



Acacia
Mining Operations

ACACIA MINE OPERATIONS GÖKIRMAK COPPER MINE

Air Quality Management Plan 2017

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AECOM

Table of Contents

1.	Purpose and Scope	2
2.	Project Standards	2
3.	Roles and Responsibilities	0
4.	Air Quality Management	0
5.	Air Quality Monitoring Program	0
6.	Training	0
7.	Audit and Reporting	0
8.	Review and Update	0

1. Purpose and Scope

This Air Quality Management (AQM) Plan is prepared for the Gökırmak Copper Project (GCP) to set out (i) the applicable mitigation measures for the Project related air emissions and (ii) the air quality monitoring programme at the Project sensitive receptors in compliance with national legislation, requirements of international financing institutions (e.g. IFC Performance Standards, EBRD Performance Requirements) and other applicable Good International Industry Practices (GIIPs). The plan is applicable for the construction, operation and rehabilitation phases of the Project.

This Plan is a living document and should be updated as appropriate. It is the responsibility of the Environmental and Public Relations Coordinator to be fully aware of its contents, to provide relevant training to staff and to ensure that procedures are being implemented to achieve compliance with this Plan by all parties including contractors and subcontractors.

2. Project Standards

The applicable national and international ambient air quality standards are:

- Turkish Air Quality Assessment and Management Regulation (AQAMR)
- Turkish Industrial Air Pollution Control Regulation (IAPCR)
- IFC General EHS Guidelines: Environmental Air Emissions and Ambient Air Quality, April 30, 2007
- Directive 2008/50/EC on ambient air quality and cleaner air for Europe
- WHO Ambient Air Quality Guidelines

The Project Standards are set taking into account the strictest amongst the available standards as given below.

Table 1. Ambient Air Quality Standards and Project Standards

AQAMR		IAPCR ⁴		IFC/WB ¹		EU ²		Project Limits ³	
Parameter	Averaging Period	Target Limits (1 Jan. 2019) (µg/m3)	Target Limits (1 Jan. 2019) (µg/m3)	Averaging Period	Guideline value µg/m3	Averaging Period	Limit Value	Averaging Period	Limit
PM ₁₀	24 hour (not to be exceeded more than 35 times a calendar year)	50 µg/m3	50 µg/m3	24 hour	150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)	24 hours	50 µg/m3, not to be exceeded more than 35 times a year - limit values for the protection of human health	24 hour (not to be exceeded more than 35 times a calendar year)	50 µg/m3
	Yearly	40 µg/m3	40 µg/m3	Yearly	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline)	Yearly	40 µg/m3 - limit values for the protection of human health	Yearly	20 µg/m3
PM _{2.5}	Limit Value not Available		Limit Value not Available	Limit Value not Available	35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline)	Yearly - Stage 1	25 µg/m3 Date by which limit value is to be met: 1 January 2015	Yearly	10 µg/m3
				50 µg/m3	75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)	Yearly - Stage 2	20 µg/m3 Date by which limit value is to be met: 1 January 2020	24-hour	25 µg/m3
Sulphur dioxide (SO ₂)	1 hour (not to be exceeded more than 24 times a calendar year)	350 µg/m3	350 µg/m3	24-hour	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)	Hourly	350 µg/m3, not to be exceeded more than 24 times a calendar year	1 hour (not to be exceeded more than 24 times a calendar year)	350 µg/m3
	24 hour (not to be exceeded more than 3 times a calendar year)	125 µg/m3	125 µg/m3			24 hours	125 µg/m3	24 hour (not to be exceeded more than 3 times a calendar year)	20 µg/m3
	Yearly	60 µg/m3	60 µg/m3	10 minute	500 (guideline)	Yearly and winter (1 October to 31 March)	20 µg/m3 (critical level) - critical level for the protection of vegetation	Yearly	20 µg/m3
	Yearly and Winter season (1 October to 31 March) - ecosystem protection	20 µg/m3	20 µg/m3					Yearly and Winter season (1 October to 31 March) - ecosystem protection	20 µg/m3
NO _x	Yearly – For the protection of vegetation	30 µg/m3	30 µg/m3	NA	NA	Yearly	30 µg/m3 NO _x (critical level) - critical level for the protection of vegetation	1 Year - For the protection of vegetation	30 µg/m3
Nitrogen dioxide (NO ₂)	1 hour (not to be exceeded more than 18 times a calendar year)	200 µg/m3 (1 Jan 2024)	200 µg/m3 (1 Jan 2024)	Hourly	200 (guideline)	Hourly	200 µg/m3, not to be exceeded more than 18 times a calendar year	1 hour (not to be exceeded more than 18 times a calendar year)	200 µg/m3 (1 Jan 2024)
	Yearly	40 µg/m3	40 µg/m3	Yearly	40 (guideline)	Yearly	40 µg/m3- limit values for the protection of human health	Yearly	40 µg/m3
CO	Maximum daily 8 hour mean	10 µg/m3	10 µg/m3	NA	NA	Maximum daily 8 hour mean	10 mg/m3- limit values for the protection of human health	Maximum daily 8 hour mean	10 µg/m3
Settled dust (mg/Nm3-day)	Monthly	390 (mg/Nm3-day)	390 (mg/Nm3-day)	NA	NA	NA	NA	Monthly	390 (mg/Nm3-day)
	Yearly	210 (mg/Nm3-day)	210 (mg/Nm3-day)	NA	NA	NA	NA	Yearly	210 (mg/Nm3-day)
Lead (Pb)	Yearly	0.5 µg/m3	0.5 µg/m3	NA	NA	Yearly	0.5 µg/m3	Yearly	0.5 µg/m3
Arsenic	Yearly	6 ng/m3	6 ng/m3	NA	NA	Yearly	6 µg/m3	Yearly	6 ng/m3
Cadmium	Yearly	5 ng/m3	5 ng/m3	NA	NA	Yearly	5 ng/m3	Yearly	5 ng/m3
Nickel	Yearly	20 ng/m3	20 ng/m3	NA	NA	Yearly	20 ng/m3	Yearly	20 ng/m3
Ozone	Maximum daily 8 hour mean	100 µg/m3	100 µg/m3	Maximum daily 8 hour mean	100 µg/m3	Maximum daily 8 hour mean	100 µg/m3	Maximum daily 8 hour mean	100 µg/m3

¹ IFC General EHS Guidelines: Environmental Air Emissions and Ambient Air Quality, April 30, 2007 & Table 1.1.1: WHO Ambient Air Quality Guidelines. ² Directive 2008/50/EC on ambient air quality and cleaner air for Europe. ³ The project limit is determined by reference to the strictest limit. ⁴ Limit values must be ensured within the impact area

3. Roles and Responsibilities

Roles and responsibilities for E&S management for the GCP are described in detail in the Project ESMS. The Environmental and Public Relations Coordinator (and the related department's sub-level personnel regarding the environmental subjects, including the Environmental Supervisor) will be responsible for the implementation of the Air Quality Management Plan.

4. Air Quality Management

The Project has the potential to affect local air quality due to emissions from earthmoving activities and stationary sources, exhaust and blasting emissions. Potential emission sources of mining activities are:

- Overburden removal (excavation)
- Boring/Blast hole drilling
- Blasting
- Blasting explosives
- Material handling (excavation, earthmoving, loading, handling)
- Wind erosion of stockpile surfaces
- Exhaust emissions from vehicles and construction/operation machinery
- Vehicles and equipment moving on unpaved surfaces
- Combustion of coal for heating purposes

The principal air pollutants from mining operations are given below:

Table 2. Air Emissions from Mining Operations

Earthmoving Emissions	Emissions of Exhaust, Stationary Sources and Blasting
Particulate Matter (PM ₁₀)	Oxides of nitrogen, or NOX composed of nitrogen dioxide (NO ₂) and nitric oxide (NO)
Particulate Matter (PM _{2.5})	Carbon monoxide (CO), Carbon dioxide (CO ₂)
Dust (comprising both suspended and deposited dust, i.e. Settled dust)	Sulfur dioxide (SO ₂)
	Ozone (O ₃)
	Metals (Lead, Arsenic, Cadmium, Nickel)
	Hydrocarbons (HCs)
	Benzene (C ₆ H ₆)

The assessment of impacts on local air quality from the Project focuses on dust (PM₁₀, PM_{2.5}, and settled dust) and exhaust emissions.

AMI will fully comply with dust reduction mitigation measures as committed within the national EIA report.

The following list of mitigation measures will be in place for dust and exhaust emissions during construction and operation phase of the Project to ensure compliance with EBRD PR3 and relevant EU legislation and GIIP.

Mitigation Measures for Dust Emissions:

- Use of water sprinkling on unpaved roads
- Wetting and covering vehicle loads with sheeting before transport from the site
- Application of speed limits
- Dedicated parking areas for employees' vehicles
- Periodic wetting of the unpaved areas
- Loading, transfer, and discharge of materials should take place with a minimum height of fall
- Implement restrictions to off-site travel of heavy vehicles used at the open pit (except for maintenance purposes)
- Fitting crushing and screening machinery with filter systems
- Use and maintenance of effective filters in vehicle cabs to keep air free of dusts and fumes;
- Visual inspection of high level dust emissions will be conducted and water sprinkling will be applied in these areas
- Rehabilitating cleared areas as soon as possible after completion of construction
- Undertaking progressive rehabilitation of land during operations so that land is revegetated as soon as possible after mining and waste disposal operations are completed.
- Minimizing the haulage distances in movement of material with road planning at the open pit
- If required, based on monitoring results
- All vehicles should be washed down before exiting the site
- Use of dust suppression spray systems during material loading and unloading

Mitigation Measures for Exhaust Emissions and Stationary Sources:

- Application of speed limits
- Dedicated parking areas for employees' vehicles
- Restriction of off-road travel
- Periodic maintenance of both heavy and light vehicle fleets
- Periodic maintenance of machinery and equipment
- Vehicles will not be permitted to keep engines running while waiting to enter the sites or waiting on-sites.
- Machinery and equipment will not be left running in periods between work, or will be throttled down to a minimum.
- Minimizing the haulage distances in movement of material
- Uphill movements will be avoided as far as possible with low-angle road planning in open pit
- Vehicle and equipment movements will be scheduled to minimize idle time and distances travelled

Successful implementation of these measures will be supported by provision of training for the operators of equipment and truck drivers. A summary of Project impacts on air quality and proposed mitigation measures are given below. Impact significance is identified as moderate to major prior to implementation of the mitigation measures. It should be noted that impacts of dust and gaseous emissions from the construction and operation phases of the Project on terrestrial flora and fauna are discussed under the Biodiversity Management Plan.

Table 3. Project Impacts from Emissions to Air on Residential Areas

Impact Description	Receptors	Magnitude	Sensitivity/ Value of Resource/ Receptor	Proposed Mitigation Measures
Dust emissions from TSF Construction	Hanonu Yilanli	Medium - Short term duration (Two year) - Narrow in Geographical Extent - Long term reversible	High (Residential)	Apply Dust Emissions Mitigation Measures given above, Conduct water sprinkling for at least 5 times a day during dry season on unpaved roads, Monitor emission according to air quality monitoring program,
Dust emissions from Construction	Hanonu, Yozlu Vakif Cayli Sepetcioglu Derekoy Geymene Asagikurecay Bagdere Kupeli Yilanli	Medium - Short term duration (Two year) - Wide in Geographical Extent - Long term reversible	High (Residential)	Apply Dust Emissions Mitigation Measures given above, Surfaces in inactive/decommissioned Project areas should be re-vegetated or otherwise rendered non-dust forming, Monitor emission according to air quality monitoring program,
Dust Emissions from Operation Period	Hanonu, Yozlu Vakif Cayli Sepetcioglu Derekoy Geymene Asagikurecay Bagdere Kupeli Yilanli	High - Long Term - Wide in Geographical Extent - Irreversible or long-term reversible - High Magnitude	High (Residential)	Apply Dust Emissions Mitigation Measures given above, Monitor emission according to air quality monitoring program, Based on the air quality model results, water sprinkling will initially be conducted for at least 5 times a day during dry season. Frequency will be increased in the case monitoring results require so, Re-vegetation or otherwise rendering non-dust forming of surfaces in inactive/decommissioned Project areas Construction of wind fences and/or vegetative barriers on one side or both sides of ore transport road (if required, depending on the assessment of monitoring results), Fitting stockpiles with sprinkler systems or dust caps (if required depending on monitoring results),
Emissions from Blasting	Sepetcioglu, Kupeli, Vakif, Bagdere,	Low - Short term duration - Restricted - One-off impact (per day) - Narrow in Geographical Extent	High (Residential)	Wetting down the entire blasting area prior to initiating the blast, the use of an air-water fogger spray prior to, during, and after initiating the blast,

Impact Description	Receptors	Magnitude	Sensitivity/ Value of Resource/ Receptor	Proposed Mitigation Measures
Dust emissions from Stockpiles And Open Areas (Wind Erosion)	Hanonu, Yozlu Vakif Cayli Sepetcioglu Derekoy Geymene Asagikurecay Bagdere Kupeli Yilanli	Medium -Long Term - Wide in Geographical Extent - irreversible	High (Residential)	Apply Dust Emissions Mitigation Measures given above, Fitting stockpiles with sprinkler systems or dust caps (if required depending on monitoring results),
Exhaust and Stationary Emissions		High -- Long Term - Wide in Geographical Extent - Irreversible or long-term reversible - High Magnitude	High (Residential)	Apply Exhaust Emissions and Stationary Sources Mitigation Measures given above Monitor emission according to air quality monitoring program, Burning of waste materials, foliage etc, must be avoided, Vehicles and equipment should not emit black smoke from exhaust systems except during ignition at start-up

5. Air Quality Monitoring Program

Continuous air quality monitoring at Sepetçiöğlü village will be conducted through installation of a fixed air quality measurement station (exact location to be determined during the site surveys). Additionally, air quality measurements at the below proposed settlements will be made:

Table 4. Air Quality Monitoring Locations

Monitoring Location	Emission Parameters and Frequencies							
	PM ₁₀	PM _{2.5}	Settled Dust	TSP / Heavy Metals	NO ₂	SO ₂	CO	Meteorology
Hanonu	Monthly ²	Quarterly	Monthly ²	Monthly ²	Monthly ²	Monthly ²	Routinely	-
Yozlu	Monthly ²	Quarterly	Monthly ²	Monthly ²	-	-	-	-
Vakif	Monthly ²	Quarterly	Monthly ²	Monthly ²	-	-	-	-
Cayli	Monthly ²	Quarterly	Monthly ²	Monthly ²	-	-	-	-
Sepetcioglu	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Routinely	Continuous
Derekoy	Monthly ²	Quarterly	Monthly ²	Monthly ²	Monthly	Monthly	Routinely	-
Geymene	Monthly ²	Quarterly	Monthly ²	Monthly ²	-	-	-	-
Asagikurecay	Monthly ²	Quarterly	Monthly ²	Monthly ²	-	-	-	-
Bagdere	Monthly ²	Quarterly	Monthly ²	Monthly ²	-	-	Routinely	-
Kupeli	Monthly ²	Quarterly	Monthly ²	Monthly ²	-	-	Routinely	-
Yilanli	Routinely ¹	Routinely ¹	Routinely ¹	Routinely ¹	-	-	-	-
Various Location (inside of fence)	-	-	-	-	-	-	-	Meteorology

¹ Monthly basis during the construction of TSF

² Every one month on dry sessions, Every 2 month on winter session.

6. Training

AMI will provide training to all its staff and subcontractors to ensure that they are aware of the relevant aspects of this Plan and follow the measures proposed in line with their specific job tasks. Training of staff will be recorded in personnel records.

7. Audit and Reporting

Regular internal inspections will be made throughout the Project life to ensure that the mitigation measures put in place are applied at all times by all site staff including contractors and subcontractors.

Monitoring results will be recorded and reported to AMI management to ensure that the Project is in line with the standards. Depending on the results the Plan will be reviewed and updated accordingly.

8. Review and Update

This Plan will be reviewed as required by potential changes in Project activities and/or results of monitoring activities. In case any noncompliance with existing project standards is identified or any corrective measure is required, the plan will be updated accordingly. The Environmental and Public Relations Coordinator will be responsible of review and update of the MP. The plan will be recommunicated to AMI personnel and will be shared with contractor/subcontractor management following any such update.