



APPRAISAL REPORT

CAO Appraisal for Audit of IFC

CAO Compliance

CAO Ref Code: C-I-R6-Y12-F160

24, July 2012

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## **Mozambique Aluminium S.A.R.L**

### **Mozambique**

#### **Case of**

Justiça Ambiental, Livaningo, Liga Moçambicana dos Direitos Humanos, Centro Terra Viva, Kulima, and Centro de Integridade Pública

#### ***Summary***

In October 2010, a coalition of local and national NGOs filed a complaint to the CAO (and other organizations as detailed in this report) regarding the Mozal project.

Mozal, located 20km west of Maputo, Mozambique is a large aluminum smelter. IFC has two active investments in the project: the first, approved in 1997, supported the construction and operation of the smelter, and the second, approved in 2001, supported doubling its production capacity. BHP Billiton, a publicly traded international mining and metals group, is the primary sponsor of Mozal.

*The* complainants maintain that Mozal's bypass program – which allowed emissions from the plant's carbon anode baking plant to bypass the fume treatment centers (FTCs) – would result in harmful exposure to people and the environment. The complainants also raise questions about the environmental and social due diligence undertaken to approve the bypass program, and the lack of access to and disclosure of information.

Having conducted a compliance appraisal in accordance with its Operational Guidelines, CAO finds that once the risk of structural failure of the FTCs was reported in 2010, IFC responded to assure itself that reasonable and practical steps were being taken by Mozal to identify, assess and rectify the plant failure. Similarly though advance measures to engage with communities around the bypass were lacking, IFC took appropriate action once this issue was identified.

Based the compliance appraisal process, however, CAO has not been able to reach a conclusion on whether IFC was sufficiently proactive in monitoring the corrosion risk in the FTCs or whether more proactive monitoring of this risk may have provided opportunities to advise Mozal in relation to techniques that could have: (a) mitigated the corrosion problem; (b) facilitated the management of the resulting maintenance in ways that minimized emissions, or (c) contributed to prior informed consultation with the community.

In these circumstances CAO proposes to conduct a compliance audit with the following focus:

- (a) The extent to which the risk of corrosion of the FTCs could have been foreseen;
- (b) The extent to which this risk was appropriately supervised by IFC;
- (c) The extent to which enhanced supervision of this risk could have provided opportunities for IFC to advise its client in relation to measures that might have mitigated or allowed earlier detection of the problem.
- (d) The extent to which IFC policies and procedures provide appropriate guidance on the scope of E&S supervision, particularly in relation to the monitoring of known risks to E&S performance, and preventative actions.

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## **About the CAO**

*The CAO's mission is to serve as a fair, trusted, and effective independent recourse mechanism and to improve the environmental and social accountability of IFC and MIGA.*

The CAO (Office of the Compliance Advisor/Ombudsman) is an independent post that reports directly to the president of the World Bank Group. The CAO reviews complaints from communities affected by development projects undertaken by the two private sector lending arms of the World Bank Group: the International Finance Corporation (IFC) and the Multilateral Investment Guarantee Agency (MIGA).

For more information about the CAO, please visit [www.cao-ombudsman.org](http://www.cao-ombudsman.org)

## 1. Overview of the CAO Compliance Appraisal process

When the CAO receives a complaint about an IFC or MIGA project, the complaint is first referred to the dispute resolution arm of the CAO, CAO Ombudsman, which works to respond quickly and effectively to complaints through facilitated settlements, if appropriate. If the CAO Ombudsman concludes that the parties are not willing or able to reach a facilitated solution, the case will be transferred to the compliance arm of CAO, CAO Compliance for appraisal and potential audit.

In the context of a CAO compliance audit, at issue is whether:

- The actual social or environmental outcomes of a project are consistent with or contrary to the desired effect of the IFC/MIGA social and environmental policy provisions; or
- A failure by IFC/MIGA to address social or environmental issues as part of the appraisal or supervision resulted in outcomes that are contrary to the desired effect of the policy provisions.

A compliance audit is concerned with assessing the application of relevant policy provisions and related guidelines and procedures to determine whether IFC and MIGA are in compliance. The primary focus of compliance auditing is on IFC and MIGA, but the role of the sponsor may also be considered.

In order to decide whether a full audit is warranted, CAO Compliance first conducts a compliance appraisal.

To guide the appraisal process, the CAO applies several criteria. These are framed as a series of questions to test the value of undertaking a compliance audit.

- Is there evidence of significant adverse social and environmental outcome(s) as a result of the project now or in the future?
- Are there indications that a policy or other audit criteria has not been adhered to or properly applied?
- Is there evidence that indicates that IFC/MIGA's provisions, whether or not complied with, have failed to provide an adequate level of protection?
- Is there an argument for the value of a full audit, either because a compliance audit is likely to support the realization of better social and environmental outcomes in the project under review, or because a compliance audit could yield information or findings that might better inform the application of policies (or other audit criteria) to future projects?

A compliance appraisal, and any audit that ensues, is limited to issues related to the complaint. CAO Compliance may seek clarification during the appraisal, but will not accept an expansion away from issues related to the complaint and identified during the assessment done by the CAO.

After a compliance appraisal has been completed, the CAO can choose one of two options: to close the case, or to initiate a compliance audit of IFC or MIGA.

The CAO will report and disclose the findings and decision of the CAO compliance appraisal in an appraisal report in order to inform the President of the World Bank Group, the Boards of the World Bank Group, senior management of IFC or MIGA, and the public in writing about its decision.

If the CAO decides to initiate a compliance audit as a result of the compliance appraisal, the CAO will draw up a Terms of Reference for the audit in accordance with CAO's Operational Guidelines.

## **2. Background and concerns that led to the Appraisal**

In October 2010, a coalition of local and national NGOs representing themselves and other locally affected people filed a complaint to the CAO regarding the Mozal project in Mozambique. The complaint was also filed with the Complaint Mechanism of the European Investment Bank (EIB); the Organization for Economic Co-operation and Development (OECD) United Kingdom National Contact Point; and in several different judicial and non-judicial mechanisms. In addition, the complainants have led a national campaign that collected thousands of community member signatures for presentation to the Parliament of Mozambique regarding the Mozal bypass program.

Mozal, located 20km west of Maputo, is an aluminum smelter with a production capacity of 500,000 tons per year. IFC has two active investments in the project: the first, approved in 1997, supported the construction and operation of the smelter, and the second, approved in 2001, supported doubling its production capacity. BHP Billiton, a publicly traded international mining and metals group, is the primary sponsor of Mozal.

The complainants maintain that Mozal's bypass program – which released air emissions bypassing the fume treatment centers while these were under rehabilitation – would result in harmful exposure to people and the environment. The complaint also raises questions about the environmental and social due diligence undertaken to approve the bypass program, and the lack of access to and disclosure of information.

The CAO deemed the complaint eligible for assessment in October 2010 and an ombudsman team traveled to the field in December 2010 to meet with the complainants, company representatives, and IFC team working on the project. The ombudsman assessment aimed to understand the perspectives of all the parties and explore options for resolution of the issues raised. In January 2011, the CAO conducted a second trip to discuss the draft assessment report with the parties and next steps. The company and complainants agreed to pursue a CAO dispute resolution process to attempt to resolve the issues raised and jointly agreed to ground rules outlining the suggested topics for discussion during the dialogue meetings.

As part of the dispute resolution process, the parties met on several occasions between February and June 2011. The ground rules paved the way for a negotiation that resulted in the drafting of several proposals. The process did bring the parties closer to an understanding of one another's concerns and potential solutions and Mozal agreed to disclose information with the coalition about the bypass program.

Although the parties worked toward a final agreement on all the issues, an agreement was not reached and the NGO coalition requested that the complaint be referred to CAO's compliance function.

## **3. Scope of the Appraisal**

The complainants raise the following issues in their complaint:

- (a) The dispersion study of emissions undertaken by the independent consultant and simulations contained therein were not made public at an appropriate time.
- (b) The complainants acknowledge that the concentrations and deposition rates of the polluting substances predicted in the dispersion study are not significant and therefore that there appears to be no significant risk of acute or chronic exposure to communities or the environment to these substances during the Bypass. However, they suggest that it is

necessary to maintain permanent surveillance on the potentially affected sites to verify these conclusions.

- (c) Mozal presented different and contradictory reasons for the need for rehabilitation.
- (d) BHP Billiton (a shareholder in Mozal) applied different criteria and procedures to a similar operation of bypass in South Africa.
- (e) MICOA (the Government permitting body) should not have issued the special authorization for the bypass operation as the legislation only permits extraordinary emission due to unforeseeable circumstances and the circumstances should have been foreseen by Mozal.
- (f) Information relating to the authorization was not made available on request to the complainants by either MICOA or Mozal.
- (g) The public remains ill-informed about the exact risks of the bypass operation due to the lack of access to impartial information and transparency.
- (h) The complainants consider that Mozal violated several elements of IFC's Performance Standard 1 (and one item - item (vi) below - relating to PS4). Details are contained within the complaint but the main issues related to:
  - i. Mozal's Social and Environmental Management System;
  - ii. Mozal's lack of communication with the local communities directly affected;
  - iii. The Environmental Management Plan was not based on appropriate social and environmental baseline data and did not permit various obligations under domestic and international human rights obligations;
  - iv. Consideration of technically and financially feasible alternatives;
  - v. Community engagement and prior disclosure of relevant information; and
  - vi. Mozal did not disclose information to enable the affected communities to understand the health risks.

Full details of the complaint can be found on the CAO's web site

[www.cao-ombudsman.org/cases/case\\_detail.aspx?id=159](http://www.cao-ombudsman.org/cases/case_detail.aspx?id=159)

#### **4. CAO Findings**

The Project was funded prior to the introduction of the Performance Standards in 2006, hence, these are not directly applicable to this investment. However, Mozal and the independent consultants undertaking the assessment of potential air quality impacts resulting from the bypass operation have, used the more stringent air quality criteria contained within the 2006 Sustainability Framework for their assessment of air quality impacts. This represents good practice.

CAO have reviewed the air dispersion modeling study undertaken on behalf of Mozal<sup>1</sup> and find the following:

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<sup>1</sup> SE Solutions, *Emissions during the BHP Billiton Mozal Aluminium Smelter Fume Treatment Centre (FTC) Rebuild – A Human Health Perspective* (November 2010).

- (a) It presents a robust assessment of the potential air quality impacts resulting from the bypass operation and follows methods and uses models (e.g. The Air Pollution Model (TAPM) for the determination of the relevant meteorological data inputs) that reflect international good practice.
- (b) The conclusion of the modeling study, is that the impacts to air quality as a result of emissions during bypass operations are unlikely to cause negative health effects. This conclusion is based on worst case scenario assumptions which is good practice.
- (c) The dispersion modeling study uses appropriate criteria for the assessment of impacts and demonstrates that impacts will be localized and acceptable in terms of these criteria.

In addition Mozal commissioned a study of the potential health effects of emissions of PAHs (polyaromatic hydrocarbons) during the bypass operation.<sup>2</sup> PAHs are a group of similar chemicals produced in very small quantities from many combustion processes. Each of the chemicals in the group has a different effect on the human when inhaled or ingested. Some are very toxic and some are relatively harmless. Some can cause cancer if exposure is great enough. As: (a) the toxicity of each of the chemicals varies; and (b) the quantities of each of them produced is highly dependent on the conditions present during combustion - simplifications have to be made in order to estimate the likely risks from a given process or a given exposure to ambient air that is polluted with PAHs. Exposure usually needs to be over a long period of time as the quantities of PAHs present in the air we breathe are very small.

The report concluded that chronic non-cancer health effects were unlikely to develop as a result of emissions during bypass, even in sensitive individuals.

The report also examines the likely cancer risk of exposure to PAHs. The calculations are complex and have been done using three different methods (United States Environmental Protection Agency (USEPA), Office of Environmental Health Hazard Assessment, Californian EPA (OEHHA IUR) and World Health Organization (WHO)). Each method uses different toxicities for each of the PAHs as there is still a lot of uncertainty about the potential for each of the PAHs to cause cancer. The three methods, therefore, give a range of possible risks from the same actual exposure.

Measurements of PAHs in the air around Mozal were first used to estimate the likely risk of cancer in a population exposed to this level of pollution. Modeling of the emissions from Mozal during a bypass operation were then used to estimate how the risk of cancer would change as a result of the additional emissions of PAHs. There is uncertainty around the emissions and the results of the modeling and so the study notes that results should be treated with caution.

The assessment sensibly relies on incremental risk tolerability criteria (IRTC). These are the additional risks of cancers being caused in a population if it is assumed that individuals exposed are at the point of maximum concentration (from an emission source). They can be expressed as the risk of something happening in a year of an individual's life or over their whole lifetime (usually assumed to be 70 years). In reality there may be no one at the point of maximum concentration and so the level of exposure of most of the population will be significantly smaller than that predicted in the report.

One IRTC used is a lifetime risk of 1 in 1 million. This means that if a million individuals were exposed to the same concentration of pollutants (PAHs) 1 person might be expected to develop cancer in their lifetime. The exposure does not necessarily have to be for the duration (i.e. 1 year, a lifetime) over which the risk factor is stated as a short term exposure can still have a lifetime risk

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<sup>2</sup> CSIR, *An Assessment of Impacts on Air Quality as a Result of the Proposed Fume Treatments Centre (FTC) Rebuild at Mozal* (February 2011).

of say 1 in 1 million if the exposure is large enough. This is considered an acceptable level of risk when considering the additional risk from a single source, since other cancer risk factors (smoking, diet, lifestyle, genetics) are likely to be 1000s of times more prevalent. If the risk from a single source rises above 1 in 10 000, mitigation is required. An intermediate criterion of 1 in 100 000 is often used to give some safety factor.

The report focuses on the risk of cancer that may arise from inhalation as this is considered to be the most likely route of human exposure. Whilst monitoring and modeling data show many uncertainties the report concludes that the inhalation carcinogenic risk is likely to be acceptable using the USEPA and OEHR methods (i.e. the risk is less than the (1 in 100 000) incremental risk tolerability criterion). The WHO method uses more conservative toxicity factors and so the background/baseline annual risk is calculated to be already above the 1 in 100 000 risk tolerability criterion (15.4 per 100 000 individuals). When the bypass emissions from Mozal are added to this background risk is estimated to increase by 147% (to 38.0 per 100 000 individuals). The same increase can also be seen with the USEPA and OEHR methods but the numbers are smaller and so indicate an acceptable risk (i.e. the total risk is well below the 1 in 100 000 incremental risk criterion).

Taking into account the uncertainties and the range of results arising from the various methods used, the report does not conclude that the incremental risks from emissions of PAHs during bypass are unacceptable. However, it does provide evidence to suggest that emissions should be minimized both in concentration and duration. In terms of disclosure and community awareness it is noted that the CSIR report was finalized in February 2011 and findings are understood to have been shared with NGOs at a workshop on 16 March 2011 (shortly before the rebuild was completed).<sup>3</sup>

CAO also notes that various discussion documents pertaining to the assessment of air quality impacts are at times less than clear and may not have been the best route to communicating outcomes of the assessment to the non-specialist. A consistent suite of pollutants of potential concern is not presented although this would not have materially affected the outcome or conclusions of the assessment.

Authorization for the bypass operation was given to Mozal via letter dated May 26, 2010. Conditions were specified including monitoring of air quality and consultation with the public. This represents good practice. As identified earlier Mozal may not have communicated adequately at this time with interested parties but this has been recognized and remedial action has been taken.

Monitoring of ambient air quality and emission concentrations was undertaken by a reputable independent company to ensure that assumptions made in the assessment and the predicted impacts were consistent with the measured data. Ambient air quality monitoring proved consistent with the modeling predictions given the inherent uncertainties in modeling and the randomness of atmospheric conditions (notably that modeling must by definition be based on historical meteorological data as a predictor of the future). Emissions monitoring also was used to verify that the Fume Treatment Centers (FTCs) were operating correctly after rehabilitation.

The original impact assessment (EIA, 1996) was updated in September 2000. This update only considered certain aspects of the project and did not update the air quality assessment - considering that the air quality assessment presented in 1996 was adequate. As stated by Mozal the 1996 EIA did not consider a case where bypass operations would last approximately 6 months as this was not considered a credible scenario.

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<sup>3</sup> As explained by IFC because the CSIR report is technically complex and very detailed, it was agreed at the workshop that only the executive summary would be made public.



It is acknowledged by IFC that the investment was relatively old (over 10 years ago) and this may have caused Mozal's management team to involve IFC at a later stage than would have been optimal. However, IFC were made aware of the FTC issue during a site visit in October 2009, conducted by IFC environmental team. Mozal undertook to provide IFC with additional information relating to potential resolutions of this issue. These included a study to estimate the potential air quality impacts and a study on the possible options for rehabilitation.

However, communication of the outcome of these studies was not immediately provided to IFC because Mozal concluded that they would not be out of compliance with any of the required assessment criteria or in breach of the terms of the IFC loan agreement. Whilst this may have been the case CAO finds that a more proactive engagement between Mozal and IFC may have resulted in fuller and earlier disclosure to potentially affected communities, including the complainants.

The usual reporting cycle of environmental and social issues by Mozal (in the form of Annual Monitoring Reports (AMRs)) was implemented. Corrosion monitoring was not regularly reported as according to the IFC process operational changes, including corrosion risk, are not within the scope of AMR reporting (unless they lead to deviations from agreed emissions level, which was not the case here). The 2002 AMR (September 2002), however, contains details of a previous FTC bypass operation, undertaken for corrosion reasons in the upper section of the cooling tower. At this time a hole of approximately one meter in diameter was observed with some thinning of surrounding metal. The cause of the thinning was found to be chemical corrosion. During repairs the FTC was placed on bypass for a period of 62 days. In order to reduce or remove the chances of recurrence, it is also reported that at this time the gas inlet ducting was modified to improve the gas flow distribution and an acid resistant coating was installed on the inside of the tower.

The October 2011 AMR includes reporting of the 2010/11 bypass operation including rebuilding of the FTCs and the associated ambient air quality monitoring. An appendix containing the close out report for the rebuild is also included.

Ad hoc communications between IFC and Mozal were used to discuss and communicate solutions and impacts and given the nature of the case this is deemed reasonable.

Mozal considered various options to rectify the problem with the FTC including shutting the plant down completely, partially closing the plant and various other technical options. However, commercial and technical considerations limited the available choice to the one taken; that of bypass operation of the two FTCs. One option that may have been overlooked was identified by EIB. This involved reducing the capacity of the plant until a third, new FTC was built and then using this FTC whilst rehabilitating the original two FTCs. This option would have caused delay in rehabilitation and may have not prevented catastrophic failure and so EIB recognize that given the uncertainties the selected option (bypass) was a reasonable one. CAO concurs with this conclusion.

CAO has not been able to establish whether the original design of the plant was faulty, whether the mal-operation (e.g. poor maintenance) of the plant or other reasons led to the corrosion that ultimately led to the requirement for bypass operation.

In reaching its findings CAO notes those of the European Investment Bank (EIB) Complaints Mechanism. The EIB Complaints Mechanism report (dated April 2012) concludes that the bypass operation was "justified" and undertaken in the intended timeframe. It identifies room for improvement in three key areas: (a) transparency and stakeholder engagement; (b) management and monitoring of emissions to the environment; and (c) operational monitoring and maintenance of key mitigation equipment.

## 5. CAO Decision

Once the risk of structural failure of the FTCs was reported in 2010, CAO finds that IFC assured itself that reasonable and practical steps were being taken by Mozal to identify, assess and rectify the plant failure. Similarly though advance measures to engage with communities around the bypass were lacking, IFC took appropriate action once this issue was identified.

Based the compliance appraisal process, however, CAO has not been able to reach a conclusion on whether IFC was sufficiently proactive in monitoring the corrosion risk in the FTCs or whether more proactive monitoring of this risk would have provided opportunities to advise Mozal in relation to techniques that in turn could have: (a) mitigated the corrosion problem; (b) facilitated the management of the resulting maintenance in ways that minimized emissions, or (c) contributed to prior informed consultation with the community.

The IFC's approach to supervision of the corrosion risk is understood by CAO to be linked to the view that process operational changes, including corrosion risk were beyond the remit of IFC's duty to monitor the client's environmental and social performance and thus legitimately outside the scope of Mozal's reporting requirements. In these circumstances IFC found itself in the position where discovery of corrosion in structural elements of the FTCs was described as unexpected and resulting in an emergency.<sup>4</sup> CAO finds that a more planned and thereby improved response to this issue may have been possible if IFC's supervision had considered not only actual emissions and down time data but also monitoring of known risks to the integrity of the systems that were designed to reduce emissions (in this case FTCs).

In terms of the questions that CAO uses to test the value of undertaking a compliance audit CAO finds as follows:

- *Is there evidence of significant adverse social and environmental outcome(s) as a result of the project now or in the future?*

While ambient air quality remained mostly within relevant limits during the rebuild, CAO finds that studies conducted provide sufficient evidence that, from a public health perspective, PAH emissions from the plant should be minimized both in concentration and duration.

- *Are there indications that a policy or other audit criteria has not been adhered to or properly applied? / Is there evidence that indicates that IFC/MIGA's provisions, whether or not complied with, have failed to provide an adequate level of protection?*

It is unclear to CAO whether IFC's policies and procedures provide adequate guidance to staff on the scope of E&S supervision, particularly with regard to the question of how IFC monitors known risks to the integrity of systems designed to achieve agreed environmental and social outcomes.

- *Is there an argument for the value of a full audit, either because a compliance audit is likely to support the realization of better social and environmental outcomes in the project under review, or because a compliance audit could yield information or findings that might better inform the application of policies (or other audit criteria) to future projects?*

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<sup>4</sup> IFC Memorandum to CAO dated 15 February 2011, available at [http://www.cao-ombudsman.org/cases/document-links/documents/IFCresponseMozalAssessmentReport\\_Feb2011.pdf](http://www.cao-ombudsman.org/cases/document-links/documents/IFCresponseMozalAssessmentReport_Feb2011.pdf) (accessed 06/26/2012).

The question of how IFC monitors known risks to the integrity of systems designed to achieve agreed environmental and social outcomes is important both for the project and the broader portfolio.

In these circumstances CAO proposes to conduct a compliance audit with the following focus:

- (a) The extent to which the risk of corrosion of the FTCs could have been foreseen;
- (b) The extent to which this risk was appropriately supervised by IFC;
- (c) The extent to which enhanced supervision of this risk could have provided opportunities for IFC to advise its client in relation to measures that might have mitigated or allowed earlier detection of the problem.
- (d) The extent to which IFC policies and procedures provide appropriate guidance on the scope of E&S supervision, particularly in relation to the monitoring of known risks to E&S performance, and preventative actions.