be measured in deg.F, instead of deg.F or deg.C.

Paragraph (a)(4) of Sec. 63.468 is being revised to correct an editorial error in order to clarify the intent of the provisions.

Paragraph (j) of Sec. 63.468 is being revised to correct language on the part 70 permitting requirements for area source batch vapor and in-line solvent cleaning machines to clarify the intent of the provisions.

The headings for appendix B and appendix C are being revised for editorial errors in order to clarify the intent of the provisions.

List of Subjects in 40 CFR Part 63

Environmental protection, Air pollution control, Hazardous substances, Halogenated solvent cleaning machines, Reporting and recordkeeping requirements.

Dated: May 10, 1995.
Mary D. Nichols,
Assistant Administrator for Air and Radiation.

For reasons set out in the preamble, title 40, chapter I, part 63, subpart T of the Code of Federal Regulations is corrected as follows:

PART 63--[CORRECTED]

1. On page 61805, in the third column, 4 lines from the bottom, Sec. 63.460(a) is corrected to add the following: "Wipe cleaning activities, such as using a rag containing halogenated solvent or a spray cleaner containing halogenated solvent are not covered under the provisions of this subpart."

2. On page 61806, first column, starting on line 18 from the top, Sec. 63.460(d) is corrected by adding the following sentence to the end of the paragraph "Except that, any machine that commences construction or reconstruction on or before November 29, 1993, that does not use halogenated hazardous air pollutant (HAP) solvent on December 2, 1994 shall, if the machine begins use of halogenated HAP solvent after December 2, 1994, achieve compliance with the provisions of this subpart no later than December 2, 1997 or 60 days after commencing use of halogenated HAP solvent covered under this subpart whichever is later."

3. On page 61806, first column, starting 7 lines from the bottom, the definition of "batch cleaning machine" under Sec. 63.461 is corrected by revising the last sentence to read as follows: "A solvent cleaning machine, such as a ferris wheel or a cross-rod degreaser, that clean multiple batch loads simultaneously and are manually loaded are batch cleaning machines."

4. On page 61806, second column, starting on the last line of the column, the definition of "existing" in Sec. 63.461 is corrected to add the following sentence to the end of the definition: "A machine, the construction or reconstruction of which was commenced on or before November 29, 1993, but that did not meet the definition of a solvent cleaning machine on December 2, 1994 because it did not use halogenated HAP solvent liquid or vapor covered under this subpart to remove soils, becomes an existing source when it commences to use such liquid or vapor. A solvent cleaning machine moved within a contiguous facility or to another facility under the same ownership, constitutes an existing machine."

5. On page 61806, second column, immediately following the definition of "cover" in Sec. 63.461, the following definition of "cross-rod solvent cleaning machine" is added: "Cross-rod solvent cleaning machine means a batch solvent cleaning machine in which parts baskets are suspended from 'cross-rods' as they are moved through the machine. In a cross-rod cleaning machine, parts are loaded semi-continuously, and enter and exit the machine from a single portal."

6. On page 61807, second column, starting on line 40 from the top, the definition of “solvent cleaning machine” under Sec. 63.461 is corrected to add the following sentence to the end of the definition: “Buckets, pails, and beakers with capacities of 7.6 liters (2 gallons) or less are not considered solvent cleaning machines.”

7. On page 61808, in the first column, starting on line 26 from the top, Sec. 63.462(d) is corrected to read as follows: “Each owner or operator of a batch cold cleaning machine shall submit an initial notification report as described in Sec. 63.468 (a) and (b) and a compliance report as described in Sec. 63.468(c).”

8. On page 61810, first column, starting on the last two lines, Sec. 63.463(e)(2)(i) is corrected to read as follows: “If a freeboard refrigeration device is used to comply with these standards, the owner or operator shall ensure that the chilled air blanket temperature (in deg.F), measured at the center of the air blanket, is no greater than 30 percent of the solvent's boiling point.”

9. On page 61814, third column, starting on line 24 from the top, Sec. 63.468(a)(4) is corrected to read as follows: “The date of installation for each solvent cleaning machine or a letter certifying that the solvent cleaning machine was installed prior to, or after, November 29, 1993.”

10. On page 61816, second column, starting on line 3 from the top Sec. 63.468(j) is corrected to read as follows: “The Administrator has determined, pursuant to the criteria under section 502(a) of the Act, that an owner or operator of any batch cold solvent cleaning machine that is not itself a major source and that is not located at a major source, as defined under 40 CFR 70.2, is exempt from part 70 permitting requirements for that source.

An owner or operator of any other solvent cleaning machine subject to the provisions of this subpart is subject to part 70 permitting requirements, such sources, if not major or located at major sources, may be deferred by the State from part 70 permitting requirements for 5 years after the EPA first approves a part 70 program (i.e., until December 9, 1999). All sources receiving deferrals shall submit permit applications within 12 months of such date (by December 9, 2000).”

11. On page 61818, in the first column, on the first line, amendment “4.” is corrected to read as follows: “4. Appendix A to subpart T is added to read as follows:” Also, on the next line, the words “Appendix B” are corrected to read “Appendix A to Subpart T”.

12. On page 61818, in the third column, on the last two lines, amendment “5.” is corrected to read as follows: “5. Appendix B to Subpart T is added to read as follows:” Also, on the next line, the words “Appendix C” are corrected to read “Appendix B to Subpart T”.

[FR Doc. 95-12769 Filed 6-2-95; 8:45 am]
BILLING CODE 6560-50-M

APPENDIX D

Alternatives to Halogenated Solvent Cleaning

APPENDIX D

ALTERNATIVES TO HALOGENATED SOLVENT CLEANING

There are many alternatives to solvent cleaning operations that use perchloroethylene (Perc), trichloroethylene (TCE) and/or methylene chloride (MeCl_2). Two of the main categories of alternatives are aqueous (or water-based) cleaning systems and substitute solvents. This appendix is divided into two sections to discuss these two categories. The first section covers many of the aqueous cleaning alternatives. The second section discusses the solvents that can be used to replace Perc, TCE, and MeCl_2 in solvent cleaning operations. This appendix also discusses the United States Environmental Protection Agency's (U.S. EPA) Significant New Alternatives Policy (SNAP) Program. The SNAP Program investigates and approves potential alternatives to ozone depleting compounds (ODCs). Both aqueous cleaners and substitute solvents are regulated under the SNAP Program. The U.S. EPA has approved aqueous cleaners as alternatives to solvent cleaning under the SNAP Program. This chapter and its associated appendices indicate where additional information can be obtained regarding aqueous cleaning alternatives and the SNAP Program.

AQUEOUS CLEANING ALTERNATIVES

Aqueous and semi-aqueous cleaning systems are viable replacement alternatives for many solvent cleaning operations. Because of this, aqueous systems provide an excellent opportunity to greatly reduce your facility's emissions and risk and comply with the requirements of SB 1731. It is estimated that up to 90 percent of all solvent cleaning operations can be effectively converted to aqueous or semi-aqueous cleaning systems. (IRTA, 1994) To find an acceptable substitute, it may be necessary to evaluate and test several aqueous systems. The conversion to aqueous cleaning alternatives results in less halogenated solvents used, reduction in emissions and risk to the public, and cost-savings to the facility owner over time.

Although water-based cleaning of parts (typically cleaned using halogenated solvents) has been performed for decades, there has recently been a great deal of evolution of the technology. New and more sophisticated aqueous cleaning systems are constantly entering the market. Also, each solvent cleaning operation is unique and may require special needs. Consequently, it is virtually impossible to provide instruction on how to evaluate these various cleaning systems to find one that is best suited as an alternative to your solvent cleaning processes. Because of the unique nature of each individual solvent cleaning process, finding an aqueous alternative to solvent cleaning usually requires a case-by-case evaluation.

If you find that you need additional assistance above the information provided in this document, there are a number of resources that may be useful. These include your district, the Department of Toxic Substances Control (DTSC), the U.S. EPA SNAP coordinator, and the Institute for Research and Technical Assistance. The DTSC publishes many documents regarding disposal of toxic substances and aqueous cleaning alternatives. A listing of their publications related to solvent cleaning operations is included in Appendix E.

There is a myriad of potential substrate/contaminant combinations. However, most categories of substrates are soiled with only a few types of contaminants specific to each type of operation. The type of operation will also greatly influence the type of cleaning process that should be selected. The following discussion outlines the main steps that need to be taken in selecting an aqueous or semi-aqueous alternative to halogenated solvent cleaning.

A. IS THE PROCESS WATER TOLERANT?

The answer to this question is not always obvious. Most processes today are water tolerant, although a little research and imagination may be needed to convert a solvent cleaning process into an aqueous cleaning process. It has been estimated that as much as 90 percent of all solvent cleaning operations using chlorinated solvents can be converted to aqueous systems. (IRTA, 1994) There are only a few processes that will not allow the use of water. These processes include some of the precision cleaning operations performed in the electronics industry and cleaning of printed circuit boards where the pH should be no greater than 11.

B. WHAT IS THE SUBSTRATE?

In the discussion of alternative cleaning processes, the characteristics of the substrate must be considered. When identifying the substrate, the composition, shape, size, and configuration of the parts that are being cleaned are important. The composition of the substrate determines the limits of the environment in which it can be cleaned. Metal, plastics, fiberglass, composites, and ceramics all have differing needs. Corrosion and rust can be of concern when cleaning metal parts. Temperature, pH, and corrosive effects must be considered when evaluating an aqueous cleaning system for printed circuit (PC) boards, which are essentially composites of plastics, metal, and laminates.

The size and shape of the parts affect the dimensions of the cleaning equipment. Parts with small holes and pooling spots, like engine blocks, must be handled differently than smooth-surfaced parts. The decision to use agitation, like ultrasonics, is dependent upon the part to be cleaned and the contaminant to be removed. If a part is cleaned using vapor cleaning, then it should also be tolerant of the temperature ranges of the aqueous systems being evaluated. Other long-term impacts like part longevity must also be considered when choosing an alternative cleaning system.

C. WHAT ARE THE CONTAMINANTS?

There are many different combinations of substrates and contaminants. Metals are usually coated with organic compounds that are used to retard rust and corrosion. PC boards are usually contaminated with fluxes and other oxides. The type of contaminant will greatly influence the type of alternative cleaning method that would be most compatible with your operation. These contaminants can be divided into three main categories: organic, inorganic, and inert particulates. Each of the categories of contaminants are discussed below.

Organic Contaminants

Organic contaminants include light and heavy oils, greases, and waxes. Instead of using petroleum or halogenated solvents, organic contaminants such as light oils, heavy oils, and waxes can be removed with a combination of aqueous or semi-aqueous chemical agents, physical agitation, and heat. Parts contaminated with light oils are easily cleaned using mild aqueous emulsifiers or surfactants. Aqueous saponifiers, emulsifiers, or surfactants can also be used in combination with physical agitation when cleaning parts contaminated with heavy oils or low temperature waxes. Some aqueous systems are capable of cleaning high temperature wax, although it may take several cleaning steps.

Inorganic Contaminants

Inorganic contaminants can be further subdivided into polar and ionic compounds. Polar compounds consist of contaminants like oxides, polishing compounds, and fingerprints. Ionic compounds include salts and acid flux. Ionic compounds are cleaned very easily using water with either acidic or alkaline pHs. Polar substances can be best removed with surfactants. Warmer bath temperatures, agitation such as or sprays or moving racks would help to improve the cleaning ability of these systems.

Inert Particulates

Inert particulates are substances such as dust, metal shavings, plastics, dirt, and other solid minutiae. These contaminants are not removed through physical agitation. High pressure sprays and immersions systems are well suited for this task. Spray pressure can vary from 2 to 400 pounds per square inch (psi). (CEC, 1992) These spray systems can utilize low-foaming detergents, which are not as strong as those used for immersion cleaning, to enhance the effectiveness of the mechanical agitation. Spray systems work well for smooth surfaces. The spray water can be collected and processed through a filtration system to recover the water for reuse. Blind holes and interior surfaces are better handled by immersion cleaning. When operated properly, spray systems use less water and leave cleaner surfaces than immersions systems because the final rinse water can be very pure.

D. WHAT AQUEOUS CLEANING AGENTS ARE THERE?

There are hundreds of formulations currently available on the market. Most of these formulations can be listed under several major categories such as alkaline cleaners, alkaline saponifiers, emulsifiers and surfactants, and acid cleaners. Finding the formulation and the system(s) that are most compatible with your operation may take some experimenting. However, the following will provide information on aqueous cleaning agents that may assist you in your evaluation.

Alkaline Cleaners

Alkaline cleaners are some of the best substitutes for halogenated solvents cleaning of metal parts. These cleaners come in either liquid or solids forms and generally consist of alkaline salts builders, with organic and inorganic additives. These additives include water softeners to chelate calcium and magnesium salts that lead to insoluble soap formation in hard water. Surfactants like alkyl benzene sulphonate, sodium and potassium carbonate, phosphate, silicate, and other anionic surfactants are common active ingredients that add detergency, emulsification, and improve the wetting ability of the cleaning solution.

Solution of alkaline cleaners for soak tanks have concentrations of 0.5 to 2 ounces per gallon and for cleaning, 6 to 12 ounces per gallon. Operating temperatures generally range from 130° to 190° F. These solutions are compatible with most ferrous and non ferrous metals. However, they may attack aluminum or reactive metals. These solutions may not be compatible with complex electrochemical devices, such as generators, because they can leave electrically conductive residues.

Alkaline Saponifiers

Alkaline saponifiers are often used in aqueous cleaning formulations. Saponifiers are alkaline solutions containing sodium or potassium hydroxide. The solutions usually have pHs of about 11. Higher pHs can damage plastic PC boards by ruining the coating or removing the ink labels on the components. Alkaline saponifiers react with oils to convert them into fatty acid salts also known as soap. The soap enhances the cleaning process by increasing the detergency of the solution.

Emulsifiers and Surfactants

Emulsions are suspensions of oils or immiscible solvents in the water. The suspension occurs because surfactants and emulsifiers break the oil up into microscopic droplets and surround the droplets. The used of emulsifiers can clean metal parts effectively with the addition of physical agitation. However, after a point, the emulsion becomes saturated and the oil begins

to coalesce on the surface of the liquid. This may result in the part becoming recontaminated when removing the part from the bath. To mitigate this problem, the equipment can be equipped with skimmers or oil separators that collect the condensed oils. This will extend the life of the emulsion. In many cases, the collected oil can be recycled or used as a fuel stock. Otherwise, it may have to be treated as a hazardous waste depending on its nature and the contaminants.

Acid Cleaners

Acid cleaners contain acids like sulfuric, nitric, or hydrochloric acids, acid salts, and wetting agents or detergents. They sometimes contain organic acids such as acetic, oxalic, or cresylic acid to remove oil, dirt, or oxides.

Water

Water-only cleaning can be performed using water sprays, steam cleaning, or immersion baths. Water is usually best when the contaminant is inert or ionic, such as inert particulates or acid fluxes. The cleansing ability of water in an immersion bath can be improved using agitation.

E. WHAT AQUEOUS CLEANING EQUIPMENT IS AVAILABLE?

Aqueous cleaning equipment is designed for specific parts and levels of cleaning. Parts with complicated surfaces like blind holes and interior surfaces are normally cleaned using immersion cleaners. Flat surfaces can usually be cleaned using both immersion cleaning and high pressure spray equipment. Mechanical agitation, such as ultrasonics, immersed nozzles and spray jets can also be employed to assist in immersion cleaning. Further, higher temperatures can greatly improve the cleaning ability of most systems.

Immersion Cleaners

Immersion cleaners can be classified as in-line (or conveyORIZED), for high throughput cleaning, and batch for low-throughput application. (CEC, 1992) The simplest immersion cleaner is a single bath system. However, most aqueous cleaning processes require more than one immersion; thus additional steps and possibly more tanks would be needed for effective cleaning. Most immersion cleaners use chemical cleaning agents, elevated temperatures, and mechanical agitation. The mechanical agitation can take the form of ultrasonics, nozzles, circulating water, or moving baskets, which helps loosen and remove the contaminants from the substrate.

Ultrasonics work well with immersion systems that clean complex parts. Ultrasonics provide a "scrubbing" action in spaces that cannot be reached with spray nozzles or basket agitation. Effective ultrasonic cleaning requires degassing of the cleaning solution, continuous filtration, and careful attention to the number and orientation of the parts to be cleaned. (CEC, 1992) In the ultrasonically agitated tank, the liquid is vibrated by high frequency sound waves, which causes microscopic cavitation. Cavitation is the formation of microscopic vapor cavities within the aqueous solution. The water vapor cavities, which are caused by pressure

differentials of the sound waves in the water, break down the dirt film on the parts. Liquids agitated by ultrasonics often need to be heated to specific temperatures to achieve optimum cavitation.

High Pressure Spray Nozzles

Spray nozzles can direct a high pressure stream of water into small spaces. This helps to force the water into those holes to enhance the cleaning ability of the cleaning solution. These nozzles can be located below or above the water surface. The nozzles can be automatically or manually operated depending on the needs of the operation. High pressure spray nozzles work well with flat surfaces that may be too large for immersion cleaning.

F. DO THE PARTS HAVE CAPILLARY-SIZED HOLES?

Parts that have capillary-sized holes pose a difficulty in effective aqueous cleaning. Capillary-sized holes are openings that are too small for water alone to penetrate due to the high surface tension of water. Physical agitation like high pressure sprays and ultrasonics, higher temperatures, or chemical agents are ways to enhance the cleaning solution's ability to penetrate these holes.

G. IS RINSING NECESSARY?

To address this question, it is necessary to know the level of cleanliness that is required. The level of cleanliness is dependent upon the end use of the part and the cleaning process. Most aqueous cleaning processes leave some remainder of the cleaning agent and some residual contaminants on the part. You will need to determine the level of residual contaminants that is acceptable for your process. In general terms, precision cleaning requires the highest level of cleanliness, followed by electronics cleaning, and lastly, metal cleaning.

Parts can be rinsed by submersion in a rinse bath similar to a cleaning bath or the part can be rinsed with spray nozzles. The rinse process can also be enhanced with agitation using spray nozzles and heating the solvent. Multiple rinsing steps are often used to achieve a high degree of cleanliness. Further, to minimize water usage and reduce hazardous waste production, water from the final rinsing step can be used in the previous step of multiple rinse processes. The spent rinse water can also be used in the aqueous cleaning process.

Precision Cleaning

Precision cleaning is distinct from basic electronic cleaning in that it requires the highest degree of cleaning. This level of cleaning is usually required for high value parts with technologically sophisticated designs of substrates where performance failure is directly associated with extreme hazard to public safety or health or catastrophic loss of equipment. Examples of parts that require precision cleaning include high performance electronic equipment (not the typical consumer electronics), semi-conductor production, PC assembly, medical devices, liquid oxygen production, and navigational devices such as gyroscopes. To achieve this level of cleaning, multiple rinsing may be needed depending on the nature of the contaminants and cleaning formulation. A final rinse with deionized water should be considered for this level of cleanliness. The deionized water would completely evaporate leaving no residue. Industries that often conduct precision cleaning include electronics, aerospace, and chemical manufacturing. (U.S. EPA, 1995)

Electronic Cleaning

Electronic cleaning is the degree of cleanliness needed for the preparation of electronic substrates for surface coatings, such as painting, varnishing, labeling, and the application of adhesives. This level of cleaning is achieved through simple one or two rinses, usually with tap water. Spray rinsing may be an option for this degree of cleanliness.

Metal Cleaning

This level of cleanliness is needed for the preparation of metals for welding and large industrial/construction projects. Because metals are involved, corrosion and rust must be taken into consideration. Therefore, the rinse water should contain rust and corrosion inhibitors. A single rinse with tap water is usually sufficient for this level of cleanliness.

H. MUST THE PARTS BE DRIED IMMEDIATELY?

Parts that are highly susceptible to corrosion or rusting, or parts that are needed immediately in the next step of processing may require an enhanced drying system. These drying systems are discussed below.

Flash Drying with Superhot Water

Flash drying with superhot water and slow withdrawal heats the part to near the boiling point of water. The latent heat of the part quickly evaporates any remaining water within a few seconds.

Air Knives

Air knives can be used to strip away any remaining liquid and speed evaporation. The use of high-velocity forced air can minimize the potential for water spotting and staining. Any remaining moisture can be evaporated using heat lamps or drying ovens.

Infrared Heat Lamps

Infrared heat lamps use infrared light to heat and evaporate water from the surface of the parts. These lamps work best with flat surfaces so that the surface is always in the line of sight of the heat lamp. Parts with blind or recess areas may be difficult to completely dry using heat lamps.

Convection Ovens

Convection ovens are simple heat ovens. Parts are placed inside the oven and are quickly dried. These ovens are often used when part are nested or have blind openings. The temperature that the ovens operate range between 100 ° to 150° F depending on the temperature at which the part begins to decompose or disfigure. Many plastics will begin to decompose at 300 ° F, but may warp at lower temperatures. (Wolf, 1996)

Vacuum Dryers

Vacuum dryers are usually small chambers in which porous or nested parts are dried. The dryer is placed under vacuum and heated to drive off the moisture in the small opening.

SUBSTITUTE SOLVENTS AND THE SNAP PROGRAM

There are a number of solvents that are available or are currently being evaluated as potential substitutes for the typical halogenated solvents used in solvent cleaning, such as Perc, MeCl, and TCE. These substitute solvents include alcohols, ketones, petroleum solvents, terpenes, hydrochlorofluorocarbons, and other halogenated solvents. Most of these potential substitute solvents have had limited toxicity evaluations and may result in greater risks to the public than those substances that are being replaced. So caution should be employed when evaluating them.

Facilities that are switching from ozone depleting compounds (ODC) to any of the alternatives solvent cleaning compounds must ensure that the alternative has been reviewed and approved by the United States Environmental Protection Agency (U.S. EPA) under the “Significant New Alternative Policy” (SNAP) program. On April 18, 1994, the U.S. EPA established the SNAP program, as required by the 1990 federal Clean Air Act (FCAA) Amendments. The SNAP program sets the policy for evaluating alternatives to compounds being phased out under the stratospheric ozone protection provision of the FCAA.

Table D-1 summarizes the technical and environmental characteristics of the compounds used in solvent cleaning and indicates the status of compounds under the SNAP program. If a compound in use at your facility for solvent cleaning has not been approved under the SNAP program, you may be found in violation of federal law. Although halogenated solvents, such as Perc, MeCl, and TCE, are considered SNAP acceptable, their use may result in an increase risk for the facilities. Therefore, one of these solvents should not be substituted for the other when developing your risk reduction plan for SB 1731. For this reason, these solvents will not be discussed as SNAP alternatives.

Flammable Solvents

Most local fire departments define flammable compounds as those with a flash point that is 100° F or less, while the U.S. EPA defines flammable compounds as those with a flash point of 140° F or less. Most flammable compounds would spontaneously ignite upon heating because their flash point is less than their boiling point. Consequently, most flammable solvents alone cannot be used in vapor degreasers. Flammable solvents, such as alcohols, ketones, and petroleum solvents, however, are used in small cold cleaning baths, remote reservoir cleaners, or for hand wipe applications.

Local fire codes have strict rules that regulate the storage and use of flammable compounds. Spraying of these compounds, which produce small droplets that can ignite, is prohibited. Additionally, most local fire departments also restrict the use of these solvents in large baths. Nitrogen gas is sometimes used in enclosed systems as an "inerting" agent to displace oxygen, which prevents the ignition of these solvents. Most flammable solvents are classified as VOCs, so a permit from the district may be required.

Alcohols

Alcohols, like methanol, ethanol, and isopropyl alcohol, are usually mild solvents that are best used where the contaminants are highly polar. They are often used in blends with other solvents or water to form azeotropes. This improves solvency, increases the evaporation rate, and shortens the drying times. Azeotropic blends with halogenated solvents are effective in defluxing operations in the electronics industry. Alcohols may not be compatible with polymers and plastics. Some alcohols, such as methanol, are highly toxic compounds and require disposal as hazardous wastes because of their toxicity and flammability.

Table D-1
Technical and Environmental Characteristics of
Potential Alternative Solvents

Solvent	PEL^a (ppm)	VOC^b	TAC^c	Boiling Point (°F)	Flash Point (°F)	Evap Rate^d	SNAP Review^e
Isopropanol	400	yes	no	82.5	72	1.70	PC, EC, MC
2-butoxy-ethanol	25	yes	yes	172	140	0.072	PC, EC, MC
Acetone	750	no	no	56.5	0	6.06	PC, EC, MC
MEK	200	yes	yes	79.6	50	4.6	PC, EC, MC
Petroleum solvents	--	yes	--	--	--	--	PC, EC, MC
Terpenes	--	yes	no	--	--	--	PC, EC, MC
NMP	--	yes	no	--	190	--	PC, EC, MC
Dibromomethane	0.13	yes	yes	97	--	--	unacceptable
DBE	--	yes	no	--	--	--	unacceptable
HCFC-123	(30)	no	no	83.7	none	(25)	PC
HCFC-141b	(400)	no	no	84	none	(25)	unacceptable
HCFC-225ca/cb	25	no	no	--	none	(15)	PC, EC
Trans-1,2-dichloroethylene	1	yes	yes	117	39	--	PC, EC, MC
Monochlorotoluene	50	yes	no	161.8	125	--	PC, EC
Benzotrifluorides	25	yes	no	--	--	--	PC, EC
Super critical fluids	--	yes	no	--	--	--	PC, EC, MC
Volatile methyl siloxanes	--	--	no	--	--	--	PC, EC, MC
Vanishing oils	--	--	no	--	--	--	MC
Perfluorocarbons	--	yes	no	--	none	--	PC, EC
HFC- 43-10	(200)	no	no	--	none	(18)	PC, EC, MC

- a. PEL: Permissible exposure limit which is the maximum concentration that an employee can be exposed to continuously for eight hours established by the Cal OSHA. The values in parenthesis are industry-suggested allowable exposure limits.
- b. VOC: Listed by the U.S. EPA as a volatile organic compound.
- c. TAC: Identified by the ARB as a toxic air contaminant.
- d. Evaporation rate relative to butyl acetate which has been assigned the value of unity. The values in parenthesis are estimates of the evaporation rates and not actual measurements.
- e. PC is SNAP acceptable for precision cleaning, EC is SNAP acceptable for electronics cleaning, MC is SNAP acceptable for metal cleaning.

Sources: U.S. EPA, 1996; ARB, 1994; IRTA, 1994; NDC, 1991; Merck, 1984.

Ketones

Ketones, like acetone and methyl ethyl ketone (MEK), are powerful solvents. Acetone has a solvency similar to MeCl_2 and evaporation rates close to those of TCE and 1,1,1 trichloroethane (TCA). Recently the U.S. EPA declassified acetone as a VOC. Similar to alcohols, ketones may not be compatible with many polymeric and elastomeric materials.

Petroleum Solvents

Petroleum solvents, like mineral spirits, kerosene, and Stoddard solvent, show good solvency for most contaminants, are compatible with most substrates, and have low surface tension which improves wetting. The toxicity of many of these solvent are unknown because they consist of blends of many potentially toxic organic compounds, including benzene. These solvent are classified as VOCs and are regulated by the districts. Because of their flammability, petroleum solvents are restricted to cold and wipe cleaning applications.

Terpenes

Terpenes are biodegradable citrus derivatives. D-limonene is a good example of a terpene. Terpenes are odoriferous, combustible liquids and are considered hazardous wastes. They are classified as VOCs and may be subject to district regulations. Terpene products are usually formulated with surfactants and are used for flux removal. Terpenes are compatible with most metals and metal alloys. However, during extended exposures, they are incompatible with polystyrene at room temperature, polyethylene, and polyvinyl chloride. (SRRP, 1990)

Because terpenes have high heating values, the preferred method of disposal is incineration. Although terpenes are biodegradable, formulations may not be able to be disposed of down the sewer because of the contaminants and terpenes' high biological oxygen demand (BOD). The local sewer district or publicly-owned treatment works should be contacted regarding the permissible discharge of terpene contaminated wastes to the sewer. Although permissible exposure limits have not been set for terpenes, they do cause skin and eye irritation. In a limited study, terpenes have also been found to cause cancer in male rats. (SRRP, 1990)

NMP

N-methyl-2-pyrrolidone (NMP) is another biodegradable compound that may have potential as a limited substitute. NMP has a flash point of 190° F. Although NMP is biodegradable, it may not be allowed to be disposed of down the sewer because of the contaminants and its BOD. The ARB has recently received information that NMP may be a reproductive/developmental toxic compound. The ARB is currently reviewing the scientific evidence. NMP is also a skin and eye irritant.

DBE

Aliphatic dibasic acid ethers (DBEs) show some promise as replacements for MeCl_2 because of their similar solvency. DBEs are refined dimethyl esters of adipic, glutaric and succinic acids. These compounds are soluble in alcohols, ketones, ethers, and most hydrocarbons. They are only slightly soluble in water and higher paraffinic hydrocarbons. DBEs are stable at ambient conditions so precautions are not needed to prevent autoxidation or hydrolysis during storage. DBEs are combustible with a flashpoint of approximately 212° F. They are classified as VOCs and may be restricted by sanitation districts for discharge to the sewer. A mixture of a DBE, such as dimethyl glutarate, and NMP have been used and may be a better solvent than either compound alone and may be suitable for specialty cleaning.

Hydrochlorofluorocarbons (HCFCs)

Hydrochlorofluorocarbons (HCFCs) are being evaluated as substitute degreasing solvents. HCFCs are organic compounds containing hydrogen, chlorine, and fluorine atoms. Because they are not fully halogenated, HCFCs have shorter atmospheric lifetimes and have minor stratospheric ozone depletion potentials relative to fully halogenated solvents, such as TCA and CFC-113. Some HCFCs are considered VOCs and may be regulated by the districts. Limited health studies indicate that some HCFCs may pose adverse health effects if inhaled or ingested.

HCFC-123

HCFC-123 (1,1-dichloro-2,2,2-trifluoroethane) is one of several HCFCs that is being evaluated for solvent cleaning applications. Its low boiling point of 83.7° F makes this solvent acceptable for cold cleaning, but unsuitable for vapor cleaning. HCFC-123 has a low ozone depletion potential (ODP) of 0.02 (which is one fifth that of TCA) and is not a VOC. However, it may be evaluated later by the U.S. EPA as an ozone depleter. HCFC-123 has good solvency and is compatible with most metals, plastics, glass, and most other substrates. Because of the low boiling point, HCFC-123 has the potential for higher emissions than comparable halogenated solvents. Its heat of vaporization and vapor density are less than those of TCA and greater than those of CFC-113. (IRTA, 1994)

HCFC-141b

HCFC-141b (1,1-dichloro-2,2,2-trifluoroethane) has a low boiling point of 84 ° F and is somewhat flammable. HCFC-141b is exempt as a VOC and has an ODP of 0.08, which is similar to that of TCA. This may result in HCFC-141b being classified as an ozone depleting substance. Mixtures of HCFC-123 and HCFC-141b, where the weight percent of HCFC-123 is greater than 31 weight percent, are non-flammable. (SRRP, 1990) HCFC-141b is not approved under the SNAP program for use in new equipment and is also unacceptable for use in existing equipment as of January 1, 1996.

A mixture of HCFC-123, HCFC-141b, and methanol form an azeotrope called KCD-9394 by one manufacturer and is best suited for precision cleaning applications. This mixture has a boiling point of 86° F, it has an ODP of 0.07 and would be considered a VOC because it contains methanol. KCD-9394 needs to be used with equipment that has a freeboard ratio of 1.6 to 2.0 and primary refrigerated coils operating at 10° F. A desiccant dryer must be employed instead of a gravity separator because water would strip the stabilizers and methanol from the mixture. (SRRP, 1990)

HCFC 225 ca/cb

HCFC 225 ca/cb is produce as a mixture of two isomers, one of which appears to be very toxic. HCFC 225 ca/cb has gentle cleaning abilities which would make it good alternative to CFC-113, but it does not have sufficient solvency to be a replacement for the other halogenated solvents. (IRTA, 1994)

FOR MORE INFORMATION ON THE SNAP PROGRAM

Lists of acceptable and unacceptable substitutes for the industrial use sectors covered under the SNAP program can be obtained from the Stratospheric Protection Hotline at 1-800-296-1996. International callers can telephone direct at (202) 783-1100. The SNAP Federal Register notices can be ordered from the Government Printing Office Order Desk at (202) 783-3238.

APPENDIX E
Department of Toxic Substances Control
Publication List

**Publication list for the California Department of Toxic Substances Control Technology
Clearinghouse • January 1997
Office of Pollution Prevention and Technology Development**

This is an abbreviated publication list for the Department of Toxic Substances Control (DTSC) Technology Clearinghouse. All reports are available at no cost. Some documents and executive summaries are available online through the Cal/EPA ACCESS Bulletin Board System at (916) 322-5041. Reference copies are located at the DTSC Library and at select California Repository libraries. To order documents, contact the DTSC, Office of Pollution Prevention and Technology Development, Technology Clearinghouse Unit at P.O. Box 806, Sacramento, California 95812-0806. If you have any questions, please contact us at (916) 322-3670. Fax numbers (916) 327-4494 and (916) 445-2939. There are no copyright restrictions, therefore, these publications may be reproduced at your own expense.

Waste Minimization Fact Sheets

A summary of waste minimization methods for specific industries .

Order #	Title and Summary
----------------	--------------------------

- | | |
|-----|--|
| 200 | <u>Waste Minimization Can Work For You</u> (1992, 4 pp.)
A summary of general hazardous waste minimization definitions and techniques for businesses. |
| 201 | <u>Aerospace Industry</u> (1992, 4 pp.) |
| 203 | <u>Automotive Repair Shops</u> (1992, 4 pp.) |
| 206 | <u>Metal Finishers</u> (1992, 4 pp.) |
| 209 | <u>Printed Circuit Board Manufacturers</u> (1992, 4 pp.) |

Waste Audit Studies

Full-scale assessments of specific industries that show where waste minimization methods can be most effective.

Order #	Title and Summary
----------------	--------------------------

- | | |
|-----|---|
| 301 | <u>Automotive Repairs</u> (1987, 69 pp.) |
| 305 | <u>Fabricated Metal Products Industry</u> (1989, 188 pp.) |
| 310 | <u>Mechanical Equipment Repair Shops</u> (1990, 116 pp.) |
| 311 | <u>Metal Finishing Industry</u> (Includes Addendum) (1988, 236 pp.) |

Hazardous Waste Minimization Check-List and Assessment Manual

Manual developed to aid manufacturers in evaluating their shops for waste minimization opportunities.

Order # Title and Summary

- 400 Automotive Repair Shops (1988, 47 pp.)
- 402 Metal Finishing Industry (1993, 143 pp.)
- 405 Electronics Industry (1996, 76 pp.)

Waste Stream Specific Information

Order # Title and Summary

- 607 Aqueous Alternatives to Solvent Cleaning (1994, 6 pp.)
A summary of general information on many of the aqueous alternatives available to replace solvent cleaners.
- 608 Alternatives to Chlorinated Solvents in Cleaning Applications (1994, 132 pp.)
Discusses the chemical and process alternatives to chlorinated solvents in vapor degreasing, cold cleaning, printed circuit board defluxing, and handwipe operations. The report also summarizes the air, water, and waste regulations that apply to alternatives. Detailed case studies demonstrate the issues that firms must consider when they are selecting an alternative.
- 609 Simplified Guide for Evaluating Alternatives to Chlorinated Solvents in Cleaning Applications (1995, 22 pp.)
Presents a simplified approach for evaluating alternatives to chlorinated solvents in various cleaning applications. This approach is based on a detailed cross-media analysis of the alternatives in vapor degreasing, cold cleaning, wipe cleaning, and printed circuit board defluxing described in Document Number 608. Written by Dr. Katy Wolf of the Institute of Research and Technical Assistance (IRTA).
- 611 Parts Cleaning Alternatives in Machine Shops (1995, 16 pp.)
A guide to assist shop operators in the evaluation and adoption of alternatives to the use of 1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113) and 1,1,1-trichloroethane (TCA) for parts cleaning. These two chlorinated solvents have been banned as of 1/1/96. The report is also a primer for those interested in pollution prevention strategies for machines shops.

APPENDIX F

Some Helpful Information and Contacts

Appendix F

Some Helpful Information & Contacts

California Air Resources Board (ARB)
Stationary Source Division, Emissions Assessment Branch
(916) 323-4327
<http://www.arb.ca.gov>

United States Environmental Protection Agency
Technology Transfer Network (TTN 2000)
<http://ttnwww.rtpnc.epa.gov>

Office of Environmental Health Hazard Assessment
Air Toxicology and Epidemiology Section
(510) 540-3324
<http://www.calepa.ca.gov/oehha>

Department of Toxics Substances Control (DTSC)
(916) 324-1826

Material Safety Data Sheet Websites
<http://haz1.siri.org/msds/index.html>
<http://haz2.siri.org/msds/index.html>
<http://www.pdc.cornell.edu/ISSEARCH/MSDSsrch.HTM>

The Institute for Research and Technical Assistance
(310) 453-0450

California Occupational Safety and Health (Cal/OSHA) Consultation Service
(916) 263-2855

Local Air Pollution Control and Air Quality Management Districts
(please check your phone book's county government listings, or call the **ARB Business Assistance Helpline at (800) 272-4572** for the phone number of your local district)

APPENDIX G
Sample District Notification
of Facility Risk Letter

Appendix G

Sample District Notification of Facility Risk Letter

Dear _____:

We are sending you this letter to notify you that the risk associated with air emissions from your facility exceeds the significant risk level established by the _____ [place the district name here]. The cancer risk associated with your facility is listed in the table below. These risk levels were estimated using the risk assessment methodology developed under Assembly Bill (AB) 2588, Air Toxics Hot Spots Information and Assessment Act.

Estimated Facility Risk and District significant and Unreasonable Risk Levels

	Facility Risk ^a	Significant Risk Level ^b	Unreasonable Risk Level ^b
Maximum Individual Cancer Risk per Million^c			

^a As estimated by the District using the methodology defined in the CAPCOA Air Toxics “Hot Spots” Program Risk Assessment Guidelines or other guidelines that may supercede these guidelines.

^b Significant and unreasonable risk levels are assigned by the District.

^c The maximum offsite individual excess cancer risk is the estimated probability of an individual contracting cancer as a result of constant exposure to ambient concentrations which result from facility emissions of carcinogenic air contaminants over a 70 year lifetime. The risk is expressed in chances per million. For example, a value of 10 refers to a probability of 10 per million.

In accordance with Senate Bill (SB) 1731 (Health and Safety Code sections 44390 through 44394), you are required to reduce your facility risk to below the significant risk level within five years.

To reduce your facility risk, related provisions of SB 1731 require you to audit your facility for risk reduction opportunities and create a risk reduction plan. The risk reduction plan will document the options you plan to implement to reduce your risk to below the significant risk level. The risk reduction plan is to be submitted to the district for approval, and then followed when implementing risk reduction options to reduce the risk from your facility.

We have enclosed SB 1731 Risk Reduction Audits and Plans Guidelines for Halogenated Solvent Cleaning Facilities. This document will assist you in complying with SB 1731 by providing information about the requirements of SB 1731 and by providing forms to use to prepare your risk reduction plan. The completed forms can serve as your facility's risk reduction audit and plan.

If you have any questions, please contact _____ [Put district contact name] at _____ [district phone number].

Sincerely,

Enclosure