



THE SURVEY OF THE MOST PROBLEMATIC TMFS IN KAZAKHSTAN, INCLUDING THE ONES WITH TRANSBOUNDARY EFFECTS: RECOMMENDATIONS AND NEXT STEPS

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TMFS AND SLUDGE COLLECTORS OF ORE DRESSING FACTORIES AND METALLURGY PLANTS

- Aktyubinskaya oblast - Donskoy MPP - a subsidiary of "TNK Kazhrom" JSC, "Voskhod Khrom" JSC, Aktyubinsk Copper Company - manage 6 TMFs;
- Almatynskaya oblast - Tekeliyskiy Mining and Processing Plant JSC - manages 1 TMF;
- Akmolinskaya oblast - "GMK Kazakhaltyn" JSC, Stepnogorskiy Mining and Chemical Plant JSC, TOO "Altyntau Kokshetau" JSC - manage 9 TMFs;
- Vostochno-Kazakhstanskaya oblast - Ust-Kamenogorskiy Titanium and Magnesium Plant JSC, "GMK Altyn MM" JSC, "FIK Alel" JSC, Bakyrchikskoye Mining Plant JSC, Satpaevskoye Mining and Processing Plant JSC, Ulbinskiy Metallurgy Plant JSC, "Vostoksvetmet" JSC, "Kaz Minerals Aktogai" JSC - manage 26 TMFs;
- Zhambylskaya oblast - Zhambylskiy subsidiary of "Kazfosfat" JSC (NDFZ), Tarazskiy Metallurgy Plant JSC, Tarazskiy subsidiary of "Kazfosfat" JSC "Mineral Fertilisers", "Altynalmas" JSC, "Sholaktau" JSC - manage 4 TMFs, 1 sludge collector and 22 collector ponds;

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- Karagandinskaya oblast - Nurkazganskaya, Karagailinskaya, Balkhashskaya, Zhezkazganskaya ore dressing factories ## 1,2,3 of the Ore Dressing Production Complex of "Kazakhmys" Corporation JSC; the Steel Department and "Vostochnaya" Central Ore Dressing Factory of Arselor Mittal Temitau JSC, the Ore Dressing Factory of "Nova-Zinc" JSC, Priozerskaya Ore Dressing Factory of "Er-Tai" JSC, Aktogaiskiy subsidiary of "AK Altynalmas" JSC, Zhairemskiy Mining and Processing Plant JSC, "Orken-Atasu" subsidiary of "Orken" JSC - manage 13 TMFs, 6 sludge collectors and 1 collector pond;
- Kostanayskaya oblast - "Varvarinskoye" JSC, Lisakovskiy subsidiary of "Orken" JSC; "SSGPO" JSC - manage 4 TMFs;
- Pavlodarskaya oblast - "Maikainzoloto" JSC, "Kazakhstan Aluminium" JSC, Aksuiskiy Ferroalloys Plant – subsidiary of "TNK Kazkhrom" JSC, "Kaz Minerals Bezshakol" JSC - manage 2 TMFs and 7 sludge collectors;
- Yuzhno-Kazakhstanskaya oblast - "Kainar" JSC - manages 1 TMF;
- Severo-Kazakhstanskaya oblast - "Tioline" JSC - manages 1 sludge collector.

PROBLEM-PRONE TMFS IN KOSTANAYSKAYA OBLAST

"SSGPO" JSC - Ore processing factory TMF

Problems include: fractured pipes, blowholes, sludge leaks. As a result, flooded and silted access roads to sludge pipes are unsuitable for maintenance transport, adjacent areas of sludge pipes are flooded.

In the previous periods, a major backlog of pipes reversal and replacement works was accumulated in the TMF. Now, "SSGPO" JSC addresses the backlog but very slowly. In this connection, a difficult situation emerged, when in the course of addressing the backlog, new sections of over-loaded sludge pipes emerge.

PROBLEM-PRONE TMFS IN KOSTANAYSKAYA OBLAST

TMF of "Varvarinskoye" JSC

- The TMF beach is arranged unevenly, in some places its width do not meet the design documentation, in some places it is absent.
- Due to destruction of the TMF beach area and water advance to the dam, the depressing curve changes as supported by water levels in piezometers (above the levels set by the design documentation).
- A failure to meet the beach width requirements in the course of TMF operation may result in water infiltration through the dam, that may become a potential cause of an accident at the TMF.
- Besides that, the design documentation for operation of 5th and 6th stages of the TMF of the gold extraction and ore dressing factory of "Proekttechstroy" JSC provides for the following operational states of the TMF: normal, potentially hazardous and pre-accident ones. By the moment of inspection, the beach width <100 m, or - according to criterial values (K2 values): the TMF was in a pre-accident state.
- The design documentation does not stipulate industrial safety maintenance procedures - namely, no information is available on locations of gauging instruments (piezometers) in the process of development of 5th and 6th stages of the TMF.
- In this connection, since 22.11.2017 r. (from the date of construction of 5th stage) the TMF operates without gauging instruments (piezometers). The date of completion of 5th stage is set as 02.11.2018. These facts suggest that, in the course of building up the dam (or for about a year in the case of construction of 5th stage), the filtration regime was not monitored (the depression curve in the dam body).
- Construction of the new TMF is planned. In Q1 2017, geo-engineering survey works were conducted for the new TMF by "Geo Top" JSC. The survey results were submitted to a design organisation – Polymetal Engineering. Investments for construction were allocated.
- Design works will be launched in 2019. Terms of completion of the new TMF construction works are set as 2024-2025.

PROBLEM-PRONE TMFS IN KARAGANDINSKAYA OBLAST

- Intensive filling of the ash and sludge collector by sludges from ash removal systems of TPP-PVS and TPP-2 of the Steel Department of "AMT" JSC (operational since 1960) resulted in filling of more than 94% of its capacity.
- According to the program of building up the ash and sludge collector in 2017-2018, the project of reinforcement of the collector dam is being implemented (already completed by 90 %). Since May 2018, works were launched to build up the dam up to the level of 101.3 m. Now, the following works were completed: comprehensive geological exploration, comprehensive geo-physical survey of the dam, topographic survey and some other necessary works, the build up of the dam has been completed by 85 %. In order to accelerate the works, the design documentation was subdivided into 2 stages: reinforcement and building up the existing dam and construction of concentration facilities.

The background is a dark blue gradient. In the corners, there are white line-art illustrations of circuit boards or neural networks, with lines connecting to small circles.

Thank you for your attention!