

TECHNICAL REPORT

MONTENEGRO

SITE: Mojkovac: Abandoned metal mining complex

ENVIRONMENTAL/HUMAN HEALTH PROBLEM

There is a concern that the abandoned tailings dam adjacent to the town of Mojkovacs presents a significant impact on the human and environmental health from the toxic heavy metals present in the tailings dam, from sewerage pollution which has been diverted into the dam and from the potential to have a catastrophic failure of the dam wall with loss of 500,000 cubic meters of tailings into the sensitive Tara River. As well as the potential impacts the dam is used recreationally both for swimming and for capturing fish for human consumption at great risk to human health.

INTERVENTION & WORKS

The planned works involves construction of a waste water treatment system, drainage of the dam, stabilization of the tailings sludge with lime, filling the rest of the tailing dam with clean fill to a final grade (i.e. **a usable surface**) and to leave a temporary **'water proof' barrier until a second tender** process is conducted to construct the final cap elements (i.e. drainage layer – gravel in pipe works system, 1 meter earth layer and grass finish). This stabilizing, cap and containment approach aims to both prevent the tailings being an ongoing source of metal contamination to the Tara River and to rehabilitate the tailing dam to permit a productive public use of the area.

CURRENT POSITION

"Sewerage Treatment Plant"

Construction of the waste water treatment plant has now been completed with a secondary treatment plant now in operation and capable of treatment to category 2 which is acceptable for protecting human health and further diluted within the Tara River.

"The Tailings Dam (TMI)"

Drainage of the tailings dam has been mostly completed with some turbid waters remaining which are probably unsuitable for release to the river and is likely to be first treated within the sewerage treatment plant or by other means before release to the Tara River. The carp have also been removed from the dam. The site has not yet been fully secured against access by the general public.

"The Stabilization Works"

The tender for conducting stabilization works has now been awarded to the Czech company Vodni Zdroje who has commenced work using a batch mixer with a hopper based system to mix reagents and tailings in an auger type mixer followed by transport along a short conveyer to discharge the discharge point for placement and curing to a final minimum strength of 45kpa after treatment with lime. Once cured, the stabilized material will be placed within the tailings dam void. There is 500,000 cubic meters of material to be treated. This stabilization and emplacement will take a minimum of two building seasons to complete. ToRs have been advertised for a second time to employ an independent expert to monitor and report on the quality standards conducted in the stabilization and

engineering works and other environmental monitoring needs with recruitment planned for early 2009.

"The Mine Site"

The Regional PMU with the National Project Co-coordinator conducted a visit to the mine site above the TMI on 26 June 2007 to consider the condition of the Rudnica and to understand what other sources of mine pollution may be impacting on Mojkovac. In summary the site is comprised of approx 10km of underground mine workings in three different levels with a number of access points, ventilation shafts and a mine elevator at the highest point. There is also a small open cut higher in the valley mine.

Potential sources of Rudnica pollution included two sources of acid mine drainage (one discharging from the lowest mine entrance and one discharging from the open cut in an abandoned cutting) and several sources of waste rock in close proximity to or forming the banks of the Rudnica. The visit highlighted the possibility in addressing some of these issues within the current UNDP project in relation to the waste rock stockpiles and has been leveraged through successfully receiving a grant from the Czech Trust Fund (100.000 USD) to assess the site and prioritize remediation activities.

NEXT STEPS

Consideration should be given to incorporating the waste rock stockpiles present along the banks of the Rudnica and near other parts of the mine site into the TMI void prior to final levels being made and the temporary cap being constructed. It is understood that there will be a considerable void which will have to be filled with uncontaminated fill obtained from a borrow pit which would be a waste of resources.

Removing these waste rock stockpiles and emplacing them into the TMI void will remove a significant source of heavy metal and acid drainage pollution which is currently impacting on both the Tara and on a number of inhabitants who have their houses and small scale agricultural plots clustered around the Rudnica and the waste rock stockpiles;

Formal monitoring programs for both engineering and environmental aspects of the works will need to be established once the independent expert has been recruited for the position. These should cover both the current works and environmental situation and recommendations for future monitoring.