

# TÜMAD

MADENCİLİK SANAYİ VE TİCARET A.Ş.



## AIR QUALITY MANAGEMENT PLAN for LAPSEKİ & İVRİNDİ PROJECTS

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## AIR QUALITY MANAGEMENT PLAN for LAPSEKİ & İVRİNDİ PROJECTS

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## **ABBREVIATIONS AND DEFINITIONS**

Project(s)	: Lapseki and İvrindi Gold and Silver Mine and Processing Projects
TÜMAD	: TÜMAD Madencilik San. ve Tic. A.Ş.
EBRD	: European Bank for Reconstruction and Development
EIA	: Environmental Impact Assessment
ESMS	: Environmental and Social Management System
EU	: European Union
HR	: Human Resources
IFC	: International Finance Corporation
IMS	: Integrated Management System
KPI	: Key Performance Indicator
MoEU	: Ministry of Environment and Urbanization
OHS	: Occupational Health and Safety
PR(s)	: Performance Requirements

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## 1 INTRODUCTION

TÜMAD Madencilik San. ve Tic. A.Ş. (TÜMAD) plans to establish the Lapseki Gold and Silver Mine and Processing Project (the Lapseki Project) within the administrative boundaries of the Şahinli and Kocabaşlar Villages of the Lapseki District in the Province of Çanakkale. The construction phase of the Lapseki Project has been at completion stage and the operation phase will start in October 2017.

TÜMAD plans to establish the İvrindi Gold and Silver Mine and Processing Project (the İvrindi Project) within the administrative boundaries of Değirmenbaşı and Küçükıllica Villages of the İvrindi District of Province of Balıkesir. The İvrindi Project has started with mobilization.

The project is seeking finance and this document is produced as a part of studies conducted to assess the Environmental and Social Impacts of the Project as per the EBRD Performance Requirements (PRs).

This Document is the Air Quality Management Plan that is prepared for TÜMAD Operations. The Integrated Management System (IMS) document registration number for Air Quality Management Plan is TMD\_CEV\_PLN.006. This management plans sets the requirements for the operation phase of the Lapseki Project and for construction and operation phases of the İvrindi Project and is an integral part of the Environmental and Social Management System (ESMS) implemented by TÜMAD for these two mine projects.

This Management Plan is based on the Project(s) ESMS Framework (TMD\_EYS\_PLN.004) of TÜMAD, which is owned by the TÜMAD General Manager. Any subsequent changes to the TÜMAD ESMS may result in the changes to this document.

This Management Plan will be reviewed on a minimum of a six monthly basis during construction and commissioning. During operation phase, this Plan will be reviewed on an annual basis to determine whether any changes or updates are required to the Management Framework unless a more frequent update is required to reflect changing project design or ESMS requirements and procedures.

Any requests for changes to this Management Plan must be addressed to the owner of this Management Plan and will be subject to appropriate review and approval processes as outlined in the Management of Change Procedure (TMD\_EYS\_PRD.006).

## 2 PURPOSE

The purpose of the Air Quality Management Plan is to;

- To define the scope and applicable interphases for the management of air emissions during TÜMAD activities,
- To define project standards in terms of air emissions,
- To define responsibilities, commitments, operating procedures and instructions for the implementation of this Management Plan,
- To manage air emissions and monitor Project performance in relation to air emissions,
- To define training requirements and Key Performance Indicators.

Air Quality Management Plan is valid as of the date on which it is approved by the General Manager of TÜMAD.

## 3 SCOPE

Air Quality Management Plan includes all activities of TÜMAD during execution of Project(s) and also applicable to all TÜMAD contractors involved in the Project(s).

### 3.1 Overlaps with other Management Plans

This Management Plan is part of the overall suite of Management Plans developed for the TÜMAD Projects and as part of ESMS overlaps with the following management plans;

- The Community Health, Safety and Security Management Plan (TMD\_EYS\_PLN.006), particularly in relation to potential impacts of air emissions on community health.
- The Traffic Management Plan (TMD\_ISG\_PLN.005), particularly in relation to the control of vehicle emissions within and outside of the mine area.

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- Framework Biodiversity Action Plans, particularly in relation to impacts of air emissions on biodiversity components.
- Cyanide Management Plan (TMD\_CEV\_PLN.008) particularly in relation to fugitive and accidental emissions of cyanide.
- TÜMAD Health and Safety Management Plan (TMD\_ISG\_PLN.007) particularly in relation to in relation to health and safety aspects of air emissions.
- Emergency Action Plans (TMD\_LAP\_ISG\_PLN.002 & TMD\_IVR\_ISG\_PLN.002) (Lapseki and İvrindi) particularly in relation to air emissions during emergency cases.
- Waste Management Plan (TMD\_CEV\_PLN.004) particularly in relation to air emissions during waste handling.

Air Quality Management Plan is supported by the Procedures and Instructions on measurement and monitoring of air quality as such;

- Air Quality Monitoring Instructions
- Procedure on Measuring and Monitoring Environmental Activities (TMD\_CEV\_PRD.006)

#### 4 PROJECT STANDARDS

Standards applicable to the Project must be complied with during all Project activities (the “Project Standards”). TÜMAD comply with the more stringent of national standards and other applicable standards.

Project Standards are defined by;

- applicable Turkish Standards;
- Turkish Environmental Impact Assessment (EIA) requirements;
- other commitments to and requirements of Turkish Government authorities;
- applicable international standards and guidelines;
- applicable TÜMAD standards, policies and procedures;
- Other industry guidelines with which TÜMAD has committed to comply.

##### 4.1 Applicable Turkish National Standards

- Turkish National Regulation on Control of Industrial Air Pollution (dated: 03 July 2009, Official Gazette No: 27277);
- Regulation on Assessment and Management of Air Quality (dated: 06 June 2008, Official Gazette No: 26898);
- Regulation on Control of Exhaust Gas Emission (dated: 30 November 2013, Official Gazette No: 28837);
- Regulation on Measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery and Approval of Type (Dated 20 June 2007, Official Gazette No: 26558).

##### 4.2 Applicable International Standards and Guidelines

*EBRD Performance Requirement 3: Resource Efficiency* and Pollution Prevention and Control which states the requirement for projects to meet the relevant European Union (EU) substantive environmental standards, where these can be applied at the project level.<sup>1</sup>

<sup>1</sup> Projects must also be designed to comply with applicable national law, and will be maintained and operated in accordance with national laws and regulatory requirements. When host country regulations differ from the levels and measures presented in EU requirements or other identified appropriate environmental standards, projects will be expected to meet whichever is more stringent.

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In that respect the following EU directives are referred for the definition of Project Standards;

- The Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on Ambient Air Quality and Cleaner Air For Europe and National Regulation is referred for the definition of the Project Standards,
- EU Directive 97/68/EC of the European Parliament and of the Council of 16 December 1997 on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery (and later amendments).

The applicable International Finance Corporation (IFC) emissions guidelines presented in General EHS Guidelines: Environmental Air Emissions and Ambient Air Quality in the absence of applicable Turkish and EU standards for specific emission. TÜMAD Operations are subject to the emission limit values stated below.

**Table 1: Project Ambient Air Quality Standards**

Pollutant	Time/Averaging Period	Maximum Allowable Limit		
		EU*,**	Turkish***	Project Standard
SO <sub>2</sub> (µg/m <sup>3</sup> )	Hourly	350	470 (for 2015) 440 (for 2016) 410 (for 2017) 380 (for 2018) 350 (for 2019-2023)	<b>350</b>
	24 hour	125	225 (for 2015) 200 (for 2016) 175 (for 2017) 150 (for 2018) 125 (for 2019-2023)	<b>125</b>
	Yearly and winter season (Oct 1st – March 31st) (for wildlife and ecosystem)	-	20	<b>20</b>
NO <sub>2</sub> (µg/m <sup>3</sup> )	Hourly	200	290 (for 2015) 280 (for 2016) 270 (for 2017) 260 (for 2018) 250 (for 2019-2023)	<b>200</b>
	Yearly	40	56 (for 2015) 52 (for 2016) 48 (for 2017) 44 (for 2018) 40 (for 2019-2023)	<b>40</b>
PM <sub>10</sub> (µg/m <sup>3</sup> )	24 hour	50	90 (for 2015) 80 (for 2016) 70 (for 2017) 60 (for 2018) 50 (for 2019-2023)	<b>50</b>
	Yearly	40	56 (for 2015) 52 (for 2016) 48 (for 2017) 44 (for 2018) 40 (for 2019-2023)	<b>40</b>

Pollutant	Time/Averaging Period	Maximum Allowable Limit		
		EU*,**	Turkish***	Project Standard
Fine particles (PM <sub>2.5</sub> , µg/m <sup>3</sup> )	Yearly	25	-	<b>25</b>
Settled Dust (mg/m <sup>2</sup> day)	24 hour	-	390	<b>390</b>
	Long term	210	210	<b>210</b>
Ozone µg/m <sup>3</sup>	Maximum daily 8-hour average in calendar year	120	-	<b>120</b>
Pb and its compounds in settled dust (mg/m <sup>2</sup> day)	Long Term****	-	250	<b>250</b>
Cd and its compounds in settled dust (mg/m <sup>2</sup> day)	Long Term	-	3.75	<b>3.75</b>
Tl and its compounds in settled dust (mg/m <sup>2</sup> day)	Long Term	-	5	<b>5</b>
Lead (Pb) concentration in PM10 (µg/m <sup>3</sup> )	1 year	0.5	-	<b>0.5</b>
Arsenic (As) concentration in PM10 (ng/m <sup>3</sup> )	1 year	6	-	<b>6</b>
Cadmium (Cd) concentration in PM10 (ng/m <sup>3</sup> )	1 year	5	-	<b>5</b>
Nickel (Ni) concentration in PM10 (ng/m <sup>3</sup> )	1 year	20	-	<b>20</b>

\* Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on Ambient Air Quality and Cleaner Air For Europe and National Regulation.

\*\*Heavy metals are maximum allowable limits from the total content of the PM10 fraction averaged over one year. Limits are from Directive 2004/107/EC

\*\*\* Regulation on Control of Industrial Air Pollution (dated: 03 July 2009, Official Gazette No: 27277)

\*\*\*\*As defined Regulation on Control of Industrial Air Pollution (dated: 03 July 2009, Official Gazette No: 27277)

**Table 2: Limits for Atmospheric Emissions from Stationary Sources**

Source	Pollutant	Standard (mg/Nm <sup>3</sup> ) unless stated otherwise		
		Turkish	EU	Project Standard
Diesel generators*	**	-	N/A	<b>1460<sup>1</sup></b>
	NO <sub>x</sub>	-	-	<b>1850<sup>2</sup></b>
	SO <sub>2</sub>	1700	-	<b>1700</b>

Source	Pollutant	Standard (mg/Nm <sup>3</sup> ) unless stated otherwise		
		Turkish	EU	Project Standard
	PM	70		<b>70</b>
	CO	<b>150</b>		<b>150</b>

\*Typically rated <2MW and below 50MW threshold in EU Directive 2001/80/EC

\*\*In the absence of applicable Turkish and EU standards for small-scale generators, the applicable IFC emissions guidelines have been used.

<sup>1</sup>IFC Standard: exhaust bore size diameter [mm] < 400

<sup>2</sup>IFC Standard: exhaust bore size diameter [mm] > or = 400

**Table 3: Recommended emission standards for non-road diesel engines (g/kWh) \***

Net Power (kW)	Date	CO	HC	NMHC+NO <sub>x</sub>	NO <sub>x</sub>	PM
<b>Stage III A</b>						
130 ≤ P ≤ 560	2006.01	3.5	-	4	-	0.2
75 ≤ P < 130	2007.01	5	-	4	-	0.3
37 ≤ P < 75	2008.01	5	-	4.7	-	0.4
19 ≤ P < 37	2007.01	5.5	-	7.5	-	0.6
<b>Stage III B</b>						
130 ≤ P ≤ 560	2011.01	3.5	0.19	-	2	0.025
75 ≤ P < 130	2012.01	5	0.19	-	3.3	0.025
56 ≤ P < 75	2012.01	5	0.19	-	3.3	0.025
37 ≤ P < 56	2013.01	5	-	4.7	-	0.025
<b>Stage IV</b>						
130 ≤ P ≤ 560	2014.01	3.5	0.19		0.4	0.025
56 ≤ P < 130	2014.1	5	0.19		0.4	0.025

\*Turkish National Regulation and EU Directive defines the same emission standards

#### 4.3 Other Commitments to and Requirements of Turkish Government Authorities

Not applicable.

#### 4.4 Applicable TÜMAD Standards, Policies and Procedures

Applicable TÜMAD Policy and Procedures are given in Section 3.1.

### 5 ROLES AND RESPONSIBILITIES

Air Quality Management Plan has been prepared under the responsibility of Environment Department of TÜMAD and owned by TÜMAD General Manager.

Primary roles and responsibilities with respect to implementation of Air Quality Management Plan are given in Table 4.

**Table 4: Roles and Responsibilities**

Roles	Responsibility
<b>TÜMAD General Manager</b>	<ul style="list-style-type: none"> <li>Approval of resources necessary for the implementation of this management plan.</li> </ul>
<b>TÜMAD IMS and Sustainability Manager</b>	<ul style="list-style-type: none"> <li>To ensure that this management plan conforms to Project(s) commitments and standards.</li> </ul>

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<b>Roles</b>	<b>Responsibility</b>
<b>TÜMAD Environment Department Head</b> <b>Environmental Engineers on site</b>	<ul style="list-style-type: none"> <li>To provide technical assistance to TÜMAD department managers and Contractors with respect to studies to be carried out within the scope of Air Quality Management Plan and the relevant procedures,</li> <li>To ensure monitoring, measurement and reporting of air quality as described in this Plan, the relevant procedures and instructions with the use of third part third party consultants when required,</li> <li>To make the plan available to employees of TÜMAD and to those of contractors,</li> <li>To control effectiveness of this plan through periodic inspections on all activity areas of TÜMAD and those of contractors,</li> <li>To report all hazards, non-compliances and incidents.</li> </ul>
<b>TÜMAD Operation Manager</b> <b>Contractor's Managers</b>	<ul style="list-style-type: none"> <li>To ensure that all activities of TÜMAD are conducted in accordance with the Air Quality Management Plan and the relevant procedures and instructions,</li> <li>To report all hazards, non-compliances and incidents,</li> <li>To ensure that Department Administrators provide employees with training on air pollutant generating activities.</li> </ul>
<b>Contractors</b>	<ul style="list-style-type: none"> <li>Carry out activities in line with Projects Standards set out in this plan,</li> <li>Implement Management Controls and Mitigation measures as set in this Plan and in the EIA,</li> <li>Report timely on any incidents or on activities that may result in unusual air emissions,</li> <li>Implement timely any corrective actions resulting from audits, inspections or complaints and as agreed with TÜMAD Managers or IMS and Sustainability Manager.</li> </ul>
<b>TÜMAD Internal inspectors</b>	<ul style="list-style-type: none"> <li>To perform routine inspections in the working area in order to ensure that the related activities are being carried out in accordance with this Management Plan and the relevant Procedures,</li> <li>To report all hazards, non-compliances and incidents.</li> </ul>
<b>Head of Community Relations Department</b>	<ul style="list-style-type: none"> <li>Within the Grievance Mechanism, solving the grievances on air emissions,</li> <li>Record the grievances.</li> </ul>

## 6 MITIGATION MEASURES AND MANAGEMENT CONTROLS

### 6.1 Overview

The key air emissions from TÜMAD operational activities include:

- dusts emitted during;
  - Drilling and blasting activities at the open pit,
  - Activities of mineral processing equipment,
  - Use of transportation vehicles,

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- Plant activities,
- Maintenance works,
- Other potentially noisy activities,
- gaseous emissions as such sulphur dioxide (SO<sub>2</sub>), oxides of nitrogen (NO<sub>x</sub>) and carbon monoxide (CO) from construction and operation vehicles and equipment.
- emissions of GHGs (principally CO<sub>2</sub>).
- fugitive and accidental emissions of HCN during operation which is also discussed in Cyanide Management Plan.

## 6.2 Management Controls

The table below presents the key management controls that TÜMAD will implement to manage the air emissions.

**Table 5: Management Controls**

Emission Type	Sources of Emission	Emission Control Measures	Responsible	Verification Tools
<b>Dust</b>	Excavation Activities	<ul style="list-style-type: none"> <li>Discharge and filling will be carried out without scattering around.</li> <li>The top surfaces of the conveyors and other carriers and their connecting parts will be covered.</li> </ul>	Head of Environmental Department  Environmental engineers at site  Open Pit Superintendent Head of OHS department  Head of Community Relations  Operation Manager	Community Grievances  Air Quality Monitoring Results  Open Pit Prescription
	Blasting Activities	<ul style="list-style-type: none"> <li>Fine particle formation will be prevented with the blasting design.</li> <li>Blasting procedures to be performed during operation will be performed by using non-electric capsules with delay period of milliseconds.</li> <li>Blasting procedure will be carried out by specialized persons.</li> </ul>		
	Transportation Activities	<ul style="list-style-type: none"> <li>Dust will be suppressed by watering or spraying the earth roads.</li> <li>Speed limit will be 20 km/hour on the roads within the mine.</li> <li>Trucks will not be loaded over their capacities.</li> <li>Transported material will be kept moist to prevent dust formation.</li> <li>The surfaces of the truck dampers will be covered.</li> <li>Organic based soil stabilizer will be used for dust suppression.</li> </ul>		
	Storage Activities	<ul style="list-style-type: none"> <li>All broken ore will be stored in a closed area.</li> <li>The unused sides of the bulk storage areas will be compacted from the surface.</li> <li>The slopes in the bulk storage areas shall be reduced considering the dominant wind direction.</li> <li>Upper layers in storage areas will be kept with 10% humidity with installation of necessary equipment.</li> </ul>		

Emission Type	Sources of Emission	Emission Control Measures	Responsible	Verification Tools
	Transportation by Wind	<ul style="list-style-type: none"> <li>When it is deemed necessary wind breaking plates will be placed on the land to prevent transport by wind effect.</li> <li>Replanting will be carried out at the points where the activity is completed and erosion due to wind will be prevented.</li> </ul>		
<b>Cyanide</b>	Plant Leach Adsorption Tank Desorption Tank Column Electrolysis Area	<ul style="list-style-type: none"> <li>HCN (hydrogen cyanide) gas and HCl (hydrochloric acid) spray may form during mineral processing operations.</li> <li>Due to the adverse effects of HCN gas on human health, its control will be carried out meticulously.</li> <li>When the chemical equilibrium of the solution in the leach tanks is obtained, cyanide is present in the HCN phase and its amount varies inversely proportional to pH and temperature. For this reason, the solution will be controlled by continuous measurements to ensure control of HCN gas.</li> <li>Against the formation of HCN gas, the pH in the leach tanks will be kept under constant control with NaOH (sodium hydroxide) addition.</li> <li>Although the pH range of the solution will vary depending on the process dynamics, it will be held constant between 10.0 and 11.</li> <li>Under no circumstances will the pH value be lowered below 10.0. When regular measurements are taken with the pH meters in the tanks.</li> <li>The tank personnel will perform manual measurements at least twice in each shift.</li> <li>In addition, HCN detectors taking measurements automatically will be installed on the leaching tanks and at certain points in the plant.</li> <li>The alarm level of the detectors will be set to 5 ppm.</li> </ul>	Head of Environmental Department  Environmental engineers at site  Open Pit Superintendent  Head of OHS Department  Head of Community Relations Operation Manager	Air Quality Monitoring Results
<b>HCl</b>	Plant Columns	<ul style="list-style-type: none"> <li>Will be used in strict compliance with the operation procedures and instruction</li> </ul>	Head of Environmental Department Environmental engineers at site Open Pit Superintendent Head of OHS department Head of Community Relations Operation Manager	Monitoring Results Audits and Inspections

Emission Type	Sources of Emission	Emission Control Measures	Responsible	Verification Tools
<b>Gaseous Emissions</b>	All Equipment and Vehicles	<ul style="list-style-type: none"> <li>The lowest sulphur content diesel available from local fuel suppliers will be used</li> <li>Road vehicles will be inspected as per the Legislation for conformance with exhaust gas standards</li> </ul>	Financial Administrators Logistic Administrators Head of Environmental Department Environmental engineers at site	Fuel quality records Vehicle Inspection Records
<b>Risk Records</b>	All activities	<ul style="list-style-type: none"> <li>Maintain and develop the risk register to identify health and environmental hazards (and nuisance) arising from the operational activities. Prioritise emission controls and abatement targets on the basis of risk levels determined through TÜMAD risk assessments procedures (TMD_ISG_PRD.004).</li> <li>The Community Health, Safety and Security Management Plan (TMD_PLN.006) will also provide procedures to manage community-related hazards and nuisance.</li> </ul>	Head of Environmental Department Environmental engineers at site Head of OHS department	Risk Assessment and Records
<b>GHG Emissions</b>	Power Lines Fuel Burn Dry Stack Tailing Facility	<ul style="list-style-type: none"> <li>Measures to manage Greenhouse Gas (GHG) emissions will be implemented for all Project facilities, equipment and activities. The GHG emission inventory will be updated annually and GHG emission reduction initiatives implemented where necessary.</li> <li>The GHG emissions inventory will be implemented as part of the Procedure on Measuring and Monitoring Environmental Activities (TMD_CEV_PRD.006).</li> </ul>	Head of Environmental Department Environmental engineers at site	Green Gaseous Inventory



## 7 MONITORING

### 7.1 Overview

The baseline conditions in terms of ambient air quality are defined EIA Study through air quality measurements at closest sensitive receivers within the study area of Project(s). Monitoring of the air quality during construction and operation at the same points has been added to the monitoring programme.

### 7.2 Key Monitoring Activities

#### As stipulated by EIA;

Monitoring of the air quality during construction and operation at the same points where baseline measurements are done during EIA process shall be performed and shall be submitted to The Ministry of Environment and Urbanization (MoEU) within the scope of Environmental Monitoring Program.

#### As stipulated by TÜMAD ESMS;

Monitoring of the air quality during construction and operation at points representing the sensitive receptors shall be performed. This will require monitoring of air quality at points in addition to the baseline sampling points.

If an issue is raised in accordance with the complaint and feedback procedure (TMD\_KTİ\_PRD.001) by the departments at the mine site or surrounding settlement areas due to Project(s)' air, a feedback should be provided by removing the corresponding air emission source or if it is not possible, by performing studies to reduce emissions and taking necessary measures.

One device for H<sub>2</sub>S measurement will be at site before the operation phase in order to measure hydrogen sulphide gas emission at the mine site. The device will be mobile and kept in a ready to use condition.

The air quality monitoring programme for the Project(s) are presented in the following tables;

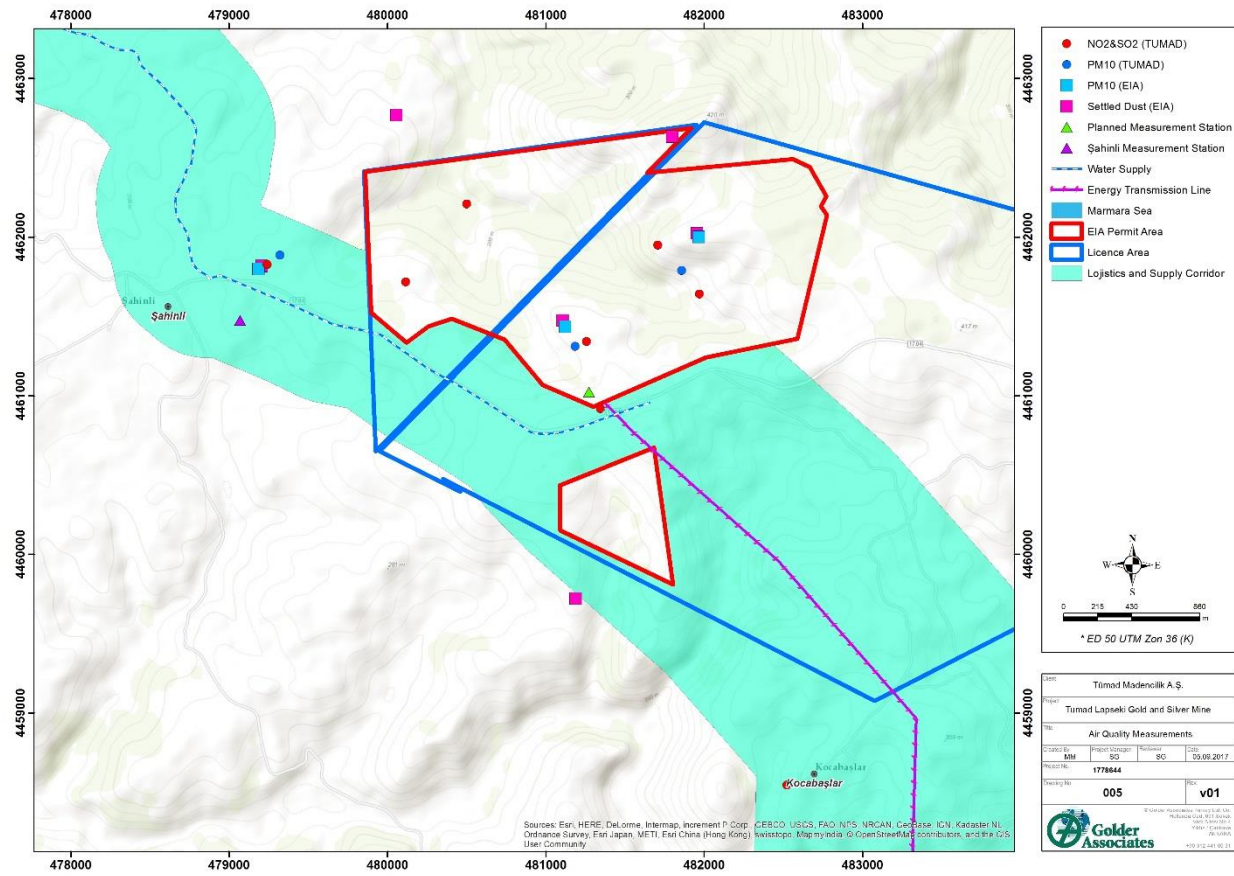
**Table 6: Air Quality Monitoring Programme for the Lapseki Mine**

No	Parameters	Locations (see Figure below)	Period	Frequency	Remarks on Selection of Locations	Status
AQM-LAP-01	Settled dust	6 different points for a period	2 months	Monthly	Within the facility and the plant area (Şahinli and Kocabaşlar villages), there are a total of 6 points. These locations are included in the EIA baseline measurement campaigns.	Completed as part of EIA. Monitoring is continued by third party consultant. Results are reported monthly in the format of MoEU.
AQM-LAP-02	PM10	3 different points	Instantaneous	Monthly	Within the facility and the plant area (Şahinli and Kocabaşlar villages), there are a total of 3 points. These locations are included in the EIA baseline measurement campaigns.	Completed as part of EIA. Monitoring is continued by third party consultant. Results are reported monthly in the format of MoEU.

No	Parameters	Locations (see Figure below)	Period	Frequency	Remarks on Selection of Locations	Status
AQM-LAP-03	PM10	<p>5 different points, According to the local grievance additional measurement locations will be located</p> <p>No grievance has been raised during completed construction phase of Lapseki</p>	24 hours	6 monthly	The locations are including the sensitive receptors and potential areas to be impacted as stipulated by the air emission modelling study for construction and operations of the mine.	Monitoring has started in April 2017.
AQM-LAP-04	PM2,5	<p>5 different points According to the local grievance additional measurement locations will be located</p> <p>No grievance has been raised during completed construction phase of Lapseki</p>	24 hours	6 monthly	The locations are including the sensitive receptors and potential areas to be impacted as stipulated by the air emission modelling study for construction and operations of the mine.	Monitoring has started in April 2017.
AQM-LAP-05	Heavy metal in Particulate matter	<p>5 different points According to the local grievance additional measurement locations will be located</p> <p>No grievance has been raised during completed</p>	24 hours	6 monthly	The locations are including the sensitive receptors and potential areas to be impacted as stipulated by the air emission modelling study for construction and operations of the mine.	Monitoring has started in April 2017.

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No	Parameters	Locations (see Figure below)	Period	Frequency	Remarks on Selection of Locations	Status
		construction phase of Lapseki				
AQM-LAP-06	SOX and NOX	8 different points According to the local grievance additional measurement locations will be located No grievance has been raised during completed construction phase of Lapseki	2 months	6 monthly	The locations are including the sensitive receptors and potential areas to be impacted by the mining operations.	Monitoring has started in April 2017.
AQM-LAP-07	PM 10	2 points According to the local grievance additional measurement locations will be located No grievance has been raised during completed construction phase of Lapseki	continuous	continuous	Şahinli Village and inside the plant area. The station inside the Plant area measures the meteorological parameters as well.	Monitoring has started in Şahinli Village in May 2017. Monitoring has started inside the Plant Area in August 2017.
AQM-LAP-08	HCN	3 points	continuous	continuous	Within the Facility (Leach area) 2 separate locations in Şahinli	Monitoring will start during operation



**Figure 1: Monitoring Locations for Air Quality for the Lapseki Mine**

**Table 7: Air Quality Monitoring Programme for the İvrindi Mine**

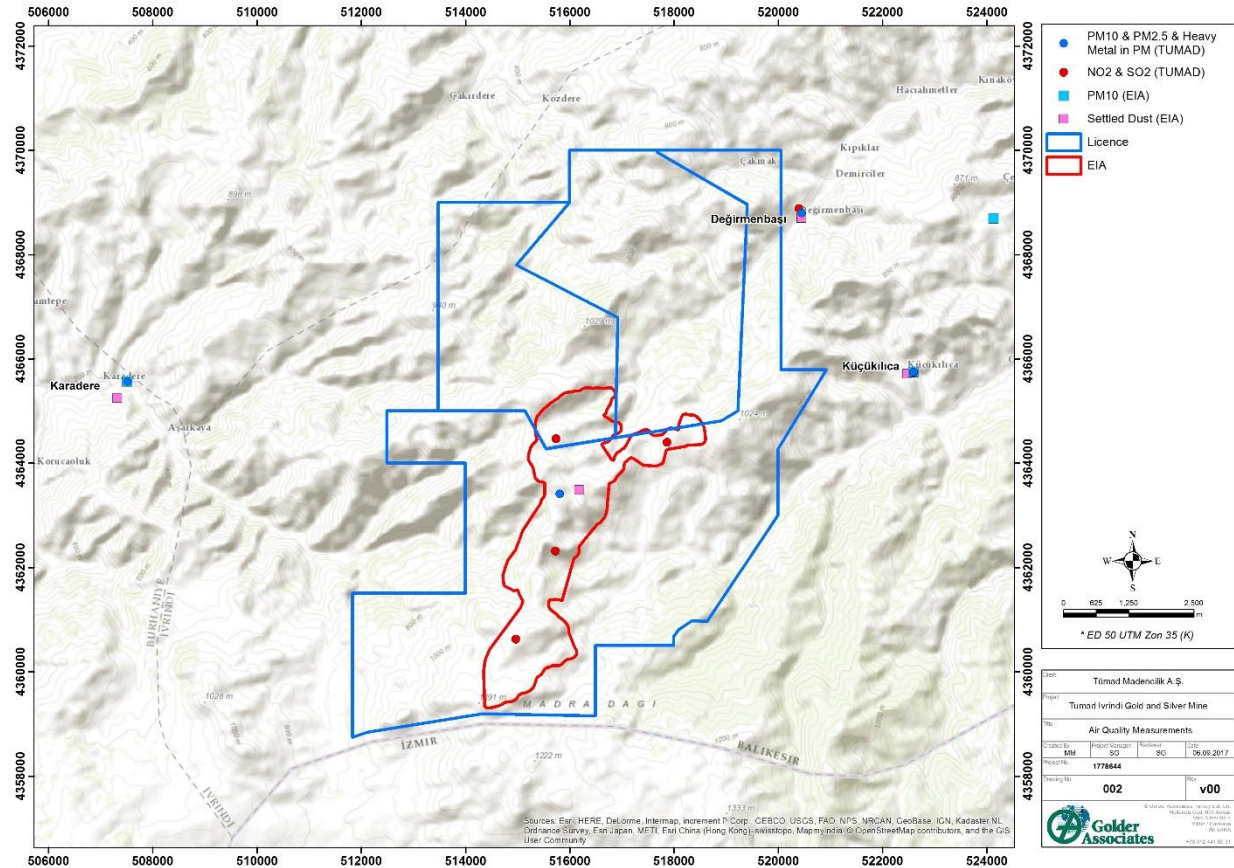
No	Parameters	Locations (See figures below)	Period	Frequency	Remarks Selection of Locations	Status
AQM-IVR-01	Settled dust	4 different points	2 months	Monthly	Değirmenbaşı, Küçükılıca and Karadere Villages and one in the plant area. These locations are included in the EIA baseline measurement campaigns.	Completed as part of EIA. Monitoring is continued by third party consultant. Results are reported monthly in the format of MoEU.

No	Parameters	Locations (See figures below)	Period	Frequency	Remarks Selection of Locations	Status
AQM-IVR-02	PM10	3 different points	Instantaneous	Monthly	Değirmenbaşı and Karadere Villages and one in the vicinity of the plan area.  These locations are included in the EIA baseline measurement campaigns.	Completed as part of EIA.  Monitoring is continued by third party consultant.  Results are reported monthly in the format of MoEU.
AQM-IVR-03	PM10	4 different points  According to the local grievance additional measurement locations will be located.	24 hours	6 monthly	Değirmenbaşı, Küçükılıca and Karadere Villages and one in the plant area.  The locations are including the sensitive receptors and potential areas to be impacted as stipulated by the air emission modelling study for construction and operations of the mine.	Not started.

No	Parameters	Locations (See figures below)	Period	Frequency	Remarks on Selection of Locations	Status
AQM-IVR-04	PM <sub>2,5</sub>	4 different points According to the local grievance additional measurement locations will be located.	24 hours	6 monthly	Değirmenbaşı, Küçükkılıca and Karadere Villages and one in the plant area. The locations are including the sensitive receptors and potential areas to be impacted as stipulated by the air emission modelling study for construction and operations of the mine.	Not started
AQM-IVR-05	Heavy metal in Particulate matter	4 different points According to the local grievance additional measurement locations will be located	24 hours	6 monthly	Değirmenbaşı, Küçükkılıca and Karadere Villages and one in the plant area. The locations are including the sensitive receptors and potential areas to be impacted as stipulated by the air emission modelling study for construction and operations of the mine.	Not started
AQM-IVR-06	SO <sub>x</sub> and NO <sub>x</sub>	6 different points According to the local grievance additional measurement locations will be located .	2 months	6 monthly	Değirmenbaşı and Küçükkılıca Villages and four in the plant area. The locations are including the sensitive receptors and potential areas to be impacted by the mining operations.	Not started
AQM-IVR-07	PM <sub>10</sub>	2 point According to the local grievance additional measurement	continuous	continuous	Not decided yet	Not started



No	Parameters	Locations (See figures below)	Period	Frequency	Remarks Selection Locations	on of	Status
		locations will be located					
AQM-IVR-08	HCN	3 points	continuous	continuous	Not decided yet		Not started



**Figure 2: Monitoring Locations for Air Quality for the İvrindi Mine**

### 7.3 Key Performance Indicators

The table below shows key performance indicators related to the Air Quality Management Plan.

**Table 8: Table of Key Performance Indicators**

No	Key Performance Indicator	Target	Monitoring and Measurement
AQM-KPI-01	Incidents related to Air Quality	Minimizing the number of reported incidents related to air quality and continuous improvement	Annually reported incidents related to air emissions.



No	Key Performance Indicator	Target	Monitoring and Measurement
AQM-KPI-02	Nonconformity with Air Quality Standards	Maximum Annual Non-conformance: 5	Number of annual non-compliance with Project air quality standards.
AQM-KPI-03	Complaints	Maximum Annual: 5	<p>The number of community complaints related to air quality reported in a year.</p> <p>Number of annual community complaints with regard to air emissions.</p> <p>Number of resolved complaints by removing the corresponding air emission source or if it is not possible, by reducing emissions levels and changing work practices.</p>

## 8 TRAINING

### 8.1 General

All employees of TÜMAD as well as contractors shall have a training on special site entry training and environmental awareness training and they shall be subject to comprehensive medical screening.

All personnel who start to work at the mine site are provided with orientation training periodically under supervision of Department Administrators.

Plant operators and key personnel, who are engaged site cleaning, construction or material usage activities, shall be provided with Job-specific specialist training.

Some outline of training for construction contractors and operation contractors/workers shall be provided.

General aspects of environmental management will be included in induction training to be provided to all employees.

### 8.2 Specific Trainings

All construction and operation contractor workers will be trained on:

- Project air emission limits
- Proper maintenance of vehicles
- Air emission mitigation measures
- Use of cyanide
- Response to accidental emissions
- Recording and responding community complaints on dust and other air emissions

All TÜMAD operation workers will be trained on;

- Project air emission limits
- Proper maintenance of vehicles
- Air emission mitigation measures
- Use of cyanide
- Response to accidental emissions
- Recording and responding community complaints on dust and other air emissions

Personnel assigned for the monitoring of the air emissions will be trained on using the measurement equipment and reporting the measurement results.

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**9 AUDIT**

Daily Inspections: operation supervisors and inspectors perform these inspections in accordance with the activities outside the fence boundary by including a wide range of operation issues, including community health and safety.

Any incident or non-compliance determined during these inspections shall be recorded and reported according to the documents of the Integrated Management System of TÜMAD.

**10 REPORTING**

Inspections, incidents and non-compliances shall be documented and administered in accordance with the Records Management Procedure of TÜMAD (TMD\_EYS\_PRD.004).

Third party environmental monitoring company will prepare “Construction Phase Environmental Monitoring Reports” every three months in the format defined by MoEU to be submitted to MoEU when required.

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