Quick Guide to IPEN Views on POPRC17
January 2022

Items on the agenda:

Methoxychlor: adoption of the risk management evaluation and whether the chemical should be recommended for consideration by the COP for listing in Annexes A, B and/or C to the convention

Dechlorane Plus and **UV-328:** adoption of their risk profiles and whether the chemicals are likely, as a result of its long-range environmental transport, to lead to significant adverse human health and/or environmental effects such that global action is warranted, and that their risk proposals should proceed.

Chlorpyrifos, Medium-chained chlorinated paraffins (MCCPs) and **Long-chain perfluorocarboxylic acids, their salts and related compounds**: evaluation of the nomination to determine if the screening criteria in Annex D are met and to proceed to the risk profile stage.

Guidance on Long-range environmental transport: comments on the draft guidance and workplan for 2022.

Specific exemptions for decabromodiphenyl ether and short-chain chlorinated paraffins: adoption of the process to further update information related to the review of the specific exemptions (for further consideration by COP-11).

Assessment of alternatives to PFOS, its salts and perfluorooctane sulfonyl fluoride: terms of reference and process for the assessment of alternatives to evaluate the continued need for the acceptable purposes and specific exemptions.

Identification of substances covered by the listing of perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds: review of information submitted, and comments on the updated indicative list of substances covered by the listing of PFOA, its salts and PFOA-related compounds.

Methoxychlor

Methoxychlor is an organochlorine pesticide which has been used as a replacement for DDT in agriculture and veterinary practices. The Committee agreed at POPRC-16 that methoxychlor is likely, as a result of its long-range environmental transport, to lead to significant adverse human health and environmental effects such that global action is warranted.

Methoxychlor has been regulated, phased out and/or banned in many countries around the world and it appears that production, sale and use of methoxychlor now only occurs in a small number of nations globally. No critical uses have been identified. The Russian Federation is the only country that submitted information indicating manufacturing and use.

The most effective means to protect human health and the environment from the risks associated with methoxychlor is a complete prohibition on its production, sale and use. The phase out of methoxychlor products in a wide number of countries shows that a complete prohibition is feasible and indicates that viable chemical and non-chemical alternatives do exist and are already in use.

Conclusion: Methoxychlor should be recommended for listing in Annex A with no specific exemptions.

Dechlorane Plus (DP) and its *syn*- and *anti*-isomers

At POPRC-16, the Committee reviewed the risk profile for DP and determined that there was decisive information on its persistence, bioaccumulation, and potential for long-range environmental transport. However, the Committee did not reach consensus about the sufficiency of evidence concerning adverse effects. The POPRC established an intersessional working group to update the risk profile with additional information concerning the adverse effects of DP.

DP is a dangerous, highly persistent and bioaccumulative flame-retardant chemical. It is a plastic additive that has adverse effects on the liver, endocrine system, and neurodevelopment. It has similar physico-chemical properties as previously listed POPs, such as mirex. Unless regulated, the use of DP is likely to increase, especially because it is promoted as a substitute to deca-BDE in plastics used in cables, television- and computer casings, and in the automobile and aviation industries. Manufactured since the 1960s, DP is now produced in only one or two known locations. DP contaminates the global environment including biota of the Arctic, Antarctic, and the Tibetan plateau. In addition to long-range transport through air and in seawater, DP may also be distributed into remote regions through migratory species and oceanic transport of plastic debris. DP is found in human cord blood serum, placental tissue, and breast milk, thus posing a threat to the health of the developing child. DP was frequently detected in baby foods (formula, cereals, puree) analyzed from China and the U.S., with very high DP concentrations found in a Chinese formula sample and in a U.S. cereal sample.

Exposure to DP is associated with inducement of oxidative stress in multiple aquatic and terrestrial species. Oxidative stress can lead to cell and tissue breakdown and contribute to the onset of disease and premature aging. DP adversely affects photosynthesis of marine algae. DP crosses the blood-brain barrier in fish and is

maternally transferred in fish, frogs, and birds. Exposure to DP is associated with neurotoxic, developmental effects, and endocrine disruption of the thyroid axis and sex hormones in fish. In laboratory studies of rodents, DP is associated with liver impairment, thyroid disruption, changes in the gut microbiome, and metabolic disorders. In humans, epidemiological studies provide evidence of thyroid and sex hormone disruption. The US EPA determined that "There is potential for carcinogenicity based on analogy to chlordane and decaBDE, the latter for expression of adverse effects in longer term studies."

Conclusion**:** At POPRC-16, the Committee concurred that there was decisive information concerning persistence, bioaccumulation, and potential for long-range transport. The current risk profile provides a thorough scientific review of available information on the adverse effects of Dechlorane Plus, verifying that it meets the criteria on adverse effects. Dechlorane Plus "is likely as a result of its long-range transport, to lead to significant adverse human health and environmental effects, such that global action is warranted" and should therefore advance to the risk management evaluation (Annex F) stage.

UV-328

UV-328 is a high production volume, benzotriazole UV-stabilizer that is used in plastics, coatings, and personal care products. It is on the EU REACH authorization list due to its very persistent, very bioaccumulative and toxic properties. At POPRC-16, the Committee concluded that UV-328 met the screening criteria for persistence, bioaccumulation, long-range environmental transport and adverse effects.

UV-328 is released into the environment during its production, use and disposal stages. Plastics containing UV-328 have the potential to transport the chemical over long distances, which has been well documented in scientific studies. Additionally, UV-328 has the potential of long-range atmospheric transport via aerosol particles and with migratory species such as seabirds. The long-range transport of UV-328 is evidenced by the findings of UV-328 in biota in remote regions including Gough Island, Marion Island, and the Arctic. The concentrations measured in the preen gland oil of seabirds are in the same range as the predicted no effect concentration (PNEC) for secondary poisoning in predators, and concentrations in environmental samples in the same range as PNEC values for aquatic organisms.

UV-328 is slowly metabolized in humans and can bind to blood proteins, which indicate a potential for bioaccumulation. UV-328 has also been detected in human breast milk and in adipose tissue. UV-328 is toxic to mammals and can cause adverse effects in specific organs such as the liver and the kidneys upon repeated exposure. It has anti-androgenic activity, can cause alterations in reproductive organs and changes in enzymatic activity.

Conclusion: UV-328 is subject to long-range transport and is, due to its toxic, bioaccumulative and persistent properties, likely to lead to significant adverse human health and environmental effects, such that global action is warranted. It should therefore advance to the risk management evaluation (Annex F) stage of evaluation.

Chlorpyrifos

Chlorpyrifos is a widely used organophosphate pesticide, applied as an insecticide in agriculture and as a biocide to control non-agricultural pests such as termites. It has been banned several countries, including Morocco, Saudi Arabia, Sri Lanka, Indonesia and Switzerland. In the European Union, renewal of the approval of chlorpyrifos for use as active substance in plant protection products was denied in 2019 based on concerns for its health impacts and the conclusion that no safe levels could be set for the substance.

Chlorpyrifos displays high acute and chronic toxicity to aquatic organisms, birds and vertebrates, and an even higher toxicity to insects. There is evidence of developmental neurotoxicity both *in vivo* animal studies and epidemiological evidence demonstrates that chlorpyrifos can damage the developing brains of children, causing reduced IQ, loss of working memory, and attention deficit disorders.

Chlorpyrifos has a low water solubility and a high soil and sediment binding capacity. It has a half-life in water greater than two months and degrades slowly in soil under both aerobic and anaerobic conditions. The degradation of chlorpyrifos is temperature dependent, which means that chlorpyrifos is expected to persist in colder regions such as the Arctic and sub-Arctic for a considerable length of time.

Reported log K_{ow} values between 4.7 and 5.2 and log K_{oa} values between 8.3 and 8.9 indicate potential for bioaccumulation in aquatic and air-breathing organisms. While fish studies have produced a wide range of BCFs , this must be considered in the light of the high toxicity of chlorpyrifos, where even moderate bioaccumulation leads to body burdens where adverse effects are seen. Concentrations currently detected in the environment are therefore already enough to cause adverse effects. Bioaccumulation is also supported by monitoring studies detecting chlorpyrifos in apex predators in remote regions.

When in particulate phase, chlorpyrifos, shows an atmospheric half-life up to 66.5 days. Chlorpyrifos has been measured in abiotic and biotic compartments of remote regions. Chlorpyrifos has been widely detected in the Arctic in abiotic compartments such as seawater, ice, and air, and in biota such as caribou, seals and polar bears.

Conclusion: Chlorpyrifos meets the Annex D criteria for persistence, bioaccumulation, adverse effects, and long-range environmental transport. It should therefore advance to the risk profile (Annex E) stage of evaluation.

Long-chain perfluorocarboxylic acids (PFCAs), their salts, and related compounds

Long-chain PFCAs (with carbon chain lengths of C9-C21) and their salts are infrequently used as components of products. However, their related compounds include substances that have been widely used in a range of applications, including in coatings, cookware, fabric/carpet protectors, textile impregnation agents, and firefighting foams.

Long-chain PFCAs do not degrade under environmentally relevant conditions. They accumulate in protein-rich tissues, can pass through the placenta into the fetus in humans, and be transferred through breast milk. C9 – C14 PFCAs have been detected in various tissues and fluids in humans. The elimination of C9 – C11 PFCAs is very slow resulting in long estimated half-lives in humans: for C9 PFCA 2.5 to 4.3 years, and for C10 and C11 PFCA 4.5 to 12 years

BCFs and BAFs > 5000 have been reported for C9 – C14 long-chain PFCAs in freshwater and marine aquatic organisms. C9 – C16 PFCAs have been reported to biomagnify in the food chain for birds and terrestrial/marine mammals with BMFs or TMFs > 1. C18 PFCA has been measured in the environment and in some top predator species such as polar bears, herring gulls and peregrine falcons.

Long-chain PFCAs have been measured in Antarctic biota, including penguins; and in Arctic biota such as polar bear, Arctic fox, reindeer, Alaskan sea otter and muskox; and in environmental matrices such as snow, ice and lake water. Long-range transport is the result of atmospheric transport of volatile precursors, and oceanic transport of precursors and/or the acids themselves.

Long chain PFCAs all have similar structures, and can therefore be expected to exhibit similar adverse effects. Therefore, even for chain-lengths where evidence is scarce, a precautionary approach to include the whole range of nominated chain-lengths is justified. Exposure to long-chain PFCAs (up to C13 PFCA) has been associated with adverse developmental effects, behavioral effects, hepatotoxicity, immunotoxicity, neurotoxicity, genotoxicity, changes in gene expression, chemosensitivity or altered thyroid function in a range of fish, birds and amphibians. Many epidemiological studies have established positive associations between exposure to C9 – C14 PFCAs and health related outcomes such as impacts on liver function, reduced kidney function, and effects on the thyroid.

Conclusion: Long-chain perfluorocarboxylic acids, their salts and related compounds meet Annex D criteria for persistence, bioaccumulation, adverse effects, and subject to long-range transport. They should therefore advance to the to the risk profile (Annex E) stage of evaluation.

Medium Chain Chlorinated Paraffins (MCCPs)—chlorinated paraffins with carbon chain lengths in the range of C_{14-17} and exceeding 45% chlorine by weight

Chlorinated paraffins (CPs) or polychlorinated n-alkanes are a large group of high production industrial chemicals that are classified according to their chain length and degree of chlorination. MCCPs are used as flame retardants, plasticizers in polyvinyl chloride plastics, in metal working fluids, and as additives to paints and sealants. With global restrictions on short chain chlorinated paraffins (SCCPs), including listing of SCCPs in Annex A of the Stockholm Convention in 2017, MCCPs have assumed the role of "regrettable substitutes," and it is likely that production of MCCPs now exceeds that of SCCPs. In environmental monitoring studies, MCCPs are often measured at higher levels than SCCPs. Humans may be exposed to MCCPs through foods, household dust, artificial sports turfs, dietary supplements, and consumer products such as ovens and hand blenders.

MCCPs are persistent in the environment, as evidenced by their presence in sediment cores from the 1940s and 1950s, demonstrating that MCCPs persist in sediment over decades and degrade slowly.

MCCPs meet Annex D criteria for bioaccumulation, with measured bioconcentration factors (BCF) exceeding 5,000 L/kg in fish. Calculated Log K_{ow} values for MCCPs range from 6.77 to 9.85, depending on chain length and degree of chlorination. MCCPs have been found worldwide in environmental samples, biota, and humans. Relatively high

MCCP concentrations measured in Arctic fish demonstrate that MCCPs undergo long-range atmospheric transport. They are detected in top predator species of remote regions, such as ringed seals and polar bear of the Arctic. In a recent study, MCCPs were found to be the most abundant of the CP groups measured in human breast milk.

MCCPs are toxic to aquatic invertebrate organisms and impair reproduction in the earthworm. In rainbow trout, exposure to MCCPs was associated with harmful effects on behavior, the liver and thyroid. Studies of prenatal effects on rabbits and rats showed reduced fetal body weight. MCCPs also affected postnatal development, with exposures resulting in reduced pup body weight and survival. Studies indicate that in humans, MCCPs adversely affect the liver, kidney, and the thyroid gland.

Conclusion**:** MCCPs meet the Annex D criteria for persistence, bioaccumulation, adverse effects, and long-range transport. They should therefore advance to the risk profile (Annex E) stage of evaluation.

Guidance on Long-range environmental transport: The POPRC will consider the draft guidance prepared by the intersessional working group and workplan for 2022. IPEN notes the following important points for the Committee to consider:

- The scope of the guidance is the annex D criteria for long-range transport, and while this has implications for the Annex E evaluation, the guidance must not make any judgements on other criteria.
- Care must be taken to ensure that any conclusions in the guidance are based on studies that also consider properties of the newer POPs, and not only the original "dirty dozen" POPs.
- The extensive theoretical discussion on local sources makes it seem like this is a serious problem, while this has yet to play a role in practice for any chemical evaluated by the POPRC. Also, the POPRC evaluation is not based on single measurements but a range of scientific, peer reviewed studies, which minimizes the risk of local point sources playing any significant role. Therefore, the default assumption must be that detection in remote locations is caused by long-range transport unless there is strong evidence of local sources. The precautionary principle dictates that any potential local sources must be rigorously assessed and verified with scientific references to make sure that long-range transport is not overlooked.
- Observations, models and measurements from beaches and surface waters from all over the world over the past 50 years have confirmed the potential for plastics to undergo long-range transport with ocean currents, and that this transport can happen over relatively short time scale. Multiple studies have also confirmed the presence of plastic pollutants in isolated locations including the open ocean, isolated islands, and polar regions.
- The current draft does not include the multitude of scientific articles that have shown the presence of additives in plastics that have undergone long-range transport. Their leaching potential from plastic products into the environment or into organisms upon ingestion has also been confirmed in multiple exposure studies and models.

Specific exemptions for decabromodiphenyl ether and short-chain chlorinated paraffins: reports on the review of information related to specific exemptions for decabromodiphenyl ether[1] and short-chain chlorinated paraffins[2] were developed by POPRC 16 and submitted to COP10. In order to update these reports for consideration by COP11, a workplan for further work until POPRC 18 has been drafted for adoption by the POPRC 17.

Additional information about the exemptions:
No Party has registered exemptions for production and use of decabromodiphenyl ether for polyurethane foam for building insulation.

The following Parties have registered for exemptions for production and/or use as of December 2021[3]:

Specific Exemption	**Party**
Parts for use in vehicles specified in paragraph 2 of Part IX of Annex A.	Brazil: expire date at the end of service life of legacy vehicles or in 2036, whichever comes earlier European Union, New Zealand, Republic of Korea, Norway, Switzerland, and United Kingdom of Great Britain and Northern Ireland: no expiry date provided
Aircraft for which type approval has been applied for before December 2018 and has been received before December 2022 and spare parts for those aircraft.	European Union, New Zealand, Republic of Korea, Norway, Switzerland, and United Kingdom of Great Britain and Northern Ireland: no expiry date provided
Additives in plastic housings and parts used for heating home appliances, irons, fans, immersion heaters that contain or are in direct contact with electrical parts or are required to comply with fire retardancy standards, at concentrations lower than 10 per cent by weight of the part.	European Union, Republic of Korea, Norway, and United Kingdom of Great Britain and Northern Ireland: no expiry date provided
Textile products that require anti-flammable characteristics, excluding clothing and toys.	Islamic Republic of Iran: expiry date: 18 December 2023

No Parties are currently registered for the specific exemptions for production and use of short-chain chlorinated paraffins for any of the applications listed in Annex A to the Convention.

[1] UNEP/POPS/POPRC.16/INF/17.

[2] UNEP/POPS/POPRC.16/INF/18.

[3] http://chm.pops.int/Implementation/Exemptions/SpecificExemptions/DecabromodiphenyletherRoSE/tabid/7593/Default.aspx

Assessment of alternatives to PFOS, its salts and perfluorooctane sulfonyl fluoride: At COP9 it was decided to undertake an evaluation of the continued need for perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride for the various specific exemptions and acceptable purposes, to be presented at COP11. POPRC 17 will adopt terms of reference and process for the assessment of alternatives to evaluate the continued need for the acceptable purposes and specific exemptions.

One Acceptable Purpose remains: Insect baits with sulfluramid (CAS No. 4151-50-2) as an active ingredient for control of leaf-cutting ants from *Atta* spp. and *Acromyrmex* spp. for agricultural use only. This has led to uncontrolled, broad use of sulfluramid for a range of purposes. As a result, many tons of PFOS are being released into the environment despite the availability of safer alternatives. This acceptable purpose should therefore be converted to a narrow, limited exemption for to specific agricultural uses.

The following Parties have registered for specific exemptions for production and/or use as of December 2021[4]:

Specific Exemption	Party
Metal plating (hard-metal plating) only in closed-loop systems	Norway and Switzerland: no expiry date provided

Identification of substances covered by the listing of perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds: In order to support Parties and facilitate the identification of substances and understanding of the listing, an initial indicative list of substances has been prepared. POPRC 17 will review the information submitted by Parties and observers, and provide comments on the updated indicative list of substances covered by the listing of PFOA, its salts and PFOA-related compounds. It should be noted that long-chain perfluoroalkyl substances, fluorotelomers and fluoropolymers commonly in use in firefighting foam and other products (C8-C14) commonly undergo physical and biotic chain-shortening to produce other end-point PFCAs including PFOA under aerobic or anaerobic conditions in soils, waterways and groundwater. Longer-chain PFAS cannot be discounted as PFOA precursors and, therefore, as PFOA related substances under Annex II to document UNEP/POPS/POPRC.16/INF/12.

[4] http://chm.pops.int/Implementation/Exemptions/SpecificExemptions/ChemicalslistedinAnnexBRoSE/PFOSRoSE/tabid/4644/Default.aspx