
Identification of hazardous activities as required by the Convention on the Transboundary Effects of Industrial Accidents
Case studies
UNECE

Case studies

Determine whether or not the following establishments fall within the scope of the Convention (i.e.: are they “hazardous activities”?)

According to Article 1 (b) of the Convention

“**Hazardous activity**” is any activity:

- in which one or more hazardous substances are present or may be present at or in excess of the threshold quantities listed in Annex I, **and**
- which is capable of causing transboundary effects (location criteria)

Case studies

Guidelines for location criteria*

- Air path
  - Within **15 km** from the border, for activities involving substances that may cause a fire or explosion or involving toxic substances that may be released into the air in the event of an accident
- Water path
  - Along or within the catchment areas of transboundary and border rivers, transboundary or international lakes, or within the catchment areas of transboundary groundwaters, for activities involving substances falling under category 3, 4, 5 or 8 of part I of Annex I to the Convention (**toxic substances, very toxic substances, oxidizing substances and substances dangerous to the aquatic environment**) that may be released into watercourses in the event of an accident and **reach another country within 2 days of average flow velocity**

** in accordance with Decision 2000/3 as amended by decision 2004/2*

Case study 1

- Establishment is located 8 kilometres from the border. It is not in the basin of transboundary watercourse
- Establishment with several tanks containing gasoline, jet fuel, diesel fuel and home heating oil
  - 2 x 10,000 m^3 and 1 x 5,000 m^3 gasoline tanks
  - 2 x 5,000 m^3 diesel fuel tanks
  - 1 x 1,500 m^3 jet fuel tanks
  - 1 x 1,500 m^3 heavy fuel oil tanks
- The operator has submitted information about the substances and their Safety Data Sheets

	Gasoline	Diesel fuel	Jet fuel	Heavy fuel oil
density (kg/m^3)	750	830	780	950

Determine whether or not the establishment falls within the scope of the Convention (i.e.: is it a “hazardous activity”?)

Case study 1

Hazardous substances and quantity criteria

Is one or more of the hazardous substances present or may be present at or in excess of the threshold quantities listed in Annex I?

Part II.

Named substances

Substance	*Threshold quantity (metric tons)*
30. Petroleum products and alternative fuels:	25 000
(a) Gasolines and naphthas;	
(b) Kerosenes (including jet fuels);	
(c) Gas oils (including diesel fuels, home heating oils and gas oil blending streams);	
(d) Heavy fuel oils;	
(e) Alternative fuels serving the same purposes and with similar properties as regards flammability and environmental hazards as the products referred to in points (a) to (d)	

Case study 1

Hazardous substances and quantity criteria

ATTENTION!

Data are given in cubic meters. The threshold is given in metric tons:
Need data on density for each substance to convert units -> SDS

Substance	Amount/tank capacity (m^3)	Density (kg/m^3)	Units conversion	Total amount (metric tons)	Threshold limit (metric tons)
Gasoline	2 x 10.000 1 x 5.000	750	$\frac{25.000 \times 750}{1000}$	18.750	
Diesel fuel	2 x 5.000	830	$\frac{10.000 \times 830}{1000}$	8.300	
Jet fuel	1 x 1.500	780	$\frac{1.500 \times 780}{1000}$	1.170	
Heavy fuel oil	1 x 1.500	950	$\frac{1.500 \times 950}{1000}$	1.425	
				29.645	**25.000**

29.645 > 25.000 : Facility within the scope of the Convention (as regards quantity of hazardous substances)

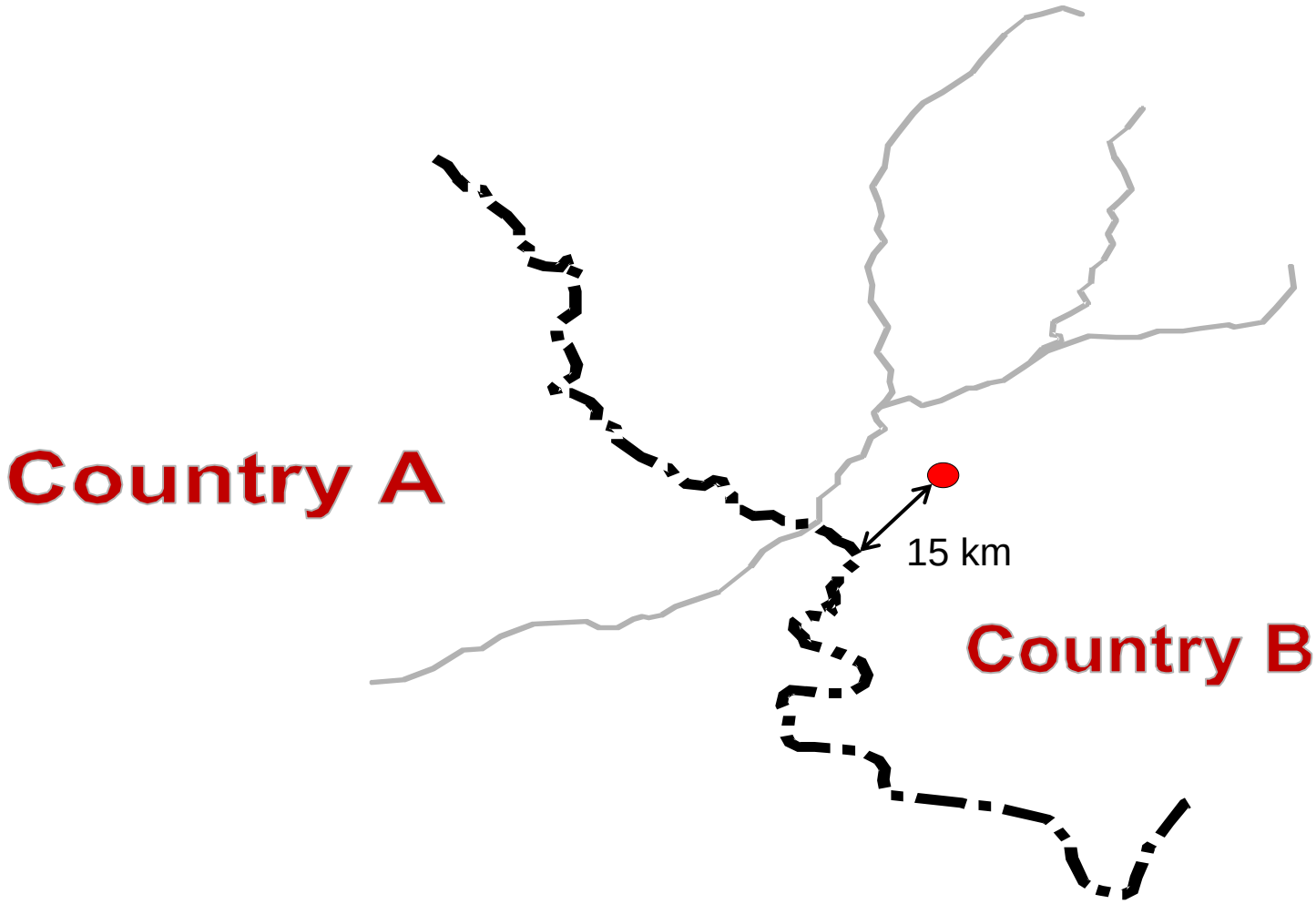
Case study 1

Location criteria

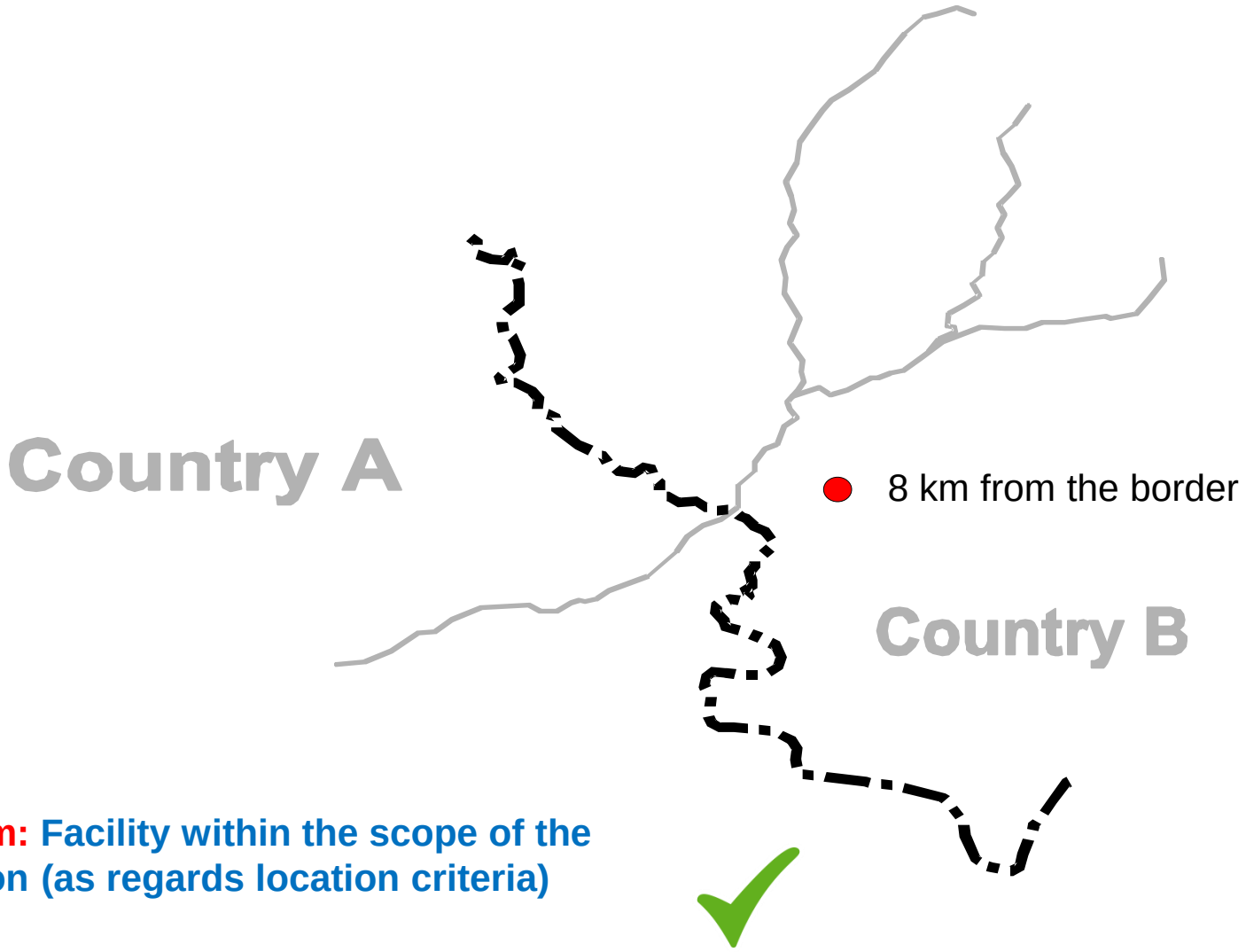
Location criteria: is the activity capable of causing transboundary effects?

- Air path
  - Within **15 km** from the border, for activities involving substances that may cause a fire or explosion or involving toxic substances that may be released into the air in the event of an accident
- Water path
  - Along or within the catchment areas of transboundary and border rivers, transboundary or international lakes, or within the catchment areas of transboundary groundwaters, for activities involving substances falling under category 3, 4, 5 or 8 of part I of Annex I to the Convention (**toxic substances, very toxic substances, oxidizing substances and substances dangerous to the aquatic environment**) that may be released into watercourses in the event of an accident and **reach another country within 2 days of average flow velocity**

Location criteria



Case study 1



8 km < 15 km: Facility within the scope of the Convention (as regards location criteria)

Case study 2

- Establishment is located on a transboundary watercourse 300 km upstream of the border, with an average flow rate of 1.5 m/s
- Establishment is storing 21 tons of sodium cyanide
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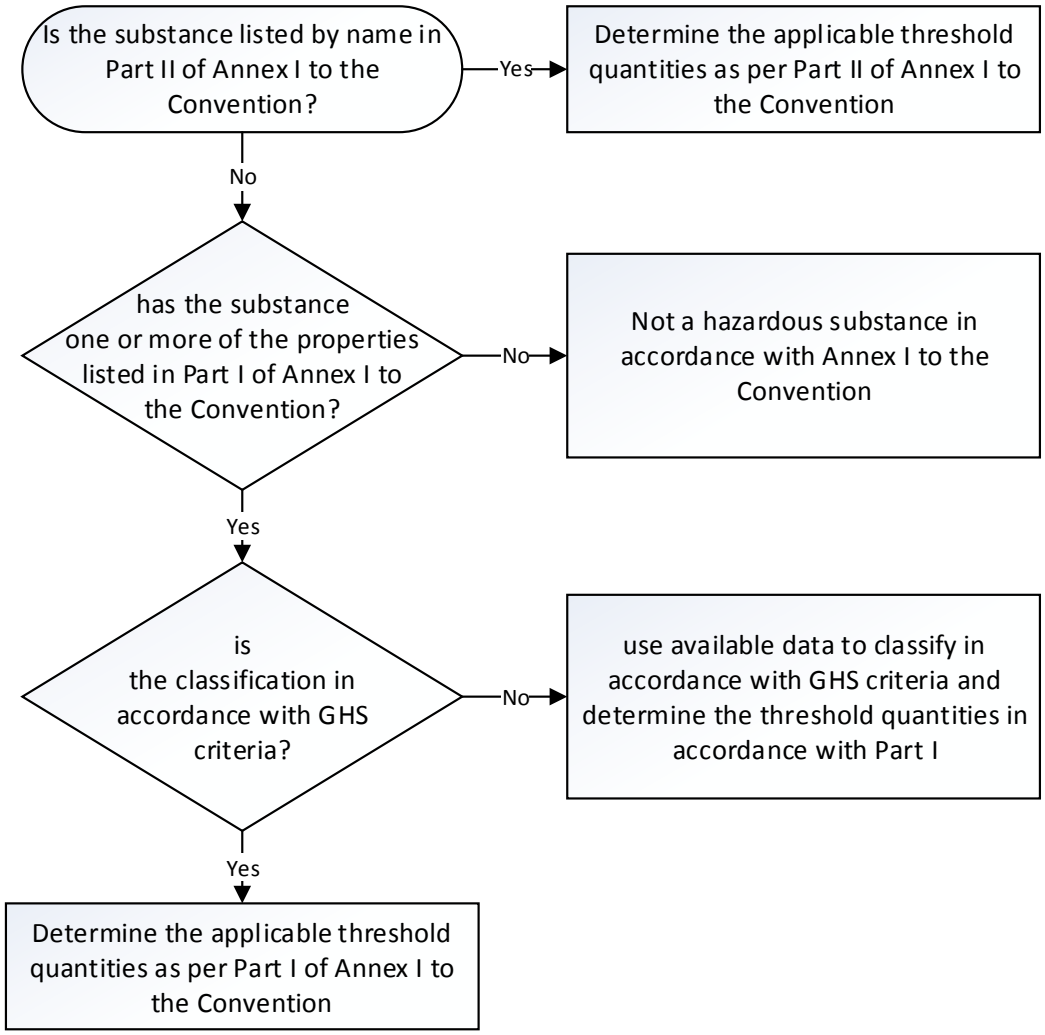
Classification of the substance (Section 2 of the SDS)	**Physico-chemical, toxicological and ecotoxicologial properties (sections 9,11 and 12 of the SDS)**
Corrosive to metals Cat.1	LD_{50} (rat) = 4.7 mg/l LD_{50} (rabbit) = 10.4 mg/l LC_{50} (rat, 4h) ≤ 0.5 mg/l LC_{50} (fish, 96h) = 0.04 mg/l LC_{50} (crustacea, 96h) = 0.09 mg/l EC_{50} (algae, 72h) = 0.051 mg/l
Acute toxicity (oral) Cat.1	
Acute toxicity (dermal) Cat.1	
Acute toxicity (inhalation) Cat.1	
STOT- repeated exposure Cat.1	
Aquatic toxicity, Acute 1	

Determine whether or not the establishment falls within the scope of the Convention (i.e.: is it a “hazardous activity”?)

Case study 2


Is the substance listed by name in Part II of Annex I to the Convention?
Yes
Determine the applicable threshold quantities as per Part II of Annex I to the Convention
No
has the substance one or more of the properties listed in Part I of Annex I to the Convention?
No
Not a hazardous substance in accordance with Annex I to the Convention
Yes
is the classification in accordance with GHS criteria?
No
use available data to classify in accordance with GHS criteria and determine the threshold quantities in accordance with Part I
Yes
Determine the applicable threshold quantities as per Part I of Annex I to the Convention

Case study 2

Is sodium cyanide present or may be present at or in excess of the threshold quantities listed in Annex I?

- Not in the list of named substances in Part II
- Classification based on the GHS is available: Acute toxicity Cat.1 (oral, dermal, inhalation) -> we can use the categories listed in Part I

Part I.

Categories of substances and mixtures not specifically named in Part II

	Category in accordance with the United Nations Globally Harmonized System (GHS) of Classification and Labelling of Chemicals	*Threshold quantity (metric tons)*
1.	Acute toxic, Category 1, all exposure routes[2]	20
2.	Acute toxic: Category 2, all exposure routes[3] Category 3, inhalation exposure route[4]	200

21 tons > 20 : Facility within the scope of the Convention (as regards quantity of hazardous substances)

Case study 2

Location criteria: water path

- Along or within the catchment areas of transboundary and border rivers, transboundary or international lakes, or within the catchment areas of transboundary groundwaters,
  - for activities involving substances falling under category 3, 4, 5 or 8 of part I of Annex I to the Convention that may be released into watercourses in the event of an accident and reach another country within 2 days of average flow velocity

The categories 3, 4, 5 or 8 referred to in the location criteria above refer to the old classification system (prior to the GHS) (toxic substances, very toxic substances, oxidizing substances and substances dangerous to the aquatic environment). Based on the data provided, we need to find out the correspondence with the current GHS classification criteria

Case study 2

Location criteria

- for activities involving substances falling under category 3, 4, 5 or 8 of part I of Annex I to the Convention ….

Need to check the applicable criteria for each category in the notes

- Toxic substances*
- Very toxic substances*
- Oxidizing substances* and
- Substances dangerous for the environment*

Case study 2

Location criteria

[6] Very toxic: substances with properties corresponding to those in table 3 or table 4 and which, owing to their physical and chemical properties, are capable of creating industrial accident hazards (LD: lethal dose; LC: lethal concentration).

Table 3

LD_{50}(oral)(1) mg/kg body weight	LD_{50}(dermal)(2) mg/kg body weight	LC_{50}(3) mg/l (inhalation)
$LD_{50} \leq 25$	$LD_{50} \leq 50$	$LC_{50} \leq 0.5$

(1) LD_{50} oral in rats.
(2) LD_{50} dermal in rats or rabbits.
(3) LC_{50} by inhalation (four hours) in rats.

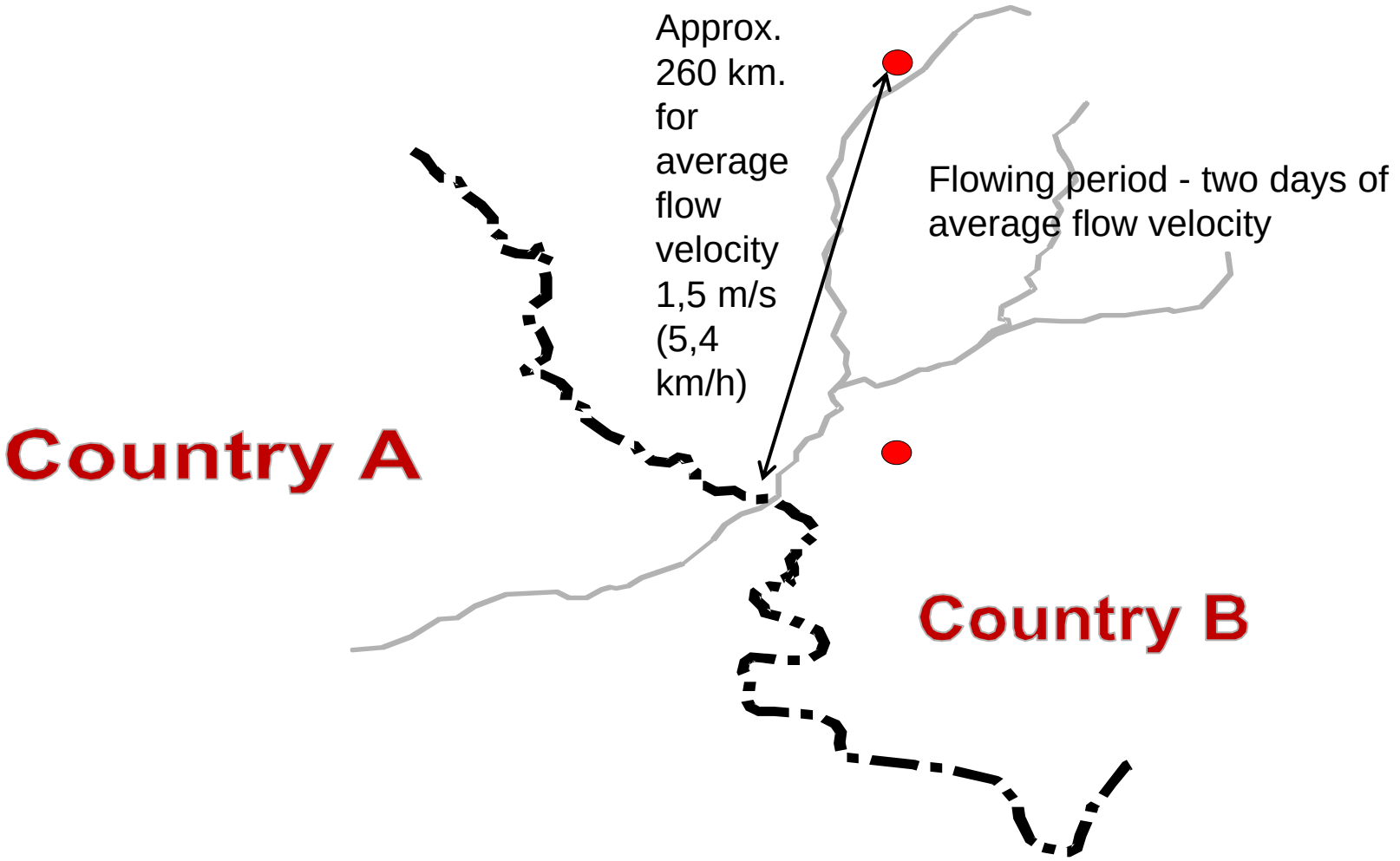
Acute toxicity Cat.1 (oral, dermal, inhalation)
LD50 (rat) = 4.7 mg/l
LD50 (rabbit) = 10.4 mg/l
LC50 (rat, 4h) ≤ 0.5 mg/l

[9] Dangerous for the environment (LC: lethal concentration; EC: effective concentration; IC: inhibiting concentration) — toxic to aquatic organisms with long-term adverse effects in the aquatic environment with:

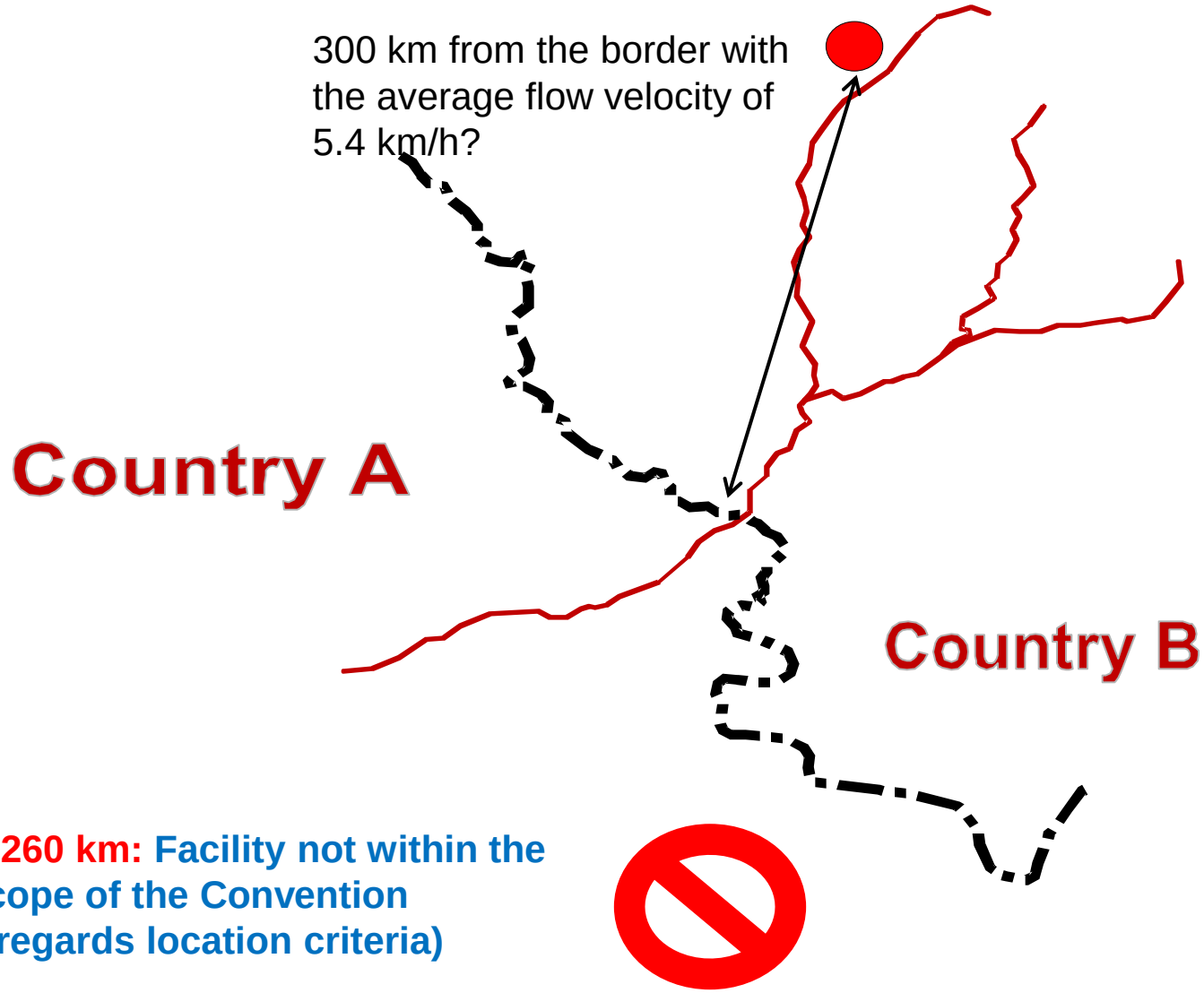
(a) Acute toxicity:
(i) 96 hr LC_{50} (for fish): 1 mg/l< $LC_{50} \leq$ 10 mg/l; or
(ii) 48 hr EC_{50} (for daphnia): 1 mg/l< $EC_{50} \leq$ 10 mg/l; or
(iii) 72 hr IC_{50} (for algae): 1 mg/l< $IC_{50} \leq$ 10 mg/l; and
(b) Persistency: the substance is not readily degradable or the log Pow (log octanol/water partition coefficient) ≥ 3.0 (unless the experimentally determined bio-concentration factor BCF ≤ 100).

Aquatic toxicity, Acute 1
LC50 (fish, 96h) = 0.04 mg/l
LC50 (crustacea, 96h) = 0.09 mg/l
EC50 (algae, 72h) = 0.051 mg/l

Location criteria



Case Study 2



300 km > 260 km: Facility not within the scope of the Convention (as regards location criteria)

Thank you!