Persistent Organic Pollutants (POPs)

What are POPS?

Persistent Organic Pollutant (POP) chemicals relate to a family of insecticides, pesticides, herbicides and insulation/fire retardants that have a long residence time in the environment and can accumulate within the food-chain (bioaccumulation).

These chemicals are no longer permitted to be used; but owing to heavy agricultural use during the 1960s-1980s it is possible that they are still present (in soil) on agricultural land. Furthermore, they can be present in the built environment in the form of fire retardant foams and insulation materials.

The persistence of these organic chemicals, which are highly resistant to degradation, means they have long lasting effects.

The direct risk is to the health of ecosystems. The cumulative risk to the human population is through the bioaccumulation of these chemicals within the food chain.

Preconstruction Phase Action

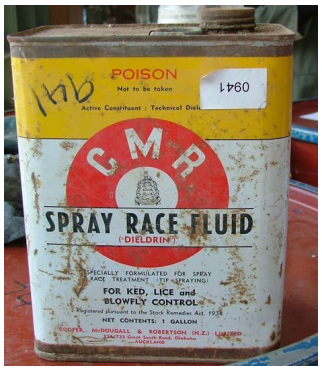
Preconstruction teams must assess the risk of POPs presence and how POPs are to be controlled and managed, with appropriate mitigation according to each type of POP.

Greenfield sites

When commissioning a Site Investigation / Geotechnical Investigation we must ensure that our investigation discounts the likelihood or presence of POPs.

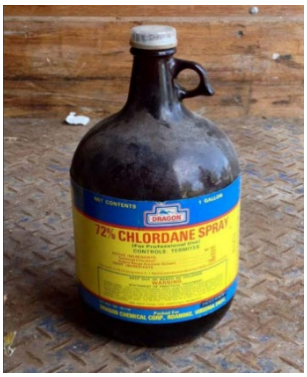
If it has been identified that the previous use of the land was agricultural, then testing for POPs must be included within the SI/GI Consultants brief. Sampling need and frequency will be determined by the likelihood and scale of POPs presence, avoiding the need to sample/test all materials and only to assess where required.

Examples of commonly used pesticides / insecticides



Dieldrin

Endrin



Chlordane

If it is identified that POPs are present, then you should speak with your Group Health, Safety and Environmental Advisor.

Built environment - demolition works

1 - Ensure clients are asked to provide information regarding the presence of POPs. For example, if their facilities asset management records hold any reference to product/material type of insulation and fire retardants used in the building. It may be unlikely that clients know, but as these are to be managed as hazardous waste, client will be liable for the added cost to discard if being removed through soft strip and demo.

2 - POPs may be present within buildings **constructed pre-1980's** in the form of fire retardant materials / insulation. The building surveyor should advise if materials predate 1980's and are likely to contain POPs.

3 - Ensure that Consultants/Surveyors are aware of any potential POPs / request sampling where suspected.

The Regulations

The Regulations state that a waste containing persistent organic pollutants listed in Table C16.1 is hazardous if the concentration of the POP is above the concentration limit assigned to it in Annex IV of the Persistent Organic Pollutants Regulation.

These thresholds are reproduced in Table 1 over page for reference.

Any sample meeting or exceeding these thresholds must be disposed of as hazardous waste. The waste must be segregated from all other types of waste and disposed of separately. Such wastes are usually destroyed by way of incineration.

Refer to EMS standard – Waste Management

TABLE 1 – POPs Chemicals – thresholds (see maximum concentration limit)

POP Chemical Brown = Building Green = Agricultural Purple = Both	**Origin, likely uses and material source for each POP chemical** Agricultural land management (intensively farmed) and Buildings constructed pre-1980's	**CAS No.**	**EU No.**	**Maximum Concentration Limit**
Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF)	By-products of high-temperature processes, such as incomplete combustion after waste incineration or in automobiles, pesticide production, and polychlorinated biphenyl production.			15 µg/kg(1)
DDT (1,1,1-trichloro-2,2-bis (4-chlorophenyl)ethane)	In agricultural soils. Insecticide. Persistence in the soil for up to 10–15 years after application.	50-29-3	200-024-3	50 mg/kg
Chlordane	Insecticide used to control termites and on a range of agricultural crops. Remains in the soil with a reported half-life of one year.	57-74-9	200-349-0	50 mg/kg
Hexachlorocyclohexanes, (HCH) including Llindane	Found in Z3 Insulation boarding/blocks containing HBCDD and HCH is insecticide. By-product of Lindane which is pesticide used as a wide-spectrum insecticide for seed, soil, leaf, tree/wood treatment plus against ectoparsites in animals/humans (headlice/scabies)	58-89-9 319-84-6 319-85-7 608-73-1	210-168-9 200-401-2 206-270-8 206-271-3	50 mg/kg
Dieldrin	Pesticide found in agricultural soils. Dieldrin's half-life is approximately five years.	60-57-1	200-484-5	50 mg/kg
Endrin	Insecticide. Sprayed on the leaves of crops, and used to control rodents. The chemical has a long half-life in soil for up to 12 years.	72-20-8	200-775-7	50 mg/kg
Heptachlor	Pesticide. Primarily used to kill soil insects and termites.	76-44-8	200-962-3	50 mg/kg
Hexachlorobenzene	Pesticide on food crops.	118-74-1	200-273-9	50 mg/kg
Chlordecone	Agricultural pesticide	143-50-0	205-601-3	50 mg/kg
Aldrin	Insecticide found in agri-soils. Aldrin can be oxidized, leading to rapid Dieldrin conversion	309-00-2	206-215-8	50 mg/kg
Pentachlorobenzene	Pesticide and unintentional byproduct. PeCB has also been used in PCB products, dyestuff carriers, as a fungicide, a flame retardant, and a chemical intermediate.	608-93-5	210-172-5	50 mg/kg
Polychlorinated Biphenyls (PCB)	• Insulator in transformers, capacitors and fluid based heat exchange systems. • Fire retardant and water proofer on a range of building surfaces. • Additive in paints, adhesives, plastics, lubricants, asphalt and pesticides.	1336-36-3 and others	215-648-1	50 mg/kg(2)
Mirex	• Flame retardant in plastics, rubber, and electrical goods. • Insecticide used against ants and termites found in soils.	2385-85-5	219-196-6	50 mg/kg
Toxaphene	Insecticide. Used on cotton, cereal, grain, fruits, nuts, and vegetables, as well as for tick and mite control in livestock. Half-life of up to 12 years in soil.	8001-35-2	232-283-3	50 mg/kg
Hexabromobiphenyl	Fire retardant found in coatings, lacquers, polyurethane foam, acrylonitrilebuta-dienestyrene (ABS) thermoplastics for constructing machine housings, such as motor housing, and radio and TV parts.	36355-01-8	252-994-2	50 mg/kg

(1) The limit is calculated as PCDD and PCDF according to toxic equivalency factors (TEFs) in Table C16.2.
(2) Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
For further information, see http://www.popstoolkit.com/about/chemical/hbb.aspx