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Accidental transboundary water pollution prevention –
contingency planning, early warning, mitigation
Budapest 4/5 November 2019

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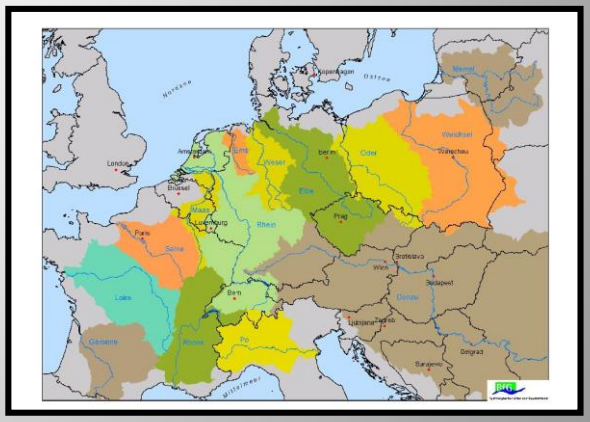
UNECE Joint Expert Group and its work on preventing accidental water pollution

- UNECE JEG
- Guidelines and Checklists
- Outlook



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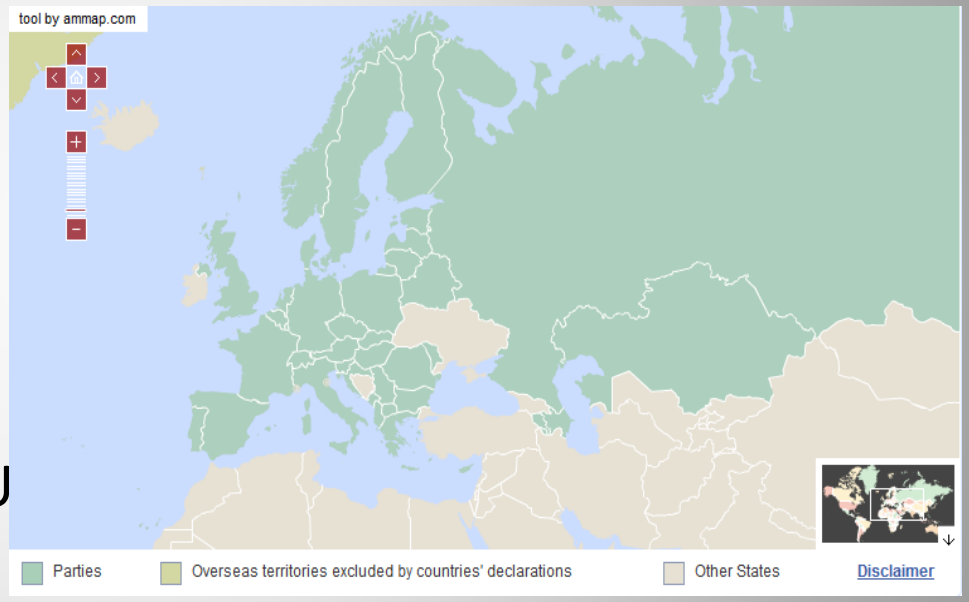
UNECE Convention on the Transboundary Effects of Industrial Accidents

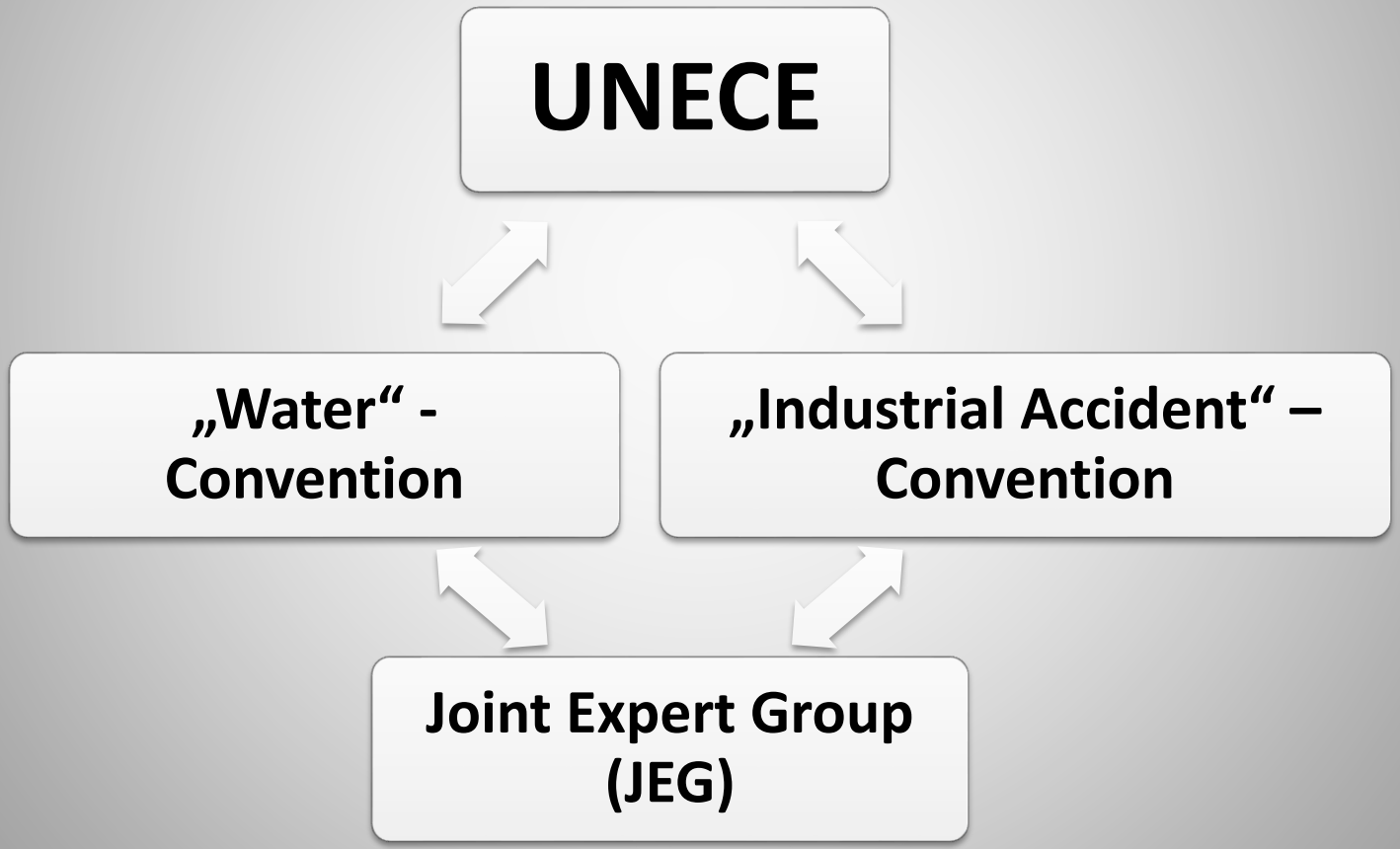
- Adopted in 1992 (Finland)
- Entered into force in 2000
- Now has 56 member states (incl. Israel) and 41 Parties, including EU
- Transboundary only



The UNECE strategy for Risk Reduction

→ Prevention of accidental water pollution

UNECE Joint Expert Group (JEG)



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Why JEG is important ?

- → **Water Accidents > 95 % of all transboundary accidents !!**
- → **Major Accidents deriving more and more from Non-Seveso-Sites (i.e. Pipelines, TMFs, Transport, Off-Shore Terminals)**
- → **Water- and IA- Convention provide the legal framework**

Lessons Learnt!

- **Water accidents can lead to the complete loss of an aquatic ecosystem!**

- **Accidents are extremly costly!**

→ **Safe operation of hazardous facilities is economically and ecologically a must**

JEG Strategy

- **A minimum set of requirements to ensure a basic and harmonized level of safety for hazardous activities**

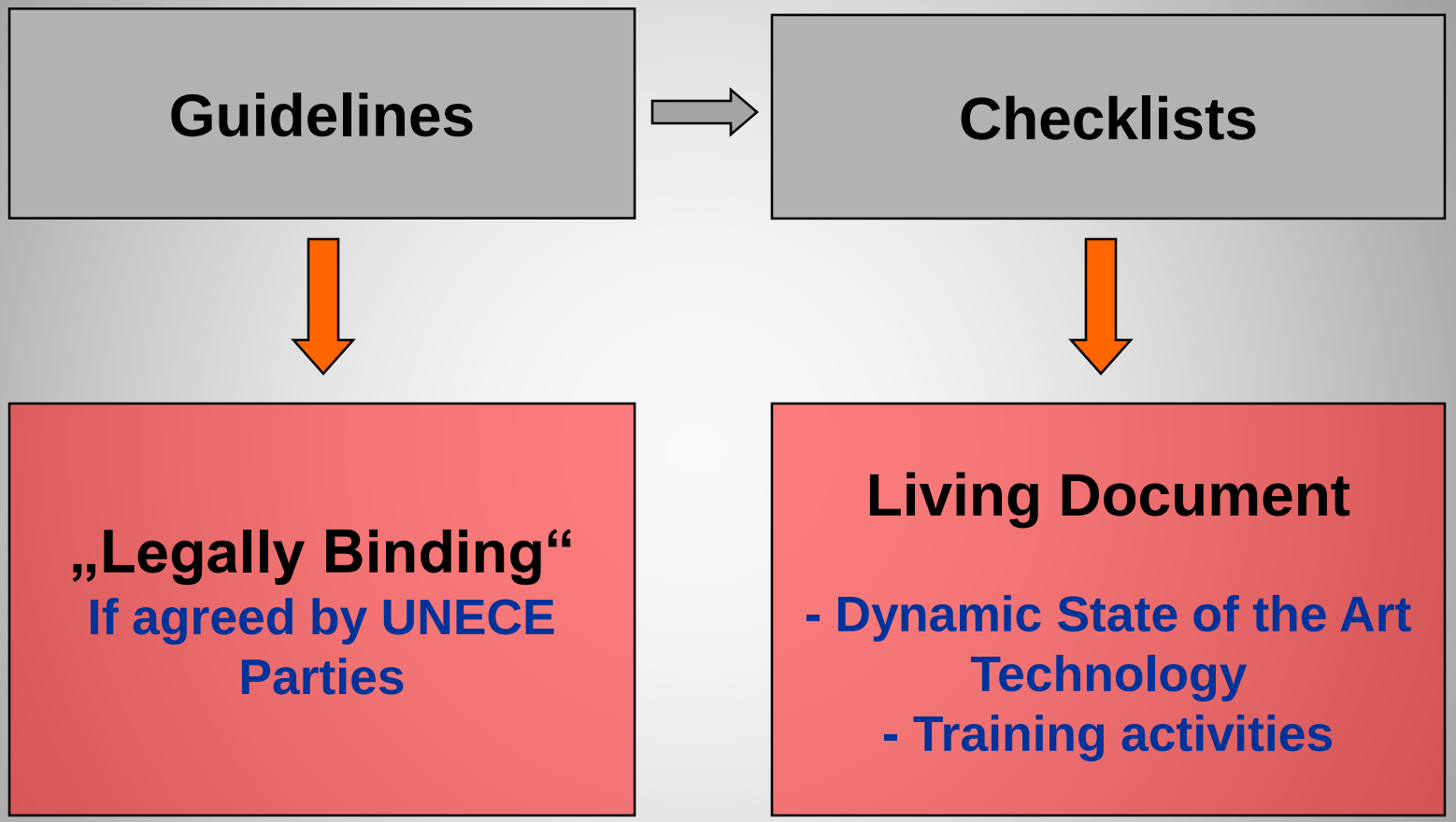
- **A common understanding of safety approaches and standards for specific sectors**

- **Assistance of national authorities and operators in ensuring an adequate safety level by means of trainings and seminars**

Tools & Products

Top → Down Safety Guidelines &

Bottom → Up Checklists



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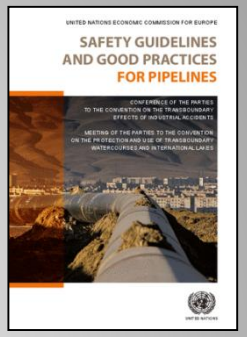
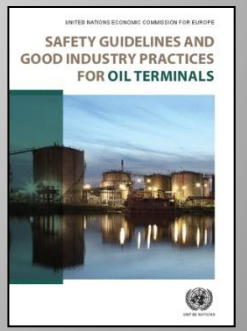
JEG - Tools and Products

→ **Safety Guidelines**

Accepted Good Practice
Procedures to ensure Conformity
with International Standards





→ **Pipelines**

→ **Tailings Management Facilities**

→ **Oil-Terminals**

→ **Fire-Water Retention**

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JEG - Tools and Products

→ Checklists

Tools for Assistance (i.e. Training) of national authorities and operators in ensuring an adequate Safety Level

→ **Waterendangering Facilities**

→ **Hazardous Industries (Seveso)**

→ **Contingency Planning**

→ **Tailings Management Facilities**

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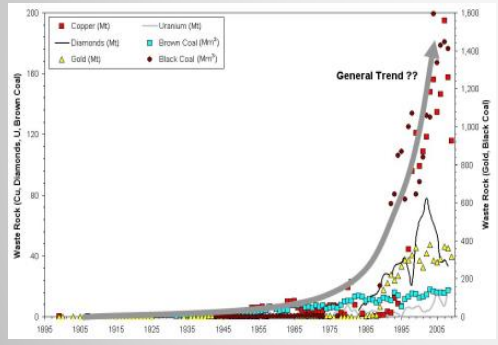
TMF-Safety

- Worldwide dramatic growth of mining waste within the last decades.
- Accidents and failures i.e. at TMFs in Romania (2000), Hungary (2010), Ukraine (2008, 2011), Finland (2012), Brazil (2015, 2019), Kazakhstan (2016), India (2019).



Amounts of mining wastes
in the world
(G.V. Mudd, 2007)

The TMF at Ajka (Hungary) after the dam failure (2010)

The river Ridder after TMF dam failure in East Kazakhstan (2016)

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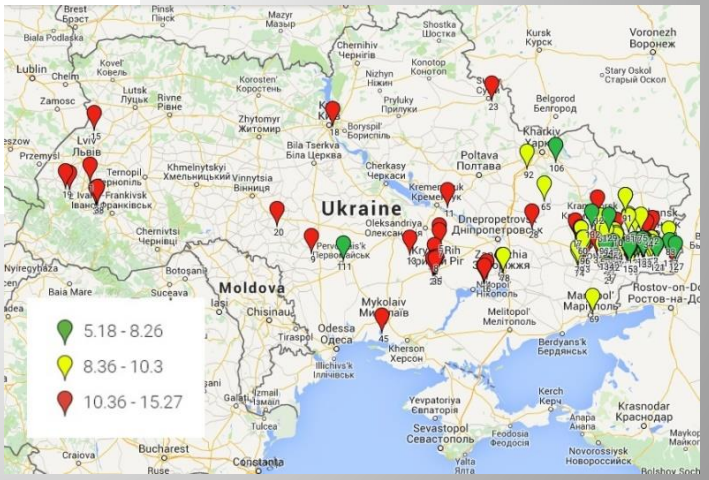
Pilot Project:
TMFs in the Ukraine

Results:

- **Inventory of > 400 TMF sites**
- **Checklist for the Safety of TMF**
- **Tailing Hazard Index (THI)**



Project Products

Methodology to improve TMF safety

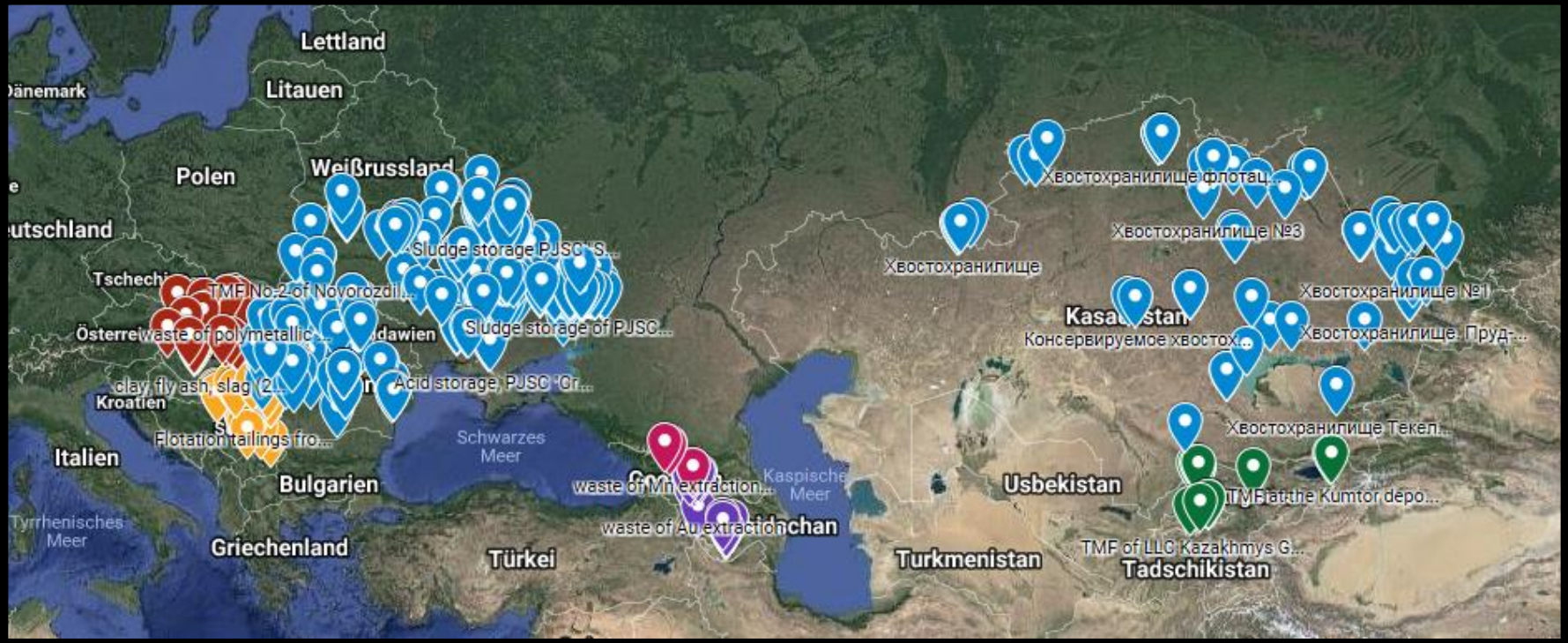
TMF Checklist
- Questionnaire,
- Evaluation Matrix,
- Measure Catalogue;

for **evaluation of the TMF Safety Level** of individual TMFs

TMF Hazard Index "Tailings Hazard Index" (THI)

Preliminary **Hazard Ranking of TMFs** (large number)

TMFs within the UNECE



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Dam-Failure, Brumadinho, Brazil, 2019

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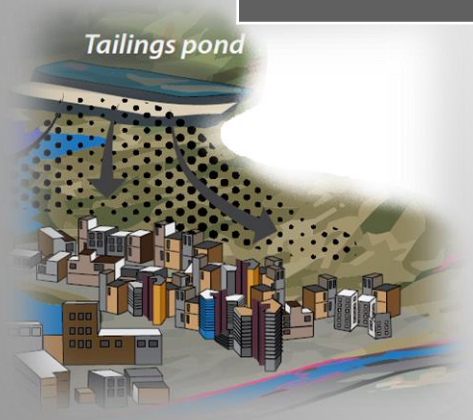
The severity of life loss on the base of historical failures

Decade	Failures	Deaths	Severity of life loss
2008-2018	57	351	**10 × 10-2**
1998-2008	31	51	**1,5 × 10-2**
1988-1998	52	88	**2,5 × 10-2**
1978-1988	57	347	**9,9 × 10-2**
1968-1978	51	315	**9 × 10-2**
1958-1968	46	1014	**29 × 10-2**
Total (1958-2018)	294	2166	**10.0 × 10-2**



Year	Failures	Deaths	Severity of life loss
2019	4	327	**$9{,}3 \times 10^{-2}$**

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Riskmanagement at the Danube Delta → Safety Guidelines for Oil Terminals

Deep Water Horizon

Danube Delta

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Safety Guideline for Oil Terminals

International Expert Group 2012 – 2013

→ Drafting Guideline

Fire on Tanker – Germany 2011

Members:
- UNECE-Secretariat
- DNV, Belgium
- EPSC, UK
- Ecoaudit, Ukraine
- GCE, Russia
- BAM, Germany
- PMI, Begium
- UBA, Germany

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UNECE Safety Guidelines and Good Industry Practices for Oil Terminals

Part 1: Principles & General Recommendations

Part 2: Technical Annex

Part 3: Further Reading

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UNECE Safety Guidelines and Good Industry Practices for Oil Terminals

Part 1

Principles & General Recommendations

→ UNECE-Parties

→ Competent Authorities

→ Operators

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UNECE Safety Guidelines and Good Industry Practices for Oil Terminals

Part 2

Technical and Organizational Safety Aspects

1. Design & Planning
2. Procurement, Construction and Asset Integrity Management
3. Operations
4. Closure & Decommissioning

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UNECE - Sources of Risk Pipeline-Accidents

1. Poland

→ Leakage of Oil-Pipeline under Vistula (10.12.2007)

2. China

→ Pipeline-Explosion at Dalian (16.07.2010)

An aerial photo, released by China's Xinhua news agency on July 17, 2010, shows an oil slick floating off the coast of Dalian, China.

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UNECE
Safety Guidelines/Best Practises for Pipelines

Principles & Recommendations

- → UNECE-Parties
- → Authorities
- → Operators
- → Technical Annex

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Safety Guidelines for Pipelines

ECE/CP.TEIA/2006/11 – ECE/MP.WAT/2006/8

ANNEX

- Design and Construction
- Pipeline Management System
- Hazard/Risk Assessment and Land Use Planning
- Inspection
- Emergency Planning

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Safety Guidelines for Fire Water Retention

Conclusion after the Joint UNECE Seminar to the 25th anniversary of the Sandoz accident (Bonn, 2011):

→ **Sufficient safety measure to prevent transboundary waters from spills of fire water are still not in place, endangering whole River Catchments, and demonstrating the need for a Strategy/Guidance to Fire Water Retention!**

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Guidelines/Best Practices for Fire Water Management and Retention

→ **Fire-Water Retention is a major element according to EU Seveso III Directive, in Annex II, Point 5., to restrict the effects of major accidents**

→ **However nearly no EU country has specific regulations for Fire-Water Retention**

→ **Non-EU countries, only Switzerland has developed a specific Guidance document**

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Guidelines/Best Practices for Fire Water Management and Retention

Part 1

Principles & General Recommendations

→ UNECE-Parties

→ Competent Authorities

→ Operators

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Guidelines/Best Practices for Fire Water Management and Retention

Part 2

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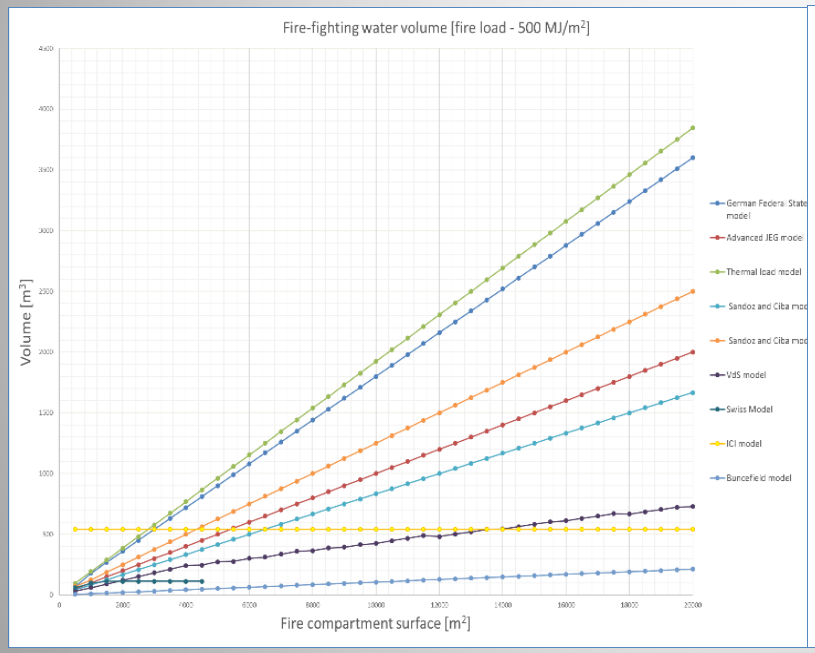
Dimensioning of Fire Water Retention

1. Several complex Models are available (German Insurance Companies (VdS 2557) or the Swiss Guidance for fire-water retention) which can serve as examples for **industrialized countries**

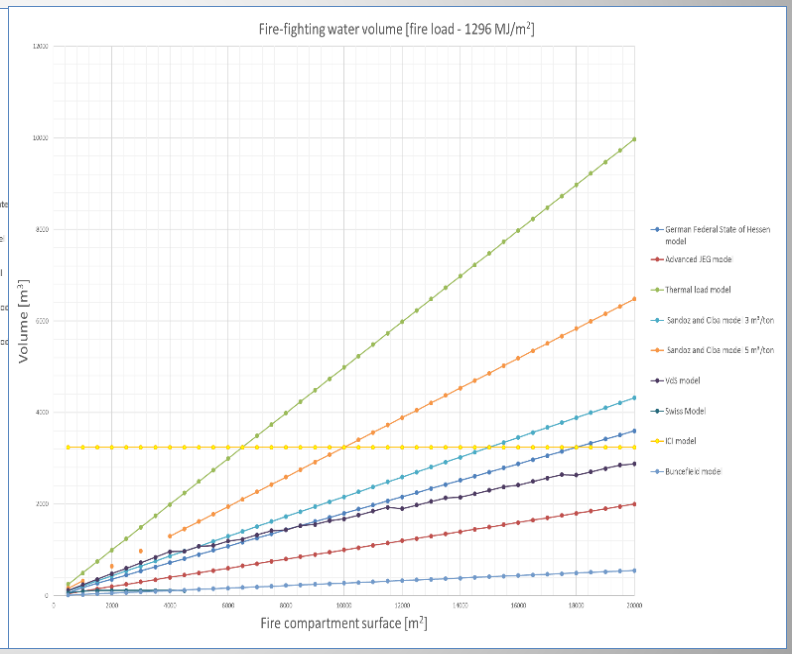
2. For **less industrialized countries** a rough and fast estimation according to a direct proportionality of the firewater retention volume needed to the largest fire-compartment area can be assumed (**JEG-model** resp. **advanced JEG-Model**)

Calculation of Fire-Water Retention-Volume according to different Models

Fire-Load ~500 MJ/m²



Fire-Load ~1296 MJ/m²



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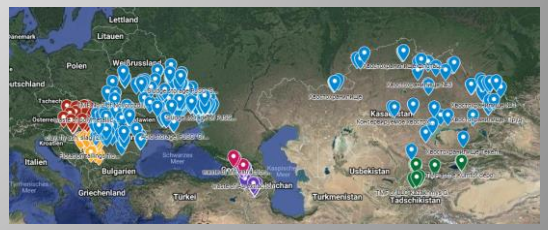
Outlook

1. **Supporting existing Safety Guidelines with Checklists**
   - Pipelines (Belorussia?)
   - Oil-Terminals
   - Fire Water Retention

2. **JEG Cooperation with International River Commissions**
   - Transboundary Exercises
   - Testing the Checklist(s) to Safety Guidelines

3. **Establishing the TMF-Methodology within the UNECE-Region**
   - TMF Pilot-Project with Kazakhstan/Kyrgistan (2020?)
   - TMF Pilot-Project(s) within the Danube-Region (2019 – 2022)



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Thank You for your Attention!

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