Identification of hazardous activities – experience shared by Croatia

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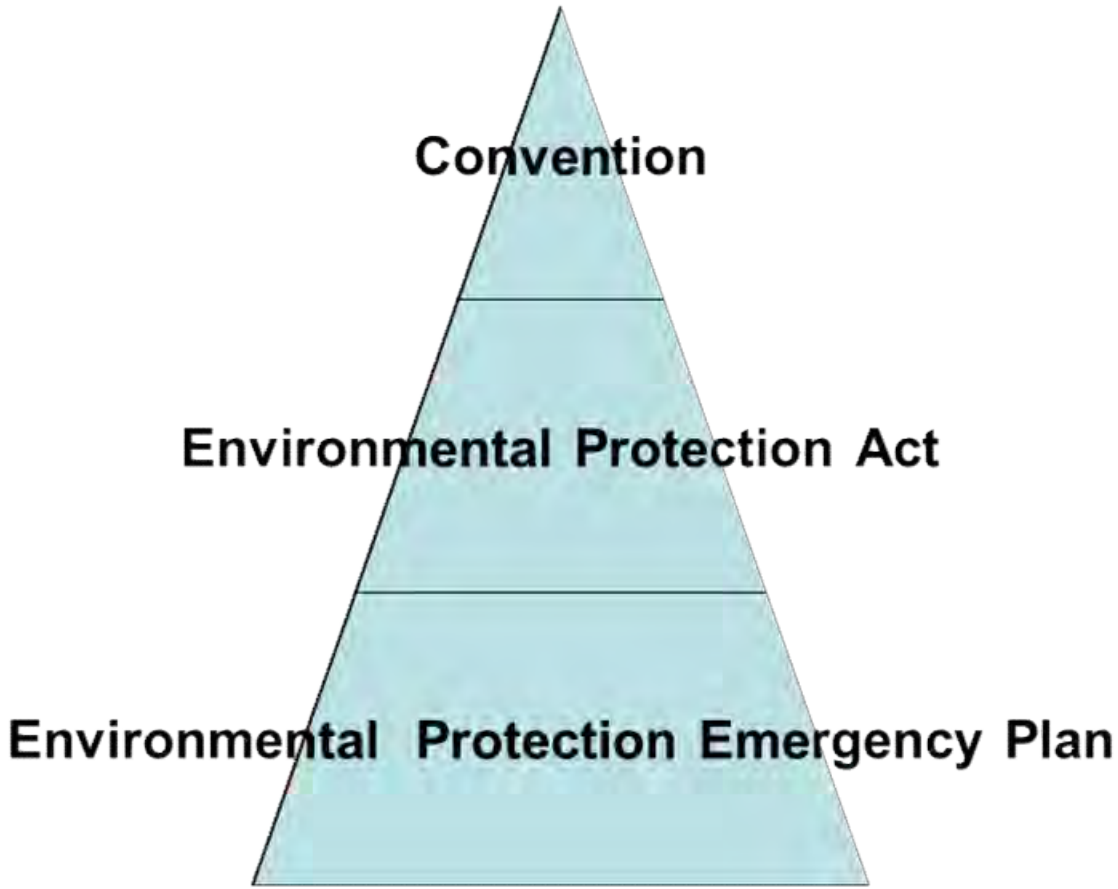
Convention on the transboundary effects of industrial accidents (TEIA Convention) in Croatia

TEIA in Croatia

- Published 7th of July 1999 (O.G. No. 7/1999)

- Entered into force 19th of April 2000 (O.G. No. 10/2001)

Historical view



Historical view - Environmental Protection Emergency Plan

- Environmental Protection Emergency Plan (O.G. No. 82/99, 86/99, 12/01)

- It applied to legal and natural persons engaged in production, storage, treatment, transportation, collection or performance of other activities involving dangerous substances from Annex I of Seveso II Directive that were developing Operative Environmental Protection Emergency Plan (OEPEP)

Historical view
Operative Environmental Protection Emergency Plan (OEPEP)

Operative Environmental Protection Emergency Plan contained information of:

- Hazardous substances
- Location
- Accident scenarios
- Domino effect
- Transboundary impact

- “worst case” analyses and a calculation for threat zones had to be made for OEPEP
- OEPEP cointained input data for external emergency plans

Historical view
Implementation

- 2000 -Internal Emergency plans
- 19 County (21)-External Emergency plans
- Control of implementation of environmental protection emergency plans is in charge of environmental inspectors

National legislation - Current

- **Environmental Protection Act (EPA)** (O.G. 80/13, 153/13 i 78/15) and its sub legislation
  - transposes **TEIA** Convention
  - transposes Directive 2012/18/EU of the European parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC (**SEVESO III Directive**)
  - Transposes **ESPO** Convention and EU **SEA** Directive, **EIA** Directive

- Act of implementation of Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006. (O.G. 50/12, 18/13)(**CLP Regulation**)

(Croatia is EU member state – directly transposes EU regulations)

Competent authorities

- Ministry of Environment and Energy **(MEE)**
  - EPA Legislation (TEIA, ESPO, SEVESO III, SEA, EIA), REDS evaluation (SEVESO), inspection, notification of parties about strategies, plans, programs and projects with transboundary impact, notification of parties about accident (through NPRD)

- National Protection and Rescue Directorate **(NPRD)**
  - Emergency response, EEP and REDS (beneath SEVESO thresholds) evaluation, inspection, notification of parties about accident, 112 call center, National civil protection headquarters

- Croatian Environment and Nature Agency **(CENA)**
  - Maintaining Registry of Establishment in which Dangerous Substances are present (REDS) – (SEVESO + beneath SEVESO thresholds establishments)

- Regional authorities – **Counties**
  - Making of External emergency plans (EEP), County civil protection headquarters

TEIA Article 4.

Identification, consultation and advice

1. For the purpose of undertaking preventive measures and setting up preparedness measures, the Party of origin shall take measures, as appropriate, to **identify hazardous activities** within its jurisdiction and to ensure that **affected Parties are notified** of any such proposed or existing activity.

2. Parties concerned shall, at the initiative of any such Party, enter into **discussions** on the identification of those hazardous activities that are, reasonably, capable of causing transboundary effects. If the Parties concerned do not agree on whether an activity is such a hazardous activity, any such Party may, unless the Parties concerned agree on another method of resolving the question, submit that question to an inquiry commission in accordance with the provisions of Annex II hereto for advice.

3. The Parties shall, with respect to proposed or existing hazardous activities, **apply the procedures** set out in Annex III hereto.

4. When a hazardous activity is subject to an environmental impact assessment in accordance with the Convention on Environmental Impact Assessment in a Transboundary Context and that assessment includes an evaluation of the transboundary effects of industrial accidents from the hazardous activity which is performed in conformity with the terms of this Convention, the final decision taken for the purposes of the Convention on Environmental Impact Assessment in a Transboundary Context shall fulfil the relevant requirements of this Convention. **(ESPO)**

Hazardous activities / presence of hazardous substances

TEIA **Hazardous activity (HA)** definition

- Any activity in which one or more hazardous substances are present or may be present in quantities at or in excess of the threshold quantities listed in Annex I hereto, and which is capable of causing transboundary effects

ECE/CP.TEIA/30/Add.1 : Decision 2014/2

- For the identification of hazardous activities, Parties shall take into consideration the **actual or anticipated hazardous properties** and/or quantities of all **hazardous substances present** or of hazardous substances which it is **reasonable to forsee may be generated during loss of control** of an activity, including storage activities, within a hazardous activity

Necessary data for identification of HA

Data needed for determining transboundary effect :

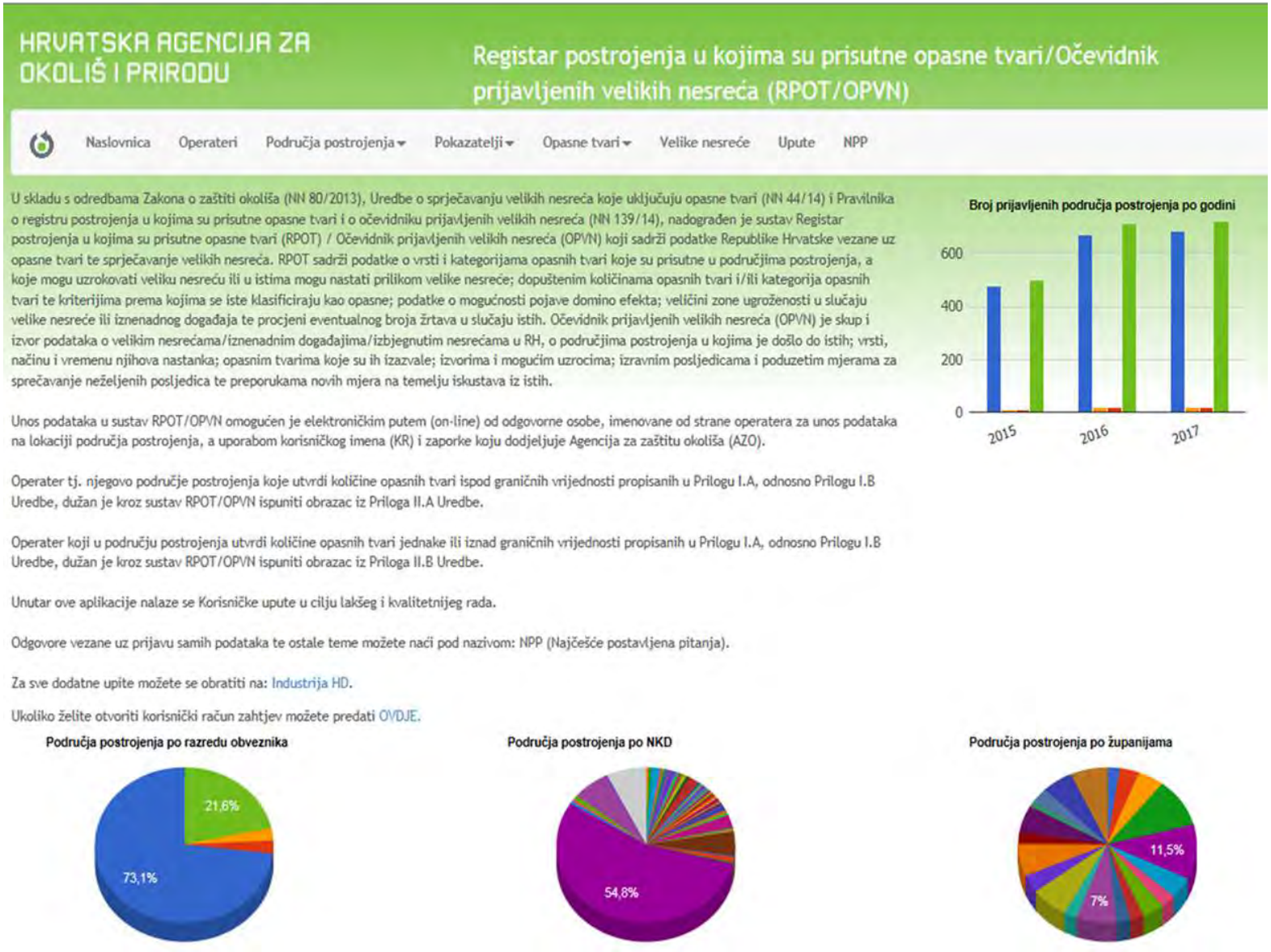
- Hazardous substances (ECE/CP.TEIA/30/Add.1 : Decision 2014/2)
    - Hazardous category in Annex I Part I
    - Named substances in Annex I Part II
- Location criteria (ECE/CP.TEIA/2, annex IV, appendix: Decision 2004/2)
    - Guidelines to facilitate the identification of hazardous activities
- Accident scenarios

Data collection

- Data collection from:
    - Operator (REDS Registry)
    - Inspections on-site
    - Other sources (ESPO Convention, EIA Directive, SEA Directive)

Croatian REDS data

- Registry of Establishment in which Dangerous Substances are present (REDS) data:
  - Hazardous substances
  - Location
  - Accident scenarios
  - Domino effect
  - Transboundary impact



- REDS database

Properties of Hazardous substances - data

- CLP Regulation - Hamonised classification and labelling
  - Part 3 Table 3.1 List of harmonised classification and labelling of hazardous substances

- ECHA website Harmonised and non – harmonised classification and labelling

https://echa.europa.eu/information-on-chemicals/cl-inventory-database

- Croatian Safety Data Sheet registry

http://www.hzt.hr/stl-deklaracije-upute/lista-zabrana-odnosno-ogranicenja.html

- Other databases e.g.

https://www.cdc.gov/niosh/npg/

Identification of Hazardous substances - TEIA Annex I

- Two Parts
    - Part I – Category of substances and mixtures not specifically named in Part II (in accordance with UN GHS)
    - Part II – Named substances
- If named substance or preparation falls within catogory in Part I, the threshold quantity set out in Part II shall be used
- Thresholds from TEIA Annex I Part I and Part II are compatible with column 3. Annex I Part I and Part II of Seveso III Directive
- CLP Regulation is compatible with UN GHS

Hazardous Substances - Categories

- Two main groups
    - Toxic for man and environment
    - Flammables, explosives, oxidizers,…

- Based on physical, chemical or toxicological properties
    - UN, EU classification
    - Indicative criteria in Annex I

Hazardous substances Annex I Part I Category (TEIA vs. SEVESO III) e. g.

Category UN GHS	Threshold Quantity (Tonnes) TEIA (Part 2.)	Threshold Quantity (Tonnes) SIII (Part 2. column 3.)
1. Acute toxic, Category 1, all exposure routes	20	20
2. Acute toxic: Category 2, all exposure routes Category 3, inhalation exposure routes	200	200
12. Flammable liquids, Categories 2 or 3, not covered by 10 and 11	50 000	50 000
16. Oxidizing liquids and solids , Category 1, 2 or 3	200	200
18. Hazardous to the aquatic environment, Category Chronic 2	500	500
19. Substances and mixtures which react violently with water, such as acetyl chloride, titanium tetrachloride	500	500

Hazardous substances Annex I Part I Category (CLP classification) e. g.

Category UN GHS	CLP - Hazard (statement Code, Class and Category Code
1. Acute toxic, Category 1, all exposure routes	H300 – Acute toxicity (oral), Hazard Category 1 H310 – Acute toxicity (dermal), Hazard Category 1 H330 – Acute toxicity (inhal.), Hazard Category 1
2. Acute toxic: Category 2, all exposure routes Category 3, inhalation exposure routes	H300 – Acute toxicity (oral), Hazard Category 2 H310 – Acute toxicity (dermal), Hazard Category 2 H330 – Acute toxicity (inhal.), Hazard Category 2 H331 – Acute toxicity (inhal.), Hazard Category 3 H301 - Acute toxicity (oral), Hazard Category 3 (see note)
12. Flammable liquids, Categories 2 or 3, not covered by 10 and 11	H225 – Flammable Liquids, Hazard Category 2 H226 – Flammable Liquids, Hazard Category 3
16. Oxidizing liquids and solids , Category 1, 2 or 3	H271 – Oxidising Liquids, Hazard Category 1 H271 – Oxidising Solids, Hazard Category 1 H272 – Oxidising Liquids, Hazard Category 2, 3 H272 – Oxidising Solids, Hazard Category 2, 3
18. Hazardous to the aquatic environment, Category Chronic 2	H411 – Hazardous to the aquatic environment — Chronic Hazard, Category 2
19. Substances and mixtures which react violently with water, such as acetyl chloride, titanium tetrachloride	EUH014 – Reacts violently with water

Named Hazardous Substances

- Widely used in industry, transport etc.

- Particularly hazardous due to physical, chemical, toxicological properties

- Require special storage, producing, processing conditions

Hazardous substances Annex I Part II Named (TEIA vs. SEVESO III) e. g.

Named substances	Threshold Quantity (Tonnes) TEIA (Part 2.)	Threshold Quantity (Tonnes) SIII (Part 2. column 3.)
Chlorine	25	25
Formaldehyde (concentration ≥ 90 %)	50	50
Liquefied flammable gases, category 1 or 2 (including liquefied petroleum gas) and natural gas	200	200
Acetylene	50	50
Methanol	5 000	5 000
Methyl isocyanate	0.15	0.15
Oxygen	2 000	2 000
Petroleum products and alternative fuels	25 000	25 000
Anhydrous ammonia	200	200

Applied thresholds – Categories – Toxic and ecotoxic e.g.

Substance	EC number	CAS number	H Class	H Code	Part I thresholds	Applied thresholds
2,4-dinitroaniline	202-553-5	97-02-9	Acute Tox. 2 * Acute Tox. 1 Acute Tox. 2 * STOT RE 2 * Aquatic Chronic 2	H330 H310 H300 H373 ** H411	200 20 200 - 500	20 Part I No 1 Acute toxic Category 1 dermal exposure route
parathion (ISO); O,O-diethyl O-4-nitrophenyl phosphorothioate	200-271-7	56-38-2	Acute Tox. 2 * Acute Tox. 2 * Acute Tox. 3 * STOT RE 1 Aquatic Acute 1 Aquatic Chronic 1	H330 H300 H311 H372 ** H400 H410	200 200 - - 200 200	200 Part I. No 2 Acute toxic Cat. 2 (oral + inhal) and No 17 Hazard. to Aquatic Env. Cat 1. (Acute + Chronic)
mercaptodimethur (ISO); methiocarb (ISO); 3,5-dimethyl-4-methylthiophenyl N-methylcarbamate	217-991-2	2032-65-7	Acute Tox. 3 * Aquatic Acute 1 Aquatic Chronic 1	H301 H400 H410	200 (Note 4) 200 200	200 Part I. No 2 Acute toxic Cat. 3 (oral) and No 17 Hazard. to Aquatic Env. Cat 1. (Acute + Chronic)

Applied thresholds – Categories – Flammable e.g.

Substance	EC number	CAS number	H Class	H Code	Part I thresholds	Applied thresholds
styrene	202-851-5	100-42-5	Flam. Liq. 3 Acute Tox. 4 * Eye Irrit. 2 Skin Irrit. 2	H226 H332 H319 H315	50 000 - - -	50 000 Part I No 12 Flammable liquid, Category 3, not covered by 10 or 11
butan-1-ol; n-butanol	200-751-6	71-36-3	Flam. Liq. 3 Acute Tox. 4 * STOT SE 3 Skin Irrit. 2 Eye Dam. 1 STOT SE 3	H226 H302 H335 H315 H318 H336	50 000 - - - - -	50 000 Part I No 12 Flammable liquid, Category 3, not covered by 10 or 11
ethanol ethyl alcohol	200-578-6	64-17-5	Flam. Liq. 2	H225	50 000	50 000 Part I No 12 Flammable liquid, Category 2, not covered by 10 or 11
acetone; propan-2-one; propanone	200-662-2	67-64-1	Flam. Liq. 2 Eye Irrit. 2 STOT SE 3	H225 H319 H336	50 (e.g. at 90°C) - -	50 Part I No 10 Flammable liquid, Category 2. maintained at a temperature above boiling point

Applied thresholds – Categories – Explosives e.g.

Substance	EC number	CAS number	H Class	H Code	Part I thresholds	Applied thresholds
2,4,6-trinitrotoluene; TNT	204-289-6	118-96-7	Expl. 1.1 Acute Tox. 3 * Acute Tox. 3 * Acute Tox. 3 * STOT RE 2 * Aquatic Chronic 2	H201 H331 H311 H301 H373 ** H411	50 200 - - - 500	50 Part I No 4 Explosive – explosives where the substance falls under division 1.1 and No 17. Hazardous to the aquatic evironment Category 1 (acute and chronic)
lead diazide; lead azide	236-542-1	13424-46-9	Unst. Expl. Repr. 1A Acute Tox. 4 * Acute Tox. 4 * STOT RE 2 * Aquatic Acute 1 Aquatic Chronic 1	H200 H360-Df H332 H302 H373 ** H400 H410	50 200 200	50 Part I No 4 Explosive – unstable explosives and No 17. Hazardous to the aquatic evironment Category 1 (acute and chronic)

Applied thresholds – Categories – Oxidizers e.g.

Substance	EC number	CAS number	H Class	H Code	Part I thresholds	Applied thresholds
potassium permanganate	231-760-3	7722-64-7	Ox. Sol. 2 Acute Tox. 4 * Aquatic Acute 1 Aquatic Chronic 1	H272 H302 H400 H410	200 - 200 200	200 Part I. No 16 Oxidizing solid category 2 and No 17 Hazardous to the aquatic evironment Category 1 (acute and chronic)
sodium nitrite	231-555-9	7632-00-0	Ox. Sol. 3 Acute Tox. 3 * Aquatic Acute 1	H272 H301 H400	200 200 (Note 4) 200	200 Part I. No 2 Acute toxic category 3 (oral), 16 Oxidizing solid Category 3 and 17 Hazardous to the aquatic evironment Category 1 (acute)

Applied thresholds – Named substances e.g.

Substance	EC number	CAS number	H Class	H Code	Part I thresholds	Applied thresholds
methanol	200-659-6	67-56-1	Flam. Liq. 2 Acute Tox. 3* Acute Tox. 3* Acute Tox. 3* STOT SE 1	H225 H331 H311 H301 H370**	50 000 200 - - 200	5 000 Part II No 18 Methanol
carbon monoxide	211-128-3	630-08-0	Flam. Gas 1 Press. Gas Repr. 1A Acute Tox. 3* STOT RE 1	H220 H360D*** H331 H372**	50 - - 200 -	200 Part II No 14 Liquefied flammable gas Category 1
Oxygen	231-956-9	7782-44-7	Ox. Gas 1 Press. Gas	H270	200	2 000 Part II No 21 Oxygen
Diesel, fuel (from MSDS)	269-822-7	68334-30-5	Flam. Liq. 3 Acute Tox. 4 Carc. 2 Asp. Tox. 1 Skin Irrit. 2 STOT RE Aquatic Chronic 2	H226 H332 H351 H304 H315 H373 H411	50 000 - - - - - 500	25 000 Part II 30 Petroleum product (c) Gas oils (Diesel fuels)

Applied thresholds – Named substances e.g.

Substance	EC number	CAS number	H Class	H Code	Part I thresholds	Applied thresholds
hydrogen	215-605-7	1333-74-0	Flam. Gas 1 Press. Gas	H220	50	50 Part II No 11 Hydrogen
propane	200-827-9	74-98-6	Flam. Gas 1 Press. Gas	H220	50	200 Part II No 14 Liquefied petroleum gas (LPG)

Location criteria (Air path)

Document ECE/CP.TEIA/12, Annex II: Decision 2004/2

- Hazardous activities within a 15 km distance to the border 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 (Air Path)

Location criteria (Water Path)

Document ECE/CP.TEIA/12, Annex II: Decision 2004/2

Along or within catchment areas of transboundary and border rivers, transboundary or international lakes, or within the catchment areas of transboundary groundwaters, for activities involving substances that fall under category 3, 4, 5, or 8 of Part I of Annex I and that may be released into watercourses in the event of an accident (**Water Path**).

(3. very toxic, 4. toxic → **acute toxic**; 5. **oxidizing** ; 8. dangerous for the environment → **hazardous to the aquatic environment**)

Accident scenarios

- Accident scenarios:
  - „worst case” scenario (suitable for transboundary impact evaluation)
  - alternative scenario

  - Determining probability for every scenario (event/year)
  - Determining threat zones (m) – thresholds based on Italian model
  - Determining casualties (number of people)

Table of exposure thresholds/end-point exposure

Scenario	High Lethality	Lethality	Irreversible effects	Reversible effects	Domino effect limit
Fire (Stationary Radiation)	12,5 kW/m^2	7 kW/m^2	5 kW/m^2	3 kW/m^2	12,5 kW/m^2
BLEVE/Fireball (NON-stationary Radiation)	Inside the fireball radius	350 kJ/m^2	200 kJ/m^2	125 kJ/m^2	200-800 m (depending on the tank type)
Flash-fire (instant termic radiation)	LFL	½ LFL	-	-	-
VCE (vapour cloud explosion - overpressure)	0,3 bar (0,6 open space)	0,14 bar	0,07 bar	0,03 bar	0,3 bar
Toxic release (absorbed dose)	LC50 (30min)	-	IDLH	LOC 1/10 IDLH	-

Conclusions

- Identification of hazardous activities should be a constant concern of the competent authorities to prevent major accidents with transboundary effects under the TEIA Convention.
- Republic of Croatia has so far identified two operators that have the type and quantity of dangerous substances with transboundary effects and that both the Republic of Bosnia and Herzegovina (Slavonski Brod and Metković) continuous improvement of REDS database.
- And in the future be developed improvement database of hazardous activities (REDS database) as part of the Environmental Information System run by the Croatian Agency for the Environment and Nature.

- Thank you for your attention

- Any questions?