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# Improving the Safety of the Tailings Management Facilities in the Danube River Basin

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for the Protection  
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zum Schutz der Donau

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## 1. Introduction

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The dramatic accidents in the last two decades worldwide but also in the Danube River Basin (DRB) have shown that failures of Tailings Management Facilities (TMFs) can lead to major catastrophes for both human health and environment. Although safety conditions have been significantly improved over recent last decades in many countries thanks to strict requirements and respective measures, the safety of a number of TMFs is still lower than required, especially due to economic constraints.

Furthermore, a steep increase in mining activities over the next decades is expected, including an increase in the number of TMFs, as smart and advanced technologies will force a dramatic rise in demand for specific metals like cobalt, copper, lithium and nickel. Thus, society may also have to face an increasing risk of TMF failures with potential casualties and ecological damages if TMF safety is not managed appropriately, i.e. in compliance with standards and taking climate change impacts into account.

More than 300 TMFs are located in the DRB, for which adequate safety conditions and measures have to be put in place. Past accidents at Baia Mare (Romania) in 2000 and Ajka (Hungary) in 2010 dramatically demonstrated how serious the impacts of inappropriate TMF operation might be on people, environment and water resources. These events call for the development and implementation of consistent and harmonised management strategies, practical safety assessment tools and suitable safety measures complying with a minimum set of standards throughout the DRB. The ICPDR, being the organisation in charge of transboundary water management in the DRB, is committed to help Danube countries cope with these challenges and improve safety conditions of the TMFs located in the region. Tackling the TMF issue at the basin-wide level will ensure that in the medium term a common set of minimum standards and safety requirements are respected in the DRB so that the overall TMF safety is improved and disasters are prevented. This will lead to a favourable situation where accident risks are reduced and population and environment are protected in line with the ambitions of the European Green Deal<sup>1</sup>.

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## 2. The Danube TMF project

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An important step towards this vision was the implementation of the Danube TMF project<sup>2</sup> in cooperation with the German Environment Agency (UBA) and supported by the ICPDR Accident Prevention and Control Expert Group. The overall objective of the transnational project was to increase the safety of the TMFs located in the DRB by contributing to strengthen the technical and management capacity at the concerned facilities and responsible authorities. The project started paving the way towards a consistent TMF safety assessment methodology at both regional and facility level and its results offer a sound technical basis for follow-up national activities. The project provided

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<sup>1</sup> [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en).

<sup>2</sup> <https://www.umweltbundesamt.de/en/topics/sustainability-strategies-international/cooperation-eeca-centraleastern-european-states/project-database-advisory-assistance-programme/capacity-development-to-improve-safety-conditions>.

Danube countries with practical tools adapted to the conditions of the DRB by revising and further developing the UBA TMF Methodology<sup>3</sup> On one hand, simple index-based approaches (Tailings Hazard Index and Tailings Risk Index) are offered to prioritize a large number of TMFs at the regional scale based on the estimated accident hazard and risk of the TMFs. On the other hand, a detailed checklist methodology (TMF Checklist) along with a catalogue of measures (in line with the revised EU Best Available Techniques Reference (BREF) Document for the Management of Waste from Extractive Industries<sup>4</sup>) is provided to assess the safety conditions of individual TMFs allowing self-assessment for operators and on-site investigations for inspectors. The project showed the potential of on-site demonstration training events and recommends implementing the train the trainer approach at national level.

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### 3. Recommendations for improving TMF safety

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Building on the outcomes of the Danube TMF project, the ICPDR is committed to make further efforts to prevent TMF-related disasters in the DRB and to minimize the adverse impacts of any TMF accidents on the society and environment. The ICPDR

- 1) at policy-making level (policies and strategies):
  - *recommends* Danube countries to establish and maintain an open dialogue and close cooperation between water management sector and competent authorities responsible for mining waste management and civil protection (e.g. ministry of interior, energy or environment) in order to ensure policy alignment and coherence, efficient information exchange and coordinated accident prevention and contingency management;
  - *underlines* the necessity of developing an enabling policy framework for implementing up-to-date industrial technologies and safety measures in compliance with the EU Seveso Directive<sup>5</sup>, the EU Extractive Waste Directive<sup>6</sup> and the respective BREF Document and for establishing an effective inspection and performance control system;
  - *is committed* to address the TMF issue within the next DRB management plans so that Danube countries will take joint actions to prevent transboundary accidental pollution of surface waters in relation to TMF disasters in line with Article 11 of the EU Water Framework Directive<sup>7</sup>;
- 2) at policy implementation level (actions and measures):
  - *suggests* optimizing the limited institutional capacity and financial resources by targeting the most hazardous TMFs where regular safety inspections are needed;
  - *stresses* the urgent need of taking appropriate safety measures in case of non-compliance with relevant technical standards and ensuring appropriate rehabilitation of closed and abandoned sites;

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<sup>3</sup> <https://www.umweltbundesamt.de/en/publikationen/improving-the-safety-of-industrial-tailings>.

<sup>4</sup> <https://publications.jrc.ec.europa.eu/repository/handle/JRC109657>.

<sup>5</sup> 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.

<sup>6</sup> Directive 2006/21/EC of the European Parliament and of the Council of 15 March 2006 on the management of waste from extractive industries and amending Directive 2004/35/EC.

<sup>7</sup> Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy.

- *recommends* linking TMF hazard assessment to national or transboundary early warning systems in order to timely respond to potential accident events related to the identified hazard hot-spots;
  - *urges* developing specific contingency measures and disaster management plans at the local level for the surrounding downstream area of TMFs associated with high risk;
  - *emphasizes* the necessity of involving land-use planning aspects and risk mapping into the design, siting and licensing of new and existing (in case of capacity enlargement) TMFs in order to limit the number of potential receptors to be affected by an accident, in particular the vulnerable receptors;
  - *calls for* organizing capacity building programs with regular training events at national or regional level for facility operators and authority inspectors to strengthen their knowledge and skills in the field of accident prevention and contingency management;
  - *encourages* Danube countries to make use of the UBA TMF Checklist as a consistent practical evaluation, self-assessment and training tool and adapt it to their national conditions where necessary to assess safety conditions of individual TMFs and to identify potential measures to be implemented to improve safety;
  - *recommends* Danube countries to apply the UBA TMF Checklist and tool as education materials in the national mining curricula;
  - *recommends* Danube countries to openly communicate TMF risks, accident events, inspection results, capacity building events and disaster management exercises to the public and discuss safety issues with local communities in the form of public hearings, dissemination materials and social media tools to raise awareness of TMF safety, accident prevention and emergency management;
- 3) at technical level (activities of the Accident Prevention and Control Expert Group):
- *encourages* Danube countries to develop and regularly update national inventories on TMFs located in their territory, including basic parameters necessary to conduct hazard and risk assessments in line with the respective basin-wide activities (i.e. application of the UBA Tailings Hazard and Risk Index methods or similar screening tools);
  - *supports* Danube countries in undertaking and updating consistent and comparable hazard and risk assessments at national or basin-wide level to prioritize the most hazardous TMF hot-spots and to identify receptors of high relevance (population, environmental resources, socio-economic goods) potentially exposed to accident impacts;
  - *is committed* to further support Danube countries in their efforts on improving TMF safety by providing a platform for knowledge transfer and information exchange, organizing demonstration training events and implementing basin-wide or regional projects on capacity building.

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## 4. Cooperation with other organizations

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The ICPDR recognizes and appreciates the efforts of the Industrial Accident Convention of the United Nations Economic Commission for Europe (UNECE)<sup>8</sup> and the Global Tailings Review<sup>9</sup> towards establishing international standards and promoting practical tools for the safer management of tailings

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<sup>8</sup> <https://unece.org/environment-policy/publications/safety-guidelines-and-good-practices-tailings-management-facilities>.

<sup>9</sup> <https://globaltailingsreview.org/global-industry-standard/>.

storage facilities and is committed to harmonize its objectives and activities in the DRB with those at the regional and global level in good synergy. The practical tools delivered by the Danube TMF project are based on the UNECE Safety Guidelines and Good Practices for Tailings Management Facilities.

Moreover, the ICPDR welcomes the Online Toolkit and Training for Strengthening Mine Tailings Safety<sup>10</sup>, recently developed and launched by the UNECE. The toolkit provides a practical training course on how to use key tools to increase mine tailings safety within a country or region, including a video for awareness raising, the UNECE Safety Guidelines and the UBA TMF methodology, recently updated by the Danube TMF project. The ICPDR is willing to facilitate further information exchange with the UNECE and all other relevant organizations dealing with accident prevention to promote the practical tools developed for the DRB on a broader scale.

To further promote the results of the Danube TMF Project in the DRB, strengthen the practical usability and the sustainability of the provided tools and address additional important aspects such as disaster management, the ICPDR is considering to implement a follow-up project that would capitalize the results of the Danube TMF Project. Discussions have been started with the Priority Area 5 (Environmental Risks) of the EU Strategy for the Danube Region (EUSDR PA5)<sup>11</sup> to jointly develop and implement a project, which would aim at developing strategies and recommendations to support TMF risk reduction, strengthening the practical knowledge of TMF management and disaster response organizations on accident prevention and preparedness and improving and adapting risk assessment, mapping and monitoring tools concerning TMFs. In this context, collaboration with the Disaster Management Working Group of the EUSDR PA5 is intended. Further cooperation with the German Environmental Agency is also foreseen.

A prerequisite for implementing such a project is a strong country commitment to ensure that national capacity programs are established and the available practical tools are put in practice in the Danube countries where the TMF issue is relevant.

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<sup>10</sup> <https://unece.org/environment-policy/industrial-accidents/online-toolkit-and-training-strengthening-mine-tailings>.

<sup>11</sup> <https://environmentalrisks.danube-region.eu/>.