

**The 9th International PCB Workshop**  
Oct.9-13,2016 KOBE

Date: 10/4/2016

Vladimir P Beškoski  
Faculty of Chemistry  
University of Belgrade  
Serbia

Dear Vladimir P Beškoski,

You are cordially invited to join us at the 9th International PCB Workshop which will be held on 9th Oct. to 13th Oct. at the Kobe International Convention Center in Kobe, Japan.

We are happy to host your two presentations at the 9th International PCB Workshop as below.

<b>Author</b>	Vladimir P Beškoski
<b>Institution</b>	University of Belgrade
<b>Citizen's Sessions Presentation</b>	Capacity Building for Analysis and Reduction Measures of Persistent Organic Pollutants in Serbia
<b>Oral Sessions Presentation</b>	Session #2 Global inventory and management: National and international activities to limit human and environmental impact of PCBs PCBs in Serbia, history of usage and present situation - can bioremediation solve this problem?

We ask for your commitment to travel to the Workshop venue and personally present the paper at the Workshop.

Should you be prevented as a presenter make sure that you will attend for replacement early and inform the organizer.

We look forward to see you in Kobe!

Sincerely,

Takeshi Nakano  
The 9th International PCB Workshop  
Executive Committee Chair



# The 9th International PCB Workshop

Kobe International Convention Center, Kobe, Japan

October 9-13, 2016



# 低濃度 PCB 廃棄物処理

環境省 大臣認定番号 平成26年第9号

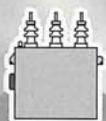
LOW CONCENTRATION PCB WASTE PROCESSING



絶縁油等  
汚染廃油処理  
23.3Kℓ/日



トランス  
(500kg相当)  
約100台/日



コンデンサ  
(100kg相当)  
約50台/日



プッシング  
(100kg相当)  
約70本/日



OFケーブル  
約200m/日



汚染物入り  
ドラム缶  
48本/日



空ドラム缶  
96本/日

Nature for The Future

**OHNO オオノ開発** 株式会社

オオノ・アソシエーツ



**popps** ポップス対策事業部

〒791-0242愛媛県松山市北梅本町甲184番地  
TEL 089-909-7644 FAX 089-976-8623

PCBに関するお問い合わせはこちら

見積り、相談無料!

 **0120-196-667**

メールアドレス  [pops@ohno-associates.jp](mailto:pops@ohno-associates.jp)



**18:00 - 21:00 Session #2 (12 speakers) "Emission"**

**Global inventory and management: National and international activities to limit human and environmental impact of PCBs**

**Co-Chairs; Roland WEBER, (POPs Environmental Consulting, Stuttgart)**

**Niklas JOHANSSON (Karolinska Institute and Melica Biologkonsult)**

<b>#2-1</b> <b>18:00</b> (skype)	<b>Jacqueline Alvarez,</b> UNEP Overview & PEN	<b>Efforts toward the elimination of PCBs</b>
<b>#2-2</b> <b>18:15</b>	<b>Carmela Romero Centeno,</b> United Nations Industrial Development Organization (UNIDO) activities, <b>Austria</b>	<b>Promoting Industrial Development through the UNIDO PCB Program</b>
<b>#2-3</b> <b>18:30</b>	<b>Leah Aurea U. Texon,</b> UNIDO, <b>Philippines</b>	<b>Polychlorinated Biphenyl (PCB) Management Initiatives in the Philippines</b>
<b>#2-4</b> <b>18:45</b> <b>20min</b>	<b>Rio Deswandi &amp; Edward Nixon Pakpahan,</b> UNIDO, <b>Indonesia</b>	<b>Conducting PCBs Inventory under Incomplete Information: An Indonesia's Experience</b>
<b>#2-5</b> <b>19:05</b> <b>10min</b>	<b>Zheng Peng,</b> Foreign Economic Cooperation Office, Ministry of Environmental Protection of China, <b>China</b>	<b>Environmental standards, specification and guidance of Environmental Sound Management and disposal of polychlorinated biphenyls waste in China</b>
<b>#2-6</b> <b>19:15</b> <b>10min</b>	<b>Xinhua Gao,</b> Foreign Economic Cooperation Office, Ministry of Environmental Protection of China, <b>China</b>	<b>Investigation and Disposal of Electrical Devices Containing PCBs in China</b>
<b>#2-7</b> <b>19:25</b>	<b>Nelson MANDA / John Pwamang,</b> UNITAR, <b>Switzerland</b>	<b>Case Study of the GEF / UNITAR / UNDP / EPA-Ghana Project on Capacity Building for the Elimination of PCBs in Ghana</b>
<b>#2-8</b> <b>19:40</b>	<b>Vladimir P Beškoski,</b> Faculty of Chemistry, University of Belgrade, <b>Serbia</b>	<b>PCBs in Serbia, history of usage and present situation - can bioremediation solve this problem?</b>
<b>#2-9</b> <b>19:55</b>	<b>Åhr Evertson,</b> Upplands Väsby Municipality, <b>Sweden</b>	<b>An Investigation of Occurrence and Transport of PCB in the Stream Väsbyån and Lake Oxundasjön in Upplands Väsby Municipality, Sweden</b>
<b>#2-10</b> <b>20:10</b>	<b>Roland Weber,</b> POPs Environmental Consulting, <b>Germany</b>	<b>Towards Systematic Tracking of PCB-Sources for Safe Food Production</b>
<b>#2-11</b> <b>20:25</b>	<b>Niklas Johansson,</b> Melica Biologkonsult, <b>Sweden</b>	<b>National Follow-up to the 2010 Inventory of Identification, Remediation and Destruction of PCB in Sealant and Flooring Materials</b>
<b>#2-12</b> <b>20:40</b>	<b>Scott N. Spak,</b> School of Urban & Regional Planning / Public Policy Center / Department of Civil & Environmental Engineering, University of Iowa, <b>USA</b>	<b>Toward Comprehensive Global Urban-scale PCB Source &amp; Emissions Inventories</b>

**PCBs in Serbia, history of usage and present situation - can bioremediation solve this problem?**

*Beškoski, Vladimir (Faculty of Chemistry, University of Belgrade, Serbia); Nakano, Takeshi (Research Center for Environmental Preservation, Osaka University, Japan)*

Fluids based on Polychlorinated biphenyls (PCBs) were used in transformers; capacitors; electric motors with liquid cooling; hydraulic systems; heat transfer systems; electromagnets; fluorescent light fittings; fluid-filled cables; additives to pesticides, inks, oils, lubricants, etc.

In the Republic of Serbia PCB based fluids were not produced, but they were imported for use in electrical equipment and devices for different purposes. Total number of transformers produced by manufacturers in Serbia was 565, and the total mass of the produced fluids in transformers was 438,155 kg. The total number of capacitors produced was 2379, and a number of transformers and capacitors with PCBs were imported. The practical realization of making a preliminary inventory of PCBs, was carried out in the framework of the preparation of the first National implementation plan on Stockholm Convention (NIP, 2010), which began in late 2006 and was completed in mid-2007.

According to collected data, the total mass of the fluids in only two public enterprises was 35,856 kg and 748.000 kg, respectively, while the total mass of the fluid and transformers in those companies was 141,642 kg and 2.244,000 kg, respectively.

Besides PCBs fluids in electrical equipment a waste consisting of, containing or which is contaminated with PCBs can be found in different physical forms, including: solvents; construction waste; contaminated oils, soil, sediments, sludge, rock and aggregates; tanks, barrels and containers. Since there is no hazardous waste landfills in Serbia, in some cases capacitors, or oils based on PCB are placed in barrels and cisterns. Furthermore, as a result of the NATO bombing campaign in 1999, electric transformer station in Bor was heavily damaged and waste containing more than 100 destroyed PCBs condensers and around 800 m<sup>2</sup> of polluted soil was produced. In industrial zone of Pancevo it is considered that about 25.000 kg of sand and the equipment used for work with the fluid-based PCBs can be found stocked in metal barrels. It is estimated that around 2000 tons of PCB-contaminated oil, or around 8000 tons of contaminated equipment can be found in Serbia.

For the treatment of this material export was the dominant method of choice. However, for the treatment of soil and sediment polluted with low levels of PCBs, bioremediation can have its potentials. Multi staged aerobic/anaerobic process has been shown as the most promising one.



# PCBs in Serbia, history of usage and present situation - can bioremediation solve this problem?

Vladimir P. Bežkoski  
University of Belgrade, Serbia

October 10, 2016  
Kobe Japan