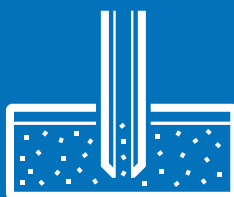
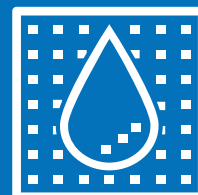
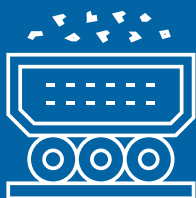


# DEKONTA POPs ELIMINATION & MONITORING SERVICES

Integrated Solutions for POPs



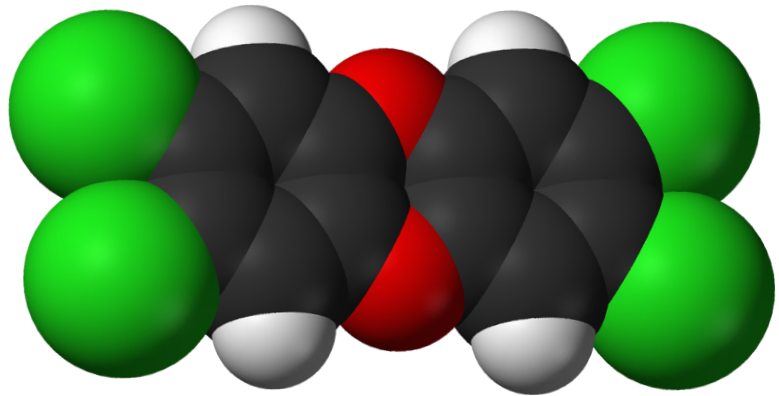
Services & technologies  
for a better environment

# PERSISTANT ORGANIC POLLUTANTS (POPs)

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## What are they?

Persistent Organics Pollutants, or POPs, are a group of chemicals that are very toxic and can cause cancer and other adverse health effects. You have probably heard names like DDT, PCBs (polychlorinated biphenyls), as well as "dioxins", that are unintentional by-products of many industrial processes. These are the most commonly encountered POPs.



*2, 3, 7, 8-tetrachlordibenzodioxin (TCDD)*

## Why POPs are a problem?

- ✓ The first reason is persistency, as the name suggests. Once released into the environment, POPs, due to their chemical composition, are not easily degraded by natural processes and can continue in the environment for several decades after their release.
- ✓ The second reason is that POPs can also enter our food chain by a process called bioaccumulation, which is a gradual accumulation of substances in animals and plants. By consuming these animals and plants, POPs can enter our organisms too.
- ✓ Finally, POPs can travel long distances. Research showed that POPs are even present at the north and south poles, meaning that accumulation of POPs can even happen in areas far from where they were used or emitted, specifically in environments where POPs have never been introduced. This makes POPs a truly global issue.



# Stockholm Convention

Adopted and put in practise by the United Nations Environmental Programme on May 2001, the Stockholm Convention aims "to protect human health and the environment from persistent organic pollutants". The convention initially identified 12 compounds, the so called "dirty dozen". This first list initially included 9 pesticides (Aldrin, Chlordane, DDT, Dieldrin, Endrin, Heptachlor, HCB, Mirex and Toxaphene), PCBs, Dioxins and Polychlorinated



dibenzofurans but since 2001, this list has been expanded to include some polycyclic aromatic hydrocarbons (PAHs), brominated flame retardants, and other compounds.

Currently the Stockholm Convention works with 184 parties showing that a global issue requires a global solution and a truly global action.

For details visit [www.pops.int](http://www.pops.int)



# INVESTIGATION, RISK ASSESSMENT & FEASIBILITY STUDY

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Before any remediation work can start in a contaminated site, one of the initial steps is to perform a site investigation to gather information about dispersion, concentrations and quantities of potential contaminants. If contamination is confirmed a risk assessment is then performed to understand if those contaminants pose a risk to the environment and nearby population.

For the implementation of this type of work, DEKONTA commonly uses its Geoprobe 54LT and Geoprobe 7822DT machines.

The 54LT model is a compact probing unit designed for tight spaces and rough terrain. The advantage of this equipment is that it enables collection of intact soil/waste samples into PE liners with no direct contact with contamination, as well as the elimination of exposure risks and potential cross-contamination.

DEKONTA is also experienced in the elaboration of Risk Assessment studies, one of the preliminary steps for the remediation of contaminated sites.



For these studies, DEKONTA follows the set of U.S. EPA (United States Environmental Protection Agency) guidelines or Czech methodological standards issued by the Czech Ministry of Environment.

The information obtained through the Risk Assessment is used to design the solution to be implemented at the site. This is done through a Feasibility Study where DEKONTA specialists consider several technologies and, based on pre-determined criteria and laboratory tests of the options, the best technical solution is selected.

## Case Studies

### PROJECT TITLE:

**Project title: Nubarashen site, Armenia - Detailed Design, Technical Definition of Works, and Supporting Assessments/Studies required for the Removal of POPs Pesticides and Recovery of Associated Contaminated Soil along with Site Clean-up, Stabilization, Containment and Monitoring**

### IMPLEMENTATION PERIOD:

**2016 - 2019**

### CLIENT:

**United Nations Development Programme**

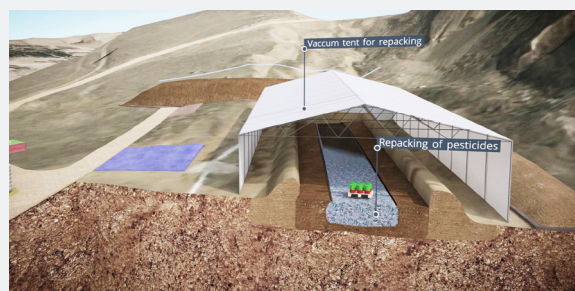


The main goal of the project was to perform an investigation of the Nubarashen burial site of Obsolete POPs pesticides and prepare tender documentation for a future clean-up project in the site.

The main activities carried out during the project were:

- Perform a site investigation in order to update the quantities of hazardous waste to be treated
- Select the most cost effective solution for the treatment of the hazardous waste
- Submit the necessary documentation for receiving EIA approval of the chosen solution

- Support UNDP in the preparation of the Terms of Reference for the future clean-up of the site
- Carry out capacity building activities for local experts in the field of sampling and transboundary movement of hazardous waste



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**PROJECT TITLE:**

**Project title: Reduction of risks associated with hazardous waste landfill in Cismichioi, Moldova**

**IMPLEMENTATION PERIOD:**

**2016 - 2017**

**CLIENT:**

**Czech Development Agency**

The objective of the project was to build a conceptual solution for the hazardous waste

landfill in Cismichioi, where approx. 37,600 m<sup>3</sup> of contaminated waste such as DDT and HCH had been deposited before 1990.



The main activities carried out during the project were:

- Perform a site investigation in order to assess the site contamination
- Collection of soil, water, bottom sediments, waste and building material samples for laboratory analyses
- Update the site inventory in order to assess the quantities of hazardous waste to be treated
- Perform air quality monitoring of the surrounding area
- Perform a Risk Assessment study of the site contamination
- Elaborate a Feasibility Study of remediation options
- Prepare the project documentation for the remediation of the site

# SAFEGUARDING, TRANSPORT & WASTE DISPOSAL

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Illegal or poorly managed storage of obsolete pesticides and other hazardous wastes is still problem in many parts of the world. It is not uncommon to encounter old buildings full of unidentified hazardous substances, many of them obsolete, stored in poor conditions and sometimes with damaged packaging posing a risk to the surrounding environment and population.

For these situations, DEKONTA offers services for safeguarding, transport and disposal of the hazardous substances.

Our company has a team of fully trained specialists that, using the latest safety equipment, is able to safeguard hazardous substances and transport them to duly licensed disposal facilities around Europe. DEKONTA is also experienced in the process of notification of transboundary movement of hazardous waste between countries, a necessary activity when the country where the hazardous waste is located does not have the proper facilities to dispose of it. In this case, DEKONTA can offer a full package of services that include the safeguarding, export and disposal in one of our partner facilities throughout Europe.

## Case Studies

**PROJECT TITLE:** **Environmentally sound management campaign of two identified sites in Sao Tome and Principe contaminated by pesticides including POPs pesticides**

**IMPLEMENTATION PERIOD:** **2016 - 2019**

**CLIENT:** **United Nations Industrial Development Organization**

The main goal of this project was to safeguard, export and dispose in the UK approximately, 30 tonnes of Obsolete Pesticides and Pesticide-contaminated material from two storehouses located in the Island of Sao Tome.

The main activities carried out during the project were:

- Import of all the necessary equipment and site set-up
- Sampling and inventory update





- Completing the Environmental, Health and Safety Plan
- Repackaging, export and disposal of the waste to a EU facility
- Train a team of soldiers and a local NGO to implement the repackaging works
- Train the staff of the Ministry of Environment to deal with the procedures of transboundary movement of hazardous waste
- Remediation of the contaminated soil surrounding the storehouses
- Implement environmental awareness activities in the local community

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<b>PROJECT TITLE:</b>	<b>Safeguarding and Disposal of hazardous chemical waste in Moldova</b>
<b>IMPLEMENTATION PERIOD:</b>	<b>2015 - 2017</b>
<b>CLIENT:</b>	<b>Food and Agriculture Organization of the United Nations</b>

The main goals of the project were repackaging, export and final disposal of approximately 360 tonnes of obsolete pesticides from the central storehouse of Pascani, district of Criuleni, to incinerator facilities located in Poland and Germany.

The main activities carried out during the project were:

- Import of all the necessary equipment and site set-up
- Sampling and inventory update
- Completing the Environmental, Health and Safety Plan
- Repackaging of the Waste
- Solidification and Stabilization of contaminated sand found in the storehouse
- Organization of the export documents according to the provisions of the Basel Convention
- Transportation of the waste according to ADR rules to the incinerator facility

- Final disposal and issue of incineration certificate

In addition, this project also had a capacity building component that included training of local experts in health and safety and also a community awareness component.





# CONTAMINATED SOIL & GROUNDWATER TREATMENT

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DEKONTA offers a wide range of technologies to deal with soil contaminated by POPs. One of the methods is Thermal Desorption that is based on heating treated material up to the temperature exceeding boiling point of contaminants present in the material. The vaporised pollutants are then concentrated in the liquid condensate that can be further treated by incineration or chemical processes.

DEKONTA offers its own Thermal Desorption unit which is designed as a modular equipment that

can be easily modified for any specific application. Mobile unit can be delivered to our client's site to be used in pilot scale runs for feasibility tests.

In addition, some POPs like PAHs and pesticides can be treated by DEKONTA's developed Co-composting technology which consists in mixing polluted soils with organic substrate in order to achieve the decontamination. Due to low substrate selectivity and high biodiversity the compost-inhabiting microbial consortia are capable of the breakdown of organic matter of different nature including the artificial chemical compounds that are persistent in the natural environment.

For in situ groundwater remediation DEKONTA offers different technologies like in situ chemical oxidation (ISCO) and in situ chemical reduction (ISCR) which use oxidants or reducing agents to treat POPs in the place where they are present without the need of pumping or excavation. ISCR is commonly used to treat chlorinated POPs (e.g. like PCBs, lindane, DDT) as it is usually capable of their dechlorination.



## Case Studies

### PROJECT TITLE:

**Project title: Remediation of the old ecological burden in the area contaminated by the historic wood impregnation facility, Ceska Lipa's water source.**

### IMPLEMENTATION PERIOD:

**2019-2022**

### CLIENT:

**Private site owner co-financed by the European Union Operational Program Environment**





The site is a former creosote impregnation facility that has been operated from the beginning of 20th century until 1970s. Improper handling of the creosote oils and leaking storage tanks caused significant migration of creosote oils in to the subsurface and contamination of the environment with heavy PAHs like benzo(a)pyrene. The local aquifer is used as a source of drinking water and therefore it needs to be cleaned up.

The main activities carried out/to be carried out within the project are following:

- Installation of insulated paved area of 5,600 m<sup>2</sup> with run-off collection for on-site co-composting
- Sequential excavation of the heavy PAHs contaminated sandy soils (total amount of 21,000 m<sup>3</sup>)
- Co-composting of contaminated soils and utilisation of cleaned soils as backfill material
- Clean-up of the unsaturated contaminated sandstone bedrock via ISCO using Fentons reagent infiltration
- Groundwater clean-up using a pump and treat system based on so called foto-oxidation (chemical oxidation via radicals created by hydrogen peroxide UV light activation)
- Groundwater monitoring

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<b>PROJECT TITLE:</b>	<b>Remediation of the industrial waste landfill in cadastral area of Novy Rychnov, Czech Republic</b>
<b>IMPLEMENTATION PERIOD:</b>	<b>2007 - 2008</b>
<b>CLIENT:</b>	<b>Dolni Cerekev Municipality</b>

The goal of the first stage of the project was the complete removal and final disposal of all the toxic waste (approx. 2 000 tonnes including also pure pesticides), stored at an unprotected landfill site. In the second phase of the project, groundwater contaminated with petroleum hydrocarbons, chlorinated ethens, pesticides and heavy metals was treated by a sophisticated system of technologies including gravity separation, air stripping and reverse osmosis.

The main activities carried out within the project were as follows:

- Geophysical investigation of the former landfill
- Waste analysis and categorization
- Waste excavation, transportation and

final disposal (incineration, solidification/stabilization)

- Remediation of groundwater contaminated with chlorinated ethenes, heavy metals and pesticides
- Final site reclamation





# AIR EMISSIONS MONITORING

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Air pollution kills an estimated seven million people worldwide, every year. From smog hanging over cities to smoke inside the home, air pollution poses a major threat to health and climate.

Dioxins and furans are groups of POPs that share certain chemical structures and biological characteristics. Usually, they are not created intentionally, but are emitted to the air as a result of human activities such as commer-



cial or municipal waste incineration, backyard burning of waste and the use of fuels, such as wood, coal or oil.

DEKONTA's comprehensive services also include air monitoring of industrial emissions. Our chemical laboratory located in the city of Usti nad Labem in Czech Republic is equipped with a mobile industrial emissions unit that is able to measure several parameters that are key for monitoring industrial emissions and air quality.



## Case Studies

<b>PROJECT TITLE:</b>	<b>Training, Assessment and Reduction of PCDD/FS Releases from Metallurgical Industries in Turkey</b>
<b>IMPLEMENTATION PERIOD:</b>	<b>2016 - 2019</b>
<b>CLIENT:</b>	<b>United Nations Industrial Development Organization</b>

The main goal of this project was to measure the POPs emitted during the industrial processes at the chosen sites and propose a set of measures, in line with the Best Environmental Practices and Best Available Techniques (BET/BAP) to be recommended to each of the companies to reduce their air emissions of POPs.

The main activities carried out during the project were:

- Provide training in U-POPs and PCDD/Fs sampling and analysis at industrial stacks and training on inventory for industries in Turkey
- Measurements of PCDD/F, mercury, flue gas and operational parameters at the stack of sintering plants and non-ferrous metal industry
- Determination of U-POPS emission factors



in iron and steel industry (sintering plants) and/or non-ferrous metal industry (copper, aluminium and zinc production) and other priority sectors

- Assessment of the facility for identifying BEP/BAT intervention for reducing U-POPs releases
- Proposing BEP/BAT measures for the entire facility and process
- Undertake sampling and analysis of the PCDD/Fs baseline and release levels after introduction of BAT/BEP

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<b>PROJECT TITLE:</b>	<b>Sampling and Analysis of PCDD/PCDF and relevant parameters in Suralaya power plant, Unit 6, Indonesia</b>
<b>IMPLEMENTATION PERIOD:</b>	<b>2015</b>
<b>CLIENT:</b>	<b>United Nations Industrial Development Organization</b>

The main goal of the project was to gather data in order to assess the effectiveness of the implemented BATs and BEPs on the emission of Dioxins, Furans and Mercury in the Suralaya Power Plant in Indonesia.

The main activities carried by out within the project were following:

- Measurement of PCDD/PCDF and Mercury in flue gas

- Measurement of operational parameters in range (temperature, pressure, gas velocity, gas flow rate, oxygen, H<sub>2</sub>O content (humidity), CO, CO<sub>2</sub>, SO<sub>x</sub> and NO<sub>x</sub> and particulate matter)
- Sampling of coal, bottom ash and fly ash
- Analysis of coal for the content of mercury and total chlorine
- Analysis of fly ash and bottom ash for PCDD/PCDF content



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## OUR READY-TO-USE SERVICES

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01.

Investigation  
and Risk  
Assessment Study

02.

Safeguarding  
and waste  
disposal

03.

Soil and  
groundwater  
treatment

04.

Air emission  
monitoring

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