

Block I General details	
1	<p>Location of the PCB disposal facility:</p> <p>Name of Facility: TRV Thermische Rückstandsverwertung GmbH & Co. KG City: Wesseling Country: Germany <i>(Provide address information in Block IV)</i></p>
2	<p>Licence / authorization:</p> <p>Is this facility licensed or authorized to handle PCBs? X Yes <input type="checkbox"/> No</p> <p>If "Yes": (i) Nature of licence / authorization: Permit according to the Federal Law on Protection from Emission, no limitation regarding PCBs (ii) Please submit the licensing history <i>(please attach to this questionnaire)</i></p> <p>Issuing authority <i>(name)</i>: Bezirksregierung / Staatliches Umweltamt, Cologne <input type="checkbox"/> National X 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: Liquid: 50 m³, Solid: 50 t Method: D 10, Incineration on land Holding time: < 1 week</p>
4	<p>Worker protection <i>(Please summarize protective measures applied during treatment of PCB wastes)</i></p> <p>Gloves, protective clothing and filter masks as standard, chemical protection suit if necessary.</p> <p>Does the facility have an accident book? X Yes <input type="checkbox"/> No</p> <p>Most frequent cause(s) of incidents involving PCBs: No incidents with PCB's since 1974, the time the plant runs.</p>

5

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

What are your major concerns?

To ensure a safe destruction of PCB's and PCB-contaminated materials, e.g. by high temperature incineration with an adequate flue gas cleaning.

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

Better sampling of PCB-contaminated materials to find out how these materials could be destructed in the best way.

Block II**Types of PCB wastes****Part A: Treatment of PCB containing equipment/material****Part A1: Metallic Parts: not possible due to TRV plant design****A1.1****Types of metallic PCB equipment/material treated:****Limitation on waste accepted**
*(please specify, if appropriate)***Concentration**
*(specify the unit)***Quantity***(specify the unit)*

unit:

min**max**

Equipment containing 100 % PCB

Equipment containing mineral oil contaminated by PCB

Others: Equipment contaminated by PCB

*Please specify any other limitation on waste accepted:***A1.2****Presentation of metallic equipment/material**

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

 Drums Other packaging: Other constraints:

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 (please specify, if appropriate)		
		Concentration (specify the unit) unit: ppm		Quantity (specify the unit) unit: 30 – 120-l-PE-drum
		min	max	
	X PCB-containing materials (clothes, cables, etc.)	1000	No limit	50 kg per drum
	X PCB-contaminated residues, sludges	1000	No limit	50 kg per drum
	X PCB-contaminated soils and sediments	1000	No limit	50 kg per drum
	X Packaged / drummed waste	1000	No limit	50 kg per drum
	X Other: bunker (solid, no dust)	50	1000	30 m ² / container
<p><i>Please specify any other limitation on waste accepted: The maximum calorific value of a single drum must not exceed 1,000 MJ.</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 (UN-approved 30 – 120-l-PE-drums)</p> <p>X Other packaging: Container for solid waste less 1000 ppm</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 X No

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

Extraction of PCB? Yes No X

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 <i>(please specify, if appropriate)</i>		
		Concentration <i>(specify the unit)</i>		Quantity <i>(specify the unit)</i>
		unit: ppm		unit: kg
		min	max	
	X 100 % PCB oils	50	No limit	30,000
	X Mineral oils contaminated by PCB	50	No limit	30,000
	X Waste oils contaminated by PCB	50	No limit	30,000
	X Other: Aqueous washing liquids contaminated by PCB	50	No limit	30,000
	<p><i>Please specify any other limitation on waste accepted: The waste must not contain any solids like rags, gloves, plastics, wood or protective clothing. The liquid waste must be pumpable, the viscosity must not exceed 180 cps.</i></p>			
B2	<p>Presentation of PCB oils and PCB waste oils</p> <p>In what form must the PCB oils and PCB waste oils be presented:</p> <p><input type="checkbox"/> Drums</p> <p>X Other packaging: ISO-tankcontainer (pressure tested)</p> <p><input type="checkbox"/> Other constraints:</p>			
B3	<p>Treatment of PCB oils and PCB waste oils</p> <p>Please specify the applied technology for the destruction of PCB oils and PCB waste oils in Part III</p>			

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

<p>C1</p>	<p>Types decontaminated PCB equipment/material treated:</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>Limitation on waste accepted <i>(please specify, if appropriate)</i></p> <p>Quantity <i>(specify the unit)</i></p> <p>unit:</p>
<p><i>Please specify any other limitation on waste accepted:</i></p>		
<p>C2</p>	<p>Presentation of decontaminated PCB equipment/material</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

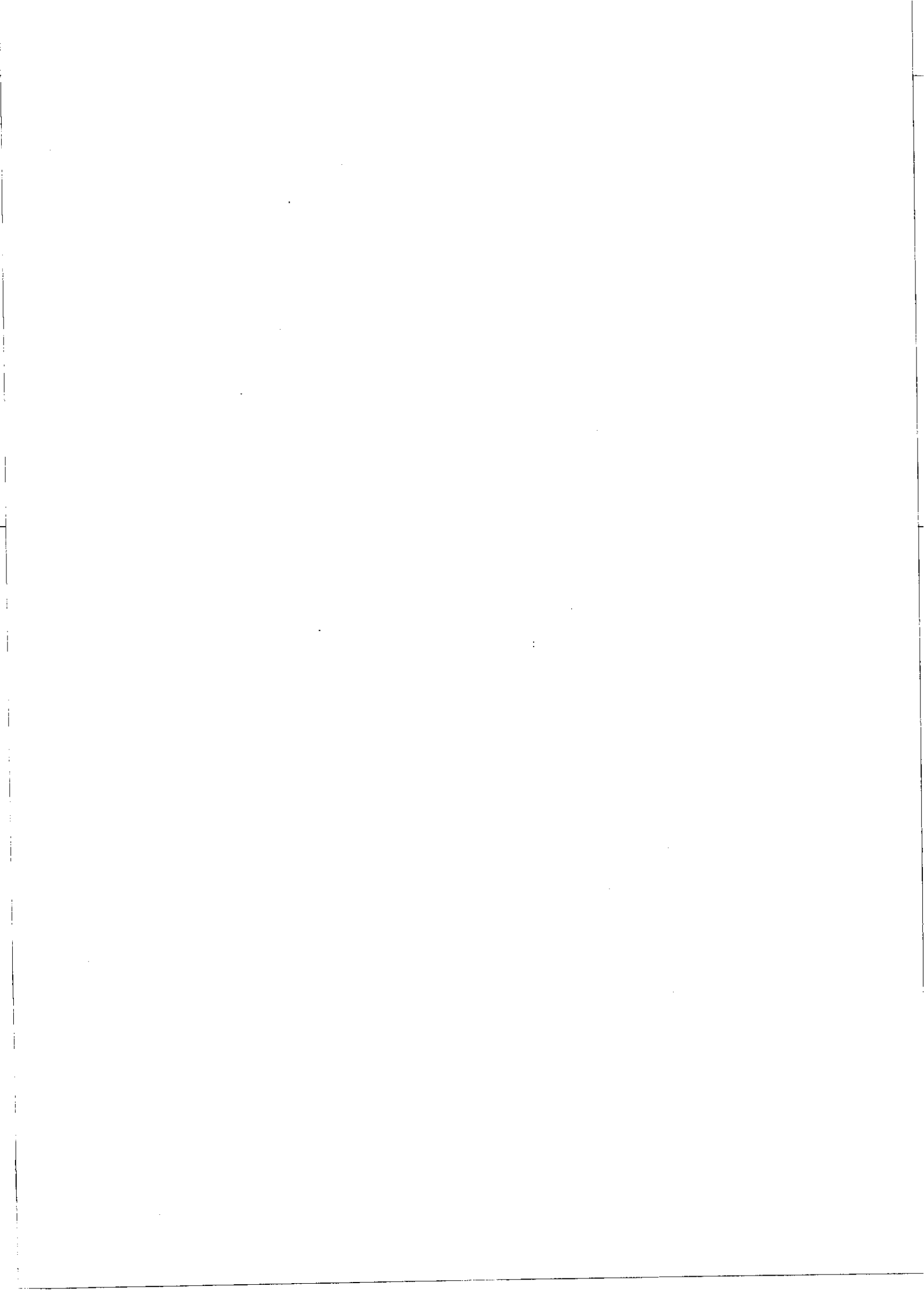
If 'Yes':

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:
	X A1 (Treatment of metallic PCB equipment/material)	no possible in TRV
	X A2 (Treatment of non-metallic PCB equipment/material)	All kinds of PCB-contaminated materials
	X B (Treatment of PCB oil and PCB waste oil)	100 % PCB oils, mineral oils, waste oils and aqueous washing liquids contaminated by PCB
	<input type="checkbox"/> C (Reuse and recycling of decontaminated PCB equipment/material)	

2

Applied technologies (Please specify the technology used for disposal):

- Pyrolysis / gasifiers
- Gas Phase Chemical Reduction (GPCR)
- Base Catalysed Decomposition (BCD)
- Sodium Reduction
- Super-Critical Water Oxidation (SCWO)
- Plasma Arc
- Molten Salt Oxidation
- Solvated Electron Technology
- Retrofilling
- X Other: High temperature incineration

Type of technology (1-sentence description):

High temperature incineration in a rotary kiln with efficient flue gas cleaning system.

Description of the technology please provide additional information as appropriate (summarize here and, if necessary, attach documentation)

For a short description of the technology see <http://www.trv-wesseling.de/> .

Commissioned? Yes No Year:

Can the technology be used in a mobile facility? Yes X No

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

In what countries: Germany

4

Pretreatment:

Does the technology require any pretreatment procedures? X Yes No

If "Yes", please specify required pretreatment procedures:

Thermal Desorption

Dilution

Low Temperature Rinsing

Electro-osmosis

Draining/Solvent washing

X Dismantling/Shredding

Other:

5

Byproducts

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

Byproduct	Kind	Amount
Liquids:	waste water after treatment	600 L per tonnes of waste treated
Solids:	A: Slag, B: Filter dust, C: residues from waste water treatment	A: 200 kg, B: 20 kg per tons of waste treated, C: 10 kg per tons of waste
Air:		m ³ per tonnes of waste treated

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

If POPs*/PTS** are discovered, can the byproducts be returned to the process for further treatment? X Yes (slag)
X No (filter dust, air, waste water)

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

If "Yes" please specify:

What volumes of such byproducts are generated by handling a unit volume of PCB wastes: TRV is a hazardous waste incineration plant which is allowed to destruct PCB and PCB-contaminated materials too. The disposed quantity is less than 1% of the whole quantity of destructed waste. So it is not possible to figure out the volume of slag or filter dust created by incineration of PCB-waste.

Can third party monitoring data be provided? X 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)*

Slag is disposed on hazardous waste landfill due to our company philosophy, filter dust is used to fulfill different salt mines (recovery operation R 5), waste water is treated additionally in the sewage plant of Basell polyolefins, residues from waste water treatment are disposed at a salt mine.

6

Efficiency

(please specify, if appropriate)

Destruction efficiencies (DEs): > 99,99 %

7

Monitoring & Control of releases

What technologies are used to monitor releases:

Air: Annual measurement campaign

Effluents: Annual measurement campaign

Solids: 3X per year sampling and testing

Are all releases monitored for POPs/PTS before release? Yes X No

If POPs*/PTS** are discovered, can the releases be returned to the process for further treatment? X Yes X No See answers under "Byproducts"

Are any of the releases classified as hazardous wastes? Yes X No

If "Yes" please specify: See answers under "Byproducts"

What technologies are used/ required to monitor and treat any such releases prior to release: Irregular sampling of slag and filter dust

What volumes of such releases are generated by handling a unit volume of PCB wastes: See answer under "Byproducts"

Is third party monitoring data available? X Yes No

If "Yes", please attach to this questionnaire.

* POPs: Persistent Organic Pollutants

** PTS: Persistent Toxic Substances

How are releases disposed of? *(please describe briefly)*

See answers under "Byproducts".

8

Disposal costs

What are the *approximate* 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.)?

Please specify type of treated/disposed PCB equipment/material/oil below: These are estimated costs per unit, exact costs based on detailed analyses will be provided on request.

	Costs per unit [‡]	Currency
a) Solid PCB-wastes in UN-approved drums	600 – 1,500	Euro
b) Liquid PCB-wastes in ISO-containers	250 – 1,500	Euro
c) Solid PCB-waste for bunker (< 1000 ppm)	250 - 900	Euro
d)		
e)		
f)		
g)		

[‡] Specify the unit for a) to g): all costs in Euro per ton

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

Capacity of existing facilities: 20,000 UN-approved drums with solids, 1500 tons of liquids and 1000 tons of bunker material (solid) units[‡] per year

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

If "Yes": 2

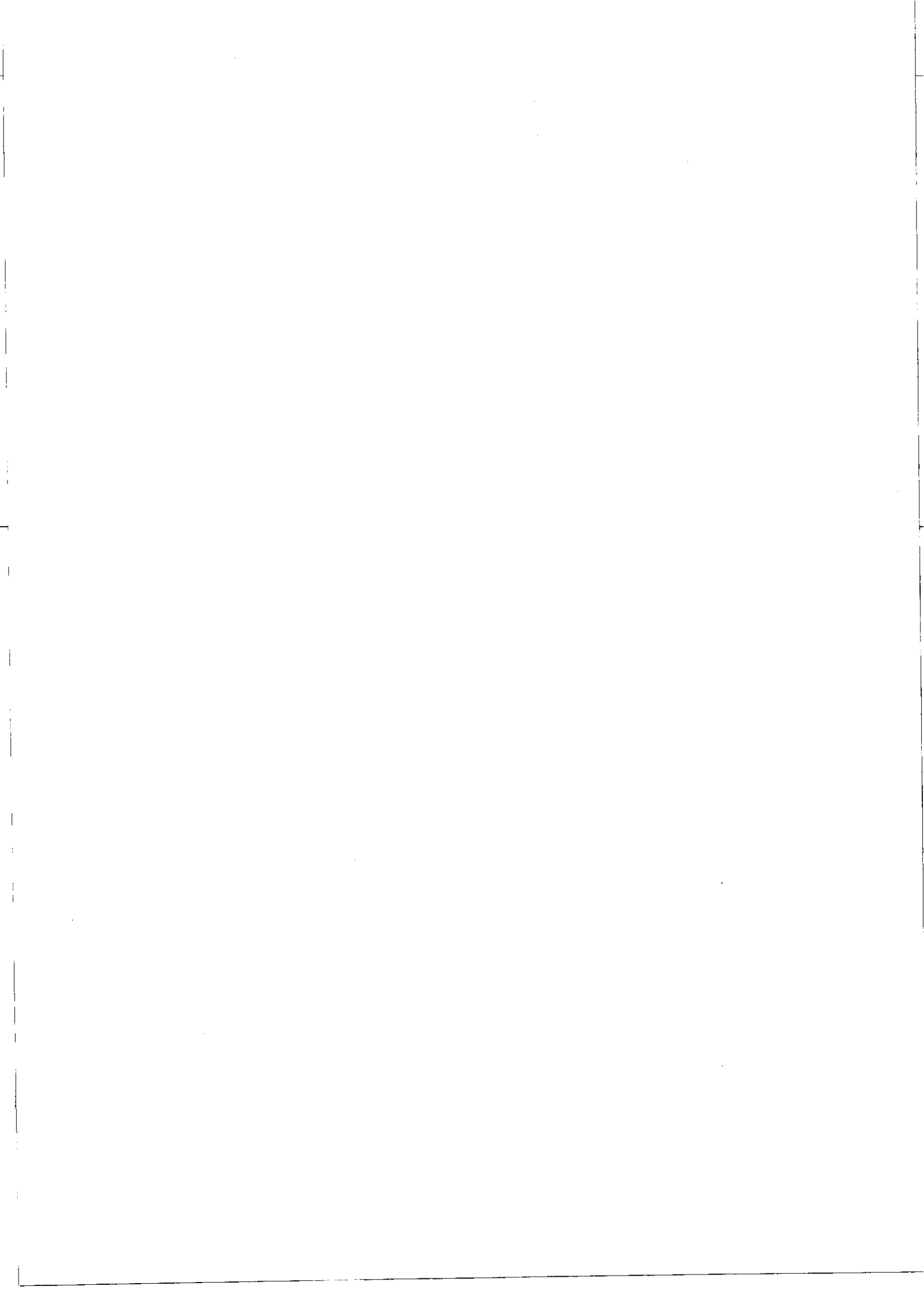
- (i) What is the capacity of the smallest commercially viable facility: units[‡] per year
- (ii) What is the capacity of the largest commercially viable facility: units[‡] per year

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: %

[‡] Please specify the unit:



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

Facility Name: TRV Thermische Rückstandverwertung GmbH & Co. KG

Address: Rodenkirchener Strasse

City/Town: 50389 Wesseling

P.O. Box:

District/State: Nordrhein-Westfalen

Country: Germany

Telephone: +49(2236)94324-0

Fax: +49(2236)94324-53

Email: info@trv-wesseling.deWeb site: <http://www.trv-wesseling.de>

Person completing form

Name: Juergen Bley (Phone +49-2236-94324-70, Mail: j.bley@trv-wesseling.de)

Position: Plant manager

For waste deliveries to the plant please contact:

RWE Umwelt Sonderabfallwirtschaft GmbH; Lüpertzender Str. 6, D-41061

Möchengladbach; Germany; Dr. Ludwig Ramacher

Tel.: +49/2161/9274364; Fax: +49/2161/9274360; e-mail: ludwig.ramacher@rwe.com

This company is shareholder of TRV and does all akquisition. The other parent company is Basell.

Parent Company (*if different*)

Address:

City/Town:

P.O. Box:

District/State:

Country:

Telephone:

Fax:

Email:

2	Other Services offered by the company <input type="checkbox"/> 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 checked="" type="checkbox"/> Other PCB-related services: High temperature incineration of PCB-wastes
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: For additional information about the high temperature incineration plant TRV visit our web-site http://www.trv-wesseling.de