Webinar Report

Introduction to SCCP/MCCP and PFAS and Inventory Development

17 September 2024

global environment facility
INVESTING IN OUR PLANET

GGKP

Introduction

This webinar, the seventh in a series of training activities organized under the Global NIP Update Project, was held as part of Component 4 (Knowledge Management and Information Sharing) of the GEF project ID 10785, titled *Global Development, Review, and Update of National Implementation Plans (NIPs) under the Stockholm Convention on Persistent Organic Pollutants (POPs)*.

The session focused on inventory development for industrial POPs, highlighting why POP-PFASs and SCCPs/MCCPs cannot be effectively addressed through traditional sectoral inventories. With SCCPs and MCCPs still produced and used in large volumes (~1 million tonnes per year), they are now among the most prevalent industrial POPs detected in human milk, signaling an urgent need for improved monitoring and control. Similarly, PFAS exposure in humans frequently exceeds the EU's tolerable weekly intake, underscoring the necessity of comprehensive inventories. The webinar introduced methodologies for tracking POP-PFAS use and stockpiles and explored options for identifying presumptive POP-PFAS contaminated sites, which are critical for effective risk assessment and management strategies.

CEST 14:00	Welcome and opening remarks
	Moderator: **Anastasiya Buchok**, Component 4, GGKP
	Speakers: **Dr. Roland Weber**, POPs Environmental Consulting **Stéphane Horel**, Le Monde
14:05	**Part A** gives an overview of the development of **industrial POPs inventories** and the relevant inventory steps and discusses why POP-PFASs and SCCPs/MCCPs cannot be addressed by the simple sectoral inventory approach.
14:20	**Part B** provides relevant information on **inventory development for POP-PFASs** (PFOS, PFOA, PFHxS and related compounds) for current use, the presence in stocks, waste, and POP-PFAS contaminated sites.
15:00	**Part C** introduces the **methodology for inventorying presumptive POP-PFAS contaminated sites** as a first step for assessing and reducing human exposure from former releases of POP-PFAS.
15:20	**Part D** gives information on **inventory development for SCCPs and MCCPs** for current production, import/export, use in production, and the presence in products, stocks, waste, and contaminated sites.
16:00	Q&A session
16:30	Closing remarks

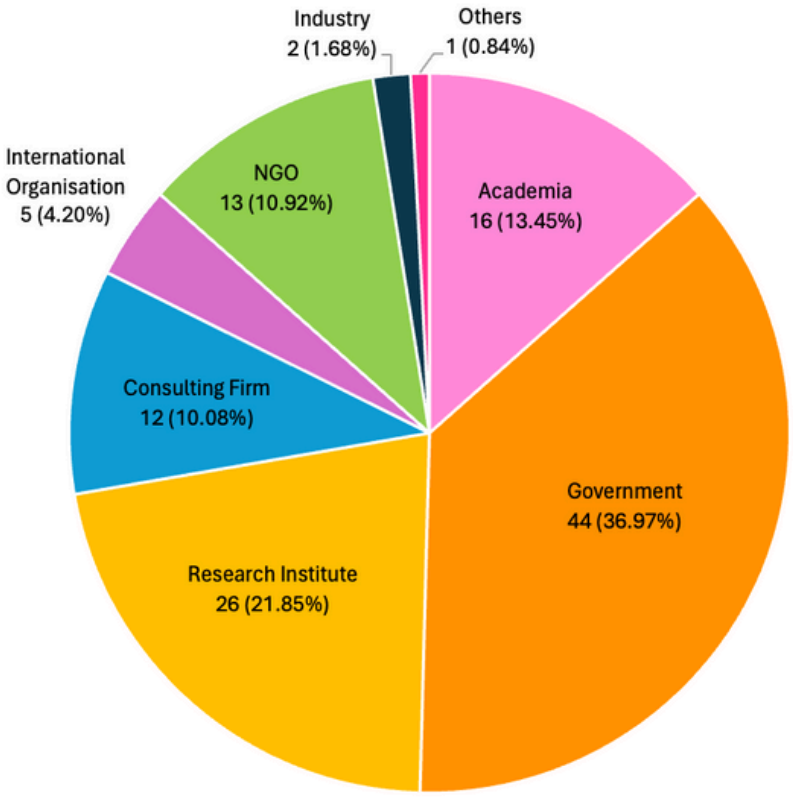
Registration and Attendance

Number of registrants: 180 / Total attendance: 119
(Approx. 44% female and 56% male)

Participants by country

Country	Attendees	Country	Attendees	Country	Attendees
Ethiopia	13	Uruguay	3	Honduras	1
Albania	7	Kenya	2	Hong Kong SAR	1
Montenegro	7	Madagascar	2	India	1
North Macedonia	7	Peru	2	Indonesia	1
Senegal	7	Saudi Arabia	2	Kazakhstan	1
Trinidad and Tobago	7	Switzerland	2	Republic of Korea	1
Armenia	4	Bahamas	1	Maldives	1
Bosnia and Herzegovina	4	Cambodia	1	Republic of Moldova	1
Cameroon	4	China	1	Nigeria	1
Dominica	4	Côte d'Ivoire	1	Pakistan	1
Burundi	3	Denmark	1	Seychelles	1
Czech Republic	3	Eswatini	1	Sweden	1
Myanmar	3	France	1	United Kingdom	1
South Africa	3	Germany	1	Vietnam	1
Thailand	3	Greece	1		
Togo	3	Guinea	1		

Participants by sector



Key Highlights

Main considerations for inventory development for new industrial POPs

The development of a POPs inventory follows a structured approach to ensure comprehensive data collection, validation and reporting. The process begins with planning, where key stakeholders are identified, a national inventory team is established, and objectives, scope and methodologies are defined based on national circumstances and available resources. A detailed work plan is then developed, outlining sectors to be assessed, data collection strategies and timelines.

Next, data collection methodologies are selected, considering the nature of POPs. While PBDEs, HBCD, DP and UV-328 can largely be addressed througha sectoral approach, POP-PFASs and SCCPs/MCCPs require a more complex, cross-sectoral method due to their extensive use in plastics, industrial applications and consumer products. Data is gathered from industrial sectors, consumer markets, professional use areas, waste management facilities and contaminated sites, using questionnaires, market surveys and chemical analysis to ensure accuracy.

For newly listed industrial POPs groups still in use (PFOS/PFOA, SCCPs, decaBDE, UV-328), the inventory approach aims to consider the entire life cycle. For all industrial POPs in the end-of-life, recycling needs to be considered (circular economy).

Once compiled, inventory data is evaluated and validated through stakeholder consultations, monitoring studies and comparisons with international inventories. Material and substance flow analysis (MFA/SFA) is used to verify findings and ensure data plausibility based on known historical and current production figures.

The final step involves compiling an inventory report, which supports NIP development and Article 15 reporting to the COP. The report must align with BRS Secretariat reporting formats, now available in electronic templates, ensuring a streamlined and standardized submission process.

Introduction to and establishing inventories for PFOS, PFOA, PFHxS, and related compounds

- POP-PFASs (PFOS, PFOA, PFHxS and related compounds) are a small part of the large PFAS family to be controlled.
- More than 10,000 PFASs are in the ECHA restriction proposal.

PFOS use:

- A large share of PFOS already entered end-of-life (landfills, environment including contaminated sites; only a minor share destroyed).

Acceptable purposes (Stockholm Convention):

- 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.

Specific exemptions (Stockholm Convention):

- Hard-metal plating only in closed-loop systems; firefighting foam for liquid fuel vapour suppression and liquid fuel fires (Class B fires) in installed systems (mobile & fixed systems).

Key Highlights

Introduction to PFOS, PFOA, PFHxS and related compounds and inventory

- **PFOA use — specific exemptions SC (Annex A)**
  - Firefighting foam (only existing stock)
  - Textiles for oil and water repellency for the protection of workers from dangerous liquids that pose risks to their health and safety
  - Photolithography or etch processes in semiconductor manufacturing
  - Photographic coatings applied to films
  - Invasive/implantable medical devices
  - Manufacturing fluorinated polymers
  - Manufacturing plastic accessories for car interior parts
  - Manufacturing electrical wires

- **Major use areas of POP-PFASs**
  - Fire-fighting foams
  - Electroplating
  - Pesticide/insecticide use (sulfluramide)
  - PFOA in electronic and semiconductor production
  - PFOS and PFOA in medical devices
  - PFOA in photographic coatings applied to films
  - PFOA and formerly PFOS in textiles, apparel and carpets
  - PFOS and PFOA in paper impregnation
  - PFAS in food contact materials
  - PFOA in pharmaceutical applications
  - PFOA in fluoropolymer production

The following types of data are needed and should be collected in the inventory:

- Quantities of PFOS/PFOA (and PFHxS) and related compounds used in industrial processes and manufacture and use of products.
- Releases of POP-PFASs from industrial and other point sources (if available in National Pollutant Release and Transfer Registers (PRTRs)).
- Quantities of PFOS/PFOA/PFHxS in products, waste, and stockpiles (and volumes of these stockpiles).
- The methodology approach can also use estimations and qualitative /indicative surveys where quantitative data are not available (but indicated in inventory).

Assessment of imports and exports of POP-PFASs

The control of the import of POPs is the first line of defense. Information on current and historic imports/exports of POP-PFASs could be available from customs services, related industries and industry associations. PFOS and PFOA and related compounds are listed in Annex III to the Rotterdam Convention and are subjected to the Prior Informed Consent (PIC) procedure. PFOS, some of its salts, and related compounds have been assigned specific HS codes. HS codes are used in import and export declarations, which can be used to seek necessary information for the inventory. CAS numbers and trade names should also be used to find the import and export information. CAS numbers are compiled in the POPRC.

Key Highlights

The Forever Pollution Project is a cross-border and interdisciplinary journalism investigation launched in 2022 to track the PFAS crisis across Europe. The project consists of two parts: the Map of Forever Pollution (published in February 2023) and the Forever Lobbying Project (in January 2025).
The webinar presented the PFAS Forever Pollution Project in Europe and a map of PFAS pollution.

- 22,934 known contamination sites and 2,300 hotspot clusters were identified

The project relied on the presumptive contamination sites method, which assumes that the following sites may be potentially contaminated:

- Fluorinated aqueous film-forming foam (AFFF) discharge sites (including military sites, airports, and firefighting training sites)
- Sites related to PFAS-containing waste(including wastewater treatment plants, waste management sites)
- Industrial sites

Introduction to Short-Chain and Medium-Chain Chlorinated Paraffins (SCCP/MCCPs)

Chlorinated paraffins (CPs) are complex mixtures of chlorinated alkanes. The Stockholm Convention listed SCCPs with a chlorine content of >48% as POPs. Also, CP mixtures with ≥1% of SCCPs are considered SCCPs/POPs. MCCPs with chlorine content ≥45% are proposed for listing by POPRC at COP12 in 2025**.**

- **Production:** Frequently produced in mixtures with MCCP; the SCCP amount was estimated to be 400,000 t/year in 900,000 t of CP mixtures (2022).
- **Past and current use:** Plasticizers and flame retardants in PVC and other plastics and rubber; metalworking fluid, lubricants; paints; coatings; adhesives and sealants; leather fat liquors; additives in textiles.
- Exemption of SCCPs expired in 2023 but is likely further produced (e.g., India has not ratified SCCP yet).
- Synergy of the SCCP/MCCP inventory: Assessment of remaining “Open Applications“ of PCB and PCN.

SCCPs and MCCPs have substituted PCBs and PCNs in these open applications in the 1970s but have also been used in these open applications since the 1930s. Therefore, the assessment of stocks of SCCPs/MCCPs, can also assess remaining PCBs & PCNs in these uses (mainly in buildings/structures having a long service life > 50 years).

Assessment of imports and exports of SCCPS/MCCPs

Short-chain chlorinated paraffins (SCCPs) can no longer be imported or exported for use as their specific exemptions expired in 2023, while medium-chain chlorinated paraffins (MCCPs) remain unlisted under the Stockholm Convention and can still be traded. However, commercial CP mixtures often contain SCCPs above 1%, making it essential to assess all CP imports and record quantities in national inventories.
SCCPs are also listed under Annex III of the Rotterdam Convention, requiring PIC for trade, though the extent of its enforcement by exporting countries remains unclear. Identifying CP imports is challenging, as they are often classified under broad, non-specific HS Codes (e.g. plasticizers, waxes, chemical preparations). To improve tracking, CAS numbers and trade names should be used alongside HS Codes, and importing companies should be consulted to clarify the exact chemical composition of shipments, particularly in countries implementing the Globally Harmonized System (GHS).

Questions and Answers

Q1. How can we estimate the quantity of the PFAS and PFOA family chemicals in different industrial products for consumers? What would be its impact on biodiversity and human health?

Dr. Roland Weber: This is quite complicated since products like carpets or textiles are not labelled. For firefighting foams, they might be labeled or the product name containing PFOS or PFHxS is known (see my GGKP presentation). Then the concentration range in firefighting foam is known (normally between 1.5 to 6% for concentrate). By doing this, you can calculate an estimate of the range.

Also, for carpets and some other consumer goods, the range of concentration is known (see inventory guidance) and can be used for an estimate. However, it is very complicated to estimate the share of affected carpets. For this initial monitoring can be made with the "drop test" which can show the repellency and indicate PFAS treatment.

See our PFOS inventory for Suriname with open access: *Pinas V, Van Dijk C, Weber R (2020) Inventory and action plan for PFOS and related substances in Suriname as basis for Stockholm Convention implementation. Emerging Contaminants 6, 421-431 https://doi.org/10.1016/j.emcon.2020.10.002*.

Q2. Let's take an example of a POP that is used clandestinely. What can we do when we cannot determine its quantity because no one agrees to give this information officially?

Dr. Roland Weber: The long way is to develop legislation that information on POPs and other substances of high concern need to be revealed by producers. See the European chemical legislation REACH. Also, the development of good relationships with the industry including agreement to keep confidentiality can result in getting more information.

Q3. Could we have commercial names of pesticides containing PFOS and PFOA?

Dr. Roland Weber: For PFOS the name of the chemical is sulfluramid. One commercial name in South America was Mirex-S.

See open access publication: *Pinas V, Van Dijk C, Weber R (2020) Inventory and action plan for PFOS and related substances in Suriname as basis for Stockholm Convention implementation. Emerging Contaminants 6, 421-431 https://doi.org/10.1016/j.emcon.2020.10.002*.

For PFOA it is not the intentional use but the unintentional contamination in fluorinated high-density polyethylene pesticide containers. Therefore, you may need to check if such containers are used for pesticides in your country.

Q4. Could we have commercial names of pesticides containing PFOS and PFOA?

Stephane Horel: Please explore the map following this link: https://www.lemonde.fr/en/les-decodeurs/article/2023/02/23/forever-pollution-explore-the-map-of-europe-s-pfas-contamination_6016905_8.html.

Q5. What about the car seats? Can we consider this category during the inventory of PFAS?

Addressed by Dr. Roland Weber: The sectoral guidance on POPs on the GGKP website suggests a first impact factor for PFOS and PFOA. One major source is likely the textiles of the car seats. Therefore, you can consider this in your inventory and these car seat textiles should best not be landfilled but destroyed in, for example, cement kilns.

Q6. Can we assume that all firefighting foams in the airports contain PFOS?

Dr. Roland Weber: A large share of firefighting foam at airports contained PFOS until recently. For 20 years also other PFAS foams often with C6-PFAS chemistry have substituted PFOS foams. China has produced PFOS foams until recently (maybe 2022). For a few years, non-fluorinated foams have been available and airports in several European countries are substituting PFAS foams at airports. There is a first UNEP project to substitute PFOS/PFAS foams at airports including also pilot countries in Africa.

Q7. When was the South African study conducted? Can we get access to this study or report?

Dr. Roland Weber: The South Africa study was published in 2020 in open access and available for public facing: *Brits et al. (2020) Chemosphere 238 (2020) 124643, https://doi.org/10.1016/j.chemosphere.2019.124643*.

Q8. I think the parameters to quantify SCCPs and MCCPs are complicated, hence how can we estimate it? The number will be increasing astronomically, what about the alternatives of these pollutants?

Dr. Roland Weber: Yes, the quantification of SCCP and MCCP is complex but robust methods have been developed. Also, low-resolution MS can be used which still can give reasonable results. We need to select green and sustainable alternatives and methodologies for alternative assessment have been developed (see IOMC Toolkit on alternative assessment; OECD activities on alternatives or *Fantke P, Weber R, Scheringer M (2015).*

From incremental to fundamental substitution in chemical alternatives assessment. Sustainable Chemistry and Pharmacy 1, 1-8. DOI: 10.1016/j.scp.2015.08.001).

Q9. Are there unknown stockpiles of POPs in some places that stay undiscovered but keep being a threat, increasingly risky in time?

Dr. Roland Weber: Yes, I agree. One example is disposed wastes in metal drums from the organochlorine industry such as “HCB waste” from solvent production. The drums are corroding over time and after decades the waste enters our environment. Similarly, side-chain fluoropolymers containing the largest share of PFOS are degrading over decades and centuries releasing slowly PFOS into the environment which also migrates slowly.

Q10. I also suggest checking the outcomes of the HBM4EU (https://www.hbm4eu.eu/infographics/pfas/).
Dr. Roland Weber: Thank you for your information. Yes, this is a state of art project on human exposure and pollutant levels in humans. It would be good to extend on more chemicals and other regions.

Q11. The CPs listed in the Stockholm Convention are only the Short Chain Chlorinated Paraffins, which are C10-13. Do we have to consider MCCPs in the inventory?
Dr. Roland Weber: MCCPs will be listed in the Convention in 2025. Therefore, it is suggested to develop an SCCP and MCCP inventory at the same time. Also, SCCPs and MCCPs are often in the same mixture. So, it is difficult to just develop a SCCP inventory.

Resources

- **A concept note and video recording in English, Spanish, French and Russian of the webinar are available on the Global NIP Update platform:** https://www.greenpolicyplatform.org/webinar/introduction-sccpmccp-and-pfas-and-inventory-development

Spanish | French | Russian

- **Developing inventories for newly listed industrial POPs**
  - GGKP (2024). Inventory of POPs in Electrical and Electronic Equipment (EEE) and Related Waste (WEEE) In Nigeria. https://www.greenpolicyplatform.org/case-studies/inventory-pops-electrical-and-electronic-equipment-eee-and-related-waste-weee-nigeria
  - GGKP (2024). Sectoral Guidance for Inventories of POPs and Other Chemicals of Concern in Buildings/Construction, Electrical and Electronic Equipment, and Vehicles. https://www.greenpolicyplatform.org/guidance/sectoral-guidance-inventories-pops-and-other-chemicals-concern-buildingsconstruction
  - GGKP (2024). Production, Use and Trade of POPs Newly Listed in the Stockholm Convention 2009 to 2022. https://www.greenpolicyplatform.org/research/production-use-and-trade-pops-newly-listed-stockholm-convention-2009-2022
  - GGKP (2024). Inventory of POPs in the Transport Sector in Nigeria. https://www.greenpolicyplatform.org/case-studies/inventory-pops-transport-sector-nigeria

Resources

- **Developing inventories for newly listed industrial POPs**
  - GGKP (2024). Short Guidance on Implementing Quality Assurance and Quality Control (QA/QC) for POPs Inventories Data Validation. https://www.greenpolicyplatform.org/guidance/short-guidance-implementing-quality-assurance-and-quality-control-qaqc-pops-inventories-0
  - GGKP (2024). Guiding Methodology for Strengthening Collaboration with National Statistical Offices to Address Gaps in POPs Data and Related Information. https://www.greenpolicyplatform.org/guidance/guiding-methodology-strengthening-collaboration-national-statistical-offices-address-gaps

- **Introduction to and establishing inventories for PFOS, PFOA,PFHxS and related compounds**
  - Guidance on Preparing Inventories of PFOS, PFOA and PFHxS. https://www.greenpolicyplatform.org/guidance/guidance-preparing-inventories-pfos-pfoa-and-pfhxs
  - More than 10,000 PFASs are in ECHA restriction proposal. https://echa.europa.eu/de/-/echa-publishes-pfas-restriction-proposal
  - PFOS inventory of Suriname: Pinas et al. (2020) Emerging Contaminants 6, 421-431. https://doi.org/10.1016/j.emcon.2020.10.002
  - USEPA (2024) Per- and Polyfluoroalkyl Substances (PFAS) in Pesticide and Other Packaging. https://www.epa.gov/pesticides/pfas-packaging
  - IPEN (2021) Throwaway Packaging, Forever Chemicals: European wide survey of PFAS in disposable food packaging and tableware. https://www.greenpolicyplatform.org/research/throwaway-packaging-forever-chemicals-european-wide-survey-pfas-disposable-food-packaging

- **PFOA-contaminated cities from fluoropolymer production**
  - Science documentation of PFAS pollutions. https://pfasproject.com/parkersburg-west-virginia/
  - Hollywood film “Dark Waters” & the documentary Film “The Devil We Know”. https://www.youtube.com/watch?v=NJFbsWX4MJM
  - PFOA exposure to 6 diseases: ulcerative colitis, pregnancy-induced hypertension, thyroid disease, testicular cancer, and kidney cancer. (Lerner, 2015). https://theintercept.com/2015/08/11/dupont-chemistry-deception/

- **The Forever Pollution Project: Mapping PFAS pollution across Europe**
  - The cost of inaction: A socioeconomic analysis of environmental and health impacts linked to exposure to PFAS. https://www.norden.org/en/publication/cost-inaction-0
  - Cordner, A. et al. (2024) PFAS Contamination in Europe: Generating Knowledge and Mapping Known and Likely Contamination with “Expert-Reviewed” Journalism, Environmental Science & Technology, 58(15), pp. 6616–6627. https://doi.org/10.1021/acs.est.3c09746
  - PFAS Data Hub. https://pdh.cnrs.fr/en/

Resources

- **Introduction to short-chain and medium-chain chlorinated paraffins (SCCP/MCCPs) and related inventory development**
  - Chen, C. et al. (2022) 'Global Historical Production, Use, In-Use Stocks, and Emissions of Short-, Medium-, and Long-Chain Chlorinated Paraffins', Environmental Science & Technology, 56(12), pp. 7895–7904. https://doi.org/10.1021/acs.est.2c00264.
  - WHO. Breastfeeding. https://www.who.int/health-topics/breastfeeding#tab=tab_1
  - Mead, M.N. (2008) 'Contaminants in Human Milk: Weighing the Risks against the Benefits of Breastfeeding', Environmental Health Perspectives, 116(10), pp. A426–A434. https://pmc.ncbi.nlm.nih.gov/articles/PMC2569122/
  - Krätschmer, K. et al. (2021). 'Chlorinated Paraffin Levels in Relation to Other Persistent Organic Pollutants Found in Pooled Human Milk Samples from Primiparous Mothers in 53 Countries', Environmental health perspectives, 129(8), 87004. https://doi.org/10.1289/EHP7696
  - Chen, C. et al. (2021) 'Distribution and Emission Estimation of Short- and Medium-Chain Chlorinated Paraffins in Chinese Products through Detection-Based Mass Balancing', Environmental Science & Technology, 55(11), pp. 7335–7343. https://doi.org/10.1021/acs.est.0c07058.
  - Guidance on Preparing Inventories of Short-Chain Chlorinated Paraffins (SCCPs). https://www.greenpolicyplatform.org/guidance/guidance-preparing-inventories-short-chain-chlorinated-paraffins-sccps

- **Import of SCCPs, MCCPs and other CPs to the country**
  - UN Comtrade Database. https://comtradeplus.un.org/
  - Zauba Import and Export Data. https://www.zauba.com/
  - Babayemi, Nnorom, Weber (2022) Initial assessment of imports of chlorinated paraffins into Nigeria and the need of improvement of the Stockholm and Rotterdam Conventions, Emerging Contaminants. https://doi.org/10.1016/j.emcon.2022.07.004
  - Guida et al. (2022) Inventory approach for short-chain chlorinated paraffins for the Stockholm Convention implementation in Brazil, Chemosphere 287, 132344. https://doi.org/10.1016/j.chemosphere.2021.132344
  - Foreign Trade HS Code. https://www.foreign-trade.com/reference/hscode.htm?code=3904

If you have any questions or comments, please contact the GGKP team.

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