Appendix A: List of Materials EPA shared with Small Entity Representatives

Appendix A1. Materials EPA shared with potential SERs before the Pre-Panel Meeting, March 17, 2016

- Agenda for Pre-Panel Outreach Meeting, March 17, 2016
- Power Point Presentation: An Overview of the Small Business Advocacy Review Panel Process
- Power Point Presentation: Rulemaking for Methylene Chloride and N-Methylpyrrolidone (NMP) under the Toxic Substances Control Act (TSCA), March 17, 2016
- SBAR Pre-Panel Discussion Questions

EPA's SBAR Pre-Panel Outreach Meeting with

Potential Small Entity Representatives for

Proposed Rulemaking for N-Methylpyrrolidone and Methylene Chloride in Paint Removers under TSCA Section 6(a)

Thursday, March 17, 2016

1:30 pm – 4:00 pm, Eastern time zone

1:30 **Welcome and Introductions** (Office of Policy)

1:45 **SBAR Panel Process Overview** (Office of Policy)

2:00 **Presentation on Rulemaking for N-Methylpyrrolidone and Methylene Chloride in Paint Removers under TSCA Section 6(a)** (Office of Chemical Safety and Pollution Prevention)

3:00 **Questions and Discussion** (All participants)

3:50 **Summary and Closing** (Office of Policy)

An Overview of the Small Business Advocacy Review Panel Process

William Nickerson, Acting Small Business Advocacy Review Chair (SBAC)
Pre-Panel Outreach Meeting, March 17, 2016

Office of the Administrator
Office of Policy
Office of Regulatory Policy and Management
http://www.epa.gov/op/orpm.html

Today, I'll answer these questions...

- What is a Small Business Advocacy Review (SBAR) Panel?
- How does a Panel fit into the rulemaking process?
- How do Small Entity Representatives (SERs) participate in the Panel process?
- What is the difference between this Pre-Panel meeting and the future Panel meeting?
- What does the Panel do with SER recommendations?

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What is an SBAR Panel?

- A Panel consists of representatives from the:
  - agency authoring the regulation (i.e., EPA),
  - Office of Management and Budget (OMB), and
  - Small Business Administration (SBA).

Title 5, section 609(b)(3), of the *United States Code* (USC). This is also known as section 609(b)(3) of the RFA.

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What is an SBAR Panel? (cont'd.)

- SBREFA amended the 1980 Regulatory Flexibility Act (RFA), which requires agencies to:

  "assure that small entities have been given an opportunity to participate in the rulemaking process"[1] for any rule "which will have a significant economic impact on a substantial number of small entities."[2]

[1] 5 USC 609(a)
[2] 5 USC 602(a)(1)

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Panel within the rulemaking process?

"the panel shall review **any material the agency has prepared**..., including any draft proposed rule, **collect advice and recommendations** of each individual small entity representative identified by the agency after consultation with the Chief Counsel [for Advocacy of the Small Business Administration], on issues related to"[1] the following:

- Who are the small entities to which the proposed rule will apply? [2]
- What are the anticipated compliance requirements of the upcoming proposed rule? [3]
- Are there any existing federal rules that may overlap or conflict with the regulation? [4]
- Are there any significant regulatory alternatives that could minimize the impact on small entities? [5]

[1] 5 USC 609(b)(4)
[2] 5 USC 603(b)(3)
[3] 5 USC 603(b)(4)
[4] 5 USC 603(b)(5)
[5] 5 USC 603(c)

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Panel within the rulemaking process?
(cont'd.)

Let's focus on "any material the agency has prepared"

- For this Panel, EPA will not provide a proposed rule, though we expect to discuss regulatory alternatives in as great a detail as we can.
- It is EPA's policy to host SBAR Panels like this one well before a proposed rule is written so we have adequate time to incorporate your advice and recommendations into senior management decision-making about the proposed rule.
- Participation in the Panel outreach meeting does not preclude or take the place of participation in the normal public comment period at the time the rule is proposed.

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How do SERs participate?

...Let's focus on "collect advice and recommendations"

- This is how SERs help the Panel members.
  - You're invited to provide advice and recommendations on the materials shared today and at the future Panel outreach meeting.
  - You will have an opportunity to submit written comments as well as the verbal comments you provide in the meetings.
- Those of you joining this meeting to assist the potential SERs are asked not to speak to allow the potential SERs ample time to talk.

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How do SERs participate? (cont'd.)

- As potential SERS, you are in a unique position during the Pre-Panel outreach and Panel outreach meetings
- You have the opportunity, because of your status as a small entity expected to be regulated by this rule, to influence the decisions senior EPA officials make about the forthcoming regulation

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Pre-Panel vs. Panel Outreach Mtg.?

- Pre-Panel Outreach Meeting
  - Conducted by EPA with SBA and OMB as invitees
  - Overview of the RFA, how the Panel process works, and the role of SERs
  - Background and overview of proposed rulemaking
- Panel Outreach Meeting
  - Chaired by SBAC, but all Panel members have active role
  - Bulk of meeting spent discussing regulatory alternatives and input of SERs

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What does the Panel do with your recommendations?

- EPA, OMB, and SBA prepare a joint Panel report:
  - Submitted to the EPA Administrator
  - Considered during senior-management decision-making prior to the issuance of the proposed rule
  - Placed in the rule's docket when the proposed rule is published

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Contact Information

- Contact my staff:
  - Nathaniel Jutras, RFA/SBREFA staff contact
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Rulemaking for Methylene Chloride and n-Methylpyrrolidone (NMP) under the Toxic Substances Control Act (TSCA)

Pre-Panel Outreach

March 17, 2016

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Today's Discussion

- Background:
  - Consultation with Small Entity Representatives
  - TSCA Work Plan for Chemical Assessments
- Methylene Chloride and n-Methylpyrrolidone (NMP)
- Toxic Substances Control Act (TSCA) Section 6(a)
  - Background
  - Developing the Regulations
- Affected entities and potential compliance costs
- Contact information
- Your feedback
- Appendix: Regulatory History and International Action

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Background: Consultation with Small Entity Representatives

- EPA is interested in not only information, but also advice and recommendations from the small entity representatives (SERs)
- EPA will use this information to develop a regulatory flexibility analysis, which becomes part of the record for the proposed regulation
- Key elements in this analysis:
  - Number of small entities to which the proposed rule would apply
  - Projected compliance requirements of the proposed rule
  - Identification of all relevant Federal rules which may duplicate, overlap or conflict with the proposed rule
  - Any significant alternatives to the proposed rule which accomplish the stated objectives and which minimize significant economic impact of the proposed rule on small entities

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SERs and the Regulatory Process

- We are seeking information on how the options presented might impact your business or organization
  - Provide specific examples of impacts
  - Provide cost data, if available
- We are also seeking alternative methods of regulating these risks
  - Suggest other relevant options, including data on their costs and information on how to ensure compliance
  - Suggest ways that small businesses could benefit from flexibilities, such as different compliance timetables, simplified reporting requirements, and exemptions
- We would like to minimize duplication
  - Provide information on any duplicative or contradictory Federal regulations you are aware of

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Background: TSCA Work Plan for Chemical Assessments

- EPA has identified a subset of existing chemicals as a high priority for risk assessment
- 2012-2013:
  - With input from stakeholders, EPA identified a subset of chemicals for assessment, known as the TSCA Work Plan, and described the methodology for how they were prioritized
  - Performed problem formulation for five Work Plan chemicals, developed draft risk assessments for peer review, and released them for public comment.

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Background: TSCA Work Plan for Chemical Assessments

- 2014-2015:
  - Released first final risk assessments (TCE, methylene chloride, NMP, antimony trioxide, HHCB)
    - No risks found for uses assessed for antimony trioxide and HHCB.
    - Risks found for uses assessed for TCE, methylene chloride, and NMP. Risk management process began.
  - Refreshed Work Plan with updated exposure information; currently contains 90 chemicals
- 2015-2016:
  - Problem formulation and data needs assessment issued for several flame retardant clusters
  - Problem formulation issued for 1,4-Dioxane
  - Draft risk assessment for 1-bromopropane (planned release) for public comment

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Overview: Methylene Chloride and NMP

- EPA assessed Methylene Chloride and NMP paint removal uses as part of the TSCA Work Plan for Chemical Assessments.
- Methylene Chloride
  - Volatile, colorless liquid, non-flammable, non-explosive, non-corrosive, inexpensive.
  - Used frequently as a solvent; also in adhesives, metal cleaning, chemical processing, pharmaceuticals.
  - 25% of methylene chloride in the US used in paint removers (66.3 million lbs annually), down from 50% in 1980s.
- NMP
  - Mildly volatile, colorless liquid, low flammability, non-explosive.
  - Used frequently as a solvent; also in adhesives, leather and brush cleaners, manufacturing of circuit boards, pesticides, petrochemical processing.
  - 9% of NMP in the US used in paint removers (16.6 million lbs annually).
  - Frequently an alternative to methylene chloride paint removers.

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	Methylene Chloride Key Information	NMP Key Information
Notes on Use	Used for decades; nonflammable; works quickly Cause of death for ~1 worker/year during bathtub refinishing + suspected additional deaths during other paint removal jobs Inhalation exposure; extremely volatile	Marketed as safer & greener than methylene chloride Works more slowly Exposure is primarily dermal, but also via inhalation
Manufacturers & Users	2 manufacturers, 7 product formulators 5,000 workers in graffiti removal & other outdoor uses 8,000 workers as home contractors (including 1,300 bathtub refinishers) 32,000 workers in commercial/industrial facilities 2.4 million consumer users	6 manufacturers, 14 product formulators 46,000 workers in graffiti removal & other outdoor uses 7,000 workers as home contractors 1,400 workers in commercial/industrial facilities 1.4 million consumer users
Health Effects and Risks of Concern	Acute effects: Neurotoxicity - confusion, incapacitation, and death Chronic effects: Cancer and liver toxicity Inhalation exposures are 2-3 orders of magnitude from target benchmarks Risks for bystanders due to inhalation exposures	Concern is for women of child-bearing age High dose acute effects: Fetal death Lower dose chronic effects (developing fetus): Low birthweight, delayed ossification, growth retardation.
Substitutes	Alternative processes (Heat guns, mechanical sanding, hydroblasting, media blasting (starch, soda, etc)) Chemical substitutes (Benzyl alcohol, dibasic esters, acetone-toluene-methanol formulations, caustics) Generally, hazards of substitutes are of less concern	
Notable Regulations	OSHA PEL 25 ppm Banned for graffiti use in 12 states Listed under California Safer Consumer Products regulation Prohibited for residential & consumer use in the EU	No OSHA PEL California PEL 1 ppm + gloves On the EU candidate list of substances of very high concern

Risk Assessment: Methylene Chloride

- Final TSCA Work Plan Chemical Risk Assessment: August 2014
  - Followed Agency peer review process of publishing a public draft, peer review, and response to peer review and public comment
- Risk assessment identified inhalation risks from paint removers containing methylene chloride:
  - Chronic exposure effects: cancer and liver toxicity
  - Acute exposure effects: Neurotoxicity - confusion, incapacitation, and death
  - Risks from chronic (lifetime) exposure in majority of scenarios except when personal protective equipment (respirator) is worn in low exposure scenarios.
  - Risks from acute high-end exposure (small, enclosed room with poor ventilation, such as a bathroom).
  - Risks to non-users (bystanders and adjacent workers) except in lowest exposure scenarios.
- See: http://www.epa.gov/assessing-and-managing-chemicals-under-tsca/assessments-tsca-work-plan-chemicals#dcm

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Risk Assessment: Methylene Chloride

- Risks were identified for most worker and consumer exposure scenarios.
- For **non-cancer risks** a **margin of exposure** (MOE) method was used to determine the presence or absence of risk for both acute and chronic exposure scenarios.
  - The benchmark MOE used in the methylene chloride risk assessment is 10.
    - This benchmark constitutes 3x residual uncertainty in extrapolating from animals and 3X residual uncertainty for variability in humans
  - People exposed are considered to be at risk when MOEs are below the benchmark MOE of 10.
  - MOEs and risks calculations for non-cancer effects are explained on the next slide
- For **cancer risks**, the inhalation unit risk (IUR) was used to estimate excess cancer risks for inhalation occupational exposure scenarios.
  - The excess cancer risk is the product of the exposure concentration and the IUR
  - Protecting against non-cancer risks protects against these cancer risks
  - Risk calculations for cancer are explained on the next slide

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Risk Calculation (Non-Cancer)

Non-Cancer MOE compared to benchmark MOE (uncertainty factors, or UFs)

MOE (acute or chronic) = Non-Cancer Hazard Value (Point of Departure)
Human Exposure (ppm)

Where: Hazard Value
POD = Human equivalent dose (ppm)
MOE = Margin of exposure (unitless)

- **The lower the exposure the higher the MOE.**
- **The *lower* the calculated MOE value, the higher the risk**
- **Cause for concern increases the lower the scenario's risk value (MOE) is below the benchmark MOE**

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Risk Calculation (Cancer)

Cancer

Risk = Human Exposure X IUR

Where:

- Risk = Cancer risk (unitless)
- Human exposure = Exposure estimate (LADC in ppm) from occupational exposure assessment
- IUR = inhalation unit risk (a x 10* ppm)

*** The *higher* the calculated risk value, the higher the risk**

*** Cause for concern increases the more the scenario's cancer risk value is above the cancer benchmark**

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Risk Estimates: Methylene Chloride

Industry	Benchmark MOE (acute & chronic)	MOE acute exposure	MOE chronic exposure, non-cancer	Cancer estimate
Professional Contractors	10	**0.015**	**0.050**	**1.9 in 1,000**
Automotive Refinishing	10	**0.11**	**0.34**	**2.9 in 10,000**
Furniture Refinishing	10	**0.035**	**0.13**	**7.7 in 10,000**
Aircraft Paint Stripping	10	**0.012**	**0.039**	**2.5 in 1,000**
Graffiti Removal	10	**0.037**	**0.16**	**6.3 in 10,000**
Other workplace settings (immersion stripping)	10	**0.0063**	**0.021**	**4.6 in 1,000**

The lower this number is below 10, the greater the risk (numbers above 10 indicate no non-cancer risks of concern)

The larger this number is, the greater the risk

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Acceptable Exposure Limit (AEL): Methylene chloride

Existing chemical acceptable exposure limit (AEL) is:

- Derived from the lowest risk estimate and appropriate UF to provide margin of safety
- Calculated for acute and chronic exposures and non-cancer and cancer effects
- Selected to be protective of all risks (for methylene chloride this is based on cancer risk)

Non-cancer

$$\text{AEL}_{non-cancer\ 8\text{hrTWA}} = \frac{POD(acute\ or\ chronic)}{MOE_{benchmark}(acute\ or\ chronic)} * Duration\ Adjustment$$

$\text{AEL}_{\text{non-cancer 8 hr TWA}}$ for acute exposures = 1.3 ppm
$\text{AEL}_{\text{non-cancer 8 hr TWA}}$ for chronic exposures = 2 ppm

Cancer

$$\text{AEL}_{cancer\ 8\text{hrTWA}} = \frac{Cancer\ benchmark(10^{-6})}{IUR} * \frac{Lifetime(24hrs\ X\ 365days\ X\ 70\ yrs)}{Working\ Career(8hrsX\ 250days\ X\ 40\ yrs)} = \mathbf{0.2\ ppm}$$

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Exposure Estimates: Methylene Chloride

Industry	Acceptable exposure limit (8 hr TWA, ppm)	Acute high-end estimated exposure (8 hr TWA, ppm)	Chronic high-end estimated exposure (8 hr TWA ppm)
Professional Contractors	**0.2**	858	431
Automotive Refinishing	**0.2**	120	64
Furniture Refinishing	**0.2**	364	169
Aircraft Paint Stripping	**0.2**	1,095	551
Graffiti Removal	**0.2**	342	139
Other workplace settings (immersion stripping)	**0.2**	2,015	1009

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Risk Assessment: NMP

- NMP is often marketed as a "safer" alternative to Methylene Chloride
- Final TSCA Work Plan Chemical Risk Assessment: March 2015
  - Followed Agency peer review process of publishing a public draft, peer review, and response to peer review and public comment
- Risk assessment identified dermal (liquid or vapor through skin) and inhalation exposure risks from the use of paint removers containing NMP:
  - Developmental effects (acute: fetal mortality; chronic: reduced fetal body weight). Concern is for women of child-bearing age.
  - Chronic exposure risks if used:
    - More than 8 hours per day for more than 5 consecutive days, even if specialized protective gloves are worn
    - More than 4 hours per day, for more than 5 consecutive days, if specialized protective gloves are not worn
  - Acute exposure risks if used:
    - More than 8 hours on a single day, even if specialized protective gloves are worn
    - More than 4 hours on a single day, if specialized protective gloves are not worn
  - No risks to bystanders
- See http://www.epa.gov/assessing-and-managing-chemicals-under-tsca/assessments-tsca-work-plan-chemicals#completed

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Risk Assessment: NMP

- Risks were identified for a number of worker and consumer exposure scenarios.
  - No risks identified for workers or residents who may be located nearby those that are working with NMP-based paint removers.
- To determine the presence or absence of non-cancer risks for both **acute and chronic exposures**, the **margin of exposure** (MOE) method was used to evaluate the risk
  - The benchmark MOE used for the NMP risk assessment is 30.
    - This benchmark constitutes 3x residual uncertainty in extrapolating from animals and 10X residual uncertainty for variability in humans
  - People exposed are considered to be at risk when MOEs are below the benchmark MOE of 30.
  - See earlier slide for an explanation of MOEs and risks calculations for non-cancer effects

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Risk Estimates: NMP

Scenario (covers several industries, assumes no gloves used)	Benchmark MOE (acute & chronic exposure)	MOE– acute exposure	MOE chronic exposure, non-cancer effects
Miscellaneous stripping Assumed mostly indoor, high end of range 1.0 weight fraction 890 cm² skin surface area, 8 hours	30	**0.7**	**0.1**
Graffiti removal Assumed mostly outdoor but may include semi-confined spaces, high end of range 1.0 Weight fraction 890 cm² Skin surface area, 8 hours	30	**0.7**	**0.1**
Miscellaneous stripping Assumed mostly indoor, mid end of range 0.625 weight fraction, 668 cm² skin surface area, 4 hours	30	**13.7**	**5.4**
Graffiti removal Assumed mostly outdoor but may include semi-confined spaces, mid end of range 0.625 weight fraction, 668 cm² skin surface area, 4 hours	30	**14.1**	**6.1**

The lower these numbers are from 30, the greater the risk (numbers above 30 indicate no risks of concern)

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Acceptable Exposure Limit (AEL): NMP

Existing chemical AEL is:

- Derived from the lowest risk estimate and appropriate UF to provide margin of safety
- Calculated for acute and chronic exposures
- Selected to be protective of all risks. (For NMP this is based on chronic exposures)

- $\mathrm{AEL}_{non-cancer\ 8\mathrm{hrTWA}}$ = **1 ppm**

- Assuming:
  - 25% or less weight fraction NMP in the product
  - Use no more than 8 hours/day
  - Specialized protective gloves are worn

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From Risk Assessment to Risk Reduction

Risks identified

- Methylene chloride and NMP found to pose risks when used in typical commercial and consumer scenarios

Risk reduction needed

- Methylene chloride: Exposures are 100 to 1,000 times greater than acceptable exposure levels
- NMP: Exposures are 5 – 10 times greater acceptable exposure levels

Approach chosen

- Regulation under TSCA Section 6(a) is the approach most likely to reduce risks to workers and consumers

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Background: TSCA Section 6(a)

- Provides EPA with the authority to prohibit or limit the manufacture, processing, distribution in commerce, use or disposal of a chemical or mixture.
- EPA must make certain findings before a section 6(a) rule may be finalized:
  - There is a reasonable basis to conclude that a chemical substance or mixture "presents or will present an unreasonable risk of injury to health or the environment."
  - The regulatory option chosen is the least burdensome option that adequately protects against such risk.

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Options Under TSCA Section 6(a)

- Prohibit or limit manufacture, processing or distribution in commerce.
- Prohibit or limit for particular use or above a set concentration.
- Require warnings and instructions.
- Require recordkeeping and testing.
- Prohibit or regulate manner or method of commercial use.
- Prohibit or regulate manner or method of disposal.
- Direct manufacturers/processors to give notice of risk to distributers and users and replace or repurchase.

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Uses Under Consideration

- Uses considered for regulation under TSCA Section 6(a) are commercial and consumer paint removers containing methylene chloride or NMP.
- Examples of small business uses:
  - Automotive, aircraft, and marinecraft body paint, and interior repair and maintenance
  - Flooring contractors
  - Furniture repair and refinishing
  - Painting and wall covering contractors
  - Bathtub refinishing

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Potentially Impacted Sectors

- Ship building and repairing
- Aircraft manufacturing and repairing
- Museums
- Independent artists, writers, and performers
- Automotive body, paint, and interior repair and maintenance
- Flooring contractors
- Reupholster and furniture repair
- Painting and wall covering contractors
- Paint remover processors or formulators

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Developing Potential Regulatory Options

- Over the past year, EPA has identified regulatory options under Section 6(a) of TSCA that would provide adequate protection from the risks identified
- Stakeholders we've been working with:
  - Affected States and Tribes
  - Chemical manufacturers, product formulators, and their trade associations
  - Commercial paint remover users in various sectors
- Generally, alternatives are available and being used successfully throughout several industries
- What we've heard, from stakeholders and from industry research:
  - Marinecraft:
    - Paint is generally not removed to the substrate; when needed, sand or soda blasting are used.
    - Chemical stripping requires consideration of disposal (heavily regulated near water).
  - Aircraft:
    - Use of methylene chloride is declining, particularly among large scale users, due to air regulations and other considerations.
    - Refinishing of small aircraft still use methylene chloride, though many now use benzyl alcohol formulations.
  - Renovations and contractors:
    - Many firms have stopped using methylene chloride due to worker safety concerns, potential for fatal accidents, odor (employee and client complaints), and specialized PPE, training, and waste disposal needed.
    - Some firms use MC only outdoors or with fans for ventilation
    - Alternatives identified tend to be mechanical methods or benzyl alcohol.
  - Automotive (collision repair and autobody):
    - Chemical removers do not appear to be critical for this sector as industry reps reported large use of abrasives for paint removal
  - Furniture refinishing:
    - Seem to exclusively use methylene chloride, with some attempts at alternatives containing acetone.
    - There are flammability concerns with substitutes given the prevalence of wood substrates

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Developing Potential Regulatory Options

- From over 50 options analyzed, the two options presented today would provide risk reduction to target benchmarks
- Other options considered **do not** reduce exposure to benchmark risk levels

Option	Why it does not provide sufficient risk reduction
Limiting concentration of methylene chloride or NMP in a formulation	Even when reduced to 5% concentration, for typical work scenarios (>4 hours), workers would be at acute risk
Prohibiting certain formulations (such as spray) to reduce inhalation exposure (methylene chloride only, since NMP exposures are primarily dermal)	For methylene chloride, most acute and cancer risk would remain.
Requiring local exhaust or other ventilation (without personal protective equipment)	Alone, ventilation does not reduce exposures to benchmark risk levels.
Requiring PPE at APFs lower than 1,000 or 10,000 (methylene chloride only)	1) Only air-supplied respirators can effectively reduce exposures 2) Below APF 1,000, exposures are not reduced to benchmark risk levels.
Requiring record keeping and testing	Alone, this does not provide protection from risks
Requiring labeling of products	The particular actions the label would need to require are not likely to be followed properly. Exposures would not be reduced to benchmark risk levels.

Potential Regulatory Options

1. Prohibit manufacturing, distribution, and use of methylene chloride or NMP as a paint remover

2. Allow commercial use with PPE and other restrictions
   - Methylene chloride:
     - Supplied air respirator (APF 1,000 in most situations, APF 10,000 for immersion stripping).
       - Some uses would also require engineering controls
       - All workers at risk of exposure would need to wear respirators. Exposure would be determined by monitoring.
       - APF is the workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees. For example, APF 1,000 reduces the exposure concentration by 1,000 times.
     - Bystanders (such as residents of homes) must stay out for up to 24 hours
     - Workplaces would have the option of meeting an exposure limit (potentially could use engineering controls to reduce the respirator APF needed)
   - NMP:
     - Require concentration limits on NMP in paint removers (25%), formulator testing to identify protective gloves for their products, and PPE requirements
       - PPE: Workers wear specialized gloves and, indoors, a respirator of APF 10.
       - All workers at risk of exposure would need to wear respirators. Exposure would be determined by monitoring.
       - Workplaces have the option of meeting an exposure limit of 1 ppm + specialized gloves, instead of the respirator with APF 10

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Risk Reduction of Regulatory Options

1. Prohibit manufacturing, distribution, and use of methylene chloride or NMP as a paint remover
   - Risks eliminated; complete risk reduction
2. Allow use with PPE and other restrictions
   - Methylene chloride:
     - Eliminates risks for bystanders (residents of homes, for example) because they are excluded from the area
     - Reduces risks to benchmarks for workers
   - NMP:
     - Reduces risks to benchmarks for workers

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Risk Reductions: Methylene Chloride PPE option

Industry	Benchmark MOE (acute & chronic exposure)	APF 1,000 Risk estimate – acute	APF 1,000 Risk estimate – chronic non-cancer	APF 1,000 Cancer estimate
Professional Contractors	10	**15**	**50**	**1.9 in 1,000,000**
Automotive Refinishing	10	**110**	**337**	**2.9 in 10,000,000**
Furniture Refinishing	10	**35**	**128**	**7.7 in 10,000,000**
Aircraft Paint Stripping	10	**12**	**39**	**2.5 in 1,000,000**
Graffiti Removal	10	**37**	**156**	**6.3 in 10,000,000**
Other workplace settings (immersion stripping) *(APF 10,000 or 1,000 + ventilation)*	10	**63** *(APF 10,000)*	**215** *(APF 10,000)*	**4.6 in 10,000,000** *(APF 10,000)*

All these numbers are now above 10, indicating no non-cancer risks of concern

All these numbers now indicate no cancer risks of concern

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Risk Reductions: NMP PPE Option

Scenario	Industry/ Activity	Exposure	PPE required to achieve MOE Greater Than the Benchmark MOE
Baseline (high end of current exposures)	Miscellaneous stripping	Acute	Not achievable
		Chronic	Not achievable
	Graffiti removal	Acute	Not achievable
		Chronic	Not achievable
With Maximum 25% NMP in products and no ventilation indoors	Miscellaneous stripping	Acute	Gloves
		Chronic	Gloves + APF 10
	Graffiti removal	Acute	Gloves
		Chronic	Gloves

- In all scenarios evaluated, without gloves and without a respirator or ventilation there are risks of concern.
  - In some scenarios (indoors) the MOE with gloves and APF 10 is greater than the benchmark MOE and "gloves + APF 10" is shown in the table signifying no significant risks when wearing gloves.
  - In some scenarios (outdoors) the MOE with gloves is greater than the benchmark MOE and "gloves" is shown in the table signifying no significant risks when wearing gloves.
  - Based on modeling and underlying assumptions, in some scenarios the exposure reduction of gloves combined with the most protective respirator (APF 10,000) would not reduce exposure sufficiently to achieve an MOE above the MOE baseline. In those cases "not achievable" is shown.
- Refer to Table 2-3 in the Final Risk Assessment for exposure durations and air concentrations used to assess risks.

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Costs: Methylene Chloride Prohibition

- Costs include costs to manufacturers, processors and to commercial users
- Changing products to remove methylene chloride (chemical substitution in formulation, relabeling, and other changes) *(applies to manufacturers, processors)* + downstream notification about prohibited uses *(applies to manufacturers, processors, distributors)*
  - 2 manufacturers, 7 formulators
  - First-year costs: $181,000, or annualized cost: $15,000 (over 20 years)
- Costs associated with switching to substitutes *(commercial users)*
  - Process change
    - For some firms this is expected to be minimal if they have experience with using alternative chemicals or paint removal methods.
    - Other firms will likely have a trial and error period until they find an alternative chemical or mechanical means that meets the needs of their work process.
  - Hazards of substitutes
    - Substitutes present some hazards, but generally less than methylene chloride.
  - Job time when using substitutes *(all users*). This is a cost or savings, depending on job specifics
    - Depending on the job, the time needed could increase or decrease. This is based on the type and number of coatings, surface prep, clean-up, dwell time, and other factors.
- **Total cost (for all commercial entities):**
  - **$15,000 per year** + qualitative inconvenience, hazards of substitutes, and increased time
  - First year monetized costs: $181,000

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Methylene Chloride Prohibition: Changing to Substitute Chemicals

- Currently assuming there is a viable chemical alternative for all industry sectors
  - We are seeking information to confirm or change these assumptions
- Current cost estimates show a cost **savings** per firm when switching from methylene chloride to an alternative chemical paint remover in all industry sectors
  - On a per ounce basis, some chemical alternatives are less expensive than methylene chloride
  - In some situations, less of the alternative product is needed (compared with methylene chloride) for the same job (example: benzyl alcohol products)

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Costs: Methylene Chloride PPE

- Costs include costs to manufacturers, processors and to users
- Downstream notification about prohibited uses *(manufacturers, processors, distributors)*
  - 2 manufacturers, 7 formulators
  - First-year costs: $2,000, or annualized cost: $60 (over 20 years)
- Commercial users (total costs and for small businesses)
  - Total Annualized Cost: $33.6 million
  - Cost per employee of worker PPE of air supplied respirator (includes device, fitting, training, medical monitoring, etc).
    - For most industries, this would be APF 1,000
    - For immersion stripping, this would be APF 10,000
  - If work is performed in a residence, homeowners are not permitted in the home while work is performed and for a period of at least 24 hours after work is completed
  - PPE Cost estimates:
    - Art Restoration & Conservation: $94,000 ($56,000 total first year costs) ($1,026 per small firm)
    - Automotive: $366,000 ($220,000 total first year cost) ($1,020 per small firm)
    - Furniture Refinishing: $11,930,000 ($7,200,000 total first year cost) ($1,005 per small firm)
    - Bathtub Refinishing: $1,591,000 ($950,000 total first year cost) ($1,056 per small firm)
    - Professional Contractors: $19,491,000 ($18,000,000 total first year cost) ($1,013 per small firm)
    - Aircraft Repainting: $289,000 ($167,000 total first year cost) ($1,095 per small firm)
    - Ship Repainting: $60,000 ($35,000 total first year cost) ($1,091 per small firm)
    - Graffiti Removal: $237,000 ($136,000 total first year cost) ($1,000 per small firm)

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Costs: NMP Prohibition

- Costs include costs to manufacturers, processors and to users
- Changing products to remove NMP (chemical substitution in formulation, relabeling, and other changes) *(applies to manufacturers, processors)* + downstream notification about prohibited uses *(applies to manufacturers, processors, distributors)*
  - 6 manufacturers, 14 formulators
  - First-year costs: $316,000, or annualized cost: $20,000 (over 20 years)
- Costs associated with switching to substitutes *(commercial users)*
  - Materials replacement *(commercial users)*
    - Commercial costs: $728,000 annually (Cost of switching to an alternative chemical paint remover)
    - Depending on the job, the time needed could increase or decrease. This is based on the type and number of coatings, surface prep, clean-up, dwell time, and other factors
  - Process change for substitutes *(commercial users)*
    - For some firms this is expected to be minimal if they have experience with using alternative chemicals or paint removal methods.
    - Other firms will likely have a trial and error period until they find an alternative chemical or mechanical means that meets the needs of their work process.
  - Hazards of substitutes
    - Substitutes present some hazards, but generally less than NMP
- **Total cost (for all commercial users):**
  - **$728,000** + inconvenience and hazards of substitutes
  - First year monetized costs: $316,000

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Costs: NMP reformulations & PPE

- Costs include costs to manufacturers, processors and to users
- Changes to product formulation, relabeling, and other changes *(manufacturers, processors)* + downstream notification *(manufacturers, processors, distributors)*
  - 6 manufacturers, 14 formulators
  - First-year costs: $316,000, or annualized cost: $20,000 (over 20 years)
- Commercial users (total costs and for small businesses)
  - Total Annualized Cost: $4.7 million
  - Cost per employee of worker PPE (specialized gloves and respirator with APF 10 (includes device, fitting, training, etc))
  - Cost estimates:
    - Art Restoration & Conservation: $83,000 ($64,000 total first year cost) ($275 per small firm)
    - Automotive: $2,000 ($1,000 total first year cost) ($186 per small firm)
    - Furniture Refinishing: $840,000 ($720,000 total first year cost) ($543 per small firm)
    - Bathtub Refinishing: $0 (NMP is not used on bathtubs)
    - Professional Contractors: $2,437,000 ($1,900,000 total first year cost) ($913 per small firm)
    - Aircraft Repainting: $0 (NMP is not used on aircraft)
    - Ship Repainting: $0 (NMP is not used on marine craft)
    - Graffiti Removal: $1,306,000 ($867,000 total first year cost) ($608 per small firm)

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Contact Information

- For paint removers rulemaking:
  - Niva Kramek, 202-564-2897, kramek.niva@epa.gov
  - Joel Wolf, 202-564-0432, wolf.joel@epa.gov
- For SBAR:
  - Nathaniel Jutras, RFA/SBREFA staff contact
    EPA Office of Policy
    202-564-0301
    Jutras.Nathaniel@epa.gov
- All Work Plan Chemical risk assessments: http://www.epa.gov/assessing-and-managing-chemicals-under-tsca/assessments-tsca-work-plan-chemicals

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Regulatory History and International Action

APPENDIX

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Regulatory History of Methylene Chloride at EPA

- Waste:
  - Listed as toxic (non-acute) hazardous waste under the Resource Conservation and Recovery Act.
  - Listed on the Toxics Release Inventory.
- Air:
  - Listed as a hazardous air pollutant (HAP) from several different emission sources.
  - 2008: Source rule for paint stripping & misc. surface coating operation established standards for using methylene chloride to remove dried paint; implemented management practices to minimize emissions.
  - 1995: NESHAP for large aerospace paint removal operations; updated 2015.
- Water:
  - 2010: Maximum Contaminant Level set under the Safe Drinking Water Act at 5 ppb.

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Regulatory History of NMP at EPA

- Listed on the Toxics Release Inventory.
- Listed under Clean Air Act Section 111: Standards of Performance for New Stationary Sources of Air Pollutants – Equipment Leaks Chemical List.
- Approved for use as a pesticide inert ingredient (food & nonfood uses).

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Methylene Chloride: Other Agencies

- Occupational Safety and Health Administration (OSHA)
  - 2000: Facilities using methylene chloride must use vapor control equipment. When using methylene chloride off-site (e.g. home renovations), air tests, improved ventilation engineered controls, and personal protective equipment (including full-face atmosphere-supplying respirators) must be used.
  - 1997: A lower Permissible Exposure Limit (PEL) was set in 1997 for paint removal in furniture operations (from 500 ppm to 25 ppm).
- National Institutes for Occupational Safety and Health (NIOSH)
  - 2013: Issued a hazard alert for methylene chloride bathtub refinishing use, highlighting the fatalities caused by this specific application.
  - 2000: Listed methylene chloride as a potential carcinogen.
- Consumer Product Safety Commission (CPSC)
  - 2013: Public fact sheet on paint strippers highlighting risks of methylene chloride.
  - 1988: Warning labels required on all products containing more than one percent methylene chloride. The cautionary labeling requirements note potential cancer hazard, factors that contribute to risk, and safeguards such as using the product in a well-ventilated area. Personal protective equipment (PPE) information is not listed.
- Food and Drug Administration (FDA)
  - 1989: Banned methylene chloride as an ingredient in all cosmetic products; had been used in aerosol cosmetic products such as hairspray.
- Housing and Urban Development (HUD)
  - Hazardous chemicals (including methylene chloride) prohibited from use for lead paint removal in enclosed spaces.

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NMP: Other Agencies

- OSHA: No PEL established
  - California: State PEL of 1 ppm
- CPSC: Public fact sheet about paint strippers, including hazards of NMP and recommendations for personal protective equipment (created in 2013; updated in 2015)

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Sample of State Regulations

State	Methylene Chloride	NMP
Alaska	Listed as a carcinogenic hazardous substance	
California	Listed by Proposition 65; listed as an informational candidate under CA's Safer Consumer Products regulations; designated chemical for biomonitoring.	Listed by Proposition 65; PEL at 1 ppm in an 8-hr TWA; requires employees to wear appropriate gloves; listed as an informational candidate under CA's Safer Consumer Products regulations.
Florida	Listed as a liver carcinogen.	
Indiana, Iowa, South Carolina	Established detection monitoring regulations.	
Minnesota	Chemical of high concern	Chemical of high concern
New Hampshire		Toxic air pollutant
New Jersey		Hazardous substance
Pennsylvania	Listed as 'environmental' and 'special' hazard (for carcinogenicity).	Hazardous substance
Vermont		Air pollutant
Washington	Chemical of high concern under Children's Safe Products Act; regulated to minimize occupational exposure	Chemical of high concern under Children's Safe Products Act

Sample of International Regulations & Classifications

State	Methylene Chloride	NMP
EU	2010: Incorporated restrictions for use in paint strippers. Banned from use in concentrations greater than **0.1%** in products for consumers / professionals unless professionals are appropriately licensed and trained. 2012: Industrial operations must have appropriate ventilation, evaporation minimization, training, PPE May be some exceptions to these restrictions in certain countries (like UK). Will be considered Carcinogen 2 under REACH	Candidate list of substances of very high concern for authorization in the EU. Proposed for restrictions under REACH on concentrations higher than 0.3%. Ongoing discussions.
Canada	2003: published code of practice to reduce methylene chloride emissions from paint strippers in commercial operations. 1999: Required pollution prevention plans for all persons using methylene chloride in several activities (including aircraft paint stripping).	High priority chemical to be addressed under CMP3, post-2016.
Australia		Subject of Tier II health risk assessment; subject to labeling and related requirements.
IARC	Will be considered a probable human carcinogen	

March 2, 2016

TSCA Section 6 Proposed Rule: Paint Removers

Pre-Panel Outreach SER Questions for Discussion

These are informal questions that aim to guide discussion on your work practices and your experiences with these chemicals. We are not seeking a structured response on each question; rather, we are interested in any feedback or details you can provide, and hope that these questions let you know what type of information would be most useful as we consider advice from the small entity representatives.

If you are interested in providing this or other information in writing, please see the contact information at the end.

<u>For manufacturers, processors, product formulators, and distributors:</u>

1) General questions related to paint removal:
    a. Who are your customers? (large businesses, small businesses, consumers, retailers)
    b. What are your products used for (specific substrates, specific coatings)?
    c. Do your customers tend to look for specific chemicals in paint removers, or do they prefer use brand names or product names?
    d. Do you sell other devices related to paint removal (such as sanders, blasters, personal protective equipment)?
2) Methylene chloride and NMP in your business:
    a. What percent of your business is paint removers?
        i. Of that, what percent contain methylene chloride?
        ii. Of that, what percent contain NMP?
    b. Have you had any worker incidents, accidents, or complaints related to paint removers containing these chemicals? If yes, can you elaborate or provide some examples?
    c. Do you sell paint removers containing alternative chemicals to methylene chloride & NMP?
        i. What feedback have you received from your customers about them?
        ii. Specifically, have customers said anything related to effectiveness, wait time for paint removal, or impacts on the substrate?
    d. What are the current and best practices in your company to reduce environmental releases of processing methylene chloride?
        i. How do you manage emissions and waste disposal?
3) General questions related to proposed regulatory options:
    a. How frequently do you reformulate your products?
    b. Are the cost estimates for reformulation accurate?
    c. How long does the reformulation process typically take?
    d. Can you think of ways to add flexibility to this rulemaking for your small business?

For all users of paint removers (all industries):

4) Current work practices related to paint removal:
    a. How often do you conduct paint or coating removal? (daily, weekly, etc)
        i. Do you typically use chemical or mechanical means to remove paint? (sanding, heat gun, blasting, other)?
        ii. What factors into your decision whether to use chemical or mechanical methods of paint removal?
    b. How significant is paint or coating removal to your business overall?
    c. Coatings:
        i. What type of coatings do you most frequently remove?
        ii. How many layers of coating do you most frequently remove?
        iii. Do any particular coatings or substrates present special challenges for removal?
    d. How does the time to remove paint vary by method or chemical used?
    e. Do you tend to look for specific chemicals in your paint removers, or do you prefer to look for brand names or product names?
        i. How do you know which chemicals are in the products you are using?
        ii. What are trusted sources of information for you about products or chemicals used in your business?
    f. What do you feel is the most important factor in paint removal: client preference, dwell time, ease of removing the coating, impact on the substrate, price of materials, worker safety, total job time, or other factors?
5) Using methylene chloride or NMP in your business:
    a. How is methylene chloride or NMP currently used in your business?
        i. How often do you use methylene chloride? In what context?
        ii. How much methylene chloride does your business use in a typical year?
        iii. How often do you use NMP? In what context?
        iv. How much NMP does your business use in a typical year?
        v. Do you use NMP as a substitute for methylene chloride?
        vi. What quantities do you purchase? (gallon containers, 55-gallon drums, etc.) Would a requirement to purchase material in a 55-gallon drum significantly affect your business?
        vii. Where/how do you purchase these products (distributor/direct sales, store, etc)?
        viii. How much do product labels (particularly hazard labels on products) inform your use of the paint remover?
    b. If paint removers containing methylene chloride or NMP were not available, what would the impacts be on your business?
    c. What are the benefits to your business of using methylene chloride or NMP?
    d. What are the challenges to your business of using methylene chloride or NMP?
    e. We have heard that many businesses involved in repainting or refinishing aircraft, marinecraft, bathtubs, and cars are moving away from using methylene chloride in paint removal. In your experience, is this correct?
6) Exposure reduction for workers
    a. What are your experiences with:

i. Installing or updating ventilation and local exhaust
ii. Installing or operating other engineering controls
iii. Equipment changes to reduce exposures
iv. Monitoring worker exposures to chemicals in the air
v. Air-supplied respirators
vi. Specialized gloves (such as Silver Shield)
vii. Other personal protective equipment
viii. Worker training to reduce exposures

b. If you have changed or updated your exposure reduction technology or methods, how long did that process take?
c. What do you do to comply with OSHA standards for methylene chloride?
d. What do you currently do to reduce environmental releases of methylene chloride? How do you manage emissions and waste disposal?
e. Have you had any worker incidents, accidents, or complaints related to paint removal?
    i. Do you have concerns about worker exposure to methylene chloride?
    ii. What do you do to address worker risks or concerns for chemical exposures, and specifically for methylene chloride?
f. Have you received any customer feedback about methylene chloride use?
g. Do you have concerns about worker exposure to NMP?
    i. What do you do to address worker risks or concerns for chemical exposures, and specifically for NMP?
h. Have you received any customer feedback about NMP use?

7) Substitutes and alternatives:
    a. What alternative chemicals or methods have you tried, and what are the results?
    b. What is the impact of dwell time for any substitutes, and are there any workarounds?
    c. How do you learn about new chemicals, products, or methods for paint removal? (sales representative or materials, trade press, other?)
    d. If you have tried or switched to alternative chemicals or methods, how long did that process take?
    e. What resources or tools does you need to move to adopting alternatives to methylene chloride and NMP?
    f. Chemical replacement:
        i. What is important to you when considering chemical replacement or process change? (ease of use, flammability, efficacy, speed, price, other)
        ii. Have you replaced chemicals, products, or processes in the past?
8) Regulatory options
    a. Which of the regulatory options presented today would you recommend?
    b. Cost estimates: In your experience, are the cost estimates accurate for both options presented?
    c. Can you think of ways to add flexibility to this rulemaking for your small business?
    d. How do you learn about EPA regulations and what you should do to comply?
    e. What is the best way to reach out to members of your industry?

Additional questions for paint remover users conducting renovations in residences, hotels, etc.:

1) General questions:
    a. Who are your customers? (Individuals, hotels, apartment building owners, property managers, non-residential building owners, others)
    b. How much do client preferences determine how paint is removed?

2) Bystander exclusion:
    a. To what extent is paint removal conducted when few non workers are in the building?
    b. Do you follow different work practices depending on whether a building is entirely vacant or if occupants are present during the renovation or at other times of the day?
    c. What would the impact to your business be if residents or non-workers needed to leave the building for 24 hours after work was completed? How would clients react? Do they leave the building already?

Additional questions for furniture refinishers:

1) General questions:
    a. What is the physical size of your business?
        i. What is the square footage of the area in which paint removal is conducted?
        ii. What else occurs in that area? (furniture repair, reupholstery, painting, administrative work, other)
    b. How much do client preferences determine how paint or coatings are removed?
2) Risk reduction:
    a. Do you have a ventilation system installed? If not, would it be feasible for you to install one?
    b. Do you have a way to isolate the paint removal area from other types of work?
    c. Do you have experience in air monitoring?
        i. For what chemicals?
        ii. At what levels?
    d. Do you have experience with workers using personal protective equipment such as air-supplied respirators?

Contact information:

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EPA Office of Policy
202-564-0301
Jutras.Nathaniel@epa.gov

Appendix A: List of Materials EPA shared with Small Entity Representatives

Appendix A2. Materials EPA shared with SERs before the Panel Meeting, June 15, 2016

- Agenda for Panel Outreach meeting, June 15, 2016
- Power Point Presentation: Small Business Advocacy Review Panel Process Recap, June 15, 2016
- Power Point Presentation: Rulemaking for Methylene Chloride and N-Methylpyrrolidone (NMP) under the Toxic Substances Control Act (TSCA), June 15, 2016
- Panel questions for Small Entity Representatives (SERs)
- Regulatory history and international actions for Methylene Chloride and N-Methylpyrrolidone (NMP)
- Additional Cost Information
- Additional Information on the Efficacy of Alternative Paint Removers
- U.S. Department of Labor Letter to EPA in Support of Rulemaking
- Articles on Methylene Chloride in Paint Removers
- List of Alternative Paint Removal Products
- OSHA Assigned Protection Factors for the Revised Respiratory Standard

EPA's SBAR Panel Outreach Meeting with
Small Entity Representatives for
Proposed Rulemaking for N-Methylpyrrolidone and Methylene Chloride in Paint Removers under TSCA Section 6(a)

Wednesday, June 15, 2016
1:30 pm – 4:00 pm, Eastern time zone

1:30 **Welcome and Introductions** (Office of Policy)

1:45 **SBAR Panel Process Overview** (Office of Policy)

1:55 **Presentation on Rulemaking for N-Methylpyrrolidone and Methylene Chloride in Paint Removers under TSCA Section 6(a)** (Office of Chemical Safety and Pollution Prevention)

2:50 **Questions and Discussion** (All participants)

3:50 **Summary and Closing** (Office of Policy)

An Overview of the Small Business Advocacy Review Panel Process

William Nickerson, Acting Small Business Advocacy Review Chair (SBAC) Panel Outreach Meeting, June 15, 2016

Office of the Administrator
Office of Policy
Office of Regulatory Policy and Management
http://www.epa.gov/op/orpm.html

Today's Topics

- What is a Small Business Advocacy Review (SBAR) Panel?
- Your role as a Small Entity Representative (SER)
- The difference between an SBAR Panel and a proposed regulation

2

What is an SBAR Panel?

- A Panel consists of representatives from the:
  - Agency authoring the regulation (i.e., EPA)
  - OMB's Office of Information and Regulatory Affairs (OIRA)
  - SBA's Office of Advocacy
- The Regulatory Flexibility Act (RFA) instructs the Panel to:
  - Review "any material the agency has prepared" related to the development of the regulation
  - Collect advice and recommendations from SERs
  - Prepare a report within 60 days of the Panel convening

See Title 5, section 609(b)(3)-(5), of the *United States Code* (USC). This is also known as section 609(b)(3)-(5) of the Regulatory Flexibility Act (RFA).

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What is an SBAR Panel? (cont'd.)

- The types of materials the Panel will review and on which you, the SERs, will provide advice and recommendations are specified by law
- Section 609(b)(4) of the RFA states that "the panel shall review any material the agency has prepared…on issues related to":
  - "a description of and, where feasible, an estimate of the number of small entities to which the proposed rule will apply" (Sec. 603(b)(3))
  - "a description of the projected reporting, recordkeeping and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for preparation of the report or record" (Sec. 603(b)(4))
  - "an identification, to the extent practicable, of all relevant Federal rules which may duplicate, overlap or conflict with the proposed rule" (Sec. 603(b)(5))
  - "a description of any significant alternatives to the proposed rule which accomplish the stated objective of applicable statutes and which minimize any significant economic impact …on small entities" (Sec. 603(c))

4

Your role as a SER

- EPA values this SBAR Panel process because it provides us with important small entity perspectives and information
- Your verbal and written input is considered and valued by the Panel as the Panel develops the Panel report
- Copies of your written comments will be appended to the Panel Report and a chapter in the Panel report will summarize them.
- The Panel will consider the comments you provide to us, but the findings that ultimately appear in the report are those of the Panel members: EPA, OMB, and SBA
- The Administrator will carefully consider the input we gather from the SERs and the Panel members, but is not legally bound to adopt the recommendations of the Panel

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The difference between an SBAR Panel and a proposed regulation

- SBAR Panel
  - Reviews materials related to:
    - the impacts of the regulation on small entities
    - Federal rules which may intersect with this proposed regulation
    - Alternatives to the regulation that may minimize small entity impacts
  - EPA uses the Panel report to inform our decision-making about the forthcoming proposed regulation
- Proposed regulation
  - Fully formed regulatory proposal or set of regulatory alternatives
  - You will have an opportunity to comment on the proposal, just like any other public citizen

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Thank You

- Participation is voluntary and we appreciate the time and energy you put towards this rulemaking.
- Thank you - we know it is, and has been, an intense resource commitment.
- Contact my staff:
  - Nathaniel Jutras, RFA/SBREFA staff contact
    EPA Office of Policy
    202-564-0301
    Jutras.Nathaniel@epa.gov
  - Lanelle Wiggins, RFA/SBREFA Team Leader
    EPA Office of Policy
    202-566-2372
    Wiggins.Lanelle@epa.gov

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Rulemaking for Methylene Chloride and N-Methylpyrrolidone (NMP) under the Toxic Substances Control Act (TSCA)

Panel Outreach

June 15, 2016

1

Today's Discussion

- Background:
  - Consultation with Small Entity Representatives
  - TSCA Work Plan for Chemical Assessments
- Methylene Chloride and N-methylpyrrolidone (NMP)
- Toxic Substances Control Act (TSCA) Section 6(a)
  - Background
  - Developing the Regulations
- Affected entities and potential compliance costs
- Contact information
- Appendices

2

Background: Consultation with Small Entity Representatives

- EPA is interested in not only information, but also advice and recommendations from the small entity representatives (SERs)
- EPA will use this information to develop a regulatory flexibility analysis, which becomes part of the record for the potential regulation
- Key elements in this analysis:
  - Number of small entities to which the potential rule would apply
  - Projected compliance requirements of the potential rule
  - Identification of all relevant Federal rules which may duplicate, overlap or conflict with the potential rule
  - Any significant alternatives to the potential rule which accomplish the stated objectives and which minimize significant economic impact of the potential rule on small entities

3

SERs and the Regulatory Process

- We are seeking information on how the options presented might impact your business or organization
  - Provide specific examples of impacts
  - Provide cost data, if available
  - Please see detailed questions in Appendix A
- We are also seeking alternative methods of regulating these risks
  - Suggest other relevant options, including data costs and information on how to ensure compliance
  - Suggest ways that small businesses could benefit from flexibilities, such as different compliance timetables, simplified reporting requirements, and exemptions
- We would like to minimize duplication
  - Provide information on any duplicative or contradictory Federal regulations you are aware of
  - For a list of existing regulations, please see Appendix B

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SERs and the Regulatory Process

- On March 17, 2016, EPA held a pre-panel meeting with SERs to discuss the rulemaking process and how the regulatory options may impact their businesses
- In response to your comments, we:
  - Provided requested follow-up information
  - Have added clarifying information to this presentation and additional information in the appendices
  - Have added your feedback to this presentation

5

Background: TSCA Work Plan for Chemical Assessments

- EPA has identified a subset of existing chemicals as a high priority for risk assessment
- 2012-2013:
  - With input from stakeholders, EPA identified a subset of chemicals for assessment, known as the TSCA Work Plan, and described the methodology for how they were prioritized
  - Performed problem formulation for five Work Plan chemicals, developed draft risk assessments for peer review, and released them for public comment.

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Background: TSCA Work Plan for Chemical Assessments

- 2014-2015:
  - Released first final risk assessments (TCE, methylene chloride, NMP, antimony trioxide, HHCB)
    - No risks found for uses assessed for antimony trioxide and HHCB.
    - Risks found for uses assessed for TCE, methylene chloride, and NMP. Risk management process began.
  - Refreshed Work Plan with updated exposure information; currently contains 90 chemicals
- 2015-2016:
  - Problem formulation and data needs assessment issued for several flame retardant clusters
  - Problem formulation issued for 1,4-Dioxane
  - Draft risk assessment for 1-bromopropane released for public comment

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Overview: Methylene Chloride and NMP

- EPA assessed Methylene Chloride and NMP paint removal uses as part of the TSCA Work Plan for Chemical Assessments.
- Methylene Chloride
  - Volatile, colorless liquid, non-flammable, non-explosive, non-corrosive, inexpensive.
  - Used frequently as a solvent; also in adhesives, metal cleaning, chemical processing, pharmaceuticals.
  - 25% of methylene chloride in the US used in paint removers (66.3 million lbs annually), down from 50% in 1980s.
- NMP
  - Mildly volatile, colorless liquid, low flammability, non-explosive.
  - Used frequently as a solvent; also in adhesives, leather and brush cleaners, manufacturing of circuit boards, pesticides, petrochemical processing.
  - 9% of NMP in the US used in paint removers (16.6 million lbs annually).
  - Frequently an alternative to methylene chloride paint removers.

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	Methylene Chloride Key Information	NMP Key Information
Notes on Use	Used for decades; nonflammable; works quickly Cause of death for ~1 worker/year during bathtub refinishing + suspected additional deaths during other paint removal jobs (see Appendix F) Inhalation exposure; extremely volatile	Marketed as safer & greener than methylene chloride Works more slowly Exposure is primarily dermal, but also via inhalation
Manufacturers & Users	2 manufacturers, 7 product formulators 5,000 workers in graffiti removal & other outdoor uses 8,000 workers as home contractors (including 1,300 bathtub refinishers) 32,000 workers in commercial/industrial facilities 2.4 million consumer users	6 manufacturers, 14 product formulators 46,000 workers in graffiti removal & other outdoor uses 7,000 workers as home contractors 1,400 workers in commercial/industrial facilities 1.4 million consumer users
Health Effects and Risks of Concern	Acute effects: Neurotoxicity - confusion, incapacitation, and death Chronic effects: Cancer and liver toxicity Inhalation exposures are 2-3 orders of magnitude from target benchmarks Risks for bystanders due to inhalation exposures	Concern is for women of child-bearing age High dose acute effects: Fetal death Lower dose chronic effects (developing fetus): Low birthweight, delayed ossification, growth retardation.
Substitutes	Alternative processes (Heat guns, mechanical sanding, hydroblasting, media blasting (starch, soda, etc.)) Chemical substitutes (Benzyl alcohol, dibasic esters, acetone-toluene-methanol formulations, caustics) Generally, hazards of substitutes are of less concern (See Appendix D)	
Notable Regulations	OSHA PEL 25 ppm Banned for graffiti use in 12 states Listed under California Safer Consumer Products regulation Prohibited for residential & consumer use in the EU	No OSHA PEL California PEL 1 ppm + gloves On the EU candidate list of substances of very high concern

Risk Assessment: Methylene Chloride

- Final TSCA Work Plan Chemical Risk Assessment: August 2014
  - Followed Agency peer review process of publishing a public draft, peer review, and response to peer review and public comment
- Risk assessment identified inhalation risks from paint removers containing methylene chloride:
  - Chronic exposure effects: cancer and liver toxicity
  - Acute exposure effects: Neurotoxicity - confusion, incapacitation, and death
  - Risks from chronic (lifetime) exposure in majority of scenarios except when personal protective equipment (respirator) is worn in low exposure scenarios.
  - Risks from acute high-end exposure (small, enclosed room with poor ventilation, such as a bathroom).
  - Risks to non-users (bystanders and adjacent workers) except in lowest exposure scenarios.
- See: http://www.epa.gov/assessing-and-managing-chemicals-under-tsca/assessments-tsca-work-plan-chemicals#dcm

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Risk Assessment: Methylene Chloride

- Risks were identified for most worker and consumer exposure scenarios.
- For **non-cancer risks** a **margin of exposure** (MOE) method was used to determine the presence or absence of risk for both acute and chronic exposure scenarios.
  - The benchmark MOE used in the methylene chloride risk assessment is 10.
    - This benchmark constitutes 3x residual uncertainty in extrapolating from animals and 3X residual uncertainty for variability in humans
  - People exposed are considered to be at risk when MOEs are below the benchmark MOE of 10.
  - MOEs and risks calculations for non-cancer effects are explained on the next slide
- For **cancer risks**, the inhalation unit risk (IUR) was used to estimate excess cancer risks for inhalation occupational exposure scenarios.
  - The excess cancer risk is the product of the exposure concentration and the IUR
  - Protecting against non-cancer risks protects against these cancer risks
  - Risk calculations for cancer are explained on the next slide

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Risk Calculation (Non-Cancer)

Non-Cancer MOE compared to benchmark MOE (uncertainty factors, or UFs)

$$\text{MOE (acute or chronic)} = \frac{\text{Non-Cancer Hazard Value (Point of Departure)}}{\text{Human Exposure (ppm)}}$$

Where: Hazard Value

POD = Human equivalent dose (ppm)

MOE = Margin of exposure (unitless)

- **The lower the exposure the higher the MOE.**
- **The *lower* the calculated MOE value, the *higher* the risk**
- **Cause for concern increases the lower the scenario's risk value (MOE) is below the benchmark MOE**

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Risk Calculation (Cancer)

Cancer

Risk = Human Exposure X IUR

Where:

- Risk = Cancer risk (unitless)
- Human exposure = Exposure estimate (LADC in ppm) from occupational exposure assessment
- IUR = inhalation unit risk (a x 10* ppm)

*** The *higher* the calculated risk value, the higher the risk**

*** Cause for concern increases the more the scenario's cancer risk value is above the cancer benchmark**

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Methylene Chloride Exposure Estimates

- SERs mentioned that they feel that their workplace exposures to methylene chloride are a shorter duration that what is described in the risk assessment
- The risk assessment describes various scenarios using an 8-hour time weighted average approach
  - Estimates consider each industry/activity separately to represent the best estimate of exposures during an 8-hour work shift from activities specific to that industry/scenario, **even if workers are using the chemical for less than 8 hours**
  - Air concentrations were identified for each industry/activity from literature sources and these data were normalized to an 8-hour time weighted average (8-hr TWA)

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Risk Estimates: Methylene Chloride

Industry	Benchmark MOE (acute & chronic)	MOE acute exposure	MOE chronic exposure, non-cancer	Cancer estimate
Professional Contractors	10	**0.015**	**0.050**	**1.9 in 1,000**
Automotive Refinishing	10	**0.11**	**0.34**	**2.9 in 10,000**
Furniture Refinishing	10	**0.035**	**0.13**	**7.7 in 10,000**
Aircraft Paint Stripping	10	**0.012**	**0.039**	**2.5 in 1,000**
Graffiti Removal	10	**0.037**	**0.16**	**6.3 in 10,000**
Other workplace settings (immersion stripping)	10	**0.0063**	**0.021**	**4.6 in 1,000**

The lower this number is below 10, the greater the risk (numbers above 10 indicate no non-cancer risks of concern)

The larger this number is, the greater the risk

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Acceptable Exposure Limit (AEL): Methylene chloride

Existing chemical acceptable exposure limit (AEL) is:

- Derived from the lowest risk estimate and appropriate UF to provide margin of safety
- Calculated for acute and chronic exposures and non-cancer and cancer effects
- Selected to be protective of all risks (for methylene chloride this is based on cancer risk)

Non-cancer

$$\text{AEL}_{non-cancer\ 8\text{hrTWA}} = \frac{POD(acute\ or\ chronic)}{MOE_{benchmark}(acute\ or\ chronic)} * Duration\ Adjustment$$

$\text{AEL}_{\text{non-cancer 8 hr TWA}}$ for acute exposures = 1.3 ppm
$\text{AEL}_{\text{non-cancer 8 hr TWA}}$ for chronic exposures = 2 ppm

Cancer

$$\text{AEL}_{cancer\ 8\text{hrTWA}} = \frac{Cancer\ benchmark(10^{-6})}{IUR} * \frac{Lifetime(24hrs\ X\ 365days\ X\ 70\ yrs)}{Working\ Career(8hrsX\ 250days\ X\ 40\ yrs)} = \mathbf{0.2\ ppm}$$

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Exposure Estimates: Methylene Chloride

Industry	Acceptable exposure limit (8 hr TWA, ppm)	Acute high-end estimated exposure (8 hr TWA, ppm)	Chronic high-end estimated exposure (8 hr TWA ppm)
Professional Contractors	**0.2**	858	431
Automotive Refinishing	**0.2**	120	64
Furniture Refinishing	**0.2**	364	169
Aircraft Paint Stripping	**0.2**	1,095	551
Graffiti Removal	**0.2**	342	139
Other workplace settings (immersion stripping)	**0.2**	2,015	1009

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Risk Assessment: NMP

- NMP is often marketed as a "safer" alternative to Methylene Chloride
- Final TSCA Work Plan Chemical Risk Assessment: March 2015
  - Followed Agency peer review process of publishing a public draft, peer review, and response to peer review and public comment
- Risk assessment identified dermal (liquid or vapor through skin) and inhalation exposure risks from the use of paint removers containing NMP:
  - Developmental effects (acute: fetal mortality; chronic: reduced fetal body weight). Concern is for women of child-bearing age.
  - Chronic exposure risks if used:
    - More than 8 hours per day for more than 5 consecutive days, even if specialized protective gloves are worn
    - More than 4 hours per day, for more than 5 consecutive days, if specialized protective gloves are not worn
  - Acute exposure risks if used:
    - More than 8 hours on a single day, even if specialized protective gloves are worn
    - More than 4 hours on a single day, if specialized protective gloves are not worn
  - No risks to bystanders
- See http://www.epa.gov/assessing-and-managing-chemicals-under-tsca/assessments-tsca-work-plan-chemicals#completed

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Risk Assessment: NMP

- Risks were identified for a number of worker and consumer exposure scenarios.
  - No risks identified for workers or residents who may be located nearby those that are working with NMP-based paint removers.
- To determine the presence or absence of non-cancer risks for both **acute and chronic exposures**, the **margin of exposure** (MOE) method was used to evaluate the risk
  - The benchmark MOE used for the NMP risk assessment is 30.
    - This benchmark constitutes 3x residual uncertainty in extrapolating from animals and 10X residual uncertainty for variability in humans
  - All users exposed are considered to be at risk when MOEs are below the benchmark MOE of 30.
  - See earlier slide for an explanation of MOEs and risks calculations for non-cancer effects

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Risk Estimates: NMP

Scenario (covers several industries, assumes no gloves used)	Benchmark MOE (acute & chronic exposure)	MOE– acute exposure	MOE chronic exposure, non-cancer effects
Miscellaneous stripping Assumed mostly indoor, high end of range 1.0 weight fraction 890 cm² skin surface area, 8 hours	30	**0.7**	**0.1**
Graffiti removal Assumed mostly outdoor but may include semi-confined spaces, high end of range 1.0 Weight fraction 890 cm² Skin surface area, 8 hours	30	**0.7**	**0.1**
Miscellaneous stripping Assumed mostly indoor, mid end of range 0.625 weight fraction, 668 cm² skin surface area, 4 hours	30	**13.7**	**5.4**
Graffiti removal Assumed mostly outdoor but may include semi-confined spaces, mid end of range 0.625 weight fraction, 668 cm² skin surface area, 4 hours	30	**14.1**	**6.1**

The lower these numbers are from 30, the greater the risk (numbers above 30 indicate no risks of concern)

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Acceptable Exposure Limit (AEL): NMP

Existing chemical AEL is:

- Derived from the lowest risk estimate and appropriate UF to provide margin of safety
- Calculated for acute and chronic exposures
- Selected to be protective of all risks. (For NMP this is based on chronic exposures)

$$\mathrm{AEL}_{non-cancer\ 8\mathrm{hrTWA}} = \frac{POD(acute\ or\ chronic)}{MOE_{benchmark}(acute\ or\ chronic)} * Duration\ Adjustment$$

$\mathrm{AEL}_{\text{non-cancer 8 hr TWA}}$ for chronic exposures = 1 ppm

- Assuming:
  - Use no more than 8 hours/day
  - Specialized protective gloves are worn

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From Risk Assessment to Risk Reduction

Risks identified

- Methylene chloride and NMP found to pose risks when used in typical commercial and consumer scenarios

Risk reduction needed

- Methylene chloride: Exposures are 100 to 1,000 times greater than acceptable exposure levels
- NMP: Exposures are 5 – 10 times greater than acceptable exposure levels

Approach chosen

- Regulation under TSCA Section 6(a) is the approach most likely to reduce risks to workers and consumers

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Background: TSCA Section 6(a)

- Provides EPA with the authority to prohibit or limit the manufacture, processing, distribution in commerce, use or disposal of a chemical or mixture.
- EPA must make certain findings before a section 6(a) rule may be finalized:
  - There is a reasonable basis to conclude that a chemical substance or mixture "presents or will present an unreasonable risk of injury to health or the environment."
  - The regulatory option chosen is the least burdensome option that adequately protects against such risk.

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Options Under TSCA Section 6(a)

- Prohibit or limit manufacture, processing or distribution in commerce.
- Prohibit or limit for particular use or above a set concentration.
- Require warnings and instructions.
- Require recordkeeping and testing.
- Prohibit or regulate manner or method of commercial use.
- Prohibit or regulate manner or method of disposal.
- Direct manufacturers/processors to give notice of risk to distributers and users and replace or repurchase.

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EPA's Authority to Regulate Occupational Risks

- SERs were interested in more information about EPA's authority to regulate occupational hazards and risks, compared to OSHA
- OSHA authority extends only to private sector employers
  - Public sector employees conducting paint removal are not subject to OSHA
- TSCA restrictions are consistent with OSHA hierarchy of hazard control (eliminate/substitute hazard; engineering controls; best practices administrative controls; personal protective equipment)
- TSCA authority can address the risks form methylene chloride and NMP in paint removal that cut across worker, public sector and consumer settings
- EPA is working closely with OSHA; both agencies feel TSCA is the appropriate authority to address the risks that EPA has identified, including those that occur in workplaces
  - See letter of support from Department of Labor in Appendix E

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Uses Under Consideration

- Uses considered for regulation under TSCA Section 6(a) are commercial and consumer paint removers containing methylene chloride or NMP.
- Examples of small business uses:
  - Automotive, aircraft, and marine craft body paint, and interior repair and maintenance
  - Flooring contractors
  - Furniture repair and refinishing
  - Painting and wall covering contractors
  - Bathtub refinishing

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Potentially Impacted Sectors

- Ship building and repairing
- Aircraft manufacturing and repairing
- Museums
- Independent artists, writers, and performers
- Automotive body, paint, and interior repair and maintenance
- Flooring contractors
- Reupholster and furniture repair
- Painting and wall covering contractors
- Paint remover processors or formulators

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Developing Potential Regulatory Options

- Over the past year, EPA has identified regulatory options under Section 6(a) of TSCA that would provide adequate protection from the risks identified
- Stakeholders we've been working with:
  - Affected States and Tribes
  - Chemical manufacturers, product formulators, and their trade associations
  - Commercial paint remover users in various sectors
- Generally, alternatives are available and have been evaluated for use in several industries (automotive, renovations/contracting/decorating, marine, graffiti removal, and aircraft)
  - As SERs and other stakeholders have reported, alterative methods and chemical substitutes are already in use
  - See Appendices D and G for more information on substitutes

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Developing Potential Regulatory Options

- What we've heard, from stakeholders, from industry research, and from SERs in our last meeting:
  - Marinecraft:
    - Paint is generally not removed to the substrate; when needed, sand or soda blasting are used.
    - Chemical stripping requires consideration of disposal (heavily regulated near water).
  - Aircraft:
    - Use of methylene chloride is declining, particularly among large scale users, due to air regulations and other considerations.
    - Refinishing of small aircraft still use methylene chloride, though many now use benzyl alcohol formulations.
  - Renovations and contractors:
    - Many firms have stopped using methylene chloride due to worker safety concerns, potential for fatal accidents, odor (employee and client complaints), and specialized PPE, training, and waste disposal needed.
    - Some firms use MC only outdoors or with fans for ventilation
    - Alternatives identified tend to be mechanical methods or benzyl alcohol; alternatives can take longer than methylene chloride to complete a job.
    - Certain wood substrates can be damaged by mechanical methods and require chemical stripping.
  - Automotive (collision repair and autobody):
    - Chemical removers do not appear to be critical for this sector as industry reps reported large use of abrasives for paint removal.
  - Furniture refinishing:
    - Seem to exclusively use methylene chloride, with some attempts at alternatives containing acetone.
    - There are flammability concerns with substitutes given the prevalence of wood substrates.
    - Certain wood substrates can be damaged by mechanical methods and require chemical stripping.
  - Manufacturers:
    - Some SERs say that methylene chloride costs less than NMP or other paint removers.
    - Limiting sales of methylene chloride to 55-gal drums could be cost-prohibitive for small businesses.

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Substitute Chemicals and Alternative Methods

- EPA has learned about successful use of substitute chemicals and alternative methods for many types of paint and coating removal with methylene chloride or NMP
  - Chemical substitutes include: Benzyl alcohol, dibasic esters, acetone-toluene-methanol formulations, and caustics
  - Alternative processes include: Heat guns, mechanical sanding, hydroblasting, media blasting (starch, soda, etc)
- Generally, hazards of substitute chemicals or alternative methods are of less concern
- Information on successful substitutes was obtained from public reports, presentations at conferences, industry research and ongoing discussions with stakeholders
- See Appendices D and G for more information on substitutes

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Analyzing Potential Regulatory Options for Methylene Chloride

- From over 50 options analyzed, the two options presented today would provide risk reduction to target benchmarks
- Other options that EPA considered **do not** reduce exposure to benchmark risk levels

Option	Why it does not provide sufficient risk reduction
Limiting concentration of methylene chloride in a formulation	Even when reduced to 5% concentration, for typical work scenarios (>4 hours), workers would be at acute risk
Prohibiting certain formulations (such as spray) to reduce inhalation exposure	Most acute and cancer risk would remain.
Requiring local exhaust or other ventilation (without personal protective equipment)	Alone, ventilation does not reduce exposures to benchmark risk levels.
Requiring PPE at APFs lower than 1,000 or 10,000 (methylene chloride only)	1) Only air-supplied respirators can effectively reduce exposures 2) Below APF 1,000, exposures are not reduced to benchmark risk levels.

Continued on next slide

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Analyzing Potential Regulatory Options for Methylene Chloride

Continued from previous slide

Option	Why it does not provide sufficient risk reduction
Requiring record keeping and testing	Alone, this does not provide protection from risks
Requiring labeling of products	The particular actions the label would need to require are not likely to be followed properly. The nature of the information the user would need to read, understand, and act upon is extremely complex. Rather than a simple message, the label would need to explain a variety of inter-related factors, including but not limited to the use of local exhaust ventilation, and respirators and assigned protection factor, as well as effects to bystanders. It is unlikely that label language changes will result in widespread, consistent, and successful adoption of risk reduction measures by users. For an example, see the Riley, et al. article referenced in Appendix F. As a result, exposures would not be reduced to benchmark risk levels.

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Potential Regulatory Options - Methylene Chloride

1. Regulatory Option #1: Prohibit manufacturing, distribution, and use of methylene chloride as a paint remover
2. Regulatory Option #2: Allow certain commercial uses with worker protections and other requirements to protect the public

- Worker protections: Personal protective equipment (PPE) or air exposure limit
  - PPE:
    - APF 1,000 would be in most scenarios, with APF 10,000 when immersion methods of paint removal are used. APF is the workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees.
    - A respiratory protection program includes training, medical monitoring, re-fitting, and other components of respirator protection programs
    - Workers nearby (occupational bystanders) would be required to wear respirators as well, or be excluded from the area
  - As an alternative, work places could meet an **air exposure limit** of 0.2 ppm
    - Potentially could use engineering controls such as ventilation to reduce the respirator APF needed
- Other requirements:
  - Downstream notification by manufacturers, processors, and distributors of the prohibitions for this use
  - Packaging of paint removers containing methylene chloride in volumes no less than 55-gallon drums
  - Bystanders (such as residents of homes) must stay out for up to 24 hours after work is completed

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Risk Reduction of Potential Regulatory Options - Methylene Chloride

Reg. Option #	Regulatory Option description	Risk Reduction as a Result
1	Prohibit manufacturing, distribution, and use of methylene chloride as a paint remover	Risks eliminated. This option provides complete risk reduction.
2	Allow certain commercial uses with worker protections (such as PPE) and other requirements to protect the public (such as bystander exclusion)	- Eliminates risks for bystanders (residents of homes, for example) because they are excluded from the area - Assuming that PPE is used as required for efficacy, this reduces risks to benchmarks for workers and for occupational bystanders (other workers). See additional details on next slides.

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Risk Reductions: Methylene Chloride PPE Option

(Regulatory Option #2)

Industry	Benchmark MOE (acute & chronic exposure)	APF 1,000 Risk estimate – acute	APF 1,000 Risk estimate – chronic non-cancer	APF 1,000 Cancer estimate
Professional Contractors	10	**15**	**50**	**1.9 in 1,000,000**
Automotive Refinishing	10	**110**	**337**	**2.9 in 10,000,000**
Furniture Refinishing	10	**35**	**128**	**7.7 in 10,000,000**
Aircraft Paint Stripping	10	**12**	**39**	**2.5 in 1,000,000**
Graffiti Removal	10	**37**	**156**	**6.3 in 10,000,000**
Other workplace settings (immersion stripping) *(APF 10,000 or 1,000 + ventilation)*	10	**63** *(APF 10,000)*	**215** *(APF 10,000)*	**4.6 in 10,000,000** *(APF 10,000)*

All these numbers are now above 10, indicating no non-cancer risks of concern

All these numbers now indicate no cancer risks of concern

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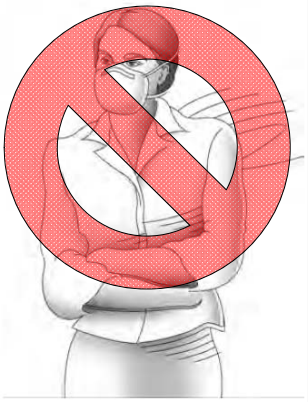
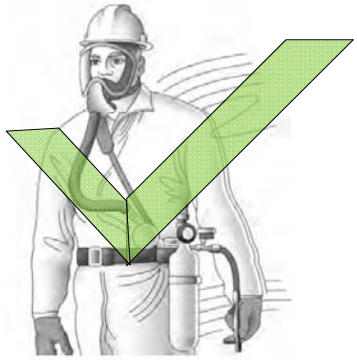
Examples of Air Supplied Respirators



Half mask/Dust mask
APF=10
Needs to be fit tested



Full Facepiece Supplied-Air Respirator (SAR) with an auxiliary Escape Bottle
APF=1,000
APF = 10,000 (if used in "escape" mode)
Needs to be fit tested

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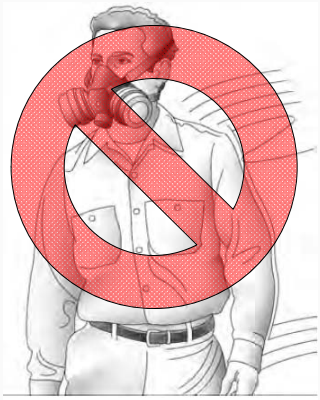
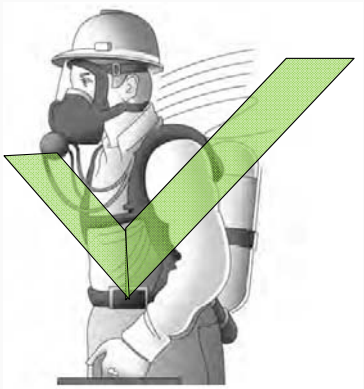
For more information, see Appendix H or https://www.osha.gov/Publications/3352-APF-respirators.pdf

Examples of Air Supplied Respirators



Half mask (Elastomeric)
APF=10
Needs to be fit tested



Full Facepiece Self-Contained Breathing Apparatus (SCBA)
Pressure demand mode is APF=10,000
Needs to be fit tested

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For more information, see Appendix H or https://www.osha.gov/Publications/3352-APF-respirators.pdf

Costs: Methylene Chloride Prohibition

(Regulatory Option #1)

- Costs include costs to manufacturers, processors and to commercial users
- Changing products to remove methylene chloride (chemical substitution in formulation, relabeling, and other changes) *(applies to manufacturers, processors)* + downstream notification about prohibited uses *(applies to manufacturers, processors, distributors)*
  - 2 manufacturers, 9 formulators
  - First-year costs: $260,000, or annualized cost: $17,000 (over 20 years)
- Costs associated with switching to substitutes *(commercial users)*
  - Process change
    - For some firms this is expected to be minimal if they have experience with using alternative chemicals or paint removal methods.
    - Other firms will likely have a trial and error period until they find an alternative chemical or mechanical means that meets the needs of their work process.
  - Hazards of substitutes
    - Substitutes present some hazards, but generally less than methylene chloride.
  - Job time when using substitutes *(all users)*. This is a cost or savings, depending on job specifics
    - Depending on the job, the time needed could increase or decrease. This is based on the type and number of coatings, surface prep, clean-up, dwell time, and other factors.
- **Total cost (for all commercial entities):**
  - **$17,000 per year** + qualitative inconvenience, hazards of substitutes, and increased time
  - First year monetized costs: $260,000

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Compliance Strategies: Methylene Chloride Prohibition

(Regulatory Option #1)

Sector	% Adopting Each Alternative											
	Benzyl alcohol	ATM	Other chemical strippers [a]	Caustic Strippers	DBE	Hand/ power sanding	Media blasting	Needle Gun/ Needle Scaler	Power Washing	Heat tools	Laser	Other [b]
Aircraft stripping	70%	0%	0%	0%	0%	0%	25%	0%	0%	0%	0%	5%
Bathtub refinishing	90%	0%	0%	0%	0%	10%	0%	0%	0%	0%	0%	0%
Professional contractors	10%	10%	0%	10%	10%	10%	10%	10%	10%	10%	10%	0%
Ship paint stripping	45%	0%	0%	0%	0%	45%	5%	0%	0%	5%	0%	0%
Graffiti removal	0%	0%	90%	0%	0%	0%	8%	0%	0%	0%	0%	2%
Consumer	23%	23%	0%	23%	23%	3%	0%	3%	3%	3%	0%	0%

Source: (IRTA, 2015).

a. This category includes a wide range of alternative chemical graffiti removers.

b. For Graffiti removal, "other" includes users who find they don't need to use graffiti removers or blasting systems and they would convert to other technologies. The dominant technology they would adopt would be painting over.

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Compliance Strategies: Methylene Chloride Prohibition

(Regulatory Option #1)

- EPA currently assumes there is a viable chemical or mechanical alternative for industry sectors with the exception of the furniture refinishing industry
  - We are seeking information to confirm or change these assumptions
- Current cost estimates show a cost **savings** per firm when switching from methylene chloride to an alternative paint remover method in some industry sectors (aircraft, marine craft, automotive, and art conservation)
  - On a per ounce basis, some chemical alternatives are less expensive (e.g. caustic, acetone-toluene-methanol mixtures) than methylene chloride, which generates cost savings when purchasing a cheaper alternative
  - In some situations, less of the alternative product is needed (compared with methylene chloride) for the same job (example: benzyl alcohol products) so even if this alternative is cheaper, less is purchased, resulting in an overall cost savings

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Costs: Methylene Chloride Prohibition

(Regulatory Option #1)

Industry Sector	Total Annualized Cost	Total Annualized Cost Savings	Cost Per Small Firm	Cost Savings Per Small Firm
Aircraft	-	$447,000	-	$307
Art Rest/Con	-	$65,000	-	$7
Automotive	-	$408,000	-	$122
Bathtub Refinishing	$747,000	-	$965	-
Furniture Refinishing	Currently unquantified	-	Currently unquantified	-
Graffiti Removal	$123,000	-	$497	-
Profess Con.	$2,400,000	-	$1,046	-
Marine Craft	-	$1,300,000	-	$1,430

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Costs: Methylene Chloride Prohibition

(Regulatory Option #1)

- Manufacturers: Are the cost estimates for reformulation accurate?
- Users:
  - What quantities do you purchase? (gallon containers, 55-gallon drums, etc.) Would a requirement to purchase material in a 55-gallon drum significantly affect your business?
  - If paint removers containing methylene chloride or NMP were not available, what would the impacts be on your business?
- SERs mentioned that EPA's estimate of material change costs is inaccurate, and that most substitute products are more expensive.
  - Can you provide any more detailed information about this?
  - For anyone who has switched to substitutes, what were the impacts on your bottom line?

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Costs: Questions for Furniture Refinishing Industry

- How significant is paint or coating removal to your business overall?
  - If you could no longer use methylene chloride to remove paint/coatings what percentage of your annual revenue would be lost?
  - Would you be forced to close your firm if methylene chloride was banned from being used in paint removers?
  - Would you still be able to perform other types of furniture restoration that does not involve the use of paint removers?
  - Could alternative chemical strippers or mechanical methods be used on a portion of the paint removing jobs you currently perform, if so, what percentage?

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Costs: Methylene Chloride PPE

(Regulatory Option #2)

- Costs include costs to manufacturers, processors and to users
- Downstream notification about prohibited uses *(manufacturers, processors, distributors)*
  - 2 manufacturers, 9 formulators
  - First-year costs: $2,000, or annualized cost: $60 (over 20 years)
- Commercial users (total costs and for small businesses)
  - Total Annualized Cost: $33.6 million
    - Cost per employee of worker PPE of air supplied respirator (APF 1,000 except for immersion stripping which requires APF 10,000)
      - Device & fitting costs included ($1,486 to $2,128 per worker, per year varies by APF)
      - PPE training costs included ($252 per worker, per year)
      - Medical monitoring costs included ($212 per worker, per year)
    - Other engineering, equipment changes, or LEV controls would be applicable under this option but are not included in the cost estimate due to lack of data
  - If work is performed in a residence, homeowners are not permitted in the home while work is performed and for a period of at least 24 hours after work is completed

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Costs: Methylene Chloride PPE

(Regulatory Option #2)

Industry Sector	Total Annualized Cost	Cost Per Small Firm
Aircraft	$289,000	$1,095
Art Restoration & Conservation	$94,000	$1,026
Automotive	$366,000	$1,020
Bathtub Refinishing	$1,591,000	$1,056
Furniture Refinishing	$11,930,000	$1,005
Graffiti Removal	$237,000	$1,000
Professional Contractors	$19,491,000	$1,013
Ship/marine Craft	$60,000	$1,091

Note: First Year Costs are in Appendix C

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Costs: Methylene Chloride PPE

(Regulatory Option #2)

- Do you have a ventilation system installed? If not, would it be feasible for you to install one?
- Do you have experience with workers using personal protective equipment such as air-supplied respirators?
- How much would ventilation and local exhaust systems cost for your workspace?
- What are your experiences with exposure reduction for workers? For example:
  - Installing or updating ventilation and local exhaust
  - Installing or operating other engineering controls
  - Equipment changes to reduce exposures
  - Monitoring worker exposures to chemicals in the air
  - Air-supplied respirators
  - Specialized gloves (such as Silver Shield)
  - Other personal protective equipment
  - Worker training to reduce exposures

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Analyzing Potential Regulatory Options for NMP

- From over 50 options analyzed, the two options presented today would provide risk reduction to target benchmarks
- Other options considered **do not** reduce exposure to benchmark risk levels

Option	Why it does not provide sufficient risk reduction
Limiting concentration of NMP in a formulation	Even when reduced to 25% concentration, for typical work scenarios (>4 hours), workers without PPE would be at acute risk
Prohibiting certain formulations (such as brush-on) to reduce dermal exposure	Most acute and chronic risk would remain
Requiring local exhaust or other ventilation (without personal protective equipment)	Alone, this would not be sufficient. Dermal protection (gloves) would be needed.
Requiring PPE (specialized gloves) and respirator (APF 10)	Alone, PPE is not enough to reduce risks for a full-workday exposure. Formulation changes would be needed.
Requiring record keeping and testing	Alone, this does not provide protection from risks
Requiring labeling of products	The particular actions the label would need to require are not likely to be followed properly. For an example, see the Riley, et al. article referenced in Appendix F. Alone, exposures would not be reduced to benchmark risk levels.

Potential Regulatory Options- NMP

1. Regulatory Option #1: Prohibit manufacturing, distribution, and use of NMP as a paint remover
2. Regulatory Option #2: Allow certain commercial use with worker protections and other restrictions to protect the public
   - Worker protections
     - Formulation requirements: No more than 25% NMP in paint remover products
       - Even when gloved, workers were found to be at risk when using high-concentration products for 8 hours
     - Gloves:
       - Formulators must test their formulated product to determine which gloves would be protective. Glove breakthrough varies, depending on which co-solvents are present.
       - Formulators must label their products and SDS with the information about gloves
       - Gloves may not be re-worn; must be replaced after each 8-hour shift (minimum)
     - Respiratory protection: In addition to gloves, respiratory protection would be required. This could be achieved by:
       - A respirator of APF 10 (worker only, not bystanders)
       - Workplaces may meet an air exposure limit of 8 ppm. Ventilation or engineering controls could be used to meet the air exposure limit.
   - Other requirements
     - Packaging requirements: Products would be packaged in volumes no less than 55-gallon drums, to prevent consumer misuse
     - Downstream notification of these requirements by manufacturers and formulators.

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Risk Reduction of Potential Regulatory Options - NMP

Reg. Option #	Regulatory Option description	Risk Reduction as a Result
1	Prohibit manufacturing, distribution, and use of NMP as a paint remover	Risks eliminated. This option provides complete risk reduction.
2	Allow certain commercial uses with worker protections (such as product reformulation and gloves) and other requirements to protect the public (such as packaging requirements)	Assuming that PPE is used as required for efficacy, this reduces risks to benchmarks for workers and for occupational bystanders (other workers). See additional details on next slides.

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Risk Reductions: NMP PPE Option

(Regulatory Option #2)

Scenario	Industry/ Activity	Exposure	PPE required to achieve MOE Greater Than the Benchmark MOE
Baseline (high end of current exposures)	Miscellaneous stripping	Acute	Not achievable
		Chronic	Not achievable
	Graffiti removal	Acute	Not achievable
		Chronic	Not achievable
With Maximum 25% NMP in products and no ventilation indoors	Miscellaneous stripping	Acute	Gloves
		Chronic	Gloves + APF 10
	Graffiti removal	Acute	Gloves
		Chronic	Gloves

- In all scenarios evaluated, without gloves and without a respirator or ventilation there are risks of concern.
  - In some scenarios (indoors) the MOE with gloves and APF 10 is greater than the benchmark MOE and "gloves + APF 10" is shown in the table signifying no significant risks when wearing gloves.
  - In some scenarios (outdoors) the MOE with gloves is greater than the benchmark MOE and "gloves" is shown in the table signifying no significant risks when wearing gloves.
  - Based on modeling and underlying assumptions, in some scenarios the exposure reduction of gloves combined with the most protective respirator (APF 10,000) would not reduce exposure sufficiently to achieve an MOE above the MOE baseline. In those cases "not achievable" is shown.
- Refer to Table 2-3 in the Final Risk Assessment for exposure durations and air concentrations used to assess risks.
- Protective gloves assumed 90% effective to account for actual use situations (physical stress on gloves, incidental exposure around gloves, enhanced absorption under gloves)

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Examples of Respirators with APF 10

Half mask/Dust mask
APF=10
Needs to be fit tested

Half mask (Elastomeric)
APF=10
Needs to be fit tested

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For more information, see Appendix H or https://www.osha.gov/Publications/3352-APF-respirators.pdf

Costs: NMP Prohibition

(Regulatory Option #1)

- Costs include costs to manufacturers, processors and to users
- Changing products to remove NMP (chemical substitution in formulation, relabeling, and other changes) *(applies to manufacturers, processors)* + downstream notification about prohibited uses *(applies to manufacturers, processors, distributors)*
  - 6 manufacturers, 14 formulators
  - First-year costs: $316,000, or annualized cost: $20,000 (over 20 years)
- Costs associated with switching to substitutes *(commercial users)*
  - Materials replacement *(commercial users)*
    - Commercial costs: $728,000 annually (Cost of switching to an alternative chemical paint remover)
    - Depending on the job, the time needed could increase or decrease. This is based on the type and number of coatings, surface prep, clean-up, dwell time, and other factors
  - Process change for substitutes *(commercial users)*
    - For some firms this is expected to be minimal if they have experience with using alternative chemicals or paint removal methods.
    - Other firms will likely have a trial and error period until they find an alternative chemical or mechanical means that meets the needs of their work process.
  - Hazards of substitutes
    - Substitutes present some hazards, but generally less than NMP
- **Total cost (for all commercial users):**
  - **$728,000** + inconvenience and hazards of substitutes
  - First year monetized costs: $316,000

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Costs: NMP Reformulations & PPE Option

(Regulatory Option #2)

- Costs include costs to manufacturers, processors and to users
- Changes to product formulation, relabeling, and other changes *(manufacturers, processors)* + downstream notification *(manufacturers, processors, distributors)*
  - 6 manufacturers, 14 formulators
  - First-year costs: $316,000, or annualized cost: $20,000 (over 20 years)
- Commercial users (total costs and for small businesses)
  - Total Annualized Cost: $4.7 million
    - Cost per employee of worker PPE of air supplied respirator (APF 10)
      - Device & fitting costs included ($178 per worker, per year)
      - PPE training costs included ($252 per worker, per year)
      - Medical monitoring costs included ($212 per worker, per year)
    - Specialized glove cost included, assumption gloves are only good for 8 hours (one work day due to uncertainty of permeability of various product formulations) ($7.74 per glove pair, assumes bulk purchase of gloves)
    - Other engineering, equipment changes, or LEV controls would be applicable under this option but are not included in the cost estimate due to lack of data

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Costs: NMP Reformulation & PPE Option

(Regulatory Option #2)

Industry Sector	Total Annualized Cost	Cost Per Small Firm
Aircraft	Not used in this industry	$0/not applicable
Art Restoration & Conservation	$83,000	$275
Automotive	$2,000	$186
Bathtub Refinishing	Not used in this industry	$0/not applicable
Furniture Refinishing	$840,000	$543
Graffiti Removal	$1,306,000	$608
Professional Contractors	$2,437,000	$913
Ship/marine Craft	Not used in this industry	$0/not applicable

Note: First Year Costs are in Appendix C

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Questions & Your Thoughts

- We would like to hear more about:
  - Methylene chloride, NMP, and your business
  - Exposure reduction for workers
  - Experiences with alternatives
- Do you have any advice for EPA?

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Contact Information

- For paint removers rulemaking:
  - Niva Kramek, 202-564-2897, kramek.niva@epa.gov
  - Joel Wolf, 202-564-0432, wolf.joel@epa.gov
- For SBAR:
  - Nathaniel Jutras, RFA/SBREFA staff contact
    EPA Office of Policy
    202-564-0301
    Jutras.Nathaniel@epa.gov
- All Work Plan Chemical risk assessments: http://www.epa.gov/assessing-and-managing-chemicals-under-tsca/assessments-tsca-work-plan-chemicals

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List of Appendices

A. Questions to SERs
B. Regulatory History and International Action
C. Additional Cost Information
D. Information on the Efficacy of Paint Removers
E. Support from Department of Labor
F. Articles on Methylene Chloride in Paint Removal
G. Alternative Paint Removal Product List (SER request)
H. OSHA Assigned Protection Factors for the Revised Respiratory Protection Standard

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TSCA Section 6 Proposed Rule: Paint Removers

Panel Outreach SER Questions for Discussion

These are informal questions that aim to guide discussion on your work practices and your experiences with these chemicals. We are not seeking a structured response on each question; rather, we are interested in any feedback or details you can provide, and hope that these questions let you know what type of information would be most useful as we consider advice from the small entity representatives.

If you are interested in providing this or other information in writing, please see the contact information at the end.

<u>For manufacturers, processors, product formulators, and distributors:</u>

1) General questions related to paint removal:
    a. Who are your customers? (large businesses, small businesses, consumers, retailers)
    b. What are your products used for (specific substrates, specific coatings)?
    c. Do your customers tend to look for specific chemicals in paint removers, or do they prefer use brand names or product names?
    d. Do you sell other devices related to paint removal (such as sanders, blasters, personal protective equipment)?
2) Methylene chloride and NMP in your business:
    a. What percent of your business is paint removers?
        i. Of that, what percent contain methylene chloride?
        ii. Of that, what percent contain NMP?
    b. Have you had any worker incidents, accidents, or complaints related to paint removers containing these chemicals? If yes, can you elaborate or provide some examples?
    c. Do you sell paint removers containing alternative chemicals to methylene chloride & NMP?
        i. What feedback have you received from your customers about them?
        ii. Specifically, have customers said anything related to effectiveness, wait time for paint removal, or impacts on the substrate?
    d. What are the current and best practices in your company to reduce environmental releases of processing methylene chloride?
        i. How do you manage emissions and waste disposal?
3) General questions related to proposed regulatory options:
    a. How frequently do you reformulate your products?
    b. Are the cost estimates for reformulation accurate?
    c. How long does the reformulation process typically take?
    d. Can you think of ways to add flexibility to this rulemaking for your small business?

For all users of paint removers (all industries):

4) Current work practices related to paint removal:
    a. How often do you conduct paint or coating removal? (daily, weekly, etc)
        i. Do you typically use chemical or mechanical means to remove paint? (sanding, heat gun, blasting, other)?
        ii. What factors into your decision whether to use chemical or mechanical methods of paint removal?
    b. How significant is paint or coating removal to your business overall?
    c. Coatings:
        i. What type of coatings do you most frequently remove?
        ii. How many layers of coating do you most frequently remove?
        iii. Do any particular coatings or substrates present special challenges for removal?
    d. How does the time to remove paint vary by method or chemical used?
    e. Do you tend to look for specific chemicals in your paint removers, or do you prefer to look for brand names or product names?
        i. How do you know which chemicals are in the products you are using?
        ii. What are trusted sources of information for you about products or chemicals used in your business?
    f. What do you feel is the most important factor in paint removal: client preference, dwell time, ease of removing the coating, impact on the substrate, price of materials, worker safety, total job time, or other factors?
5) Using methylene chloride or NMP in your business:
    a. How is methylene chloride or NMP currently used in your business?
        i. How often do you use methylene chloride? In what context?
        ii. How much methylene chloride does your business use in a typical year?
        iii. How often do you use NMP? In what context?
        iv. How much NMP does your business use in a typical year?
        v. Do you use NMP as a substitute for methylene chloride?
        vi. What quantities do you purchase? (gallon containers, 55-gallon drums, etc.) Would a requirement to purchase material in a 55-gallon drum significantly affect your business?
        vii. Where/how do you purchase these products (distributor/direct sales, store, etc)?
        viii. How much do product labels (particularly hazard labels on products) inform your use of the paint remover?
    b. If paint removers containing methylene chloride or NMP were not available, what would the impacts be on your business?
    c. What are the benefits to your business of using methylene chloride or NMP?
    d. What are the challenges to your business of using methylene chloride or NMP?
    e. We have heard that many businesses involved in repainting or refinishing aircraft, marinecraft, bathtubs, and cars are moving away from using methylene chloride in paint removal. In your experience, is this correct?
6) Exposure reduction for workers
    a. What are your experiences with:

i. Installing or updating ventilation and local exhaust
ii. Installing or operating other engineering controls
iii. Equipment changes to reduce exposures
iv. Monitoring worker exposures to chemicals in the air
v. Air-supplied respirators
vi. Specialized gloves (such as Silver Shield)
vii. Other personal protective equipment
viii. Worker training to reduce exposures

b. If you have changed or updated your exposure reduction technology or methods, how long did that process take?
c. What do you do to comply with OSHA standards for methylene chloride?
d. What do you currently do to reduce environmental releases of methylene chloride? How do you manage emissions and waste disposal?
e. Have you had any worker incidents, accidents, or complaints related to paint removal?
    i. Do you have concerns about worker exposure to methylene chloride?
    ii. What do you do to address worker risks or concerns for chemical exposures, and specifically for methylene chloride?
f. Have you received any customer feedback about methylene chloride use?
g. Do you have concerns about worker exposure to NMP?
    i. What do you do to address worker risks or concerns for chemical exposures, and specifically for NMP?
h. Have you received any customer feedback about NMP use?

7) Substitutes and alternatives:
    a. What alternative chemicals or methods have you tried, and what are the results?
    b. What is the impact of dwell time for any substitutes, and are there any workarounds?
    c. How do you learn about new chemicals, products, or methods for paint removal? (sales representative or materials, trade press, other?)
    d. If you have tried or switched to alternative chemicals or methods, how long did that process take?
    e. What resources or tools does you need to move to adopting alternatives to methylene chloride and NMP?
    f. Chemical replacement:
        i. What is important to you when considering chemical replacement or process change? (ease of use, flammability, efficacy, speed, price, other)
        ii. Have you replaced chemicals, products, or processes in the past?
8) Regulatory options
    a. Which of the regulatory options presented today would you recommend?
    b. Cost estimates: In your experience, are the cost estimates accurate for both options presented?
    c. Can you think of ways to add flexibility to this rulemaking for your small business?
    d. How do you learn about EPA regulations and what you should do to comply?
    e. What is the best way to reach out to members of your industry?

Additional questions for paint remover users conducting renovations in residences, hotels, etc.:

1) General questions:
    a. Who are your customers? (Individuals, hotels, apartment building owners, property managers, non-residential building owners, others)
    b. How much do client preferences determine how paint is removed?

2) Bystander exclusion:
    a. To what extent is paint removal conducted when few non workers are in the building?
    b. Do you follow different work practices depending on whether a building is entirely vacant or if occupants are present during the renovation or at other times of the day?
    c. What would the impact to your business be if residents or non-workers needed to leave the building for 24 hours after work was completed? How would clients react? Do they leave the building already?

Additional questions for furniture refinishers:

1) General questions:
    a. What is the physical size of your business?
        i. What is the square footage of the area in which paint removal is conducted?
        ii. What else occurs in that area? (furniture repair, reupholstery, painting, administrative work, other)
    b. How much do client preferences determine how paint or coatings are removed?
2) Risk reduction:
    a. Do you have a ventilation system installed? If not, would it be feasible for you to install one?
    b. Do you have a way to isolate the paint removal area from other types of work?
    c. Do you have experience in air monitoring?
        i. For what chemicals?
        ii. At what levels?
    d. Do you have experience with workers using personal protective equipment such as air-supplied respirators?

Contact information:

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Regulatory History of Methylene Chloride at EPA

- Waste:
  - Listed as toxic (non-acute) hazardous waste under the Resource Conservation and Recovery Act.
  - Listed on the Toxics Release Inventory.
- Air:
  - Listed as a hazardous air pollutant (HAP) from several different emission sources.
  - 2008: Source rule for paint stripping & misc. surface coating operation established standards for using methylene chloride to remove dried paint; implemented management practices to minimize emissions.
  - 1995: NESHAP for large aerospace paint removal operations; updated 2015.
- Water:
  - 2010: Maximum Contaminant Level set under the Safe Drinking Water Act at 5 ppb.

1

Regulatory History of NMP at EPA

- Listed on the Toxics Release Inventory.
- Listed under Clean Air Act Section 111: Standards of Performance for New Stationary Sources of Air Pollutants – Equipment Leaks Chemical List.
- Approved for use as a pesticide inert ingredient (food & nonfood uses).

2

Methylene Chloride: Other Agencies

- Occupational Safety and Health Administration (OSHA)
  - 2000: Facilities using methylene chloride must use vapor control equipment. When using methylene chloride off-site (e.g. home renovations), air tests, improved ventilation engineered controls, and personal protective equipment (including full-face atmosphere-supplying respirators) must be used.
  - 1997: A lower Permissible Exposure Limit (PEL) was set in 1997 for paint removal in furniture operations (from 500 ppm to 25 ppm).
- National Institutes for Occupational Safety and Health (NIOSH)
  - 2013: Issued a hazard alert for methylene chloride bathtub refinishing use, highlighting the fatalities caused by this specific application.
  - 2000: Listed methylene chloride as a potential carcinogen.
- Consumer Product Safety Commission (CPSC)
  - 2013: Public fact sheet on paint strippers highlighting risks of methylene chloride.
  - 1988: Warning labels required on all products containing more than one percent methylene chloride. The cautionary labeling requirements note potential cancer hazard, factors that contribute to risk, and safeguards such as using the product in a well-ventilated area. Personal protective equipment (PPE) information is not listed.
- Food and Drug Administration (FDA)
  - 1989: Banned methylene chloride as an ingredient in all cosmetic products; had been used in aerosol cosmetic products such as hairspray.
- Housing and Urban Development (HUD)
  - Hazardous chemicals (including methylene chloride) prohibited from use for lead paint removal in enclosed spaces.

3

NMP: Other Agencies

- OSHA: No PEL established
  - California: State PEL of 1 ppm
- CPSC: Public fact sheet about paint strippers, including hazards of NMP and recommendations for personal protective equipment (created in 2013; updated in 2015)

4

Sample of State Regulations

State	Methylene Chloride	NMP
Alaska	Listed as a carcinogenic hazardous substance	
California	Listed by Proposition 65; listed as an informational candidate under CA's Safer Consumer Products regulations; designated chemical for biomonitoring.	Listed by Proposition 65; PEL at 1 ppm in an 8-hr TWA; requires employees to wear appropriate gloves; listed as an informational candidate under CA's Safer Consumer Products regulations.
Florida	Listed as a liver carcinogen.	
Indiana, Iowa, South Carolina	Established detection monitoring regulations.	
Minnesota	Chemical of high concern	Chemical of high concern
New Hampshire		Toxic air pollutant
New Jersey		Hazardous substance
Pennsylvania	Listed as 'environmental' and 'special' hazard (for carcinogenicity).	Hazardous substance
Vermont		Air pollutant
Washington	Chemical of high concern under Children's Safe Products Act; regulated to minimize occupational exposure	Chemical of high concern under Children's Safe Products Act

Sample of International Regulations & Classifications

State	Methylene Chloride	NMP
EU	2010: Incorporated restrictions for use in paint strippers. Banned from use in concentrations greater than **0.1%** in products for consumers / professionals unless professionals are appropriately licensed and trained. 2012: Industrial operations must have appropriate ventilation, evaporation minimization, training, PPE May be some exceptions to these restrictions in certain countries (like UK). Will be considered Carcinogen 2 under REACH	Candidate list of substances of very high concern for authorization in the EU. Proposed for restrictions under REACH on concentrations higher than 0.3%. Ongoing discussions.
Canada	2003: published code of practice to reduce methylene chloride emissions from paint strippers in commercial operations. 1999: Required pollution prevention plans for all persons using methylene chloride in several activities (including aircraft paint stripping).	High priority chemical to be addressed under CMP3, post-2016.
Australia		Subject of Tier II health risk assessment; subject to labeling and related requirements.
IARC	Will be considered a probable human carcinogen	

First Year Costs: Methylene Chloride PPE

Industry Sector	First Year Cost
Aircraft	$167,000
Art Restoration & Conservation	$56,000
Automotive	$220,000
Bathtub Refinishing	$950,000
Furniture Refinishing	$7,200,000
Graffiti Removal	$136,000
Professional Contractors	$18,000,000
Ship/marine Craft	$35,000

1

First Year Costs: NMP PPE

Industry Sector	First Year Cost
Aircraft	$0/not applicable
Art Restoration & Conservation	$64,000
Automotive	$1,000
Bathtub Refinishing	$0/not applicable
Furniture Refinishing	$720,000
Graffiti Removal	$867,000
Professional Contractors	$1,900,000
Ship/marine Craft	$0/not applicable

2

Additional Information on the Efficacy of Alternative Paint Removers

for EPA's Planned Proposed Rule under
the Toxic Substances Control Act (TSCA) Section 6(a)
for Methylene Chloride and N-Methylpyrrolidone (NMP) in Paint Removers

Resources:

1. Kelley, John, and Thomas Considine. "Performance Evaluation of Hap-Free Paint Strippers vs. Methylene-Chloride-Based Strippers for Removing Army Chemical Agent Resistant Coatings (CARC)." *Army Research Laboratory* (2006): 1-42.
    - Available online: http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA451375
    - *Abstract/Overview: The purpose of this effort is to investigate alternative chemical paint strippers free of hazardous air pollutants (HAPs) as potential replacements for the methylene-chloride- based chemical strippers currently used in manual and immersion ("dip") coating stripping operations. Historically, methylene-chloride- based strippers have been faster and more effective at stripping the MIL-P-46168 chemical agent resistant coatings (CARC) system than many alternatives. Therefore, finding a HAP-free chemical stripper that will minimally impact the U. S. Army depots throughput rate is an important consideration. This report compares the performance of methylene-chloride strippers vs. HAP-free alternatives in timed laboratory paint stripping experiments to remove four different CARC systems.*

2. Stack, Stacey. "Graffiti Remover Research and Field Test Report: The Search for Safer Products." *Responsible Purchasing Network's Purchasing Guides* (2003): 1-27.
    - Available online: http://www.responsiblepurchasing.org/publications/Grafitti_Report.pdf
    - *Abstract/Overview: This report encompasses the results of product content evaluation and subsequent field tests of those products for graffiti removal. It presents lessons learned and resources for the reader to apply when exploring low-risk graffiti remover products.*

3. SHARP (Safety & Health Assessment & Research for Prevention). "Successful Bathtub Stripping with Benzyl Alcohol as an Alternative to Methylene Chloride (MC)." (2012).
    - Available online: http://www.lni.wa.gov/safety/research/files/mchazalertbenzylalcoholalternative.pdf
    - *Abstract/Overview: In a 2005 Washington-OSHA inspection, Bathcrest of Seattle was assessed over $10,000 for 15 violations related to the use of Klean-Strip Aircraft Remover (containing up to 85% MC) during bathtub stripping. Bathcrest of Seattle's owner, Lorelei, realized the health hazards and costs of working with MC required them to find an alternative product free of MC. Finding a safe but effective stripper for use on residential bathtubs has not been easy. After trying several different paint strippers, Bathcrest's 3 full-time technicians now use water-based Smart Strip with benzyl alcohol (30-50%) by Dumond Chemicals.*

4. Michigan Fatality Assessment & Control Evaluation (FACE). "Methylene Chloride Causes Death of Three MI Bathtub Refinishers." (2010).
    - Available online: http://www.oem.msu.edu/userfiles/bathtubrefinishingha14.pdf
    - *Abstract/Overview: Provides information on the hazards of methylene chloride and different chemical products that can be used instead.*

5. Sosman, B.A., Jeremy, and Meza, MPH, Erika. "Toxic Paint Removers: Safer Choices Campaign." (2014): 1-52.
    - Full report available online: http://aoec.org/ohip/wp-content/uploads/2014/08/Final-Report-San-Francisco.-Jeremy-Sosman-Erika-Meza.pdf
    - Summary presentation available online: http://aoec.org/ohip/wp-content/uploads/2014/08/13-San-Francisco-Toxic-Paint-Removers-Safer-Alternatives.pdf
    - *Abstract/Overview: Research project that evaluated worker knowledge of paint remover risks, and collected feedback from commercial and professional users on substitutes for methylene chloride and NMP.*

6. Toxics Use Reduction Institute (TURI). "Higher Hazard Substance Designation Recommendation: Methylene Chloride or Dichloromethane (CAS 75-09-2)." (2013): 1-15.
    - Available online: http://www.mass.gov/eea/docs/eea/ota/tur-prog/policy-analysis-methylene-chloride-may-29.pdf
    - *Abstract: As part of the higher hazard substance designation in Massachusetts for methylene chloride, the Toxic Use Reduction Institute analyzed the trends in commercial use of methylene chloride for paint removal, and identified alternative chemicals in use already in several industries.*

7. Jacobs, Molly; Bingxuan Wang, Mark Rossi. “Alternatives to Methylene Chloride in Paint and Varnish Strippers.” *BizNGO*. (2015): 1-44.
    - Available online: http://www.biznGO.org/resources/entry/resource-methylene
    - Abstract/Overview: *BizNGO (a collaboration of leaders from businesses, environmental groups, universities, and governments) initiated a demonstration project to a draft priority product under California Safer Consumer Product regulations: paint and varnish strippers with methylene chloride. Among the conclusions detailed in the report is the finding that safer alternatives to methylene chloride for paint stripping are widely available based on assessing the hazards of eleven chemical alternatives.*

8. Elber, Gail. “Paint Strippers, Types of Strippers.” *PaintPRO Magazine: The Professional Paint & Decorating Contractor’s Journal* (June 2000), Vol. 3 No. 3.
    - Available online: www.paintpro.net/Articles/PP303/PP303_strippers.cfm
    - *Abstract/Overview: Description of types and brands of chemical paint strippers for professional painters and renovators, with pros and cons of each.*

9. Hardin, Drew. “The Ultimate Paint and Body Guide Part 2- How To Strip Paint.” *Hot Rod Network*. June 1, 2007. Republished February 2009.
    - Available online: http://www.hotrod.com/how-to/paint-body/hdrp-0606-paintstripping-basics-tips/
    - Abstract/Overview: *It's time to reach beneath the surface to see what is really hiding under that old paint on your ride. Find out which method is best for you as we delve into the many methods you can use to take it down to bare metal.*

10. “What You Should Know About Using Paint Strippers”. *Doityourself.com*. Accessed April 30, 2016.
    - Available online: http://www.doityourself.com/stry/usingpaintstrippers#b
    - *Abstract/Overview: Overview of different types of chemical paint strippers available for do-it-yourself or small projects, with pros and cons of each.*

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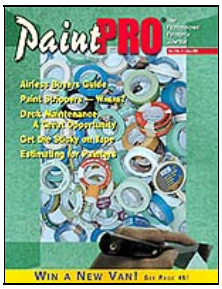

PaintPRO Product Index

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Paint Strippers, Types of Strippers

Types of strippers: Strippers fall into three categories: caustic, solvent, and biochemical. There is no shortage of strippers to choose from. Many painters are loyal to one brand. If you're not yet one of them, consult your dealer, quiz other painters, and experiment.

by Gail Elber

Here's the range of answers I got when I asked several painters if they used chemical paint strippers:

- "Never! Ever! It gives you brain damage!"
- "Never! Well, except on concrete. Outdoors. And first I get most of the paint off with a heat gun."
- "Occasionally, but only when I have to."

After more conversations with painters and paint dealers, I found that many painters don't understand how strippers work, or how to match a stripper to a job. Although many painters prefer to minimize their use of these chemicals, most painters must use them occasionally. So unless you're a hard-core "Never! Ever!" painter, take the next few minutes to learn how to use strippers safely and productively.

Types of strippers

Strippers fall into three categories: caustic, solvent, and biochemical.

Caustic strippers are water-based solutions with a pH of 13 to 14. Their active ingredient is lye, which may be either potassium hydroxide (known as caustic potash) or sodium hydroxide (caustic soda). In caustic strippers, the lye reacts with the oily component of the paint film, turning it into soap. This reaction with the paint loosens it from the surface. The health risks of caustic strippers include skin burns and lung irritation.

Solvent strippers remove paint by dissolving or softening the bond between the film and substrate, causing the coating to bubble up. The most common solvent is methylene chloride (also called dichloromethane), but alcohol, toluene, acetone, and ketones are often also present.

Methylene chloride-based strippers work very well. However, they pose more potent health risks than caustic strippers do. They temporarily reduce the blood's capacity to carry oxygen and may cause permanent liver and kidney damage and cancer.

Another solvent is N-methyl-2-pyrrolidone (NMP), often used in combination with dibasic esters (DBE). Although these strippers are promoted as a safer alternative to methylene

esters (DBE). Although these strippers are promoted as a safer alternative to methylene chloride, their health effects are not yet completely understood. According to the EPA, NMP causes skin swelling, irritation, and blisters. Dibasic esters cling nicely to vertical surfaces, but they work slowly and have been reported to fuzz the surface of wood.

Yet another solvent system is a combination of alcohol, toluene, and methanol. This cocktail works quickly, but it evaporates quickly and is highly flammable. Breathing it can give you brain damage. The fact that it evaporates quickly reduces somewhat the volume of waste you must dispose of.

Biochemical-based stripping agents are another category. The solvents in them are derived from plants. Biochemical-based strippers may include terpenes, from pine or citrus; lactic acids, from corn sugars; dimethylsulfoxide (DMSO), from wood pulp and paper by-products; citric acid; and soy oil. Some of these materials can irritate your skin. In addition to the biochemical ingredients, most of these strippers contain NMP.

Although manufacturers of citrus-based products emphasize their suitability for commercial use, the paint stores in my town don't report selling a lot of citrus-based strippers to professionals. If customers are concerned about odor, they may be happier if you use a citrus-based stripper. Remind them, though, that citrus-based strippers do contain harmful chemicals, and that the stripper will have to remain on the surface for a long time to work.

Strippers marketed as "safe" or "eco" don't contain methylene chloride, but they may contain NMP, DBE, biochemical agents, or a combination.

Matching the stripper to the job

There is no shortage of strippers to choose from. Many painters are loyal to one brand. If you're not yet one of them, consult your dealer, quiz other painters, and experiment. You may find that you prefer one brand for wood and another for concrete, for example.

Both methylene chloride and caustic strippers will chew through most combinations of alkyd and latex paints. Methylene chloride offers a slight edge in removing epoxies and polyurethanes; caustics perform better than solvents on alkyds. Caustics will darken wood, necessitating a bleaching step if you're planning to stain it. They'll also eat aluminum. Caustics have to remain on the surface longer, but many prefer the risks of caustics to the risks of methylene chloride or other solvents. Surface temperature is also a factor in choosing a stripper: caustic strippers don't work well at temperatures below 50 degrees F. And the logistics of ventilation are important. You don't want to use methylene chloride if it's too cold to keep the windows open.

Some strippers are designed for a certain application. Got milk? Caustic strippers designed for coping with milk paint are available (for example, D.O. Siever, www.realmilkpaint.com). Got lead? Strippers meant for lead-based paint contain lime, which bonds with the lead so that it can't leach out of the waste that you scrape off. Consult your local environmental authorities to see if this will ease your waste disposal problems. Dumond Chemicals and Back to Nature, among others, make strippers of this type. Dumond is also notable for its Peel Away series of products that come with fiber sheets that act as a sort of poultice to hold the stripper on the surface. And Napier Environmental Technologies (www.biowash.com) makes a caustic product specifically formulated for removing stain from decks, fences, and log homes.

Andre Weker of Fiberlock Technologies recommends that you put up test patches of several different removers. Not only will this tell you which type works best on a particular job, but it'll tell you how long you'll need to wait before scraping, so you can plan your day.

Stripping tips

Read the label. It'll tell you what precautions to take, whether the container needs to be shaken or stirred, how long the materials should remain on the surface, how to neutralize the surface after stripping, and other important information.

No matter what kind of stripper you use, you'll want to cover your skin, wear a respirator designed to exclude solvent vapors, and don safety glasses and neoprene or butyl gloves. For all strippers, ventilation is absolutely necessary. Take cabinet doors or other easily removable parts outside to strip. If you must work indoors, to stay within OSHA's new 25 ppm exposure limit for methylene chloride, the air in the room must change 7-10 times an hour, says Gene Freeman of Bix Manufacturing. To accomplish this, arrange a fan behind you so that the air carries the vapors away from you and out a window, not toward you. Freeman recommends using respirators that supply filtered compressed air from your compressor. Finally, if you're using a flammable stripper, make sure pilot lights of nearby gas appliances are out.

You can apply strippers with a brush, a roller, a hand spray bottle, or a sprayer, depending on the consistency of the product and the area to be covered. Both solvent-based and caustic based strippers will destroy the rubber, leather, and aluminum parts of a sprayer, but some sprayers can be fitted with neoprene or polyethylene replacements for rubber components and stainless steel replacements for aluminum. If you do a lot of stripping of big areas, consult the manufacturer of your sprayers to determine the cost of dedicating one to stripper.

To brush on a caustic stripper, lay it on thickly in one direction, as if you were icing a cake. Don't brush over the surface once it's applied, or you'll disturb the airtight layer that quickly forms to keep the chemical moist while it does its work. Solvent strippers, whether liquid or gel, don't need to be applied so thickly.

Leave the area completely while the stripper is working. Your test patches are your guideline for how long to wait. When it's time, scrape off the goo into a plastic bag or a paint container. A flexible-bladed drywall knife is a good scraper, but dull the edge and round off the corners with a file to minimize the risk of gouging the surface. A plastic scrubbie will get the stuff out of wood pores without leaving rusty fibers as steel wool can. Get into the nooks and crannies with toothpicks, bits of paper, and so forth. If paint remains, give it another application.

When all the paint is gone, wash or neutralize the surface according to the manufacturer's directions. Caustic strippers can be neutralized with vinegar and water. Some caustic strippers, such as Dumond's Peel Away, require a proprietary neutralizer. You must test the surface with pH paper to make sure it's reached pH 7. Solvent strippers can be washed off with mineral spirits. Manufacturers of methylene chloride-based strippers say they clean up with water, but water can fuzz the surface of wood, so it's best to use mineral spirits if you're stripping woodwork.

Porous substrates such as wood or concrete will absorb alkaline material from caustic strippers. Even if you neutralize the surface, the absorbed material can bleed to the surface over a period of time. Andre Weker of Fiberlock Technologies recommends neutralizing the surface to pH 7, going away for a few days, then testing the pH again before painting over it.

Whichever kind of stripper you use, thoroughly dry the surface with fans and heat (it may take a week or more, depending on your climate) before further preparation and painting. If you haven't invested in a moisture meter yet, now would be a good time. A surface that is 15 percent water is too wet to paint; 12 percent is just right. Cedar, cypress, and redwood contain water-soluble material that may bleed through paint if the surface is damp when painted, and these woods may take 60-90 days to dry.

What to do with the goo

Environmental regulations vary so much from place to place that you had better call your local authorities to determine the best way to dispose of the goo that you scrape off while stripping. Don't let it get down the drain or into the storm sewer. For a small residential job, you may be able to let the slurry dry outdoors on newspapers, then put them in plastic bags and throw them in the trash. In my town (Eugene, Oregon), the county waste-disposal site has a household hazardous waste day once a month, and some painters go there in an unmarked vehicle to drop off waste from an occasional job. The local paint stores also cooperate on a paint-disposal and recycling program, and they tolerate occasional pails of goo, though large volumes are discouraged. Painters who do more stripping accumulate pails of goo in the shop, and eventually pay a waste-disposal service to get rid of it all at once. Don't put stripping waste in a metal paint can or mix waste from different jobs in the same container: unpredictable reactions may happen.

To strip or not to strip

Strippers are among the most dangerous chemicals you encounter in your line of work. Although the trend is toward newer solvents that are safer than methylene chloride, you must treat all strippers with respect. Weigh all the considerations, and decide where stripping fits into your business. You may feel comfortable with taking the necessary precautions and using strippers regularly. You may use them as a last resort on troublesome spots after doing all you can with a heat gun. Or - especially if you're of reproductive age, have health problems, or simply feel that you're close to absorbing your quota of chemicals for one lifetime — don't be ashamed if you decide to pass that work to someone else.

The Ultimate Paint And Body Guide Part 2- How To Strip Paint

IT'S TIME TO REACH BENEITH THE SURFACE TO SEE WHAT IS REALLY HIDING UNDER THAT OLD PAINT ON YOUR RIDE. FIND OUT WHICH METHOD IS BEST FOR YOU AS WE DELVE INTO THE MANY METHODS YOU CAN DO TO TAKE IT DOWN TO BARE METAL.

Photography by Courtesy Of The Eastwood Co., Drew Hardin, Sears, Steve Dulcich

Hot Rod Magazine, February 24, 2009

Unless your project car has been hammered out of virgin sheetmetal, the first thing to do when considering new paint is figure out how to handle the paint that's already there.

In some cases, the decision is pretty straightforward. Many painters consider a car's original finish to be one of the best foundations you can have for fresh paint, provided what's still on the car isn't cracking, lifting, or showing other signs of wear or damage. As John Sloane of Eastwood put it, a car's original finish "was applied with perfect prep and under ideal conditions, so it's tough to beat." If that's the case with your project car, you can feel pretty secure about scuffing the original finish, then priming and shooting right over it.

Then again, how many potential project cars have you run into lately that still sport unblemished, original paint? More likely, the cars you're looking to buy and build are covered with Lord-knows-how-many resprays over the top of Lord-knows-how-much body filler, questionable patch panels, bad welds, rust, or some combination of them all. And that is definitely not the kind of foundation you want under your spanking-new paint.

If you're not completely familiar with a car's history, how can you tell what may be lurking underneath that top layer of pigment? Well, there's a decidedly low-tech method: Grab a piece of sandpaper, pick a spot on the car -- preferably a location likely to have seen some damage over the years, like a rocker or rear quarter-panel -- and start rubbing. (A pocketknife will work, too, if you can find a corner to pick at.) It won't take long before you start revealing layers beneath the topcoat. Read them like tree rings: The more layers you find, the greater the certainty that a scuff job won't cut it and a strip to bare metal is in order.

Tools of the sanding trade, found at Paint n Place in Placentia, California: Sanding board

If you're looking for a less intrusive way to judge the integrity of a car's finish, Eastwood sells a couple of different types of paint-thickness gauges you can use without leaving a mark. Paint-thickness gauges -- a magnetic version retails for about $50 and an ultrasonic one with a digital readout will set you back about $350 -- are actually not 100 percent accurate, Sloane said. What these gauges do is measure the distance between the paint's surface and the sheetmetal below (both gauges work only on steel bodies). OE paint will measure between 0.003 inch and 0.005 inch thick. If the measurement you get is more than 0.005 inch, chances are good "there's something other than paint under there," Sloane said. That rule of thumb doesn't apply to custom paint jobs, however, which can measure .012-inch to .015-inch thick or more. But even so, if you're running into paint that thick, it becomes "less and less desirable to put paint over what you have," Sloane said. "At that thickness, you can't assume you won't develop cracks in the new paint as the different substrates beneath it expand and contract at different rates."

There is another way to look at the strip versus scuff-and-shoot question. Most of the restoration specialists and high-end rod builders we spoke to prefer to start a paint job with a completely clean slate: bare metal. That way they know exactly what they're building on as they put together a show-winning finish. So if you don't own a car with well-preserved, original paint or you're clearing a place on your mantel for a boatload of car-show trophies, read on to figure out the best plan of attack to get the starting point you need for eye-popping paint.

Sand 'n' Scrape

Paint-stripping techniques generally fall into two broad categories -- mechanical and chemical. Mechanical stripping methods utilize some form of abrasive to remove paint from the metal. Abrasives range from good old-fashioned sandpaper to a variety of blasting media.

Do-it-yourselfers will usually default to sanding. Logistically, it's the easiest method, as the disassembly process is simpler than for blasting or dipping the metal, and you don't have to transport the car anywhere to get it done. It's also far less expensive. The thousand or more dollars you'd pay for blasting or dipping can buy a lot of sandpaper, not to mention a new air-powered sander, sanding boards, maybe even a new compressor if you shop smart. (See the "Compressor Tips" sidebar for more info on powering your air tools.)

Yet sanding an entire car, even if you're doing just the outside, is one of those jobs that's measured in days, not hours. If there's a ton of paint on the car, or if the paint is relatively new -- and therefore strong -- you're going to be working it awhile, even if you're using power sanders. And either way, your arms will ache for days afterward. But if you have more time and muscle than money, get out the paper and start rubbing.

One of sanding's advantages is that you can easily tailor its aggressiveness to the job at hand. If all you need to do is scuff original paint, a light touch with 320- to 400-grit paper should do the trick. If you're stripping down to metal, the consensus from our paint experts is that 80-grit is a good starting point. If your car's finish is particularly stubborn or thick, stepping down to 40- or even 24-grit paper will help cut the tough stuff. Take care, though, as it's very easy to gouge the metal when using paper that rough.

A power sander, whether a rotary or a dual-action (DA) sander, will cut your sanding time and effort considerably. A rotary sander generally spins faster than a DA, so it does offer more paint-cutting power, but there's a risk of burning rather than removing the paint if you're spinning the abrasive too fast. Burning the paint will, at best, clog your paper and waste material, and at worst, generate enough heat to warp the sheetmetal.

In some cases, you can remove paint more quickly by peeling it up with a razor blade than by rubbing it off with a sander. Jerry Sievers of Paint n Place told us he's seen entire race trailers stripped not with abrasives but with razors. This can be especially effective if the paint you're removing wasn't applied well in the first place. If you catch an edge of poorly prepped paint with a razor, it'll come off in sheets.

Sanding w ith 80-grit paper on a rotary or dual-action sander is a good w ay to attack the t

Not all sanding boards are flat. Note the curvature along the bottom of this board and how

Using a sanding board on broad, flat surfaces (such as this GTO door) helps the sandpaper

A stripping job doesn't necessarily have to go to bare metal. In this case, the Paint n Pl

Believe it or not, a razor blade can be just as effective as -- if not faster than -- sand

It's a Blast

Media blasting is an amazing thing to watch. Layers of paint that would take days to sand off simply vaporize

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at the end of a high-pressure nozzle. Depending on the medium used and the nozzle's line pressure, blasting can be gentle enough to strip wood and fiberglass or aggressive enough to cut through body filler and even rust.

If done improperly, however, media blasting can do more harm than good. Blast sheetmetal too hard, for too long, or with the wrong medium, and you'll warp panels, either because the impact of the medium is stretching the metal or because excessive heat caused by the medium hitting the metal is making it expand. Straight, flat panels are particularly prone to warping. One of the blasters we visited, Ron Hambright of Hambro Industries, won't blast Chevelle or El Camino hoods because the metal's too thin. Given the potential for damage, do some research and get referrals regarding the blasting operators in your area before bringing them your project car.

The best medium for your stripping job depends on what you expect to find beneath the top layer of paint. If you're stripping only a couple of coats of paint and you don't anticipate encountering much body filler or rust, or if you're stripping a nonmetal material such as fiberglass, a soft medium such as baking soda will work fine. The trade-off: Soda won't cut into rust. For cancerous panels or sheetmetal that's thickly coated with filler, a more aggressive medium such as aluminum oxide or DuPont's StarBlast will work better. Even with the more abrasive media, though, the operator has the option of removing filler entirely or just roughing it up for paint.

No matter which medium you choose, some disassembly will be required before you take your car to the blaster. If you're painting just the exterior, the prep job is easier, as all you need to remove are the car's trim pieces, bumpers, lights, and so on. For an "outside only" job like this, blasters can mask over glass to protect it from overspray and ricocheting media. But if you're planning a full-on, jambs-included, inside-and-out color change, you'll need to take off the doors, hood, and trunk lid, plus strip the interior of all upholstery, glass, carpet, and the instrument panel. Better access for the blasting nozzle gives you a more complete strip job.

It makes a difference regarding the job's price, too. The blasters we visited didn't have set prices for their work; the cost of the stripping depended on how much prep they had to do, how much car there was to strip, how long it took to get the metal clean, and whether the job was outside-only or inside-and-out. The more disassembly work you can do to make the blaster's job easier, the less the job will cost.

Given all the variables listed above, the blasters we interviewed were hesitant to give exact price quotes. But here are some ballpark figures: Hambright, who uses StarBlast for most automotive sheetmetal, said an outside-only job for a typical muscle-era car would run about $500. An "inside, outside, underneath" job on a unibody car like a Mustang runs closer to $1,400, he said, "and that's every part of the car, including suspension." A stripped '57 Chevy we photographed at Hambro was a $700 job, but that was because "there were no inner fenders to do, no frame or suspension pieces," Hambright said.

Manny Vega, whose Anacapa Soda Blasting stripped Editor Rob Kinnan's '69 Camaro with baking soda, estimated the job at between $1,400 and $1,600. That encompassed the body's exterior (including the fenders, cowl, and other miscellaneous parts, which were off the car) and the inside of one door, but not the rest of the interior, the firewall, or front subframe.

Both blasting shops perform a thorough cleaning of the car after blasting.

Hambro blows the StarBlast media out with compressed air and is able to reuse it. The Anacapa crew blows, vacuums, and even hoses out the used soda, which basically turns to talc on impact and can't be used again.

Water on bare sheetmetal? Yep. Vega claims the soda dries out the panels so thoroughly that as long as there's no standing water on the steel, it won't oxidize for days, even weeks. (Anacapa is located in Oxnard, California, near the coast, and we saw a lot of bare metal there that hadn't started to oxidize even after sitting for months.)

Because it's a relatively soft medium, soda will leave the bare metal fairly smooth. Some painters may want to scuff the metal with fine paper to promote adhesion before shooting primer. A medium like StarBlast, on the other hand, leaves the surface a little rougher, so no sanding is necessary prior to priming, Hambright said.

Not inclined to spend days sanding your ride? Media blasting strips automotive paint quick

Rust and other stubborn surface imperfections require a more aggressive medium. Hambro Ind

Baking soda, which is used by Anacapa, is one of the less-aggressive blasting media. It'll

Media blasting is messy. Because the Camaro's taillights were removed before blasting, the

StarBlast is too aggressive to shoot pot metal pieces, like this VIN plate, without some p

Strip or Dip

Many do-it-yourselfers prefer chemical stripping to sanding because it's faster and requir

As with mechanical stripping, there's a do-it-yourself way to chemically strip and a do-it-for-me method.

DIY-ers can purchase bottles, cans, or drums of chemical stripper, brush it onto the sheetmetal, let the chemistry work its magic, then scrape off the residue with some sort of edged tool. Using a plastic or nylon scraper or even a body filler spreader instead of a metal blade will prevent scratching or gouging the metal. Plan on using a couple of gallons of stripper to do a complete fullsize car, with the chemicals costing from $30 to $50 per gallon.

Chemical stripper works fairly quickly -- anywhere from 10 minutes to a couple of hours, depending on the type of stripper and the paint's type and thickness -- and the brush-on/scrape-off process takes less effort than hours of sanding. However, the process doesn't stop at the scraping; some strippers need to be neutralized, and the body will need cleaning and sanding to prep it for primer.

You also have to keep stripper away from seams, as these folded-metal areas tend to retain the stripper. Eventually those chemicals will seep out of the seams and ruin your new paint job. Dan Swanson of Sears said trying to stop stripper from running into creases and seams "can turn into a project itself." Sloane of Eastwood recommends masking over seams before brushing on the stripper, then going back and stripping the seams mechanically with an abrasive wheel.

Tank dipping, as seen here at Strip Clean, is chemical stripping taken to the extreme. The

Because only steel (plus copper and brass) can safely go into the dipping tank, the vehicl

After the car soaks in the tank for several hours, it's pulled out and hosed down with wat

If you have the funds, you can avoid the hassle (and hazardous waste) of chemical stripping by having your car dipped. This is by far the most thorough means of taking paint off a car because the caustic chemicals in the stripping tank leach into the sheetmetal's every nook, cranny, and crevice, seen and unseen. Every other means of stripping we've discussed is limited by access; you're removing paint only from where you can see or reach. The dip tank, on the other hand, strips every bit of paint off a car -- as well as all body filler, sealer, caulk, weatherstripping, undercoating, rust, you name it. When a car comes out of a dipping tank, it's all steel and nothing else.

Because only steel, brass or, copper can safely go into the tank without risk of damage, your car has to be completely stripped of every nonferrous part prior to dipping. It must be totally disassembled, too, so that the chemicals can reach otherwise hidden places, such as the areas behind door hinges. Typically the car's body will go into the tank by itself, while the doors, hood, and other parts will be placed in a big, steel basket and dipped separately.

The time your car spends in the tank is just one part of the dipping process. After the car comes out, it's washed with a high-pressure hose to clean off any remaining chemicals and debris. Then the parts are dipped again, this time in a phosphate bath that coats the metal with a protective finish to keep it from rusting. Charlie Masters, who operates Strip Clean in Santa Ana, California, likens the phosphate coating to an etching primer. "You can paint right over it after scuffing it with Scotchbrite or a fine sandpaper."

The thoroughness of the dipping tank does have its drawbacks, though. Remember how we said paint is removed from areas both seen and unseen? If you can't see -- or reach -- part of the car, you can't repaint it. That means there will be portions of the car that remain covered with nothing but the phosphate coating.

After the stripped sheetmetal is cleaned, it's dipped again in a phosphate solution simila

Look into this fender's headlight bucket. Tank dipping removed all traces of rust but left

Nailing down the cost of dipping was like getting an exact blasting price -- nearly impossible because of all the variables involved. The car's age, size, whether it's body-on-frame or unibody, and whether you're having the frame dipped were among the factors that affected the dip price. Masters was able to give us these estimates, though: A unit-body musclecar, such as a Mustang, would cost around $1,600 to dip. "Something like a Cadillac, a really big sumbitch, would cost a couple hundred more," Masters said. A non-unit-body car, like a '40 Ford, would be between $1,000 and $1,600, while a Deuce roadster would run around $850.

Is there one stripping method that's best? No. Each car is a unique case, as is each car owner. Your car's condition, your ability (or desire) to get your hands dirty, and the size of your bank account will all factor into which approach works best for your particular situation. Just be sure that, whichever method you choose, the stripping job is as perfect as it can be. Because at this point, you're starting to lay the foundation upon which the rest of the paint process will be built. And a mistake at this stage can ruin a whole lot of subsequent work. You don't want that.

Compressor Tips

Power: According to Sears' Dan Swanson, the compressor industry is in a state of transition, as major manufacturers switch their horsepower ratings from "maximum" to what's called "running" horsepower, a more realistic appraisal of the compressor's output. A 5hp maximum-rated compressor would have more like a 2hp running rating. But not all compressor-makers are complying, so take care when comparing power figures.

Output: "You want the compressor capacity to be in excess of the tool's average cfm if you're not willing to wait around for the compressor to catch up with you," Swanson said.

Tank capacity: Go big on the tank and you can sand longer before having to wait for the tank to fill. But Swanson actually doesn't mind switching between sanding and other tasks while the tank fills. "It's nice to give your hands a break from the vibration."

SOURCE

Anacapa Soda Blasting

Eastwood
263 Shoemaker Road
Pottstown
PA 19464
1-800-345-1178
www.eastwoodco.com

Hambro Industries
San Fernando
CA

Paint N Place

Sears, Roebuck & Co
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What You Should Know About Using Paint Strippers

ByDoItYourself Staff

If Not Properly Used, Paint Strippers are Hazardous to Your Health and Safety

Paint strippers contain chemicals that loosen paint from surfaces. These chemicals can harm you if not used properly. Some paint stripping chemicals can irritate the skin and eyes, or cause headaches, drowsiness, nausea, dizziness, or loss of coordination. Some may cause cancer, reproductive problems, or damage of the liver, kidney, or brain. Others catch fire easily. Proper handling and use of paint strippers will reduce your exposure to these chemicals and lessen your health risk.

General Safety Precautions:

Paint strippers contain different chemicals, and the potential hazards are different for various products. Each product has specific safety precautions (see the section below on paint stripper types). However, there are some general safety steps to keep in mind when using any paint stripper. If you use paint strippers frequently, it is particularly important that you follow these steps:

1. Always read and follow all the instructions and safety precautions on the label. Do not assume you already know how to use the product. The hazards may be different from one product to another, and the ingredients in individual products often change over time. The label tells you what actions you should take to reduce hazards and the first aid measures to use.
2. Wear chemical-resistant gloves appropriate to the type of stripper being used (see manufacturer's instructions). Common kitchen latex gloves do not provide enough protection.
3. Avoid getting the paint stripper on your skin or in your eyes. Wear protective clothing and goggles appropriate for the project and type of stripper.
4. Use paint strippers outdoors if possible. If you must use them indoors, cross-ventilate by opening all doors and windows. Make sure there is fresh air movement throughout the room. Ventilate the area before, during, and after applying and stripping. Never use any paint stripper in a poorly ventilated area. If work must be done indoors under low ventilation conditions, consider having the work done professionally instead of attempting it yourself.
5. If you must work indoors, always work so the stripper fumes are blowing away from you and to the outside. A fan can be used to improve cross-ventilation and to ensure fresh air movement. A fan is particularly important for nonflammable products that evaporate quickly, such as methylene chloride. Electrical sparks from fans may increase the chance of flammable paint strippers fumes to catch fire.
6. Do not use flammable paint strippers near any source of sparks, flame, or high heat. Do not work near gas stoves, kerosene heaters, gas or electric water heaters, gas or electric clothes dryers, gas or electric furnaces, gas or electric space heaters, sanders, buffers, or other electric hand tools. Open flames, cigarettes, matches, lighters, pilot lights, or electric sparks can cause the chemicals in the paint strippers to suddenly catch fire.
7. Only strip paint with chemicals that are marketed as paint strippers. Never use gasoline, lighter fluid, or kerosene to strip paint.
8. Dispose of paint strippers according to the instructions on the label. If you have any questions, ask your local environmental sanitation department about proper disposal.

Types of Paint Strippers:

Solvent-Based Strippers: Most paint strippers are solvent-based. Solvents dissolve the bond between wood and paint. Solvents also can dissolve other materials, including the latex or rubber of common household or dish washing gloves. Some solvents will irritate or burn the skin. Some solvents may cause serious health effects even if contact does not immediately cause pain. In addition, many solvents evaporate quickly and you can easily inhale them. Inhalation of these solvents can produce health effects immediately or years after exposure. It is especially important to use paint strippers containing solvents that evaporate quickly either outdoors or in an indoor area with strong fresh air movement. Some paint strippers contain solvents that do not evaporate quickly. When using these strippers indoors, be sure to open windows and doors to provide

fresh air movement in and out of the work site. You should always follow the manufacturer's instructions and safety precautions. Use the amount of stripper recommended by the manufacturer to avoid buildup of harmful fumes.

The Different Types of Solvent-based Paint Strippers and Their Potential Hazards and Safety Precautions are:

1. Methylene Chloride (also called dichloromethane, or DCM): Methylene chloride is the most commonly used chemical in paint strippers. Methylene chloride products come in two varieties. One type is nonflammable, while the other type is flammable. The flammable paint strippers have less methylene chloride but have other flammable chemicals, including acetone, toluene, or methanol. Methylene chloride causes cancer in laboratory animals. The U.S. Environmental Protection Agency (EPA) and the U.S. Consumer Product Safety Commission (CPSC) consider the chemical to be a potential cause of cancer in humans. Methylene chloride evaporates quickly, and you can inhale it easily. Breathing high levels of methylene chloride over short periods can irritate the eyes, skin, nose, and lungs. It can also cause dizziness, headache, and lack of coordination. Your body changes some inhaled methylene chloride to carbon monoxide. Carbon monoxide lowers the blood's ability to carry oxygen. This can cause problems for people with heart, lung, or blood diseases who use methylene chloride paint strippers indoors without fresh air cross-ventilation. High exposures to methylene chloride for long periods can also cause liver and kidney damage.

- It is very important to reduce your exposure to methylene chloride vapors.
- It is very important to have a lot of fresh air when using methylene chloride products.
- Use methylene chloride paint strippers outdoors if possible. If you must use them indoors, open all doors and windows to ensure that the fresh air is moving in and out of the room.
- For indoor use of nonflammable methylene chloride strippers, also use a fan to keep fresh air moving throughout the work area. Electrical sparks from fans may increase the chance of flammable paint strippers fumes to catch fire.
- The safest place to use flammable methylene chloride strippers is outdoors away from any source of sparks, flame, or high heat.

2. Acetone, Toluene, and Methanol: These chemicals are commonly used together. All three chemicals evaporate quickly and are very flammable. Breathing high levels of these chemicals can cause a variety of effects, including drowsiness, dizziness, and headache. Breathing high levels of toluene may harm unborn children. Breathing very high levels for a long period may cause brain damage. Toluene and methanol are poisonous if swallowed.

- To avoid fire and health problems, it is very important to use products containing these chemicals only in areas with plenty of fresh air.
- Do not work near an open flame, pilot lights, or electrical sparks when using flammable paint strippers. Do not use strippers near gas stoves, kerosene heaters, gas or electric water heaters, gas or electric clothes dryers, gas or electric furnaces, gas or electric space heaters, sanders, buffers, or other electric hand tools.

3. N-methylpyrrolidone (NMP): Excessive contact with NMP may cause skin swelling, blistering, and burns. These skin reactions may not appear until some time after exposure. N-methylpyrrolidone can readily get into the body through the skin and may cause health problems. NMP may cause reproductive problems and harm to unborn children.

- It is very important to wear chemical-resistant gloves and avoid skin contact when using this solvent.
- Wash hands immediately after use, even when wearing gloves.
- Gloves should fit properly and be chemical-resistant. Common kitchen latex gloves do not provide enough protection.
- Avoid using this product for extended periods in an enclosed area without open doors or windows to the outside for cross-ventilation.

4. Dibasic Esters (DBE): including dimethyl adipate ester, dimethyl succinate ester, and dimethyl glutarate ester Much less is

known about the possible health effects of these chemicals than about most of the other paint stripping chemicals. Some people using DBE products without fresh air have reported temporary blurred vision. Repeatedly breathing DBE damages the cells lining the nose of laboratory animals. Some strippers include a mixture of DBE products and NMP.

- Avoid using this product for extended periods in an enclosed area without open doors or windows to the outside for cross-ventilation.
- Use appropriate protective clothing and provide fresh air to the work site when using these products.

Caustoc-Based Strippers (Not Flammable):

Caustic Alkalis: Caustic alkalis react with the paint coating and loosen it from the surface. One of the chemicals in this type of stripper is sodium hydroxide (lye). Some people do not use caustic alkalis because caustic products can darken wood and raise the grain. Caustics can cause severe burns to skin and eyes even on short contact. Therefore, be very careful to keep caustic chemicals away from skin and eyes and wear protective clothing. If contact occurs, wash off immediately with cold water. Caustics are also highly toxic if swallowed.

- It is very important to avoid skin and eye contact when using caustic alkalis.
- Use gloves that fit properly and are appropriate for caustic alkalis.
- Wear appropriate protective clothing and goggles when using caustic alkalis.

Other Types of Paint Strippers:

Some paint strippers have a citrus smell or make "environmentally friendly" claims. However, these paint strippers may be hazardous despite the smell and environmental claims.

It is important to use appropriate protective clothing and fresh air for cross-ventilation when using these products.

Content Provided By the DOE

By
DoItYourself Staff

related articles

How to Strip Masonry Paint

How to Strip Paint from Drywall

U.S. Department of Labor

Assistant Secretary for
Occupational Safety and Health
Washington, D.C. 20210

James J. Jones
Assistant Administrator
Office of Chemical Safety and Pollution Prevention
U.S. Environmental Protection Agency
1200 Pennsylvania Ave, N.W.
Washington, DC 20460

Dear ~~Mr.~~ Jim — Jones:

This letter follows our discussion with your office related to the risks associated with methylene chloride (MC) and N-methylpyrrolidone (NMP) in paint removers and trichloroethylene (TCE) in aerosol degreasing, spot cleaning in dry cleaning, and vapor degreasing under the Toxic Substances Control Act (TSCA). More specifically, you are inquiring whether the risks from occupational exposure are more appropriately handled by actions taken under the Occupational Safety and Health (OSH) Act. Given certain limitations imposed on OSHA's authority under the OSH Act, this agency believes TSCA provides the Environmental Protection Agency (EPA) with a means of eliminating or reducing the risks associated with these chemical uses in a more coordinated fashion across both consumer and occupational settings.

There are limits on OSHA's authority to regulate exposures to hazardous chemicals such as MC, NMP, and TCE. The OSH Act grants OSHA the authority to promulgate and enforce occupational safety and health standards to address exposure to unsafe levels of hazardous chemicals in the private sector and in most federal workplaces. *See* 29 U.S.C. §§ 652(5), 655(b)(5), 653(a), 668. OSHA lacks direct jurisdiction over state and local government workers, and they are covered only if they work in those states that have an OSHA-approved state safety and health program. *See* 29 U.S.C. § 652(5); 29 C.F.R. § 1902.4(d). In such cases, they are subject to the state's safety and health standards, which must be at least as effective as OSHA's requirements. *See* 29 U.S.C. § 667(c)(2). Currently, 28 states have OSHA-approved programs.

Moreover, OSHA does not cover self-employed workers, military personnel and uniquely military equipment, systems, and operations, and workers whose occupational safety and health hazards are regulated by another federal agency (for example, the Mine Safety and Health Administration, the Department of Energy, or the Coast Guard). In addition, since 1976, there has been an annual rider to OSHA's appropriation that prohibits the agency from expending appropriated funds to issue standards for or conduct enforcement activities against certain small farming operations. See, e.g., Consolidated Appropriations Act, 2014, Pub. L. No. 113-76 (2014). Finally, OSHA's jurisdiction is limited to the workplace, and the agency does not have authority to address exposures outside that scope, such as purely consumer uses of hazardous chemicals.

OSHA has issued standards which set permissible exposure limits (PELs) for MC and TCE in the workplace. OSHA's MC standard, 29 C.F.R. § 1910.1052, was issued in 1997 through a rigorous notice and comment process and applies to general industry, construction, and shipyard employment. It sets the PEL for airborne MC to an eight-hour time-weighted-average (TWA) of 25 parts per million (ppm). This standard also includes provisions for initial exposure monitoring, engineering controls, work practice controls, medical monitoring, and personal protective equipment.

OSHA's PEL for occupational exposure to TCE is found at Table Z-2 of 29 C.F.R. § 1910.1000. Under Table Z-2, each employee's cumulative exposure to TCE during an eight-hour work shift may not exceed an eight-hour TWA of 100 ppm. Moreover, each employee's exposure to TCE may not exceed 200 ppm at any time during an eight-hour work shift (except that each employee's exposure to TCE may reach 300 ppm for five minutes every two hours). The PEL for TCE was adopted at the formation of OSHA in 1971 and is based on an outdated ACGIH occupational exposure limit. The ACGIH has since reduced its TCE exposure limit to a 10 ppm eight-hour TWA and a 15 minute short-term limit of 25 ppm to reflect updated scientific evidence.

OSHA does not have a PEL for NMP. However, the agency may issue citations and penalties to employers under the general duty provisions of the OSH Act, 29 U.S.C. § 654(a)(1), in instances where that substance presents a recognized hazard that is causing or is likely to cause death or serious physical harm to employees.

OSHA's current regulatory agenda does not include updates to the agency's MC and TCE requirements or the issuance of a new standard for NMP, and at this time OSHA does not anticipate such regulatory activity in the near future. However, OSHA supports the goals of EPA to broadly address the hazards associated with these chemicals and looks forward to collaborating with you on activities that will reduce occupational risk.

Sincerely,

David Michaels, PhD, MPH

☐ CONGRESSIONAL

OSHA's Controlled Correspondence Unit

Room: N 3626 – *Phone:* 3 - 2050

DATE: 3/31/16 **CONTROL #:** 800965

FOR CCU USE ONLY

DIRECTORATE/OFFICE: DSG

CONGRESSMAN(WOMAN)/SENATOR:

NON-CONGRESSIONAL ORIGINATOR:

ORGINATOR ORGANIZATION:

SUBJECT/ISSUE: Risks associated w/ Methylene Chloride (MC) and N-Methylpyrolidone (NMP) in paint removers (TCE)

COMMENTS

DESTINATION *(Check Box)*

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- ☐ SOL/OSH
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Correspondence Details

Correspondence ID: **OSHA-L2016-800965**
Record Status: **Closed**
Originator: **Michaels, David**
Addressed To: **Jones, James**
Organization: **DSG**
Constituent:
Subject: **Risk associated with Methylene Cloride (MC) and N-Methylprrolidone (NMP) in pain**
Letter Type: **Agency Generated Letter**
Signature Level: **Assistant Secretary**
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Date: **3/31/2016**
Office: **DSG - Directorate of Standards & Guidance**
Action: **Action**

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Final Signed By: **Michaels, David**
Final Signed Date: **4/4/2016**
Close Out Date: **4/4/2016**

Articles on Methylene Chloride in Paint Removers

for EPA's Planned Proposed Rule under
the Toxic Substances Control Act (TSCA) Section 6(a)
for Methylene Chloride and N-Methylpyrrolidone (NMP) in Paint Removers

Resources:

1. Estill, C. Fairfield, R. Kurimo, and D. Watkins. "Engineering Controls for Furniture Strippers to Meet the New OSHA PEL for Methylene Chloride." *AIHce 2000* (2000): 326-333.
    - Available online: http://www.ncbi.nlm.nih.gov/pubmed/12174809
    - *Abstract: This case study demonstrates how methylene chloride exposures during furniture stripping can be reduced to below the Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) of 25 ppm (as an 8-hour time-weighted average). Five surveys were conducted at one facility; the first four resulted in employee exposure geometric means from 39 to 332 ppm. For the fifth survey local exhaust ventilation was used at the stripping tank and the rinsing area, which together exhausted 138 m3/min (4860 ft3/min). Additional controls included providing adequate make-up air, adding paraffin wax to the stripping solution, raising the level of the stripping solution in the tank, and discussing good work practices with the employee. The employees' methylene chloride exposures during the fifth survey resulted in a geometric mean of 5.6 ppm with a 95% upper confidence limit of 8.3 ppm, which was found to be significantly lower than the OSHA PEL and the OSHA action level of 12.5 ppm. The cost of the ventilation system was $8900.*

2. Anundi, H., et al. "Air and Biological Monitoring of Solvent Exposure during Graffiti Removal." *International Archives of Occupational and Environmental Health.* National Center for Biotechnology Information. U.S. National Library of Medicine, 4 Mar. 2000: 361-369.
    - Available online: http://www.ncbi.nlm.nih.gov/pubmed/11100951
    - *Abstract: The principal aim of the study was to estimate the level of exposure to organic solvents of graffiti removers, and to identify the chemicals used in*

different cleaning agents. A secondary objective was to inform about the toxicity of various products and to optimise working procedures. Many different cleaning agents were used. The average exposure to solvents was low, but some working tasks included relatively high short-term exposure. To prevent adverse health effects, it is important to inform workers about the health risks and to restrict the use of the most toxic chemicals. Furthermore, it is important to develop good working procedures and to encourage the use of personal protection equipment.

3. California Department of Public Health- Occupational Health Branch. "Methylene chloride linked to worker death in tank." (2012).
    - Available online: https://www.cdph.ca.gov/programs/ohb-face/Documents/paintstripper.pdf
    - *Abstract: The California Fatality Assessment and Control Evaluation (CA/FACE) program tracks and investigates cases of fatal injuries at work, and makes prevention recommendations for employers and workers. The CA/FACE program is investigating the preventable death of a worker who was using a paint stripper inside a tank at a paint manufacturing company. A second worker was also nearly killed after attempting a rescue.*

4. Riley, D.M., et al. "Evaluating the Effectiveness of Risk-Reduction Strategies for Consumer Chemical Products." *Risk Analysis.* Vol. 21, No. 2. (2001): 357-369.
    - Available online: http://sds.hss.cmu.edu/risk/articles/EffectConsumerChem.pdf
    - *Abstract: Communication about risks offers a voluntary approach to reducing exposure to pollutants. Its adequacy depends on its impact on behavior. Estimating those impacts first requires characterizing current activities and their associated risk levels, and then predicting the effectiveness of risk reduction strategies. Characterizing the risks from chemical consumer products requires knowledge of both the physical and the behavioral processes that influence exposures. This article presents an integrated approach that combines consumer interviews, users' beliefs and behaviors, and quantitative exposure modeling. This model was demonstrated in the context of consumer exposure to a methylene chloride-based paint stripper, showing how it could be used to evaluate current levels of risk and predict the effectiveness of proposed voluntary risk-reduction strategies.*

Proposed Rulemaking under TSCA Section 6: Paint Removers

SBAR Pre-Panel Outreach: Response to SER Request

During the pre-panel outreach meeting on March 17, 2016, small entity representatives were interested in learning if there were currently paint and coating removing products available for sale that 1) do not contain methylene chloride and 2) do not contain more than 25% N-methylpyrrolidone (NMP). In response to that request, EPA has compiled the following list of products based on information in publicly available Safety Data Sheets (SDS). These are the products EPA is aware of that, based on their SDS, appear to meet these criteria. It is not a comprehensive list of all possible products.

This list of paint remover products is provided **for informational purposes only.** It was generated by EPA on May 15, 2015 by searching through all of the publicly available product SDSs that EPA could find, and it may not necessarily be complete. Additionally, EPA has not verified the chemical composition of the products on this list. Furthermore, formulations may have changed since EPA accessed the SDS in May 2015.

Inclusion on this list is not intended to be or imply any endorsement of the product or the manufacturer.

Type of product	Product Name
NMP ~25% or less	Dumond Peel Away 7 General
NMP ~25% or less	Dumond Peel Away 4 General
NMP ~25% or less	Dumond Peel Away 5 General
NMP ~25% or less	Sprayon SP 404 Graffiti
NMP ~25% or less	Sprayon SP 405 General
NMP ~25% or less	Sprayon SP 915 General
NMP ~25% or less	CRC Gasket Remover
NMP ~25% or less	CRC Graffiti Remover
NMP ~25% or less	Sunnyside West Marine Remover Spray Marin
NMP ~25% or less	Sunnyside Easy-Strip General
NMP ~25% or less	Sunnyside Ready-Strip Deck
NMP ~25% or less	Sunnyside Ready-Strip Marine
NMP ~25% or less	Sunnyside Ready-Strip Pro General
NMP ~25% or less	Teknikem RonJohn Dip Strip
NMP ~25% or less	Chemtronics Inc Super Bio Wash
NMP ~25% or less	Invista Formulation A
NMP ~25% or less	Invista Formulation B
NMP ~25% or less + Dibasic Esters	Atco Vango II Graffiti Remover
NMP ~25% or less + Dibasic Esters	Atco Vanish Graffiti Remover
NMP ~25% or less + Dibasic Esters	Dumond Peel Away Marine Safety Strip
NMP ~25% or less + Dibasic Esters	Savogran Biodegradable Spray Graffiti Remover
NMP ~25% or less + Dibasic Esters	Sunnyside Aqua Strip General
NMP ~25% or less + Dibasic Esters	Sunnyside Back to Nature Double Duty General
NMP ~25% or less + Dibasic Esters	Sunnyside Back to Nature Iduna Strip General

Type of product	Product Name
NMP ~25% or less + Dibasic Esters	Sunnyside Back to Nature IV-S General
NMP ~25% or less + Dibasic Esters	Sunnyside Back to Nature Strip-Tox General
NMP ~25% or less + Dibasic Esters	Sunnyside Dyna Strip 2 General
NMP ~25% or less + Dibasic Esters	Sunnyside Dyna Strip 3 General
NMP ~25% or less + Dibasic Esters	Sunnyside Multi-Strip Professional General
NMP ~25% or less + Dibasic Esters	Sunnyside Paint Remover 651General
NMP ~25% or less + Dibasic Esters	Sunnyside Ready-Strip Mastic Remover
NMP ~25% or less + Dibasic Esters	Sunnyside Ready-Strip Plus Safer P&V Remover General
NMP ~25% or less + Dibasic Esters	Sunnyside Tough 2 Strip General
Acetone-Tolune-Methanol	Benco B20 Industrial Paint Remover
Acetone-Tolune-Methanol	Star10 Phase 1 Semi-Paste Paint Stripper/Phase 2 Liquid Paint Stripper
Acetone-Tolune-Methanol	Star 10 Aerosol Stipper
Caustic	Fiberlock Piranha NexStrip 8 Alkaline Paint Remover
Caustic	Dumond Peel Away 1
Caustic	Dumond Smart Strip HD
Caustic	Air Products
Caustic	Marine Strip
Benzyl Alcohol	McGean-Roh Co Cee-Bee E-1058
Benzyl Alcohol	Dumond Smart Strip
Benzyl Alcohol	Chemique StripIt Safer Water Based Paint Remover
Benzyl Alcohol	Dumond Smart Strip PRO
Benzyl Alcohol	Dumond Smart Strip Log and Timber
Benzyl Alcohol	Benco B96 Industrial Paint Remover
Dibasic Esters	Seymour Graffiti Remover
Dibasic Esters	Invista DBE-2
Dibasic Esters	Invista Formulation C
Dibasic Esters	Charlotte Products Paint Stripper and Graffiti Remover

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Assigned Protection Factors

for the Revised Respiratory Protection Standard

OSHA 3352-02 2009

https://www.osha.gov/Publications/3352-APF-respirators.pdf