

Block I General details	
1	<p><b>Location of the PCB disposal facility:</b></p> <p>Name of Facility: BC Hydro &amp; Power Authority Surrey Oil Business Unit ✓</p> <p>City: Surrey Country: Canada</p> <p>(Provide address information in Block IV)</p>
2	<p><b>Licence / authorization:</b></p> <p>Is this facility licensed or authorized to handle PCBs? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If "Yes":</p> <p>(i) Nature of license / authorization:</p> <p>(ii) Please submit the licensing history (please attach to this questionnaire)</p> <p style="text-align: center;">See Attached</p> <p>Issuing authority (name):</p> <p><input type="checkbox"/> National <input checked="" type="checkbox"/> Local or <input type="checkbox"/> Independent - Included in Licence Detail</p>
3	<p><b>Please provide information on storage at the facility including:</b></p> <p>Capacity for the various PCB waste and equipment types:</p> <p>Method: Permitted storage capacity for PCB storage included in permit details attached.</p> <p>Holding time: There are no time restrictions on storage. It is considered "temporary" while awaiting decontamination.</p>
4	<p><b>Worker protection</b> (Please summarize protective measures applied during treatment of PCB wastes)</p> <p>All workers wear personal protective equipment when handling PCB contaminated materials directly</p> <p>All workers receive training on the hazards they will be exposed to, and how to deal with them</p> <p>Does the facility have an accident book? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Most frequent cause(s) of incidents involving PCBs:</p> <p style="text-align: center;">Spills of PCB contaminated materials.</p>

5

Opinion box - PCB Management issues (Please describe briefly)

What are your major concerns?

No major concerns

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

Development of an effective method to  
decontaminate PCB contaminated soil without  
having to incinerate it.

**Block II      Types of PCB wastes**

**Part A: Treatment of PCB containing equipment/material**

**Part A1: Metallic Parts**

A1.1	Types of metallic PCB equipment/material treated:	Limitation on waste accepted <i>(please specify, if appropriate)</i>		
		Concentration <i>(specify the unit)</i>		Quantity <i>(specify the unit)</i>
		unit:		unit:
		min	max	
<input type="checkbox"/> Equipment containing 100 % PCB				
<input type="checkbox"/> Equipment containing mineral oil contaminated by PCB				
<input checked="" type="checkbox"/> Others: <i>Light ballast capacitors contaminated by PCB</i>		<i>n/a</i>	<i>n/a</i>	<i>200,000 kg</i>
<p><i>Please specify any other limitation on waste accepted:</i></p> <p><i>The limitation on quantity results from the Waste Storage Permit, which allows 200,000 kg of waste PCB solids to be stored at the facility</i></p>				
A1.2	<p><b>Presentation of metallic equipment/material</b></p> <p>In what form must the metallic PCB equipment/material be presented:</p> <p><input checked="" type="checkbox"/> Drums</p> <p><input checked="" type="checkbox"/> Other packaging: <i>- flexible intermediate bulk containers</i></p> <p><input type="checkbox"/> Other constraints:</p>			

A1.3

**Treatment of metallic PCB equipment/material**

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

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>		Quantity <i>(specify the unit)</i>
		unit:		unit:
		min	max	
	<input type="checkbox"/> PCB-containing materials (clothes, cables, etc.)			
	<input type="checkbox"/> PCB-contaminated residues, sludges			
	<input type="checkbox"/> PCB-contaminated soils and sediments			
	<input type="checkbox"/> Packaged / drummed waste			
	<input checked="" type="checkbox"/> Other: PCB-contaminated potting compound from light ballast ✓	n/a	n/a	200,000 kg ✓
<p><i>Please specify any other limitation on waste accepted:</i></p> <p>The limitation on quantity results from the Waste Storage Permit, which allows 200,000 kg of waste PCB solids to be stored at the facility</p>				
A2.2	<p><b>Presentation of non-metallic equipment/material</b></p> <p>In what form must the non-metallic PCB equipment/material be presented:</p> <p><input checked="" type="checkbox"/> Drums</p> <p><input checked="" type="checkbox"/> Other packaging:- Flexible intermediate bulk 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

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 non-metallic equipment/material subjected to reuse/recycling? Yes  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 (please specify, if appropriate)	
		Concentration (specify the unit) unit: min   max	Quantity (specify the unit) unit:
	<input type="checkbox"/> 100 % PCB oils		
	<input checked="" type="checkbox"/> Mineral oils contaminated by PCB	2 parts per million	5000 parts per million 350,000 litres
	<input type="checkbox"/> Waste oils contaminated by PCB		
	<input type="checkbox"/> Other:		
Please specify any other limitation on waste accepted:			
B2	<b>Presentation of PCB oil and PCB waste oil</b> In what form must the PCB oil and PCB waste oil be presented: <input checked="" type="checkbox"/> Drums <input checked="" type="checkbox"/> Other packaging: ~ Shipment to facility in bulk tankers.  <input type="checkbox"/> Other constraints:		
B3	<b>Treatment of PCB oils and PCB waste oils</b> 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**

*Not Applicable*

<p><b>C1</b></p>	<p><b>Types decontaminated PCB equipment/material treated:</b></p> <p><input type="checkbox"/> Transformers</p> <p><input type="checkbox"/> Capacitors</p> <p><input type="checkbox"/> Materials (clothes, cables, etc.)</p> <p><input type="checkbox"/> Residues, sludges</p> <p><input type="checkbox"/> Soils and sediments</p> <p><input type="checkbox"/> Other:</p>	<p><b>Limitation on waste accepted</b> <i>(please specify, if appropriate)</i></p> <p><b>Quantity</b> <i>(specify the unit)</i></p> <p>unit:</p>
<p><i>Please specify any other limitation on waste accepted:</i></p>		
<p><b>C2</b></p>	<p><b>Presentation of decontaminated PCB equipment/material</b></p> <p>In what form must the decontaminated PCB equipment/material be presented:</p> <p><input type="checkbox"/> Drums</p> <p><input type="checkbox"/> Other packaging:</p> <p><input type="checkbox"/> Other constraints:</p>	

C3

**Treatment of decontaminated PCB equipment/material**

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

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

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

If 'Yes', please specify:

Transport to the disposal site? Yes  No

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 checked="" type="checkbox"/> A1 (Treatment of metallic PCB equipment/material)	PCB contaminated light ballast capacitors
	<input checked="" type="checkbox"/> A2 (Treatment of non-metallic PCB equipment/material)	PCB contaminated light ballast potting compound
	<input checked="" type="checkbox"/> B (Treatment of PCB oil and PCB waste oil)	PCB contaminated mineral oil
	<input type="checkbox"/> C (Reuse and recycling of decontaminated PCB equipment/material)	
2	<p><b>Applied technologies</b> (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><input checked="" type="checkbox"/> 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><b>Type of technology</b> (1-sentence description):  Low temperature sodium-based chemical process</p> <p><b>Description of the technology</b> please provide additional information as appropriate (summarize here and, if necessary, attach documentation)  Copies of Powertech PCB Destruction Technology, BC Hydro Oil Decontamination + Reconditioning, and BC Hydro PCB in Solids Decontamination brochures attached</p> <p>Commissioned? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No      Year: 1987-Liquids Plant; 2003-Solids Plant</p> <p>Can the technology be used in a mobile facility? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>	
3	<p><b>State of development</b></p> <p>Does the technology exist as an industrial unit? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If "No", please indicate when it will become operational:</p> <p>If "Yes", please indicate how many units exist: <b>3</b> Liquids plants (1 in each of Canada, Iran &amp; Japan)</p> <p>In what countries: <b>1</b> Solids plant - Canada</p>	

4 **Pretreatment:**

Does the technology require any pretreatment procedures?  Yes  No

If "Yes", please specify required pretreatment procedures:

Thermal Desorption

Dilution

Low Temperature Rinsing

Electro-osmosis

Draining/Solvent washing

Dismantling/Shredding

Other:

5 **Byproducts**

What byproducts does the technology produce? (please specify below)

Byproduct	Kind	Amount
Liquids:	Caustic Water (with oil)	0.03 litres of water per litre of oil processed per tonnes of waste treated
Solids:	n/a	kg per tonnes of waste treated
Air:	n/a	m <sup>3</sup> per tonnes of waste treated

Does the technology allow all byproducts to be monitored for POPs\*/PTS\*\* before release?  Yes  No

If POPs\*/PTS\*\* are discovered, can the byproducts be returned to the process for further treatment?  Yes  No

Are any of the byproducts classified as other sorts of hazardous wastes?  Yes  No

If "Yes" please specify: - Classified as "Waste Oil"

What volumes of such byproducts are generated by handling a unit volume of PCB wastes: - See table above.

Can third party monitoring data be provided?  Yes  No

If "Yes", please attach to this questionnaire.

\* POPs: Persistent Organic Pollutants  
\*\* PTS: Persistent Toxic Substances

How are byproducts disposed of? (please describe briefly)

The caustic water is treated by a Waste Management Contractor to remove the oil and adjust the pH to make it neutral.

6	<p><b>Efficiency</b> (please specify, if appropriate)</p> <p>Destruction efficiencies (DEs):            100 %</p>
7	<p><b>Monitoring &amp; Control of releases</b></p> <p>What technologies are used to monitor releases:</p> <p>Air: Annual monitoring to verify compliance with air discharge</p> <p>Effluents: Monthly testing to verify compliance with Effluent discharge permit</p> <p>Solids: Decontaminated materials tested for PCB</p> <p>Are all releases monitored for POPs*/PTS** before release? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>If POPs*/PTS** are discovered, can the releases be returned to the process for further treatment? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Are any of the releases classified as hazardous wastes? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If "Yes" please specify: Decontaminated solids materials contain oil and are classified as waste oil - a hazardous material</p> <p>What technologies are used/ required to monitor and treat any such releases prior to release: None</p> <p>What volumes of such releases are generated by handling a unit volume of PCB wastes: 1 tonne of PCB solids generates 1.1 tonnes of decontaminated material</p> <p>Is third party monitoring data available? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If "Yes", please attach to this questionnaire. - Copy of Lab w/tech Lab Report attached</p> <p>* POPs: Persistent Organic Pollutants ** PTS: Persistent Toxic Substances</p>
	<p>How are releases disposed of? (please describe briefly)</p> <p>The decontaminated solids material is taken to a secure landfill facility by a Waste Management Contractor. Efforts are underway to find a commercial use for this material.</p>

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**Disposal costs**

What are the *approximate* costs for applying the technology per unit<sup>‡</sup>, **including** costs for all technical pretreatment steps and **excluding** all costs **not** related to the technical application of the technology (transport costs, costs for disposal of decontaminated transformers/capacitors/materials, etc.)?

Please specify type of treated/disposed PCB equipment/material/oil below:

	Costs per unit <sup>‡</sup>	Currency
a) PCB contaminated mineral oil	\$ 0.15 per litre	Canadian
b) PCB contaminated light ballast capacitors	\$ 5.06 per kg	Canadian
c) PCB contaminated light ballast potting compound	\$ 1.09 per kg	Canadian
d)		
e)		
f)		
g)		

<sup>‡</sup> Specify the unit for a) to g):

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**Treatment capacities and scaling** (tonnes per year for main waste & equipment types)

Capacity of existing facilities: 2,400,000 litre units<sup>‡</sup> per year for liquids plant } *Constrained by Air Discharge Permit*  
 1,650,000 kg per year for solids plant

Can the technology be adapted to higher or lower capacities? Yes  No

If "Yes":

- (i) What is the capacity of the smallest commercially viable facility: units<sup>‡</sup> per year
  - (ii) What is the capacity of the largest commercially viable facility: units<sup>‡</sup> per year
- } *Commercial viability will vary in different jurisdictions*

Does the adaptation will cause additional costs?  Yes  No

If "Yes" specify the increase in costs for the adaptation (%) of the initial costs:

- (i) For smaller plants: %
- For larger plants: %

<sup>‡</sup> Please specify the unit:

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

1

Facility Name: BC Hydro + Power Authority  
Surrey Oil Business Unit  
Address: 12340 88th Avenue  
City/Town: Surrey  
P.O. Box:  
District/State: British Columbia  
Country: Canada  
Postal Code: V3W 3J6  
Telephone: (604) 590-7633  
Fax: (604) 590-7636  
Email: noel.chalmers@bhydro.com  
or pctfree@bhydro.com  
Web site: n/a

Person completing form

Name: Noel Chalmers

Position: manager

Parent Company (if different):

Address:

City/Town:

P.O. Box:

District/State:

Country:

Telephone:

Fax:

Email:

2	<p><b>Other Services offered by the company</b></p> <p><input checked="" type="checkbox"/> Laboratory analysis / testing</p> <p><input type="checkbox"/> PCB waste packaging for shipment</p> <p><input type="checkbox"/> PCB classification / labeling</p> <p><input checked="" type="checkbox"/> Clean-up of PCB contaminated sites</p> <p><input checked="" type="checkbox"/> PCB wastes transport</p> <p><input type="checkbox"/> Other PCB-related services:</p>
3	<p><b>Further information</b></p> <p>Identify any company information (brochures, notes etc...) provided separately and if you wish provide additional comments on your services in <b>not</b> more than 50 words:</p>