

CAFOD analysis of Anglo Gold Ashanti's proposed Tailings Retreatment Project in Mongbwalu, Democratic Republic of Congo, 4 January 2010

Context

In addition to the large-scale gold mining project which Anglo Gold Ashanti (AGA) plans to develop in Mongbwalu, DRC, we are aware that AGA plans to develop a tailings retreatment project (TRP) in the same area as a community development initiative.

Our partners, the Cadre de Concertation, and members of the community in Mongbwalu have told us they have limited information about the costs and benefits of the TRP and increasingly this is being raised in community meetings with the company. For this reason, we requested to see the Environmental and Social Adjustment Plan (ESAP) which AGA commissioned for the TRP and this was shared with us in April 2009.¹

Following a careful analysis of the ESAP and a research trip to Mongbwalu last May, we have a number of concerns which we believe AGA should address. While the concerns outlined below are primarily in reference to the TRP and the ESAP report, we feel that these issues should be addressed equally in relation to the forthcoming large-scale project in Mongbwalu.

We welcome that AGA is proactively seeking to develop means for job creation in Mongbwalu and the surrounding areas. However, we are concerned that unless the issues outlined in the attached analysis are addressed, local people in Mongbwalu may be worse off as a result of AGA's operations.

A. Social and Economic Concerns

1. Job creation and displacement

We are concerned that the Tailings Retreatment Project (TRP) appears to create fewer jobs than the number of people it risks displacing, negating its value as a community development initiative. The maximum number of jobs likely to be created at each site is 160,² all of which will be temporary, ending with the closure of the project after two and a half years.³ Set against this, the ESAP report states that the displacement of artisanal miners is a certainty and that it may be necessary to displace local families as well.⁴ While 160 jobs might be created for local people, this would be in stark contrast with the estimated 1,000 miners in Yedi (one of the potential project sites) who would have to "vacate the project area" when operations start.⁵

Secondly, we welcome that the recruitment process should be "formal and transparent" and "accountable," with "fair access to jobs" but would like more detail on how this will be achieved.⁶ The TRP will aim to target artisanal miners, ex-combatants and women as priorities for employment⁷ but, as these are sensitive community groups, we are concerned that a poorly handled recruitment process could have a significant impact on the conflict dynamics in the area. The negative division that may be created between those who are employed and those who aren't could also potentially outweigh any positive impact that job creation will have in the area. This risk of division is conceded in the report⁸ but the extent of the division is not really highlighted.

2. Training and skills development

In terms of local skills development, the benefits of the TRP also seem quite limited given that only 20 of the 160 jobs created at each project site will be skilled jobs. It is also unclear whether those people will receive training or be recruited with an existing skill set. This should be clarified.

The ESAP report also states that the 140 unskilled labourers will be wheelbarrow pushers.⁹ However, the suggestion pushing wheelbarrows will provide workers with valuable formal experience that may make them more appealing to future employers is not convincing, particularly in an area where there are so few job opportunities.¹⁰ There are over a thousand former KIMIN workers in the area with both skilled and unskilled experience of mining who remain unemployed.¹¹

To increase the sustainable benefit of both the TRP and the large-scale mine for community development, AGA should ensure that all workers are provided with at least some form of skills training.

3. Consultation and information sharing about the TRP

We welcome that AGA has carried out a series of consultation meetings with local community members, who were reportedly given the opportunity to “provide comments to AGA” about the TRP.¹² However, it is not clear from the ESAP report whether the people included in those consultations had sufficient access to detailed information about the project because the AGA report on the TRP is not publicly available. We believe that meaningful community participation is impossible until the tailings report has been publicly shared and, for the second round of consultation,¹³ AGA should seek to engage in meaningful dialogue with the local community, beyond simply “inform[ing]”.¹⁴ This should apply to the large-scale mine as well as the TRP.

We also feel that the geographic scope of public consultation for the TRP has been too narrow, restricting consultation to those who fall within AGA’s identified employment catchment zone. We are concerned that an exclusive approach to information disclosure will not manage community expectations. Where there is limited information, there are likely to be rumours, particularly so in a context like Mongbwalu where expectations are already very high.¹⁵ In fact, the ESAP report cites evidence of increased migration in some areas already due to rumours about the large-scale mine project.¹⁶ While there is clearly a need to manage community expectations about both the TRP and the large-scale mine, we believe an inclusive approach to information disclosure is the only way to achieve this.

In terms of information sharing once the project is up and running, AGA’s Stakeholder Engagement Action Plan proposes to empower local people to “contribute to the development of the project” through the establishment of a Community Development Committee.¹⁷ There are clear similarities (in terms of make-up and function) between this proposed committee for the TRP and the Mongbwalu Forum of Stakeholders (Forum) which was established in relation to the large-scale mine. However, given some of challenges which AGA has experienced in relation to the Forum, it is essential that the Committee is considered credible by the wider community as independent and autonomous, and that the election process of members is fully transparent.

4. Community Development and Investment

Full transparency of the economics of the TRP and the large-scale mine is necessary to establish whether they are financially viable or not, and to ensure that affected communities are fully aware of the value of the resource and are satisfied they are deriving fair benefit from it. However, very little information is provided in the ESAP report about the gold grades of the deposit and what profits can be expected.

The ESAP report states that *if* there are any profits from the project, they will be directed towards social development¹⁸ but it is not clear whether these profits will be added to an existing development budget or whether the budget will be derived solely from the profits. It is difficult to assess the scale and quality of the Social Development Plan without this information and knowing whether profits from the project will be used for any other purpose. We would welcome clarification on this issue. To avoid confusion, it should also be clarified whether, and how, social development projects for the TRP will be distinct from social plans for the large-scale mine.

Given the “short life”¹⁹ of the Project, it is clearly also important to ensure that any investment or development project is sustainable beyond decommissioning if the community is really to benefit from operations. The Social Project Closure Plan outlines the importance of involving communities throughout the life of the project and continuing to monitor potential risks and impacts post-closure. However, if this is to be effective, more detailed information on how these initiatives might work in practice should be shared publicly and with local communities.

B. Environmental Concerns

1. Nature of the tailings deposits and potential risks in reworking them

On the basis of the information presented in the ESAP report, we feel that it is not possible to say with any certainty that the reworking of the tailings will, or will not, generate environmental contaminants. The make-up of the tailings is not outlined in sufficient detail.

Different minerals are associated with different degrees of environmental risk (the amount of pyrite and arsenopyrite is particularly important) and in the absence of quantified data, the risks cannot be meaningfully assessed. AGA should specify (as weight or volume percentages) the amount of sulphide material present in the tailings. Although the report refers to mineralogical test work done in 1985 at the tailings dam sites²⁰, these important results are not provided. Instead the report refers to “minor occurrences of oxide and sulphide minerals.”²¹ However, the term “minor” is not specific enough because even small amounts of sulphides have the potential to generate acidic water and leach metals if exposed to water and oxygen.

In a similar way, we feel that the assumption that “... any pollutants in the tailings have probably long ago leached out” needs to be substantiated.²² It is most likely true that all chemicals from the original processing of the ore body and any dissolved metals produced have been leached out over the past 30 years. The current state of the tailings also seems to be relatively stable, and the quality of the water around the two sites for which adequate data are available, appears (mostly) uncontaminated. However, sources of potential contamination are still present in the tailings in the form of sulphides. These sulphides may be benign because of the (reported) impermeability of the tailings deposits, which would prevent contact with oxygen. However, as tailings are reworked and re-deposited on site

there is a possibility that oxygen and/or oxygenated waters might be introduced into the tailings, which would initiate sulphide oxidation and water acidification. This risk is not dealt with in the report so there is a need to clearly outline the management systems which will be put in place to mitigate and manage this.

Furthermore, the fact that all four tailings deposits are considered in the report as being mineralogically “the same” may not be appropriate either. Given that the tailings were derived from geological environments separated by as much as 20 km (and were most probably processed in different plants), the mineralogy, geochemistry and physical properties of the different tailings deposits may be quite different. Unless it can be shown that the deposits are really very similar, the risks for each tailings dam should be considered separately and independently.

Finally, while the report indicates that no chemicals will be used in the gravity concentration plant to be used at the tailings sites, allowance is made for the possible use of flocculants to aid the settlement of sediments in process water.²³ Which flocculent or coagulant agents will be used are not specified in the report and the list of possible options is long (e.g., clays, metal hydroxides, polysaccharides, starch derivatives, ferric and ferrous sulphate, aluminium sulphate, ferric chloride²⁴). This is an important issue because not all of these agents are necessarily environmentally benign. AGA should specify what flocculent is to be used and, if poses risks to the environment, what mitigation/neutralisation process is planned prior to discharging the waste waters.

2. Problems with the hydrological study

It is concerning that the ESAP report also provides an inadequate understanding of the hydrology of the area and how disrupting local water systems might impact on local people’s health and livelihoods. In particular, we do not believe that the limited number of water samples taken to date does can provide a scientifically defensible baseline against which to evaluate impacts on the hydrological systems during the course of the project. “Downstream” samples are particularly critical because, when compared with those taken “upstream”, they provide an indication of the extent to which the tailings dams are currently leaking contaminants.²⁵

Further water samples should be taken to provide a credible baseline assessment against which future water testing can be compared. For example, one of the two downstream samples taken (GAL03 at Galaya) shows elevated iron (Fe) concentrations²⁶ but the same sample also indicates barium (Ba) concentrations that are significantly higher than in any of the other samples (although still below WHO drinking water standards). A greater number of samples would clarify whether this one sample is “anomalous”, or whether it reflects a wider problem and is cause for concern.

Secondly, we would like more information about how it was calculated that any environmental impact from the TRP would be limited to within a 250 m radius around the site²⁷ as this does not seem to be supported by any evidence in the report. We believe that, in all likelihood, this is too small. Water borne contaminants and high sediment loads, if generated by the reworking activities, could potentially disperse much further downstream of the deposits, which could mean that the true impacts of the project go unmonitored. AGA should ensure that the radius is sufficient to encompass sites further downstream which could potentially be affected by the project.

Finally, we are concerned that the report does not consider the extent to which, and for how long, food supplies and livelihoods might be disrupted by increases in water suspended-solid load and water contamination.²⁸ Of particular concern is that allowance is made for the possibility of using the village spring at Galaya to supplement the plant water supply if necessary.²⁹ We believe that the potable water supply for local villagers should never be compromised for mining activities. Trying to satisfy the 90 m³ per day requirement of the processing plant, even in part, with water from the spring (producing 30 m³ of water per day) could have severe consequences for the villagers. Water supply for the plant should be strictly limited to the non-potable water taken upstream of the tailings dam or an alternative water supply found.³⁰

3. *iGoli* chlorine leach processing and its environmental risks

The *iGoli* process and the use of chlorination in general is not yet a proven technology. Yet, there is no consideration at all in the report of the potential impacts of the *iGoli* chlorine leaching process that is planned to be used for the gold recovery, and no justification provided for this particular choice of processing method. Industry and academic research to date involving alternative reagents to cyanide (of which chlorine is one) has mostly lacked any environmental focus in terms of employee health and safety, environmental protection, and proper disposal of wastes.³¹ While we are not suggesting that cyanide would be a better choice of reagent, we would like to highlight that chlorination is not yet fully tested in production mode and that its potential impacts are not yet fully understood.

The results of a pilot study carried out by Mintek (South Africa), the developers of the *iGoli* method,³² show that the effluent (water) wastes emerging from the process are highly acidic, chlorine-rich, and contain dissolved metals in the form of metal ions and metal-chlorites (salts). Mintek tests using three different “neutralising” agents (including caustic soda (NaOH) that the AGA project proposes to use) showed that all three failed to reduce the metal and chlorine concentrations in the effluent waters to acceptable levels. The “neutralised” waste effluent still had metal concentrations that were between 10 – 1000 times higher than South African groundwater standards, with the only metal concentration within limits being phosphorous.³³

The Mintek tests³⁴ also showed difficulties in reducing the *arsenic* and *chlorine* concentrations in the waste effluent. High concentrations of arsenic in the effluent occur if the arsenic-bearing mineral arsenopyrite (FeAsS) is present in the ore material being processed so the fact that the Mongbwalu tailings deposits are reported as containing arsenopyrite³⁵ is cause for some concern. Furthermore, although Mintek research showed that the use of the mineral apatite is critical in reducing arsenic and chlorine concentrations to lower (but still unacceptably high) concentrations in the effluent, apatite is not included in the list of reagents in the ESAP report.

A further risk is that these high chlorine levels could react with organic materials to produce trihalomethanes and haloacetic acids,³⁶ which can have carcinogenic and other health damaging effects.³⁷ Worryingly, the ESAP report states that there are “significant amounts of organic material”³⁸ in the tailings deposits. If these organic materials are not filtered out prior to chlorine processing, there is a risk that these dangerous chemicals could be released into the environment with the waste effluent. It is also possible that they

could be generated in the (organic-rich) local river systems, if high-chlorine-concentration effluent is discharged into them.

Finally, as the material being passed through the *iGoli* process is a heavy mineral concentrate, it can be assumed that a large proportion of the tailings will consist of sulphide minerals that were not dissolved during the leaching process. A significant proportion will also consist of metal-hydroxide minerals, precipitated out of the waste effluent during neutralisation of the effluent. This presents a risk of acid water generation and the leaching of metals into local surface and subsurface drainage systems.

Given the potentially dangerous chemicals present in the tailings, how they are stored or disposed of is crucial. However, preventative measures, mitigation plans and monitoring systems have not been included in detail and the ESAP report states that a disposal site for the solid tailings generated by the chlorine-leach process has not yet been identified.³⁹ We would urge AGA to provide more detail on how these risks will be managed as soon as possible.

4. Project closure plan

We believe that AGA's plan for the closure of the project after 2.5 years should also be examined in more detail to ensure that the longer-term impacts of the mine are adequately managed.

We are particularly concerned that the closure plan does not provide any justification for the decision to return the tailings sites back to wetland conditions after mining them. The flushing of water through the unconsolidated tailings may result in the development of acid conditions and the leaching of metals as the tailings consolidate. Such a strategy may therefore have short- to medium-term detrimental impacts on the quality of local waters. However, no consideration has been given to how long it might take for the tailings to consolidate after re-deposition and no justification is given for the rejection of alternative strategies, namely the possibility of keeping the tailings dry. We would welcome more information on this issue to better understand how these decisions have been reached.

We would also like to see more information to justify assuming that "the chemical composition of the deposit is benign." We are concerned that a "once-off chemical analysis of the tailings material... to confirm there are no toxic constituents in it or the potential for toxic leachates" on project closure will be insufficient.⁴⁰ The characteristics of the tailings and their potential for leaching contaminants should be assessed and potential remediation strategies identified, before the project starts. To do so at project closure is too late.

Similarly, it is not certain that one year of water-quality monitoring post-closure will be adequate because the consolidation and stabilisation rate of the tailings is not known.⁴¹ To address this, AGA should allow for a longer monitoring period. This should be as much as five years or at least as long as is necessary to establish with certainty that the tailings and water conditions in and around them have stabilised. The environmental management plan should also clearly state what remedial steps will be taken in the case of water quality problems arising. A simply reactive approach to monitoring is not sufficient.

Notes and references

1 Correspondence between AGA and CAFOD, 9 April 2009

2 SRK Consulting. 2009. Ashanti Goldfields Kilo Tailings Retreatment Project: Environmental and Social Adjustment Plan, p.61

3 Ibid, p.64

4 Ibid.

5 Ibid, p.67

6 Ibid, p. 61

7 Ibid, p.2

8 Ibid, p.68

9 Ibid, p.61

10 Ibid.

11 CAFOD and Cadre de Concertation interviews with former-KIMIN workers, 16 May 2009

12 SRK Consulting (2009), p.72

13 Ibid, p.72

14 Ibid.

15 Ibid, p.69

16 Ibid, p.62

17 Not to be confused with the Cadre de Concertation, an independent civil society platform which represents the community of Mongbwalu in meetings with AGA/K on a wide range of issues. The Community Development Committee is a company-led initiative specifically designed to facilitate community involvement in AGA's social development plan for the tailings project.

18 Ibid, p.62

19 Ibid. The project life is not clearly stated in the report but reference is made to the figure of 2.5 years (p.64)

20 Ibid, p.6

21 The occurrence of pyrite, chalcopyrite, covellite, sphalerite, pyrrhotite, arsenopyrite, rutile, sphene, magnetite, hematite and ilmenite was detected.

22 Ibid, pp. ii and 114

23 Ibid, p.14

24 Lottermoser, B.G. 2007. Mine Wastes: Characterization, Treatment and Environmental Impacts, 2nd Ed. Springer, Berlin Heidelberg, p.304

25 Downstream samples were only taken at Galaya and Yedi, and none at Issuru and Creek (although a sample was taken in the middle of the latter deposit). The current status of the Issuru and Creek deposits, in terms whether they are producing contaminants or not, therefore remains untested.

26 SRK Consulting (2009), p.38

27 Ibid, p.20

28 Ibid, p.55

29 Ibid, p.83

30 Ibid, p.56

31 Aylmore, M.G. 2005. Alternative lixivants to cyanide for leaching gold ores. In: Adams, M.D. (editor), Advances in Gold Ore Processing. Developments in Mineral Processing, Vol 15. Elsevier, pp. 501-539.

32 Mahlatsi, S. 2006. The iGoli mercury-free gold extraction process. CASM-AGM, Antsirabe, Madagascar, 11-15 November 2006.

33 Ibid.

34 Ibid.

35 Ibid, p.6

36 Hylander, L.D., Plath, D., Miranda, C.R., Lücke, S., Öhlander, J. and Rivera, A.T.F., 2007. Comparison of different gold recovery methods with regard to pollution control and efficiency. *Clean*, 35(1), 52-61.

37 Plewa, M.J., Wagner, E.D., Jazwierska, P., Richardson, S.D., Chen, P.H. and McKague, A.B., 2004. Halonitromethane drinking water disinfection byproducts: chemical characterization and mammalian cell cytotoxicity and genotoxicity, *Environmental Science & Technology*, 38, 62; and USEPA, 2000. National Primary Drinking Water Regulations: Public Notification Rule, Fed. Regist. 2000, 65 (120), 38639. www.epa.gov/EPAWATER/2000/June/Day-21/w9534.htm.

38 SRK Consulting (2009), p.6

39 Ibid, p.16

40 Ibid, p. 88

41 Ibid, p.89