PCB in Open Applications & other Building Contaminants - Part II

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Building / construction sector issues

- We aim to raise awareness, provide background information and ideas about possible approaches and trust that todays Webinar will be a kind of eye opener to get your attention and raise committment to address this issue more in-depth in your country.

- Furthermore we should also realize about the opportunities by increasing the ambitions of different stakeholders to track and control chemicals along the value chains of the building and construction sector.

In construction material/waste we may find many legacies

Building Contaminants and CDW

Building contaminants

Mineral **construction wastes** account for approx. 10 million tonnes of wastes / year in Switzerland

➔ by far the largest waste stream

To be considered regarding Construction and Demolition Waste

Annual construction waste is expected to reach **2.2 BILLION TONS** globally by 2025.

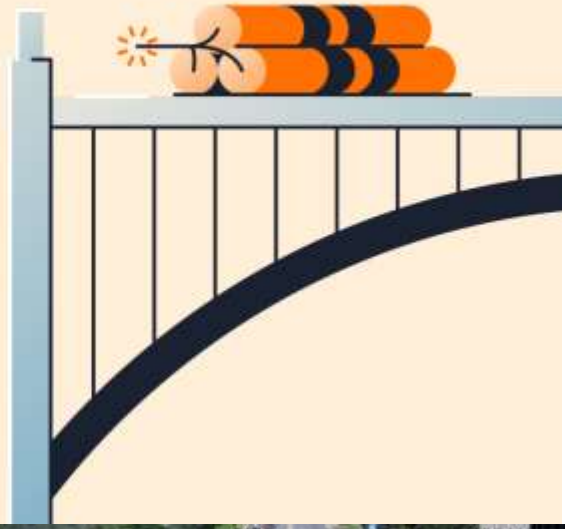
Building / construction sector issues

- Building and construction is one of the most chemical intensive sectors of the industry!

- Given the sectors complexity and its diversity of materials and products, the range of chemicals of concern and the various applications can not be covered by a Webinar.

Also this fact should be considered

Demolition of roads and bridges generated **43% MORE WASTE** than building demolition.



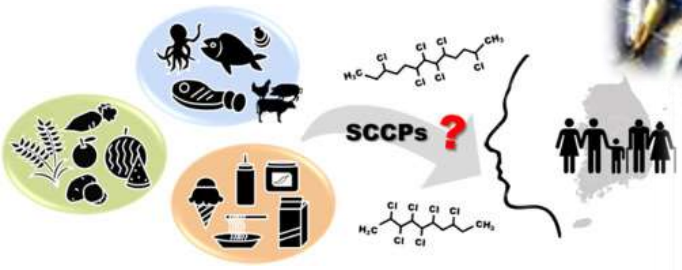
UNE: Chemicals of concern in building sector 2021

UN environment programme

5 Conclusion

The present research has identified almost 30 chemicals of concern relevant in the context of products of the building and construction sector. Yet the number of chemicals for which evidence for potential concern is emerging likely is higher. Continued collaborative research and action will be needed to address the identified gaps and challenges in order further protect human health and the environment from potential harmful impacts of chemicals of concern used in the sector and to shift the sector towards more sustainable patterns of consumption and production. Given the current trends in the building and construction sector and the increased focus on environmental concerns, including energy efficiency, the use of resources and health considerations, should be used a springboard to address the issue of chemicals of concern and to seize the opportunity this offers for sustainable development.

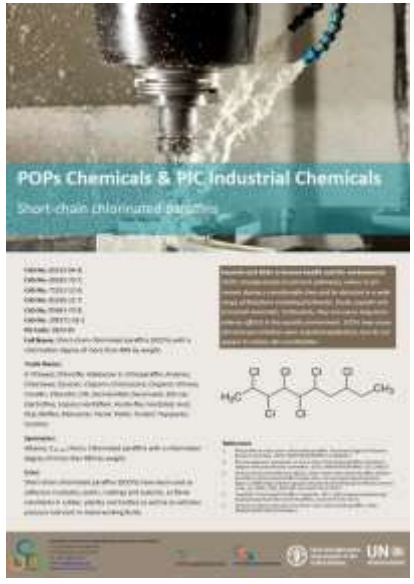
We shall care about PCBs in open applications …
… but also their persistent and mineral pollutant colleagues



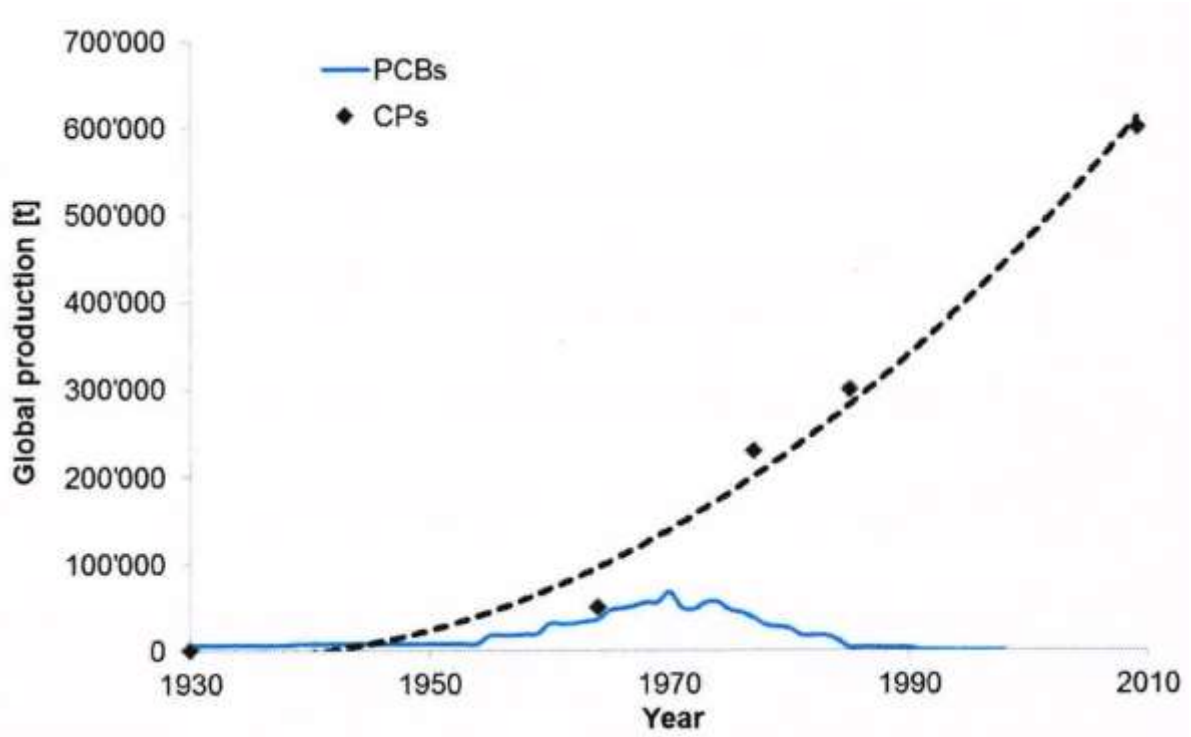
Constantly more POPs chemicals to be considered

Some important POPs with regard to open uses and applications:

- Perfluorooctane Sulfonic Acid (PFOS) and Perfluorooctane Sulfonyl Fluoride (PFOSF)
- Perfluorooctanoic Acid (PFOA) and PFOA-related compounds
- Polychlorinated Naphthalenes (PCNs)
- Short-chain Chlorinated Paraffins (SCCPs)



Global Production of PCBs vs. CPs



Source: P. Diefenbacher ETH Diss.

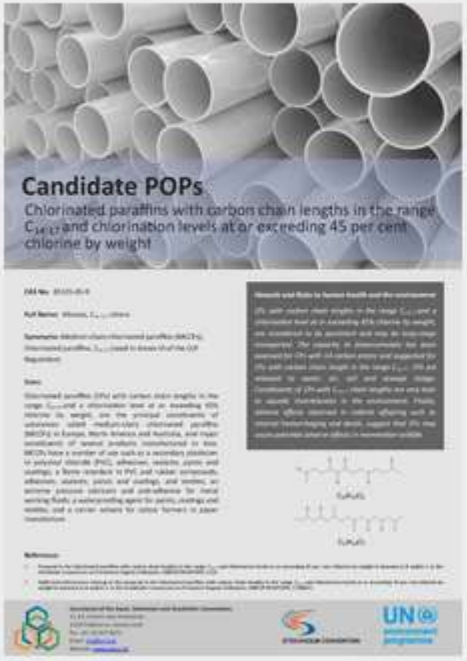
Some examples of PFOS, PCNs, SCCPs

Source: Green Science Policy Institute, Building a Better World, 2021

Chemicals proposed for SC-listing

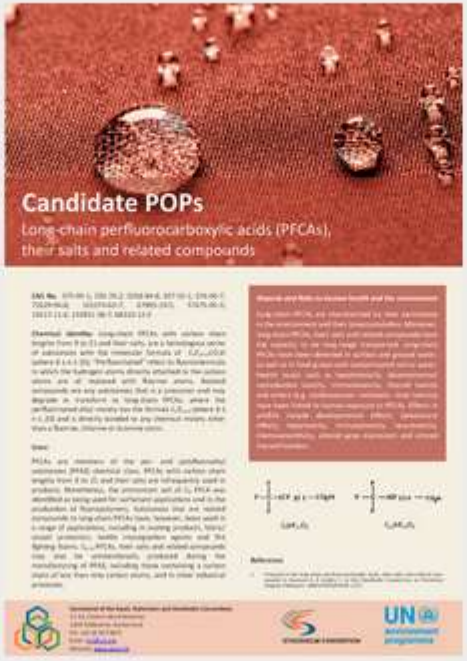
Currently, the following chemicals are under review:

Chlorinated paraffins

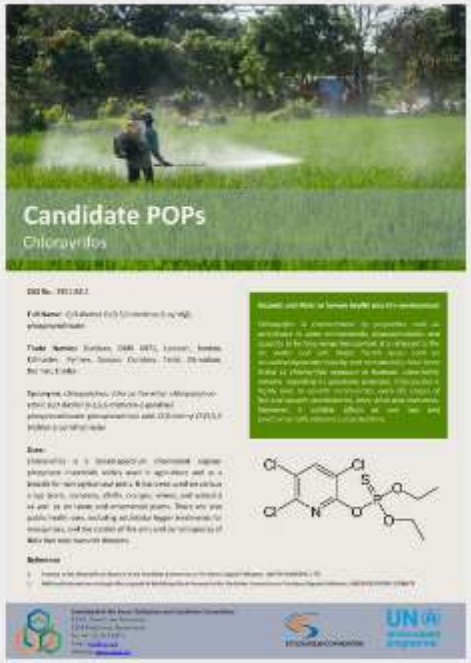


Medium-chain chlorinated paraffins (MCCPs)

LC-PFCAs



Chlorpyrifos

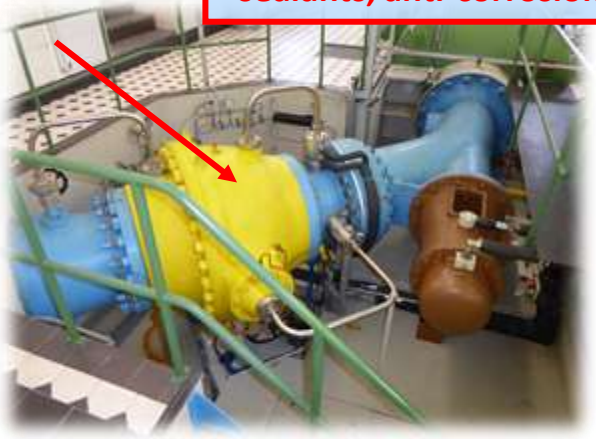


Insecticide

Examples of SCCPs, MCCPs and LC-PFCAs

LC-PFCAs, for example in:
carpets, textiles, roofing materials, paints and lacquers etc.

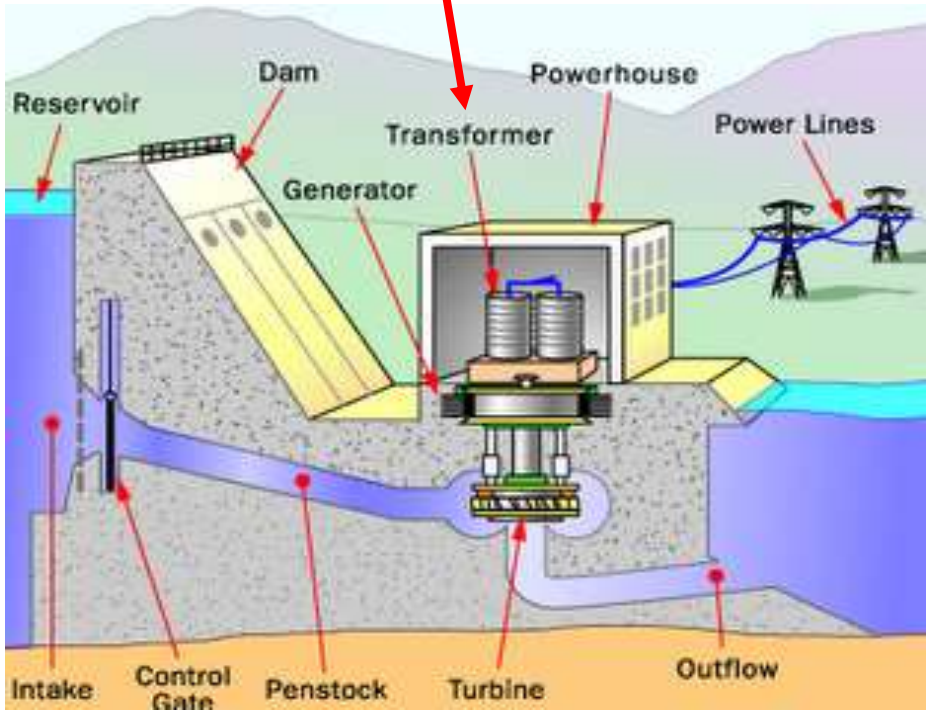
MCCPs, for example in:
sealants, anti-corrosion coatings, paints



Overlaps between PCB closed /open applications

Example Hydro Power Plant

PCB closed application



PCB open applications

Potential PCB anti-corrosion coatings and paints and coatings on concrete:

- **Generators**
- **Turbines**
- **Machinery**
- **Cranes**
- **Pipelines**
- **Pylons**
- **Gates**
- **Floors**
- **Etc.**

PCB caulks:

- **Façade**
- **Windows**
- **Etc.**

Overlapping of PCBs and asbestos applications …

Is asbestos listed in the Conventions?

ROTTERDAM CONVENTION
Share Responsibility

ROTTERDAM CONVENTION

Chemical	Relevant CAS number(s)	Category
Monocrotophos	6923-22-4	Pesticide
Parathion	56-38-2	Pesticide
Pentachlorophenol and its salts and esters	87-86-5*	Pesticide
Toxaphene	8001-35-2	Pesticide
All tributyltin compounds including: – Tributyltin oxide – Tributyltin fluoride – Tributyltin methacrylate – Tributyltin benzoate – Tributyltin chloride – Tributyltin linoleate – Tributyltin naphthenate	 56-35-9 1983-10-4 2155-70-6 4342-36-3 1461-22-9 24124-25-2 85409-17-2	Pesticide
Dustable powder formulations containing a combination of: – Benomyl at or above 7 per cent, – Carbofuran at or above 10 per cent, – Thiram at or above 15 per cent	 17804-35-2 1563-66-2 137-26-8	Severely hazardous pesticide formulation
Methamidophos (Soluble liquid formulations of the substance that exceed 600 g active ingredient/l)	10265[illegible]-6	Severely hazardous pesticide formulation
Phosphamidon (Soluble liquid formulations of the substance that exceed 1000 g active ingredient/l)	13171-21-6 (mixture, (E)&(Z) isomers) 23783-98-4 ((Z)-isomer) 297-99-4 ((E)-isomer)	Severely hazardous pesticide formulation
Methyl-parathion (emulsifiable concentrates (EC) at or above 19.5% active ingredient and dusts at or above 1.5% active ingredient)	298-00-0	Severely hazardous pesticide formulation
Asbestos: – Actinolite – Anthophyllite – Amosite – Crocidolite – Tremolite	 77536-66-4 77536-67-5 12172-73-5 12001-28-4 77536-68-6	 Industrial Industrial Industrial Industrial Industrial

BASEL CONVENTION

Y14	Waste chemical substances arising from research and development or teaching activities which are not identified and/or are new and whose effects on man and/or the environment are not known
Y15	Wastes of an explosive nature not subject to other legislation
Y16	Wastes from production, formulation and use of photographic chemicals and processing materials
Y17	Wastes resulting from surface treatment of metals and plastics
Y18	Residues arising from industrial waste disposal operations

WASTES HAVING AS CONSTITUENTS:

[illegible]	Metal carbonyls
[illegible]	Beryllium; beryllium compounds
[illegible]	Hexavalent chromium compounds
Y22	Copper compounds
Y23	Zinc compounds
Y24	Arsenic; arsenic compounds
Y25	Selenium; selenium compounds
Y26	Cadmium; cadmium compounds
Y27	Antimony; antimony compounds
Y28	Tellurium; tellurium compounds
Y29	Mercury; mercury compounds
Y30	Thallium; thallium compounds
Y31	Lead; lead compounds
Y32	Inorganic fluorine compounds excluding calcium fluoride
Y33	Inorganic cyanides
Y34	Acidic solutions or acids in solid form
Y35	Basic solutions or bases in solid form
Y36	Asbestos (dust and fibres)
Y37	Organic phosphorus compounds

...yes, some types...


… but how about the 95 % Chrysotile?
DANGER
ASBESTOS
REMOVAL
IN

Asbestos is an important topic!

- Asbestos was / is an excellent construction material with various positive characteristics and effects ➔ but dangerous for human health
- Asbestos can still be found in many building materials and parts of ships, e.g. roofing, engines, boilers … there are > 3'000 known applications
- In areas with poor ventilation, asbestos can linger in the air for hours and be inhaled

Overlapping of PCBs and asbestos applications is common

Railway Power Station

Elevator shaft

Do we know the substances/materials we work with?

Both at work and **at home** we can be affected by POPs and building contaminants

Why should the industry invest in BEP/BAT?

Prevention is much CHEAPER and EASIER than remediation!

Example Costs of Inaction and Passivity: Example of a recent River Pollution 2016 to 2026


DOKUMENTATION STATUSAUFNAHMEN UND BEFUNDE NACH SCHADENEREIGNIS

Bild 1: Ansicht Staumauer Punt dal Gall mit Zugang in den Maschinensaal

Bild 2: Eingang zum Maschinensaal mit Installationsplatz Korrosionsschutzsanierer

2016

Nearby St. Moritz / Switzerland:
Incident 22.09.2016, approx. 05:00 am
Leaking decontamination zone during regular clean-up/renovation work at a Hydropower plant Swiss/Italian Border

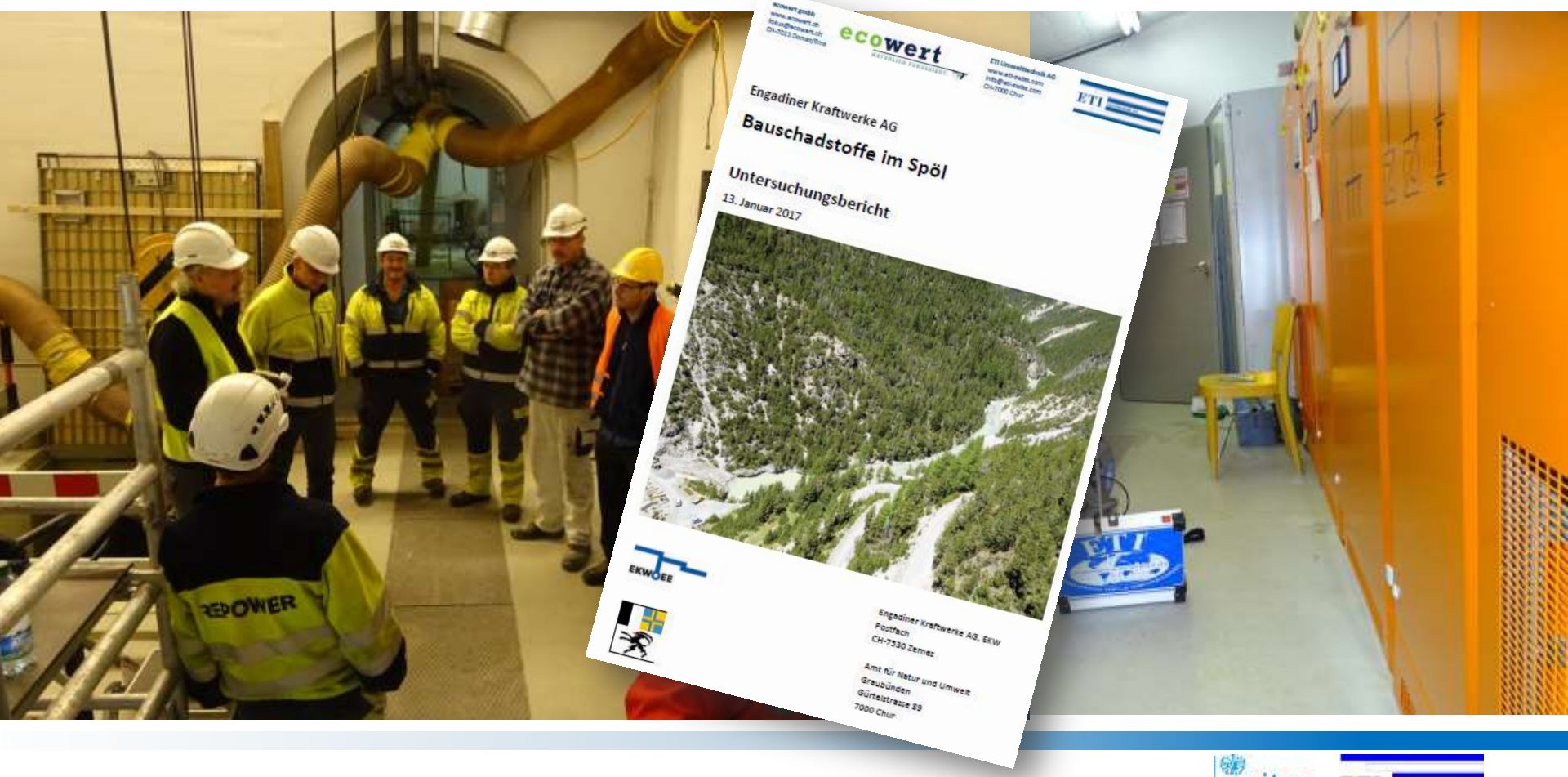
The installation is bordering to Italy, the river flows to Austria and the site is located in the only Swiss National Park.

Budget for a Supervision of the Work: +/- USD 20'000.00. Supervision was voluntary (at that time…) => no control

Spot of Incident: Hydropower Plant in Switzerland

2016: Incident River Spöl Switzerland

1st Focus: Health of third parties working in that site
Information of staff by ETI and OHS experts after air measurements



2nd Focus: (cross contamination)

… immediate Decontamination… Costs of US$ 256’000.00

2016 to 2026: Hydropower Plant in Switzerland

Die Mündung des Spöl in den Inn bei Zernez © cc-by-sa Wikimedia Commons, Adrian Michael

Gift im Nationalpark: Streit blockiert PCB-Sanierung

Daniela Gschweng / 31.10.2022 **Seit Jahren ist der Gebirgsfluss Spöl mit giftigen Chemikalien verseucht. Doch passiert ist bisher wenig.**

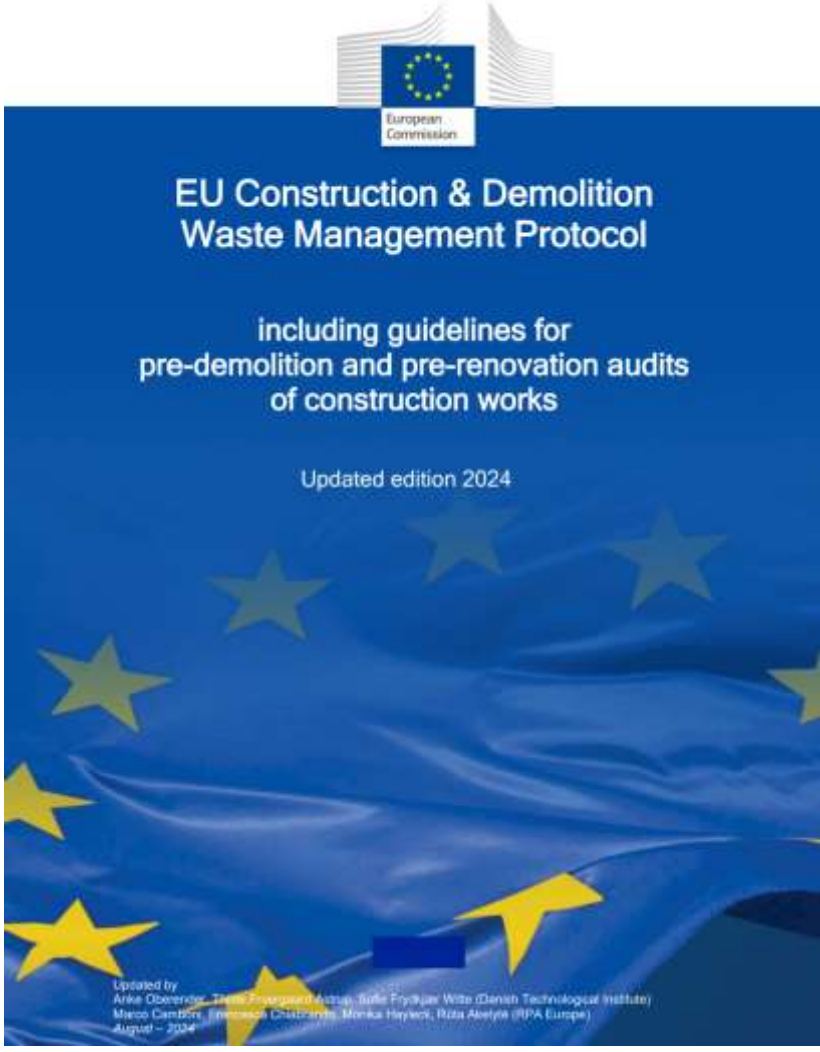
2016 - 2024 Contamination of river in Swiss national park with PCBs; PCBs are detected in fishes and birds; legal disputes about financing of clean-up of river (Site owner, contractor, public, all?)

2024 Clean-up strategy finally agreed between different stakeholders;
costs +USD 15'000'000.00 vs. 20'000.00…

2025 Emptying of river; start of clean-up activities in river bed

2026 Clean-up of river bed

Useful Publications and Links will be shared

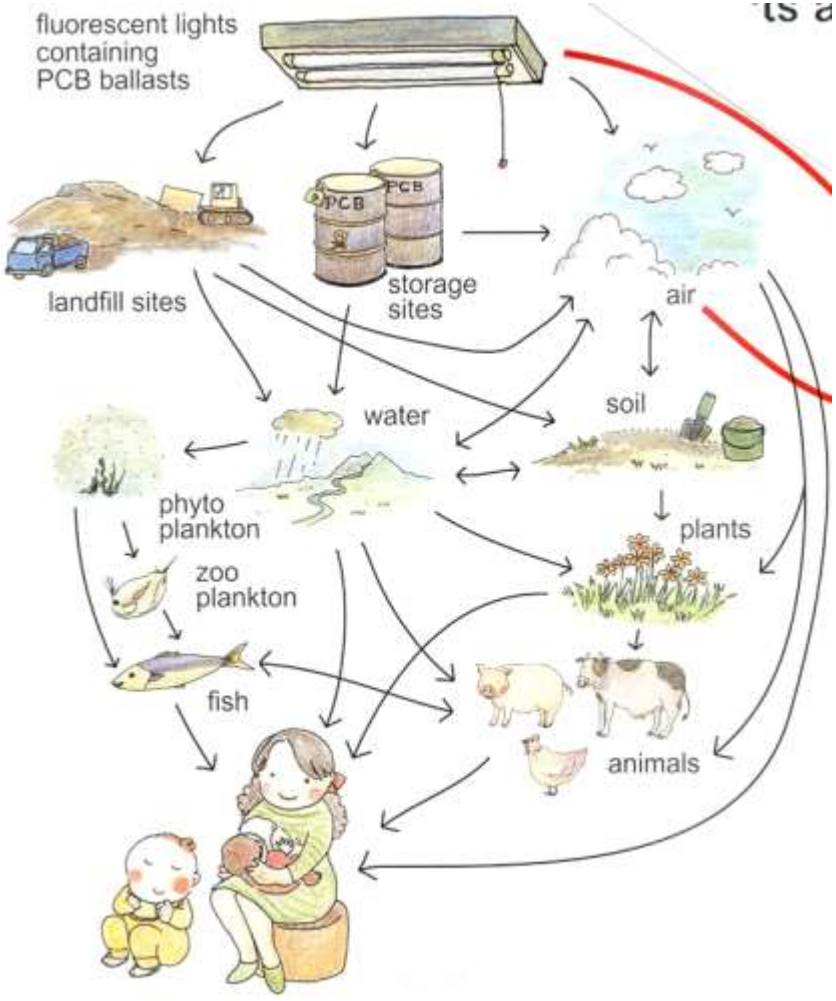



Thank you for your kind attention
Have a sunny day
Please find additional slides at the end of this presentation

UNITAR Webinar #4

Further Slides for Participants information

Ballasts can be found in nearly every building



Conclusions and lessons learnt with PCB OA

The conclusions and lessons learnt on managing PCB in open application from Swiss projects and experience can be summarised as follows:

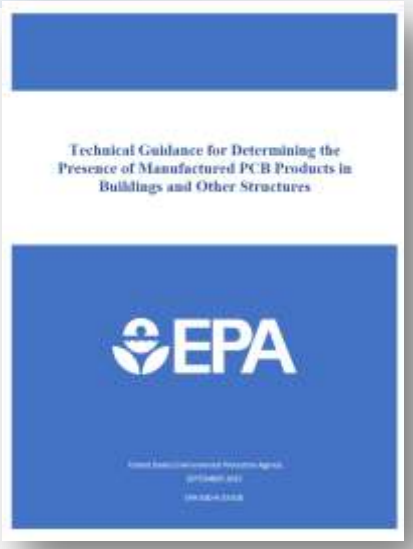
- As a first step it is necessary to undertake an assessment of whether PCBs have been used in open applications in the country/region. For Switzerland and other investigated countries the largest uses of PCBs in open applications have been in sealants and paints.
- All open PCBs applications should be addressed within a comprehensive management framework.
- In order to manage all applications of PCBs in an environmentally sound manner, a legislative framework should be established which requires the investigation and remediation of PCB containing materials and stipulates concentration thresholds for both solid materials and indoor air quality.
- PCB removal techniques and associated precautions should be regulated in a national PCB framework. Different applications need different remediation approaches and this can be addressed in associated guidance.
- Standards for screening, sampling and analysis are necessary for the assessment of existing contamination, for the remediation and for the assessment of the effectiveness of the remediation.
- After PCB remediation or removal works, indoor air quality measurements should be undertaken to assess the effectiveness of the remediation, as part of the works approval process.
- Remediation and removal of PCB materials must only be carried out by appropriately qualified and experienced specialist contractors. This work must always be supervised by experts.

Waste hierarchy

Source: EU Construction & Demolition Waste Management Protocol

Existing guidelines and regulations - US

- **US EPA - Technical Guidance for Determining the Presence of Manufactured PCB Products in Buildings and Other Structures (2023)**



- **US EPA - PCB guidance on website:**

Polychlorinated Biphenyls (PCBs) in Building Materials

EPA is concerned that there is potential widespread use of PCB-containing building materials in schools and other buildings constructed or renovated between about 1950 and 1979. This webpage provides the Agency's updated guidance for school administrators and building owners, including information about managing PCBs in building materials to help minimize possible exposures to building occupants.

On this page:

- Information about PCBs in building materials for school administrators, building owners and managers
- Information for contractors working in older buildings that may contain PCBs
- Test methods for PCBs in buildings
- EPA research on PCBs in buildings
- Additional Resources

Existing guidelines and regulations - EU

- **EU – CDW Management Protocol**

Pre-demolition or pre-renovation audits - some examples:

- **Austria:** pre-demolition audit is mandatory for demolition projects with an estimated waste production of more than 750 t. The requirements for the audit depend on whether the volume of the building is greater or smaller than 3,500 m^3.
- **Denmark**: a screening and mapping with respect to hazardous substances must be carried out for buildings demolished or renovated and where more than 1 t of CDW is expected. An audit of the building must be carried out if the screening shows the potential presence of hazardous substances. There are also requirements on the removal of hazardous waste from CDW, which in practice means that contaminants other than PCB must be included in the inventories to fulfil this obligation.
- **Germany**: a pre-demolition audit is, until now, mandatory only following the detection of harmful substances. These audits arise essentially due to the obligation to evaluate the risk and adopt safety measures when workers may be exposed to hazardous materials or materials containing dangerous substances.

Existing guidelines and regulations - EU

- **Flanders**: pre-demolition audits are not mandatory, but a pre-demolition inventory of the types/quantities of materials present in buildings is mandatory for non-residential building with an enclosed volume over 1,000 m^3. Hazardous waste and other waste materials are to be identified. Furthermore, the follow-up by a recognised demolition management organisation is mandatory (demolition follow-up plan for non-residential buildings with enclosed volume over 1000m^3 and residential buildings with an enclosed volume over 5000 m^3), a demolition certificate is required upon completion of works.
- **Sweden**: there is no threshold. Pre-demolition audits are always required.
- **Netherlands**: Dutch municipalities require a pre-demolition audit for each demolition in which more than 10 m^3 of waste is produced. The audit corresponds to an inventory indicating the nature and quantity of expected waste and a statement regarding the intended destination of the materials.
- **Basque Country** (North of Spain): a pre-demolition audit must be carried out for demolitions where the ground/soil or where the building/installation to be demolish is listed in the inventory of potentially contaminated soils – as elaborated by the government. Hazardous materials must be identified and removed under the supervision of an external environmental company, that must sign the “OK” to demolish before starting the demolition. Non-hazardous materials prior to and after the demolition, must be managed under the supervision of the external environmental company and the government.

Existing guidelines and regulations - EU

- **France:** a compulsory audit is to be carried out for any significant demolition and renovation operation whose cumulative floor area is greater than 1,000m2 and operations involving at least one building that has hosted an agricultural, industrial, or commercial activity and has been the site for the use, storage, manufacturing, or distribution of one or more substances classified as dangerous. At the end of the work, and inventory check must also be carried out.
- **Norway**: requirements are in place for carrying out an audit with respect to hazardous waste, CDW, and products with potential for re-use.
- **Portugal**: the waste management legislation stipulates that in the case of demolition or renovation of public buildings or public infrastructures the producers of CDW carry out a pre-demolition audit.

Existing guidelines and regulations - example Germany

- **Germany:**

Asbestos	Guideline for evaluation and removal of friable asbestos materials in buildings
PCB	Guideline for evaluation and removal of PCB contaminated materials in buildings
PCP	Guideline for evaluation and removal of PCP contaminated materials in buildings
Contaminated waste	Guideline for planning and realisation of removal and clean-up of contaminated materials in constructional and technical plants and installations
CDW	Guideline for planning and realisation of demolition and removal works in general, and of constructional and technical plants and installations in particular