UNECE Guidelines for the Safety of Tailings. Introduction to tailings methodology and checklist

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UNECE guidelines on the safety of tailings as a basis for the Checklist

- "Guidelines..." were developed by the joint expert group on water and industrial accidents with the support of the UNECE Secretariat.
- The "guidelines..." were endorsed by the fifth meeting of the Conference of the Parties to the industrial accidents Convention (Geneva, 2008) and the fifth session of the Meeting of the Parties to the water Convention (Geneva, 2009).
- The document was updated in 2014.
«Guidelines ...». Content

| Part A                  | • Introduction, 
|                        | • Principles of operational safety of tailing dumps, 
|                        | • Recommendations to countries, competent authorities and operators of tailing dumps. |
| Part B                 | Technical and organizational aspects, including 
|                        | • Design and construction, 
|                        | • operation and management, 
|                        | • inspections on the objects, 
|                        | • identification, evaluation and management of orphan objects, 
|                        | • preparation of contingency plans. |
| Part C                 | References to international instruments. |
Unsatisfactory condition of dams is the main or significant cause of accidents.

Accident losses are almost always higher than the cost of ensuring an adequate level of operational safety and control to prevent incidents.

The potential risk of chronic contamination and the risks associated with the storage of tail materials may persist for a long time.

The importance of compliance with the rules of proper operation, closure of tailing dumps in order to eliminate unacceptable risks and negative impact in the future.
Ensuring the safety of tailing dumps

1. **Operators have the primary responsibility** for ensuring the safety of tailing dumps.

2. **An individualized or site-by-site approach** should be used in the planning, construction, operation and closure of tailing dumps.

3. All work related to tailing dumps should be carried out only by **competent and certified personnel**.

4. A systematic approach to the safety management of tailing dumps during their life cycle “**planning - construction - operation - closure – remediation**” should be followed.

5. During the planning and design phase, an understanding of the processes taking place during the life cycle of the tailing dumps should be sought.
The stages of risk assessment

2. Accident scenarios.
3. Identification of potential objects of influence.
4. Ensuring operational safety.
5. Impact assessment.
6. Risk assessment and analysis.

Special attention – pond-ump and dam.
The operation and management plan (Operating Manual) should contain a description of:

- tail materials transportation systems,
- all monitoring procedures / mechanisms for inspection;
- procedures for reporting nonconformity and emergency situations;
- corrective actions to be taken in case of non-conformities;
- internal PMLLPA;
- Parameters for assessing the effectiveness of use.
### «Guidelines ...». Inspections

<table>
<thead>
<tr>
<th>Stage</th>
<th>What is checked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design and construction</td>
<td>• Waste storage facility; • Safety factor based on the design decision; • Construction of the dam.</td>
</tr>
<tr>
<td>Exploitation</td>
<td>• Physical stability of the object; • No pollution of soil, air, surface and groundwater; • Regularity of monitoring observations; • Compliance with the procedure for informing about emergency situations and taking appropriate measures for their prevention and elimination.</td>
</tr>
<tr>
<td>Closing and Post Closing</td>
<td>• Physical (mechanical) stability of the object; • Environmental Rehabilitation Process; • Proper documentation.</td>
</tr>
</tbody>
</table>
PMLLPA should include an assessment
• flood hazards in the downstream and upstream.
• the number and types of equipment necessary to eliminate the discharge of hazardous substances,
• building materials and equipment required for the repair work.

At abandoned sites, competent authorities should conduct regular inspections and assess risks.

The dam, the storage pond, water management systems, the catchment area are subject to inspection.
The need to develop a checklist

1. The need for a unified approach to tailings at different stages of the life cycle

2. The need to synchronize verification, assess the level of safety, and prescribe measures to improve the safety of tailings

3. The need for efficient use of limited resources to verify and improve the safety of tailings
Methodology to improve the safety of tailings

Tailings Hazard Index

Designed for rapid preliminary risk assessment (ranking) of a large number of tailings at the national / regional level

Checklist

Designed for detailed assessment of individual tailings
Identification of non-compliance with safety requirements

Safety assessment of tailings

Recommendations for eliminating nonconformities through short, medium and long-term measures
Детальная структура контрольного списка для хвостохранилищ

Жизненный цикл хвостохранилища

Проектирование и строительство
Эксплуатация и управление
Планирование действий в ЧС
Закрытие и рекультивация

Базовая проверка (Группа А)

Базовая визуальная проверка (Подгруппа А1)
Базовая проверка документации (Подгруппа А2)
16 вопросов
11 вопросов
5 вопросов

Детальная проверка (Группа В)

Детальная визуальная проверка (Подгруппа В1)
Детальная проверка документации (Подгруппа В2)
107 вопросов
89 вопросов
45 вопросов

Проверка неактивных объектов (Группа С)

Визуальная проверка неактивных объектов (Подгруппа С1)
33 вопроса
4 вопроса

Проверка документации неактивных объектов (Подгруппа С2)
Оценка и приоритетные задачи для неактивных объектов (18 вопросов)
Управление неактивными объектами (6 вопросов)

Оценочная матрица

Группа А
Категориальная оценка
Общая оценка

Группа В
Категориальная оценка
Общая оценка

Группа С
Категориальная оценка
Общая оценка

Каталог Мероприятий
## Group A

<table>
<thead>
<tr>
<th>Group of questions</th>
<th>Purpose</th>
<th>Data source</th>
<th>Users</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group A “Basic check”</strong></td>
<td>Preliminary and rapid assessment of the safety level of the tailings storage facility, aimed at determining the priority of the subsequent detailed verification</td>
<td>Available documentation of the tailings operator, interviewing of tailing personnel</td>
<td>Competent public authorities</td>
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</tbody>
</table>
# Group B

<table>
<thead>
<tr>
<th>Group of questions</th>
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<th>Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group B &quot;Detailed check&quot;</td>
<td>Comprehensive and detailed assessment of the tailings safety level to determine the need for action</td>
<td>Existing documentation of the tailings operator; additional studies and tests that clarify all the parameters of the tailings, performed, including with the involvement of external experts; visual inspection; tailing personnel interviewing</td>
<td>State inspectors and operators of tailings</td>
</tr>
<tr>
<td>Group of questions</td>
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<td>Data source</td>
<td>Users</td>
</tr>
<tr>
<td>--------------------</td>
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<tr>
<td>Group C “Check for inactive objects“</td>
<td>Assessing the safety level of inactive tailings to determine the need for action</td>
<td>Existing documentation of the tailings operator, additional research and tests that clarify all the parameters of the tailing dump, carried out with the assistance of external experts, visual inspection, interviewing of tailing personnel</td>
<td>State inspectors and operators of tailings</td>
</tr>
</tbody>
</table>
# Appearance of the questionnaire Checklist

<table>
<thead>
<tr>
<th>№</th>
<th>Question</th>
<th>Recommendation (factors and parameters that need to be taken into account when answering a question)</th>
<th>Answer</th>
<th>Data source (details of documents or photos as evidence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Does the project documentation correspond to the actual location of the tailings?</td>
<td>Correspondence of plans and maps to the displayed elements of the tailings on the ground</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Tailings Assessment Program

<table>
<thead>
<tr>
<th>№</th>
<th>Evaluation stage</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Preparation of a request for obtaining general information about the object of assessment (enterprise and tailing dump)</td>
<td>1 day</td>
</tr>
<tr>
<td>2</td>
<td>Development and dispatch of the “Plan of the visit to the site”</td>
<td>up to 5 days</td>
</tr>
<tr>
<td>3</td>
<td>Object visit</td>
<td>1-2 days</td>
</tr>
<tr>
<td>4</td>
<td>Assessment of the tailings using the Checklist (MS Excel file), including the study of documents and information obtained in the previous stages</td>
<td>10-20 days</td>
</tr>
<tr>
<td>5</td>
<td>Sending an additional request for documents on the tailing dump (if necessary)</td>
<td>1-2 days</td>
</tr>
<tr>
<td>6</td>
<td>Report generation</td>
<td>5 days</td>
</tr>
</tbody>
</table>
Application of the Checklist by state authorities

Create / update national or regional tailing dump database

Check tailings by hazard index

Rank tailings by hazard index value

Apply group A Checklist

Results:
- national / regional tailing dump database, which ranks objects by their hazard / risk and tailing dump safety level
- Investment security enhancement programs
Application of the Checklist by State Inspectors and Tailings Operators

- Apply Group B Checklist for the most commonly used tailings.
- Apply group C of the checklist for individual inactive tailings.

Select the appropriate event from the prescribed Event Catalog

Results:
- A detailed assessment of the safety level of the tailings
- Investment programs to improve the safety of proven tailings
Thanks for attention!