

For ILMA MWF Committee September 30, 2024

Outline

• MCCP

- Global Regulatory Situation
- Critical Uses/Future Efforts
- LCCP/vLCCP
 - REACH
 - North America

Global CP Situation

- Asia produces 95% of the total global CP production (~1500-2000 kT/Y)
 - China is largest global producing (and consuming) nation
 - Chinese products focus on chlorination level not carbon-chain length (e.g. 42, 45, 52, 70% Cl-wt.)
 CP-52 is largest product (90% in 2020)

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- India second largest
- Europe (including UK) ~ 50-100 kT/Y
- USA ~20-25 kT/Y
- Flame retardant and secondary plasticizer are main uses of CPs globally
 - PVC, rubber, sealants, caulks
- CP use in MWF is less common outside of N.A.

Actions on MCCP

• EU Restriction

- Stockholm Convention proposed listing
- Potential prohibition coming for C10-C20 chloroalkanes based on revised CEPA (Canadian Environmental Protection Act)

• EPA PMN assessments

EU Restriction

- ECHA/committees have finished work and the restriction is now at the Commission in Brussels
- Commission will issue the regulatory text after its review process
 - Expectation is that they will adopt the recommendations of the REACH committees.
- Final rule expect in Q3 2025 at the earliest
- If SEAC recommendation is adopted, MWF use could continue until 2035/2036
 - All others cease 2 years after entry into force)

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Stockholm Convention - MCCP

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- UK proposed to list C14-17 chlorinated paraffins (≥45% CI wt.) on the POPs list in 2021
- EU/CH/NO pushed for a listing based on congener groups, which would effectively list all commercial MCCPs
- Proposal has been discussed now at 4 POPs Review Committee meetings (POPRC 17-20); very heated at times
- POPRC-20 just concluded and there appears to be a compromise agreement on a final proposal
- Will be discussed for adoption at the next Conference of Parties (COP-12) meeting April 28-May 9, 2025
- China (and India?) may challenge; U.S. is not a member and does not get a vote

MCCP POP MWF Exemptions

- (a) For metalworking fluids in professional or industrial settings with collection systems, until 2036, limited to use as extreme temperature and pressure additives for metalworking fluids used in "heavy duty" processes for the production and repair of metals and metal alloy components such as those used in the following applications and sectors:
- (i) Aerospace;
- (ii) Defence;
- (iii) Automobiles;
- (iv) Electrical and electronic equipment (EEE) used in medical devices, *in vitro* diagnostics devices, and instruments for measurement, analysis, manufacturing, control, monitoring, testing and inspection;
- (v) Production of machinery and tools used in agriculture and building/construction;
- (vi) Energy and power generation;
- (vii) Oil and gas extraction;
 - Including the following processes: deep drawing, broaching and fine blanking, drawing with ironing; precision metalworking (cutting/punching/drilling), tapping, cold drawing, cold rolling (pilgering), stamping, forging, and grinding.
 - Including the following alloys, metals, and alloys of these metals: stainless steel, titanium, nickel, aluminum, copper and beryllium.
 - Defined as: motor vehicles covering all land-based vehicles, such as cars, motorcycles, agriculture and construction vehicles and industrial trucks.

CPIA Update to ILMA

CEPA Reauthorization

- Bill S-5 passed the Canadian Parliament in 2023
- Major features include:
 - Dividing CEPA Schedule 1 (CEPA toxic substances) into two parts with Part 1 slated for prohibition; C10-C20 chloroalkanes are listed in Part 1 of Schedule 1

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- Includes consideration of cumulative effects of chemicals
- Create a new 'watch list' of substances deemed capable of becoming toxic
- New confidential business information (CBI) provisions.
- Environment and Climate Change Canada (ECCC) ECCC indicates that it is still working through the CEPA changes and it will likely be a year or more until any new proposals come out
- C10-13 chloroalkanes have been prohibited since 2012, so no further action is required on them
- ECCC indicates that it is open to considering exemptions in any future prohibition regulation of C14-20 chloroalkanes.
- ECCC has requested information on key use of C14-20 chloroalkanes; CPIA is interested in working with any impacted users/industries in Canada to seek exemptions/extensions (already organized discussions for certain polymer applications).

EPA MCCP Evaluation

 CPIA has concluded testing program on MCCP (per the CO/SNURs) and submitted all reports/data to EPA

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- No additional MCCP testing is planned at this time
- EPA (New Chemicals Office) has given no timeline for completing its review of MCCP
- POPs outcome may impact EPA decision, though U.S. is not an official member of the Stockholm Convention
- EPA was quick to propose exemptions for MCCP uses in MWFs under POPs
 - EPA appears to understand that US is minor user in comparison to globe (1 year in Asia = Century in US)

Key/Critical Uses

- Regulators have been open to accepting key/critical uses of MCCP
 - ILMA advocacy on MCCP restriction in EU likely reason for 10 year phase-out period
- CPIA believes developing case studies is the best way to allow applications to continue.
 - Dodge presented excellent case study an 6th MWF Conference in Atlanta

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LCCP/vLCCP

- During the PMN review period (2012-2017) EPA began using "LCCP" to refer to just C18-20 chloroalkanes and vLCCP to review to C21+ chloroalkanes.
 - There is no natural/obvious reasons for a brightline at C20/C21
 - In the U.S. C18-20 is not a common product, though several products (C20-24, C20-28) include C20
- vLCCP PMNs were approved at a time (2013) when EPA was still evaluating the MCCP and LCCP PMNs (products contain C18-20 constituents)
 - vLCCP PMNs contained a tiered testing program focused on chemical analysis and soil and sediment biodegradation and bioaccumulation
 - Requirements under the CO were suspended in 2017 pending the testing and evaluation of MCCP
- EU and UK have requested more testing on the LCCP/vLCCP range but U.S. is still awaiting MCCP decision before it takes further action

LCCP Evaluation in EU and UK

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- Both EU and UK have requested more testing on LCCP
- Key endpoint for testing is bioaccumulation as the MCCP very persistent in sediment conclusion will be carried over to LCCP
 - LCCP has lower water solubility and less bioavailability than MCCP so the bioaccumulation potential is expected to be lower
- Some toxicity testing also being conducted to fill data gap
- Testing and evaluation is expected to take 4-5 years

Thank You!

Andrew Jaques Chlorinated Paraffins Industry Association 1250 Connecticut Avenue, NW, Suite 700 Washington, DC 20036 Phone: +1.301.461.9695 Email: andrew@chlorinatedparaffins.org

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Extra Slides

New CP Substances on TSCA

			SNUR (40 CFR)						
CAS Number	Substance Name	<u>PMN</u>	<u>(Year)</u>						
Medium-Chain (MCCP) (C14-17)									
		P-12-283							
198840-65-2	Tetradecane, chloro derivs.	P-14-683	721.11073 (2019)						
		P-12-282							
1372804-76-6	Alkanes, C14-16, chloro	P-14-684	721.11072 (2019)						
85535-85-9	Alkanes, C14-17, chloro	P-12-453	721.11076 (2019)						
Long-Chain (LCCP	(C18+)								
2097144-48-2	Octadecane, chloro derivs.	P-12-284	721.11074 (2019)						
106232-85-3	Alkanes, C18-20, chloro	P-12-433	721.11075 (2019)						
2097144-45-9	Alkanes, C20-24, Chloro	P-12-281	721.11071 (2019)						
2097144-43-7	Alkanes, C20-28, chloro	P-12-277	721.11068 (2019)						
2097144-44-8	Slackwax (petroleum), Chloro	P-12-278	721.11069 (2019)						
Very Long-Chain (v	/LCCP) (C21+)								
1417900-96-9	Alkanes, C21-34-branched and linear, chloro.	P-12-539	721.10673 (2016)						
1401974-24-0	Alkanes, C22-30-branched and linear, chloro.	P-13-107	721.10674 (2016)						
288260-42-4	Alkanes, C22-30, chloro	P-12-505	721.11077 (2019)						
1402738-52-6	Alkanes, C24-28, chloro	P-13-109	721.10675 (2016)						
2097144-46-0	Hexacosane, chloro derivs.	P-12-280	721.11070 (2019)						
2097144-47-1	Octacosane, chloro derivs.	P-12-280	721.11070 (2019)						

MCCP SVHC Congener Groups

Table 1: Congener groups of MCCP concluded as PBT and/or vPvB in accordance with the criteria set out in Annex XIII of the REACH Regulation

Number chlorine atoms and Carbon chain lenght	Cl1	Cl ₂	Cl ₃	Cl4	Cl ₅	Cl ₆	Cl ₇	Cl ₈	Cl9	Cl ₁₀	Cl11	Cl ₁₂	Cl ₁₃	Cl ₁₄	Cl ₁₅	Cl ₁₆	Cl ₁₇
C ₁₄	-	-	vPvB	PBT vPvB	PBT vPvB	PBT vPvB	PBT vPvB	vPvB	vPvB	vPvB	vPvB	-	-	-			
C ₁₅	-	-	vPvB	vPvB	PBT vPvB	РВТ	PBT	РВТ	-	-	-	-	-	-	-		
C ₁₆	-	-	vPvB	vPvB	PBT vPvB	PBT	PBT	PBT	-	-	-	-	-	-	-	-	
C ₁₇	-	-	-	-	-	PBT	PBT	PBT	PBT	-	-	-	-	-	-	-	-

Note: Symbol '-' means that not enough information is available to conclude whether the congener group has PBT and/or vPvB properties. Grey cells means congener groups not considered in the PBT/vPvB assessment.

CPIA Update to ILMA



6TH INTERNATIONAL METALWORKING FLUIDS CONFERENCE

CHLORINATED PARAFFINS IN METALWORKING FLUIDS AN INDUSTRY PERSPECTIVE

MIKE PEARCE W.S. DODGE OIL CO. **JANUARY 9, 2024**



AGENDA

WHY USE THEM?
WHAT ARE CRITICAL USES?
CASE FOR USING CHLORINATED PARAFFIN
CASE AGAINST USING CHLORINATED PARAFFIN
BRIEF CASE STUDIES
CONCLUSION



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CRITICAL USES

- Centerless grinding of aerospace bolts, especially titanium
- Wire drawing (mostly stainless steel)
- Deep drawing stainless steel
- Machining high-nickel alloys (Inconel, Waspalloy, numerous others) in a variety of applications
- Tapping high-nickel and titanium nuts
- Certain drilling and tapping applications in aluminum parts
- Numerous Others



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WHY USE CHLORINATED PARAFFIN?

- Excellent EP ("Extreme Pressure") additive for metalworking fluids ("MWF")
- Often used in conjunction with sulfurized, phosphorus, and polar additives
- Cost effective, safe on most metals
- Clear, pleasant smelling
- Known performance, benefits, and handling characteristics
- For critical applications, <u>no practical</u> <u>substitute</u>



THE CASE AGAINST CP

Disposal

- Potential for Staining
- Weldability
- Cleanability
- Must be removed prior to heat treating
- "Alpha case" issue with titanium (sort of)
- Parts issues
 - Example: medical parts often require fluids to have zero sulfur and chlorine
- Regulatory challenges?
- Site-specific issues



GENERAL OVERALL INDUSTRY REACTION?

- Give me something that works!
- Don't give me anything that will cost significantly more!
- Don't disrupt my operations!
 - Hidden cost of testing and qualifying is enormous
- I will obey any regulations that apply to me, but you just said that for the moment we are OK, with no clear guidance on when CPs will really be a problem.



January 2024

- Located in So. California
- Makes both bolts and nuts
- 95% High-nickel alloys and titanium, 5% other
- Primary operations
 - Heading
 - Machining (automatic screw machines)
 - Deep Drawing
 - Centerless Grinding
 - Numerous "2nd Operations" (tapping, thread rolling, many others)
 - CNC Machining







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- They had a major push to eliminate CP
 - Problem was their new parts washer, not regulations
- Successful:
 - Screw Machines (cost went up 15%)
 - Most tapping (cost up 40%)
 - Heading (cost up 100%, but better performance compared to CP)
 - CNC (no net cost difference)
- Unsuccessful:
 - Deep drawing stainless steel
 - Centerless grinding titanium, Inconel, A286
 - Waspalloy and some difficult Inconel tapping



ISSUES WITH CP REPLACEMENT IN CENTERLESS GRINDING OIL

- Cost: 5,000 gallons in use to be replaced by fluid 80 to 100% more expensive (estimated \$100 to \$150K)
- Replacement will likely need routine disposal and cleanout
- Replacement may not be compatible with filtration
- Current replacement technology is not operator friendly



DISPOSAL OF CP NOT A THREAT TO THE ENVIRONMENT

- About 1,200 gal./month waste oil generated
 - Hauled as "hazardous" waste (you have to love California!)
 - Converted to marine diesel fuel
- About 5,000 gal. water per month to sewer
 - Average daily CP component estimated to be 4 to 8 OUNCES
- Stormwater testing confirms no significant ground oil discharge of any kind.
 - The parking lot is far worse than the plant



Division of Fortune 50 company
Company declared an initiative to eliminate all CP worldwide
Platarg press
Transfer press (also called an "Eyelet" press
Classic part-Liptstick Tubes
Each station has independent stroke length
Uses the principle of "reverse draw"



- Part was a severe deep draw
- A286 Stainless Steel
- Original oil contained 40% CP plus sulfur and fats
- New design, with a longer draw, had very short die life-200 pieces per sharpening
- Tried 5 different chlorine-free formulations
 - Best die life was 7 parts per sharpening
- Tested an oil with 70% CP plus sulfur and fats
- 7,000 parts per sharpening
- Still using after 15 years



CONCLUSIONS

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- Industry wants better performance, for less money
- Not terribly concerned with regulations off in the future
- No universal regulations at present against using CP
- Site-specific issues largely determine whether to use CP or not
- CP is not getting into the environment from modern manufacturers
- For the most part, they do not see CP as a problem

D^{*o*}**DGE**