

Block I General details	
1	<p>Location of the PCB disposal facility:</p> <p>Name of Facility:</p> <p>We do not run own facility. Technology (Sodium based reduction) is sold to customers together with equipment</p> <p>City: Country:</p> <p><i>(Provide address information in Block IV)</i></p>
2	<p>Licence / authorization:</p> <p>Is this facility licensed or authorized to handle PCBs? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Customer is responsible; we offer personal support to apply for the licence</p> <p>If "Yes":</p> <p>(i) Nature of licence / authorization:</p> <p>(ii) Please submit the licensing history <i>(please attach to this questionnaire)</i></p> <p>Issuing authority <i>(name)</i>:</p> <p><input type="checkbox"/> National <input type="checkbox"/> Local or <input type="checkbox"/> Independent</p>
3	<p>Please provide information on storage at the facility including:</p> <p>Capacity for the various PCB waste and equipment types:</p> <p>Capacity for liquids : from mobile units up to 40,000 tpy or more if required</p> <p>Method: Sodium reduction</p> <p>Holding time:</p>
4	<p>Worker protection <i>(Please summarize protective measures applied during treatment of PCB wastes)</i></p> <p>Protective clothing</p> <p>Does the facility have an accident book? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Most frequent cause(s) of incidents involving PCBs: spilling of oil</p>

5

Opinion box - PCB Management issues *(Please describe briefly)*

What are your major concerns?

Can you identify research and development needs in PCB management that would be beneficial for your region and waste managers worldwide?

PCB-extraction methods from solids to decrease volume of waste to be treated

Block II Types of PCB wastes

Part A: Treatment of PCB containing equipment/material

Part A1: Metallic Parts

A1.1	<p>Types of <u>metallic PCB</u> equipment/material treated:</p> <p>NON</p>	<p>Limitation on waste accepted <i>(please specify, if appropriate)</i></p>		
		<p>Concentration <i>(specify the unit)</i></p> <p>unit:</p>	<p>Quantity <i>(specify the unit)</i></p> <p>unit:</p>	
		<p>min</p>	<p>max</p>	
	<input type="checkbox"/> Equipment containing 100 % PCB			
	<input type="checkbox"/> Equipment containing mineral oil contaminated by PCB			
<input type="checkbox"/> Others:				
<p><i>Please specify any other limitation on waste accepted:</i></p>				
A1.2	<p>Presentation of metallic equipment/material</p> <p>In what form must the metallic PCB equipment/material be presented:</p> <input type="checkbox"/> Drums <input type="checkbox"/> Other packaging: <input type="checkbox"/> Other constraints:			

A1.3

Treatment of metallic PCB equipment/material

Immediate destruction of metallic equipment/material containing PCB? Yes No **X**

If 'Yes', please specify the applied technology in Part III

Extraction of PCB? Yes No

If 'Yes':

- please specify the applied technology in Part III
- Is the decontaminated metallic equipment/material subjected to reuse/recycling? Yes No

If 'Yes', please specify in **Block II Part C** (Reuse and recycling)

Part A: Treatment of PCB containing equipment/material

Part A2: Non-metallic Parts

A2.1	Types of non-metallic PCB equipment/material treated:	Limitation on waste accepted <i>(please specify, if appropriate)</i>	
		Concentration <i>(specify the unit)</i> unit: min max	Quantity <i>(specify the unit)</i> unit:
	<input type="checkbox"/> PCB-containing materials (clothes, cables, etc.)		
	X PCB-contaminated residues, sludges	0	Pure PCB
	<input type="checkbox"/> PCB-contaminated soils and sediments		
	<input type="checkbox"/> Packaged / drummed waste		
	X Other: contaminated adsorbents		
<p><i>Please specify any other limitation on waste accepted:</i></p>			
A2.2	<p>Presentation of non-metallic equipment/material</p> <p>In what form must the non-metallic PCB equipment/material be presented:</p> <p>X Drums</p> <p>X Other packaging: plastic containers, steel containers</p> <p><input type="checkbox"/> Other constraints:</p>		

A2.3

Treatment of non-metallic PCB equipment/material

Immediate destruction of non-metallic equipment/material containing PCB? Yes No **X**

If 'Yes', please specify the applied technology in Part III

Extraction of PCB? Yes **X** No

If 'Yes':

- please specify the applied technology in Part III
- Is the decontaminated non-metallic equipment/material subjected to reuse/recycling? Yes **X** No

If 'Yes', please specify in **Block II Part C** (Reuse and Recycling)

Part B: Treatment of PCB oils and PCB waste oils

B1

Types of PCB oils and PCB waste oils treated:	Limitation on waste accepted <i>(please specify, if appropriate)</i>		
	Concentration <i>(specify the unit)</i>		Quantity <i>(specify the unit)</i>
	unit: min	max	unit:
X 100 % PCB oils	0	pure	any
X Mineral oils contaminated by PCB	0	pure	any
X Waste oils contaminated by PCB	0	pure	any
X Other: any organic liquid with PCB	0	pure	any

Please specify any other limitation on waste accepted:

Water content shall be less than 1 %

B2

Presentation of PCB oils and PCB waste oils

In what form must the PCB oils and PCB waste oils be presented:

X Drums

X Other packaging: any suitable packaging can be accepted

Other constraints:

B3

Treatment of PCB oils and PCB waste oils

Please specify the applied technology for the destruction of PCB oils and PCB waste oils in Part III

Part C: Reuse & Recycling of decontaminated PCB equipment/material

C1

Types decontaminated PCB equipment/material treated:	Limitation on waste accepted <i>(please specify, if appropriate)</i> Quantity <i>(specify the unit)</i> unit:
<input type="checkbox"/> Transformers <input type="checkbox"/> Capacitors	
<input type="checkbox"/> Materials (clothes, cables, etc.)	
<input type="checkbox"/> Residues, sludges	
<input type="checkbox"/> Soils and sediments	
<input checked="" type="checkbox"/> Other: Oil/Transformer oil	any

Please specify any other limitation on waste accepted:

C2

Presentation of decontaminated PCB equipment/material

In what form must the decontaminated PCB equipment/material be presented:

- Drums
- Other packaging: any suitable for oil
- Other constraints:

C3

Treatment of decontaminated PCB equipment/material

Reuse and Recycling of decontaminated PCB equipment/material? **Yes X** No

If 'Yes', please specify the applied technology in Part III

Is the decontaminated PCB equipment/material disposed of? Yes No **X**

If 'Yes', please specify:

Transport to the disposal site? Yes No **X**

If 'Yes':

International transport

National transport

Location of disposal site:

Please provide a short description of disposal site:

Block III Detailed information on applied technologies

1	The following description refers to Block II, Part:	Type of PCB waste or decontaminated equipment/material:
	<input type="checkbox"/> A1 (Treatment of metallic PCB equipment/material)	
	<input checked="" type="checkbox"/> A2 (Treatment of non-metallic PCB equipment/material)	Sludge, activated carbon, solids
	<input checked="" type="checkbox"/> B (Treatment of PCB oil and PCB waste oil)	Any oil can be treated to give at least fuel or better: reconditioned transformer oil
	<input type="checkbox"/> C (Reuse and recycling of decontaminated PCB equipment/material)	
2	<p>Applied technologies (Please specify the technology used for disposal):</p> <p><input type="checkbox"/> Pyrolysis / gasifiers</p> <p><input type="checkbox"/> Gas Phase Chemical Reduction (GPCR)</p> <p><input type="checkbox"/> Base Catalysed Decomposition (BCD)</p> <p>X Sodium Reduction</p> <p><input type="checkbox"/> Super-Critical Water Oxidation (SCWO)</p> <p><input type="checkbox"/> Plasma Arc</p> <p><input type="checkbox"/> Molten Salt Oxidation</p> <p><input type="checkbox"/> Solvated Electron Technology</p> <p><input type="checkbox"/> Retrofilling</p> <p><input type="checkbox"/> Other:</p> <p>Type of technology (1-sentence description): Dispersed Sodium is reacted with PCB's at temperatures up to 150 °C</p> <p>Description of the technology please provide additional information as appropriate (<i>summarize here and, if necessary, attach documentation</i>) This approved Technology can be used in mobile and/or stationary units. The recycling rate is up to 99 % for oil.</p> <p>Commissioned? X Yes <input type="checkbox"/> No Year: first unit in 1988</p> <p>Can the technology be used in a mobile facility? X Yes <input type="checkbox"/> No</p>	

3

State of development

Does the technology exist as an industrial unit? X Yes No

If "No", please indicate when it will become operational:

If "Yes", please indicate how many units exist: 1 // + 2 units in construction

In what countries: France

4	<p>Pretreatment:</p> <p>Does the technology require any pretreatment procedures? X Yes <input type="checkbox"/> No</p> <p>If "Yes", please specify required pretreatment procedures:</p> <p><input type="checkbox"/> Thermal Desorption</p> <p><input type="checkbox"/> Dilution</p> <p><input type="checkbox"/> Low Temperature Rinsing</p> <p><input type="checkbox"/> Electro-osmosis</p> <p><input type="checkbox"/> Draining/Solvent washing</p> <p><input type="checkbox"/> Dismantling/Shredding</p> <p>X Other: Dewatering (for oils); grinding (for sludge, solids)</p>														
5	<p>Byproducts</p> <p>What byproducts does the technology produce? <i>(please specify below)</i></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Byproduct</th> <th style="width: 30%;">Kind</th> <th style="width: 45%;">Amount</th> </tr> </thead> <tbody> <tr> <td>Liquids:</td> <td>NONE</td> <td>zero L per tonnes of waste treated</td> </tr> <tr> <td>Solids:</td> <td>Sodium chloride / Tar</td> <td>1-2 kg per tonnes of waste treated for oil with 1000 ppm PCB</td> </tr> <tr> <td>Air:</td> <td>NONE</td> <td>zero m³ per tonnes of waste treated</td> </tr> </tbody> </table> <p>Does the technology allow all byproducts to be monitored for POPs*/PTS** before release? X Yes <input type="checkbox"/> No</p> <p>If POPs*/PTS** are discovered, can the byproducts be returned to the process for further treatment? X Yes <input type="checkbox"/> No</p> <p>Are any of the byproducts classified as other sorts of hazardous wastes? <input type="checkbox"/> Yes X No</p> <p>If "Yes" please specify:</p> <p>What volumes of such byproducts are generated by handling a unit volume of PCB wastes: NaCl is produced according to stoichiometry (content of PCB)</p> <p>Can third party monitoring data be provided? <input type="checkbox"/> Yes X No</p> <p><i>If "Yes", please attach to this questionnaire.</i></p> <p style="text-align: right; font-size: small;">* POPs: Persistent Organic Pollutants ** PTS: Persistent Toxic Substances</p>			Byproduct	Kind	Amount	Liquids:	NONE	zero L per tonnes of waste treated	Solids:	Sodium chloride / Tar	1-2 kg per tonnes of waste treated for oil with 1000 ppm PCB	Air:	NONE	zero m ³ per tonnes of waste treated
Byproduct	Kind	Amount													
Liquids:	NONE	zero L per tonnes of waste treated													
Solids:	Sodium chloride / Tar	1-2 kg per tonnes of waste treated for oil with 1000 ppm PCB													
Air:	NONE	zero m ³ per tonnes of waste treated													
	<p>How are byproducts disposed of? <i>(please describe briefly)</i></p> <p>As "solid" fuel for incineration of these low quantities.</p>														

6	<p>Efficiency <i>(please specify, if appropriate)</i></p> <p>Destruction efficiencies (DEs): > 99,9999 % PCB-degradation</p>
7	<p>Monitoring & Control of releases</p> <p>What technologies are used to monitor releases: Air: No necessary Effluents: Lab analysis for total organic chlorine Solids: Lab analysis for total organic chlorine Are all releases monitored for POPs/PTS before release? X Yes possible</p> <p>If POPs*/PTS** are discovered, can the releases be returned to the process for further treatment? <input type="checkbox"/> Yes X No</p> <p>Are any of the releases classified as hazardous wastes? <input type="checkbox"/> Yes X No</p> <p>If "Yes" please specify:</p> <p>What technologies are used/ required to monitor and treat any such releases prior to release:</p> <p>What volumes of such releases are generated by handling a unit volume of PCB wastes: Depending on PCB-content : 1 Cl → 1 NaCl</p> <p>Is third party monitoring data available? <input type="checkbox"/> Yes X No</p> <p><i>If "Yes", please attach to this questionnaire.</i></p> <p style="text-align: right;">* POPs: Persistent Organic Pollutants ** PTS: Persistent Toxic Substances</p> <hr/> <p>How are releases disposed of? <i>(please describe briefly)</i> Incineration of small volume of tar</p>

8	Disposal costs		
	<p>What are the <i>approximate</i> costs for applying the technology per unit[‡], including costs for all technical pretreatment steps, excluding all costs not related to the technical application of the technology (transport costs, costs for disposal of decontaminated transformers/capacitors/materials, etc.)?</p> <p><i>Please specify type of treated/disposed PCB equipment/material/oil below:</i></p>		
		Costs per unit[‡]	Currency
	a) Oil: up to 10.000 ppm PCB:	< 100 €/t	€
	b) Oil: for more than 10.000 ppm PCB: price must be calculated according to PCB-content		
	c) Oil: pure PCB (Cl content 50 %)	~ 1.500 €/t	€
	d)		
	e)		
	f)		
	g)		
[‡] Specify the unit for a) to g):			
9	Treatment capacities and scaling (<i>tonnes per year for main waste & equipment types</i>)		
<p>Capacity of existing facilities : 2000 tpy units[‡] per year (tons per year)</p> <p>Can the technology be adapted to higher or lower capacities? Yes X No <input type="checkbox"/></p> <p>If "Yes":</p> <p>(i) What is the capacity of the smallest commercially viable facility: 10 tpy units[‡] per year</p> <p>(ii) What is the capacity of the largest commercially viable facility: any units[‡] per year</p> <p>Does the adaptation will cause additional costs? XYes <input type="checkbox"/> No</p> <p>If "Yes" specify the increase in costs for the adaptation (%) of the initial costs:</p> <p>(i) For smaller plants: %) must be calculated</p> <p>For larger plants: %) for special request</p> <p>[‡] Please specify the unit:</p>			

Block IV**Facility: Address and Service Information****1**

Facility Name: at customers site

Address:

City/Town:

P.O. Box:

District/State:

Country:

Telephone:

Fax:

Email:

Web site:

Person completing form

Name: **Dr. Bilger**

Position: President

Parent Company (*if different*)***Dr. Bilger Umweltconsulting GmbH***

Address: Rodenbacher Chaussee 6

City/Town: D – 63450 Hanau

P.O. Box:

District/State:

Country: Germany

Telephone: (49)-6181-58-2684

Fax: (49)-6181-58-2686

Email: bilgergmbh@t-online.de

2	Other Services offered by the company X Laboratory analysis / testing <input type="checkbox"/> PCB waste packaging for shipment <input type="checkbox"/> PCB classification / labeling <input type="checkbox"/> Clean-up of PCB contaminated sites <input type="checkbox"/> PCB wastes transport <input type="checkbox"/> Other PCB-related services:
3	Further information Identify any company information (brochures, notes etc...) provided separately and if you wish provide additional comments on your services in not more than 50 words: - Laboratory for investigation and studies available - Technical equipment for test runs up to 500 l available - Internet: www.bilgergbh.de (in German, in English: soon)