TSCA Methylene Chloride Ruling and LLNL's Pathway to Compliance

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Objectives

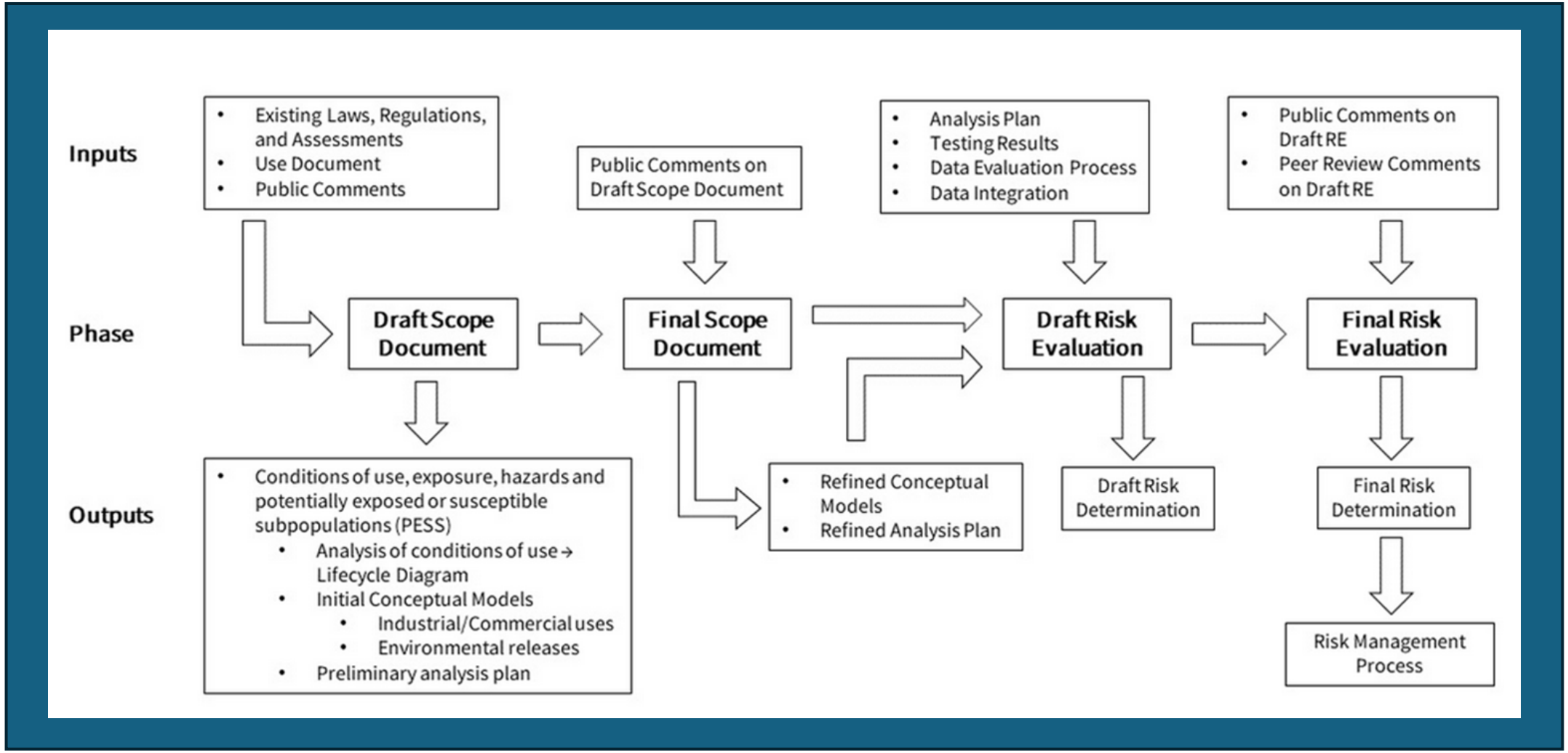
- Background on EPA TSCA Risk Rulings
- Details on methylene chloride ruling
- Requirements on methylene chloride ruling
- Uses of methylene chloride in a research and development setting
- LLNL’s pathway to compliance
- Questions

EPA and TSCA Risk Rulings

- Toxic Substance Control Act of 1976
- 40 CFR Chapter I, Subpart R, Part 707
  - *"TSCA is intended to be comprehensive, and assure protection of health and the environment from **unreasonable risks** associated with chemicals whether the chemicals are imported or produced domestically."*
- EPA to maintain TSCA Chemical Substance Inventory (~87,000)
  - *"confidential and non-confidential chemical substances manufactured or processed in the [U.S.] for nonexempt commercial purpose with the EPA complied and keeps current…"*
- Amended with Frank R. Lautenberg Chemical Safety for the 21st Century Act

Risk-based Chemical Assessments

Prioritization → Risk Evaluation → Risk Management



- “Ongoing and Completed Chemical Risk Evaluations under TSCA”

Ongoing and Completed Chemical Risk Evaluations under TSCA

The existing chemicals listed on this page have either undergone or are currently undergoing risk evaluation as part of EPA’s existing chemical process under the Toxic Substances Control Act (TSCA) to determine whether they present an unreasonable risk to public health or the environment.

Learn more about:

- The risk evaluation process for existing chemicals under TSCA
- The prioritization process, and how chemicals are identified as a high priority for risk evaluation
- Manufacturer-requested risk evaluations
- Risk management for existing chemicals

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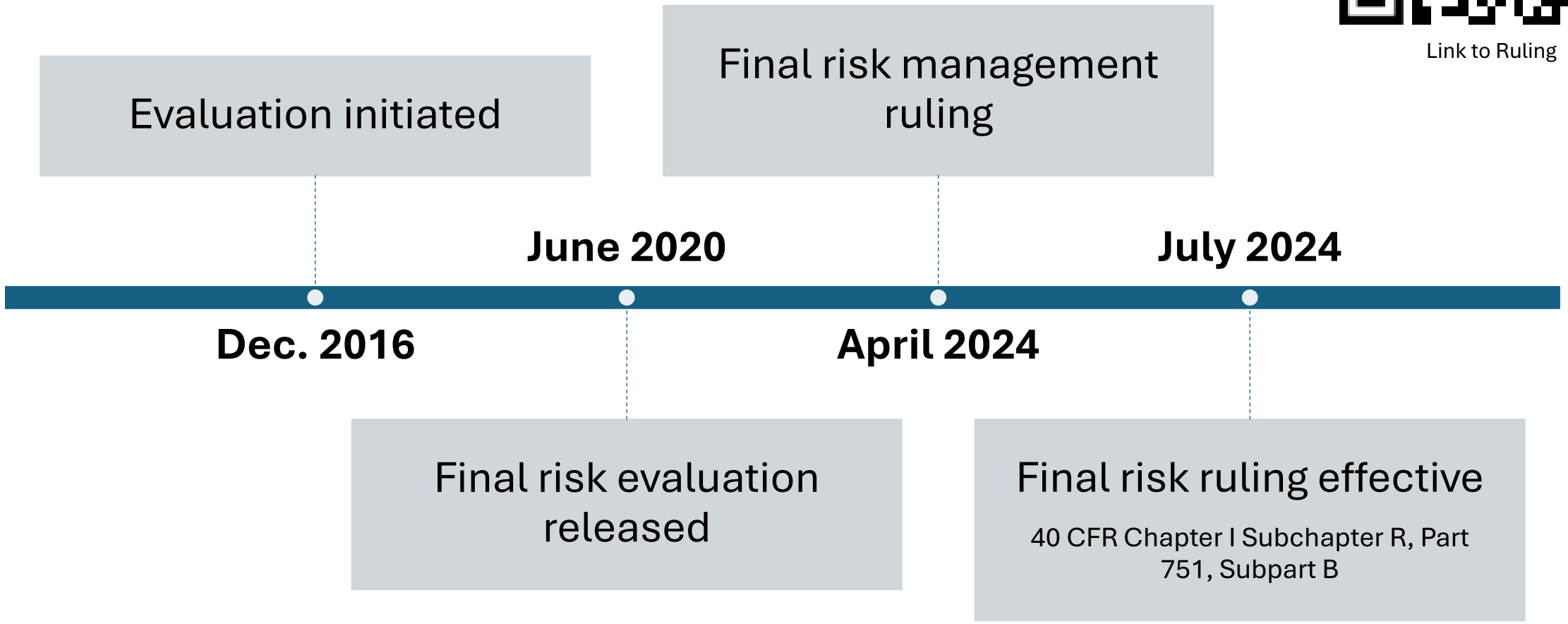
Chemical Name	CASRN	Chemical Group	Date Initiated	Docket Number(s)	Status*	Agency Contact
1-Bromopropane (1-BP)	106-94-5	Solvents	December 2016	EPA-HQ-OPPT-2019-0235 ; EPA-HQ-OPPT-2016-074	Final risk evaluation (August 2020), Proposed risk management rule (July 2024)	Olivia Bailey Email: 1BP_TSCA@epa.gov Phone: (202) 566-0894
1,1-Dichloroethane	75-34-3	Solvents	December 2019	EPA-HQ-OPPT-2018-0426, EPA-HQ-OPPT-2024-0114	Final risk evaluation (June 2025)	Clara Hull Email: 1.1.Dichloroethane.TSCA@epa.gov Phone: (202) 564-3954

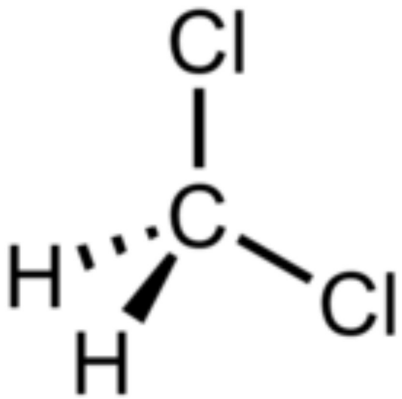
What is being done at LLNL?

Substance	CASRN	Chemical Group	Date Initiated	Date Checked	Status of Ruling	Date Checked	Status of Ruling	Date Checked	Status of Ruling
1-Bromopropane (1-BP)	106-94-5	Solvents	December 1, 2016	1/8/2025	5. Final risk evaluation	4/1/2025	5. Final risk evaluation	9/11/2025	6. Proposed risk management rule
1,1-Dichloroethane	75-34-3	Solvents	December 1, 2019	1/8/2025	4. Draft risk evaluation	4/1/2025	4. Draft risk evaluation	9/11/2025	5. Final risk evaluation
1,1,2-Trichloroethane	79-00-5	Solvents	December 1, 2019	1/8/2025	3. Final Scope	4/1/2025	3. Final Scope	9/11/2025	3. Final Scope
1,2-Dichloroethane	107-06-2	Solvents	December 1, 2019	1/8/2025	4. Draft risk evaluation	4/1/2025	4. Draft risk evaluation	9/11/2025	4. Draft risk evaluation
1,2-Dichloropropane	78-87-5	Solvents	December 1, 2019	1/8/2025	3. Final Scope	4/1/2025	3. Final Scope	9/11/2025	3. Final Scope
1,3-Butadiene	106-99-0	N/A	December 1, 2019	1/8/2025	4. Draft risk evaluation	4/1/2025	4. Draft risk evaluation	9/11/2025	4. Draft risk evaluation
1,3,4,6,7,8-Hexahydro-4,6,6,7,8,8-hexamethylcyclopenta [g]-2-benzopyran (HHCB)	1222-05-5	Fragrance additives	December 1, 2019	1/8/2025	3. Final Scope	4/1/2025	3. Final Scope	9/11/2025	3. Final Scope
1,4-dioxane	123-91-1	Solvents	December 1, 2016	1/8/2025	5. Final risk evaluation	4/1/2025	5. Final risk evaluation	9/11/2025	5. Final risk evaluation
Asbestos (Part 1)	1332-21-4	N/A	December 1, 2016	1/8/2025	3. Final Scope	4/1/2025	7. Final risk management rule	9/11/2025	7. Final risk management rule
Asbestos (Part 2)	1332-21-4	N/A	December 1, 2016	1/8/2025	5. Final risk evaluation	4/1/2025	5. Final risk evaluation	9/11/2025	5. Final risk evaluation
Butyl benzyl phthalate - 1,2-Benzene- dicarboxylic acid, 1- butyl 2(phenylmethyl) ester	85-68-7	Phthalates	December 1, 2019	1/8/2025	1. Initiated	4/1/2025	1. Initiated	9/11/2025	4. Draft risk evaluation
Carbon Tetrachloride	56-23-5	Solvents	December 1, 2016	1/8/2025	7. Final risk management rule	4/1/2025	7. Final risk management rule	9/11/2025	7. Final risk management rule
Di-ethylhexyl phthalate - (1,2-Benzene- dicarboxylic acid, 1,2- bis(2-ethylhexyl) ester)	117-81-7	Phthalates	December 1, 2019	1/8/2025	1. Initiated	4/1/2025	1. Initiated	9/11/2025	4. Draft risk evaluation
Di-isodecyl phthalate (DIDP) – (1,2-benzenedicarboxylic acid 1,2-diisodecyl ester)	26761-40-0, 68515-49-1	Phthalates	December 1, 2019	1/8/2025	5. Final risk evaluation	4/1/2025	5. Final risk evaluation	9/11/2025	4. Draft risk evaluation
Di-isononyl phthalate (DINP) – (1,2-benzenedicarboxylic acid, 1,2-diisononyl ester)	28553-12-0; 68515-48-0	Phthalates	December 1, 2019	1/8/2025	4. Draft risk evaluation	4/1/2025	5. Final risk evaluation	9/11/2025	5. Final risk evaluation
Dibutyl phthalate (1,2-Benzene- dicarboxylic acid, 1,2- dibutyl ester)	84-74-2	Phthalates	December 1, 2019	1/8/2025	1. Initiated	4/1/2025	1. Initiated	9/11/2025	4. Draft risk evaluation
Dicyclohexyl phthalate	84-61-7	Phthalates	December 1, 2019	1/8/2025	4. Draft risk evaluation	4/1/2025	4. Draft risk evaluation	9/11/2025	4. Draft risk evaluation
Ethylene dibromide	106-93-4	N/A	December 1, 2019	1/8/2025	3. Final Scope	4/1/2025	3. Final Scope	9/11/2025	3. Final Scope
Formaldehyde	50-00-0	N/A	December 1, 2019	1/8/2025	5. Final risk evaluation	4/1/2025	5. Final risk evaluation	9/11/2025	5. Final risk evaluation
Methylene Chloride	75-09-2	Solvents	December 1, 2016	1/8/2025	7. Final risk management rule	4/1/2025	7. Final risk management rule	9/11/2025	7. Final risk management rule
N-Methylpyrrolidone (NMP)	872-50-4	Solvents	December 1, 2016	1/8/2025	6. Proposed risk management rule	4/1/2025	6. Proposed risk management rule	9/11/2025	6. Proposed risk management rule
o-Dichlorobenzene	95-50-1	N/A	December 1, 2019	1/8/2025	3. Final Scope	4/1/2025	3. Final Scope	9/11/2025	3. Final Scope
Octamethylcyclotetra- siloxane (D4)	556-67-2	N/A	October 1, 2020	1/8/2025	3. Final Scope	4/1/2025	3. Final Scope	9/11/2025	3. Final Scope
p-Dichlorobenzene	106-46-7	N/A	December 1, 2019	1/8/2025	3. Final Scope	4/1/2025	3. Final Scope	9/11/2025	3. Final Scope
Perchloroethylene	127-18-4	Solvents	December 1, 2016	1/8/2025	7. Final risk management rule	4/1/2025	7. Final risk management rule	9/11/2025	7. Final risk management rule
Phosphoric acid, triphenyl ester (TPP)	115-86-6	Flame retardants	December 1, 2019	1/8/2025	3. Final Scope	4/1/2025	3. Final Scope	9/11/2025	3. Final Scope
Phthalic anhydride	85-44-9	N/A	December 1, 2019	1/8/2025	3. Final Scope	4/1/2025	3. Final Scope	9/11/2025	3. Final Scope
trans-1,2- Dichloroethylene	156-60-5	Solvents	December 1, 2019	1/8/2025	3. Final Scope	4/1/2025	3. Final Scope	9/11/2025	3. Final Scope
Trichlorethylene (TCE)	79-01-6	Solvents	December 1, 2016	1/8/2025	7. Final risk management rule	4/1/2025	7. Final risk management rule	9/11/2025	7. Final risk management rule
Tris(2-chloroethyl) phosphate (TCEP)	115-96-8	Flame retardants	December 1, 2019	1/8/2025	5. Final risk evaluation	4/1/2025	5. Final risk evaluation	9/11/2025	5. Final risk evaluation
Acrylonitrile	107-13-1	---	December 1, 2023	1/8/2025	1. Initiated	4/1/2025	1. Initiated	9/11/2025	1. Initiated
Benzenamine	62-53-3	---	December 1, 2023	1/8/2025	1. Initiated	4/1/2025	1. Initiated	9/11/2025	1. Initiated
Vinyl Chloride	75-01-4	---	December 1, 2023	1/8/2025	1. Initiated	4/1/2025	1. Initiated	9/11/2025	2. Draft Scope
4,4' Methylene bis(2-chloraniline) (MBOCA)	101-14-4	---	December 1, 2023	1/8/2025	1. Initiated	4/1/2025	1. Initiated	9/11/2025	1. Initiated

Methylene Chloride Ruling

Link to Ruling





Methylene Chloride

Colorless, volatile liquid; sweet odor. Irritating to eyes/skin/ respiratory tract. Toxic.
Also causes: tingling limbs, anemia, CNS effects, heart problems.
Chronic: dermatitis, liver disease, CNS effects.
Possible reproductive effects/ cancer hazard.

CAS No. 75-09-2

Methylene Chloride Ruling Background

- Colorless liquid and a volatile chemical with a sweet odor resembling chloroform.
- Uses include adhesives, sealants, automotive products, paint, and paint removers.
- 2020 risk evaluation found carcinogenic and non-carcinogenic health effects
  - Carcinogenic and genotoxic effects, specifically in the liver and lungs.
  - Six non-cancer adverse health effects: liver, immune system, nervous system (CNS), reproductive/developmental effects, irritation/burns.
  - Target organs: liver, CNS, eyes (peripheral vision), lungs

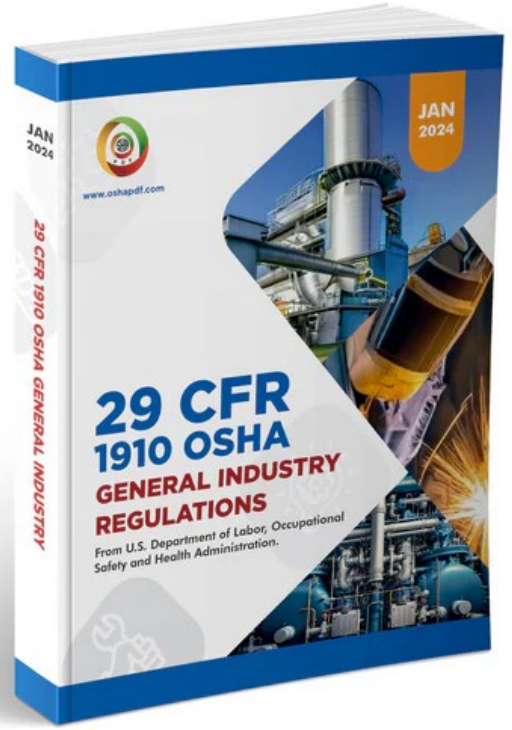
Requirements of Ruling §751.105, 107, 109

- Several prohibitions of manufacturing, processing, or distributing to consumers.
  - *"Do not apply to products containing methylene chloride with less than 0.1% by weight."*

- Where not prohibited, or otherwise regulated (pesticides tobacco, food, drugs, cosmetic, munitions) a Workplace Chemical Protection Program (WCPP) is required.
  - Applicable to various applications including as "industrial and commercial use as a laboratory chemical."

To Supplement not Replace

- Ruling states 29 CFR 1910 sections still apply
  - Respiratory protection **.134**
  - Personal protective equipment **.132**
  - Methylene chloride **.1052**



Exposure Limits §751.109(c)(1-2)

- Existing Chemical Exposure Limit (ECEL)
  - 2 ppm as an 8-hour TWA
  - AL: 1 ppm as an 8-hour TWA
- STEL
  - 16 ppm as a 15-minute STEL
- OSHA PEL: 25 ppm
- ACGIH TLV: 50 ppm

Regulated Areas §751.109(c)(3)

- Where exposure is measured or is reasonably expected to exceed ECEL *or* STEL.
- “Mark area in any manner that adequately establishes and alerts potentially exposed persons”.
- Regulate access to areas.

Exposure Monitoring §751.109(d)

- Initial and periodic monitoring
- Personal breathing zone air samples of each potentially exposed person.
- Representative breathing zone air sampling
  - *"at least one potentially exposed person in each job classification in a work area during every work shift…[with] highest methylene chloride exposure."*
- Documentation is needed to show work, and conditions are similar across shifts.

- Methods require:
  - 95% confidence level
  - +/- 25% for airborne concentrations above ECEL or STEL, *or* +/- 35% for airborne concentrations at or above ECEL AL, but below ECEL.
- Direct monitoring instrumentation can be used if exposure to methylene chloride is known to be **fewer than 30 days per year**.
- Cannot rely on monitoring that is more than **5 years** old to show compliance to requirements.
- Periodic monitoring requirements are outlined in Table 1 of 40 CFR Chapter I Subchapter R, Part 751, Subpart B

Methylene Chloride

CAS number:	75-09-2
OSHA PEL:	25 ppm (87 mg/m^3) 8-Hour TWA PEL, 12.5 ppm (43 mg/m^3) 8-Hour TWA Action Level, 125 ppm (434 mg/m^3) 15-Minute STEL, General Industry, Construction, Shipyard
Procedure:	Collect samples by drawing workplace air containing methylene chloride vapor through two Anasorb 747 synthetic charcoal sorbent tubes connected in series. Extract samples with 60/40 (v/v) *N*,*N*-dimethylformamide/carbon disulfide (DMF/CS_2) and analyze by gas chromatography (GC) using a flame ionization detector (FID).
Recommended sampling time and sampling rate:	240 min at 50 mL/min (12 L, 8-Hour TWA) 15 min at 50 mL/min (0.75 L, 15-Minute STEL)
Limit of quantitation: Reporting limit:	0.22 ppm (0.77 mg/m^3, 8-Hour TWA), 3.6 ppm (12 mg/m^3, 15-Minute STEL) 0.48 ppm (1.7 mg/m^3, 8-Hour TWA), 7.7 ppm (27 mg/m^3, 15-Minute STEL)
Uncertainty (u):	8.6% (8-Hour TWA) 9.3% (15-Minute STEL)
Special requirements:	Immediately after sampling, separate and cap the two sampling tubes to prevent post-sampling migration.
Author:	Michael Simmons

METHYLENE CHLORIDE 1005

CH_2Cl_2 MW: 84.94 CAS: 75-09-2 RTECS: PA8050000

METHOD: 1005, Issue 3 **EVALUATION:** FULL **Issue 1:** 15 August 1984 **Issue 3:** 15 January 1998

OSHA : 25 ppm; STEL 125 ppm
NIOSH: lowest feasible; carcinogen
ACGIH: 50 ppm; suspect carcinogen
(1 ppm = 3.47 mg/m³)

PROPERTIES: liquids, d 1.323 g/mL @ 20 °C; BP 40 °C; MP -95 °C; VP 47 kPa (349 mm Hg) @ 25 °C, nonflammable

SYNONYMS: dichloromethane, methylene dichloride

SAMPLING

SAMPLER: SOLID SORBENT (2 coconut shell charcoal tubes, 100/50 mg)

FLOW RATE: 0.01 to 0.2 L/min

VOL-MIN: 0.5 L @ 500 ppm
-MAX: 2.5 L

SHIPMENT: separate front and back tubes

SAMPLE STABILITY: ca. 30 days @ 5 °C [1]

BLANKS: 2 to 10 field blanks per set

ACCURACY

RANGE STUDIED: 1700 to 7097 mg/m^3 [2]

BIAS: - 4.1%

OVERALL PRECISION ($\hat{S}_{rT}$): 0.076 [1, 2]

ACCURACY: ±15.8%

MEASUREMENT

TECHNIQUE: GAS CHROMATOGRAPHY, FID

ANALYTE: methylene chloride

DESORPTION: 1 mL CS_2

INJECTION VOLUME: 1 µL

TEMPERATURE-INJECTION: 250 °C
-DETECTOR: 300 °C
-COLUMN: 80 to150 °C at 10 °C/min

CARRIER GAS: Helium, 2.4 mL/min

COLUMN: capillary, 30 m x 0.32-mm ID, 0.25-µm film polyethylene glycol, Stabilwax, or equivalent

CALIBRATION: solutions of methylene chloride in CS_2

RANGE: 1.4 to 2600 µg per sample [1]

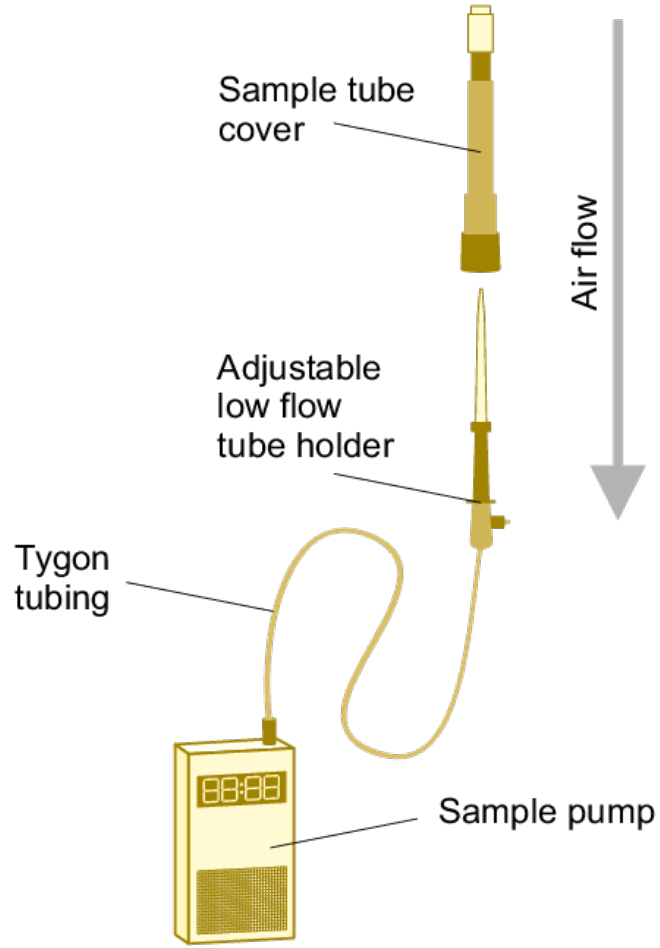
ESTIMATED LOD: 0.4 µg per sample [1]

PRECISION ($\hat{S}_r$): 0.026 [1]

APPLICABILITY: The working range for GC-FID analysis is 0.4 to 749 ppm (1.4 to 2600 mg/m^3) for a 1-L air sample [1]. An electron capture detector (ECD) also may be used to obtain lowest feasible level of detection and quantitation [3]. Conditions for using an ECD are listed in the APPENDIX.

INTERFERENCES: No specific interferences were identified. However, any compound with a similar retention time may interfere. Alternate chromatographic columns are Carbowax-PEG and DB-1 fused silica capillary columns. The capacity of the charcoal is greatly reduced when sampling in high humidity [4].

OTHER METHODS: This revises NMAM 1005 (dated 8/15/94) [5]. If sampling in an atmosphere with high relative humidity (≥ 80%), a tube with larger bed of charcoal is recommended. OSHA Method 59 uses a sampler with three sorbent sections, each containing 350 mg of charcoal, and has been evaluated for a 10-L air sample at 1 ppm of methylene chloride with 80% relative humidity [4]. OSHA Method 80 uses a carbon molecular sieve sampler and GC-FID analysis, and has been evaluated at 10 ppm and 500 ppm [6].



Frequency of Periodic Monitoring Based on Initial Monitoring Results

Initial Monitoring Results	ECEL Monitoring Frequency	STEL Monitoring Frequency
<AL & <STEL	Once/5 yrs.	NA
<AL & >STEL	Once/5 yrs.	Once/3 mos.
AL≤ *x* ≤ECEL & ≤STEL	Once/6 mos.	NA
AL≤ *x* ≤ECEL & >STEL	Once/6 mos.	Once/3 mos.
>ECEL & >STEL	Once/3 mos.	Once/3 mos.

Additional monitoring is required within 30 days of a change in process that would impact potential of exposure to methylene chloride.

What is being done at LLNL

- Discipline Action Plans (DAP)
- Instructions for conducting certain evaluations of health and safety conditions.
  - Eyewash and safety shower activations
  - Surface contamination (Pb, Be, Rad)
- Inventories listed each month for ES&H techs to complete and to be reviewed by area IHs
  - Based on initial sampling results, this is a tool that will be leveraged for routine sampling
  - Will be reviewed to change frequency of sampling as well

Notification and Recordkeeping §751.109(d)(5-6)

- Potentially exposed need to be informed of results within 15 days.
  - Results
  - Explanation of ECEL, ECEL AL, STEL
  - Exceedance of threshold limits
    - If exceeded, what actions will be taken to reduce exposure
  - Respiratory protection required
  - Quantity of methylene chloride in use at the time
  - Location of use
  - Manner of use
  - How it is released during work
- Written in language majority of workforce will understand and posted in an appropriate and accessible location outside regulated area.
- Provide opportunity to observe monitoring, and PPE during observation.

Exposure Control Plans §751.109(e)(2)

- Controls must reduce concentrations to lowest levels achievable and supplemented with respiratory protection.
- Identification of controls considered (following hierarchy of controls).
- Explanation as to why control was or wasn't selected.
  - **Worker rotation is NOT a means of compliance**.
- What actions will be taken to implement controls
- Description of regulated areas (how they are marked and who can enter them).
- Description of activities and explanation of how changes to the activities will be addressed.

- Owner must maintain effectiveness of controls.
- Plan must be reviewed at least every **5 years**.
- Exposure control plan and monitoring results must be readily available to potentially exposed persons.
- Upon request, provide control plan and/or monitoring results within 15 days, or provide explanation for delay.

What is being done at LLNL

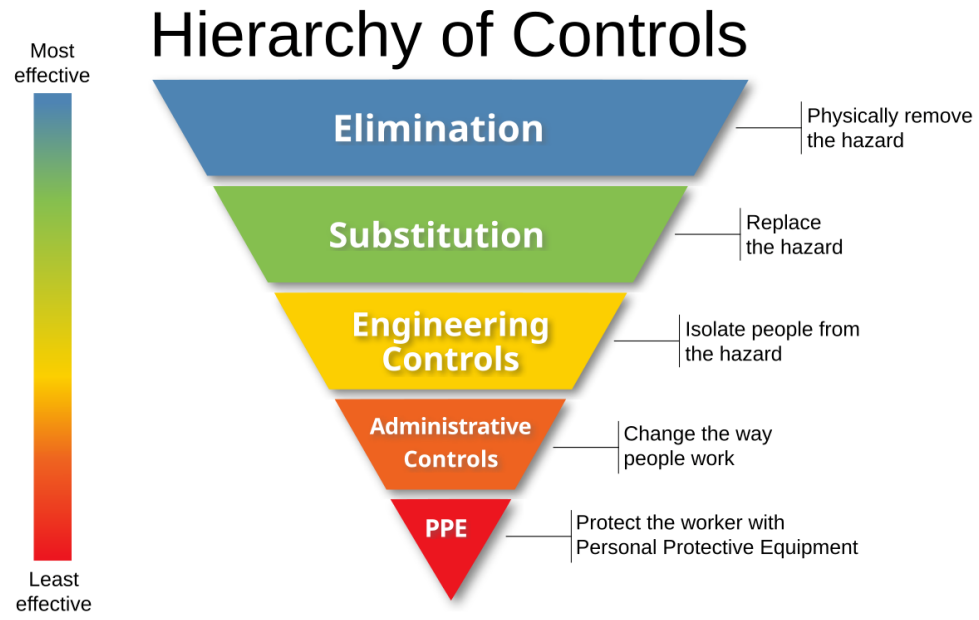
- Work Planning and Control (WP&C)
- Formalized process to review, record, and manage work and tasks done at the lab.
- Recorded in a Work Control Document (WCD)
  - Includes a description of the work, a breakdown of the tasks, and what the task *does not* include.
- Majority of the WCD is populated with safety controls, following the hierarchy of controls, to follow during work.
- Includes actions to take like exposure sampling, employee training, and PPE procurement.

Respiratory Protection §751.109(f)

Concentration (ppm)	Respiratory Protection Req.
≤2 or 16 (STEL)	None
2< *x* ≤50	NIOSH approved SAR Airline w/ continuous flow and loose-fitting facepiece or helmet/hood (APF 50)
50< *x* ≤100	NIOSH approved SAR Airline w/demand mode w/ full facepiece (APF 50) NIOSH SCBA in demand mode w/ full facepiece or helmet/hood (APF 50)
100< *x* ≤2,000	NIOSH approved SAR Airline respirator in continuous flow mode w/ full facepiece or helmet/hood (APF 1,000) Airline respirator in pressure-demand (or positive pressure mode) with full facepiece or helmet/hood (APF1,000) NIOSH approved SCBA in pressure demand w/ full facepiece or helmet/hood (APF 10,000)

Dermal Protection 751.109(g)

- Use of gloves that are chemically resistant to methylene chloride
- Activity specific training where dermal contact is possible
- Must provide training to potentially exposed persons prior to work with methylene chloride.
  - Per 29 CFR 1910.1052(l)(1-6)



What is being done at LLNL

Title of work to be done		*Title of task*			
Tasks NOT in scope	**Topics to cover before task can begin**	**Identification of Hazards**	**Description of Hazards**	**Safety Controls**	**Waste Practices** Waste stream info. **Other actions to take before work is approved** Contact IH to perform air sampling
Working with products with greater than 0.01% methylene chloride by volume	Pre-job talking points First aid measures	Methylene chloride	Skin irritation Eye irritation May cause dizziness Carcinogenic	Engineering Administrative PPE	

Key dates and deadlines

Date Deadline (Private Industry)	Action Required
May 5, 2025	Carry out initial monitoring
August 1, 2025	Ensure workplace concentrations of methylene chloride are at or below ECEL and EPA STEL
October 30, 2025	Develop and implement exposure control plan

Date Deadline (Gov. and Gov. Contracts)	Action Required
November 9, 2026	Carry out initial monitoring
February 8, 2027	Ensure workplace concentrations of methylene chloride are at or below ECEL and EPA STEL
May 10, 2027	Develop and implement exposure control plan

Any Questions?