AIR QUALITY MANAGEMENT PLAN
Table of Contents:

1. Introduction .................................................................................................................3
2. Environmental and Social Management System Considerations ..............................4
3. Air Quality Management Process ................................................................................5
   3.1 Purpose and Scope ..............................................................................................5
   3.2 Project Overview ..................................................................................................7
   3.3 Environmental and Social Management System considerations ...........................7
4. Air Quality Management Plan ......................................................................................8
   4.1 Introduction ..........................................................................................................8
   4.2 Air quality management during the construction period ......................................10
      4.2.1 Actions for pollution control ........................................................................11
      4.2.1.1 Actions entailing design requirements .................................................................11
      4.2.1.2 Operational actions ............................................................................................11
      4.2.2 Management actions ......................................................................................12
      4.2.2.1 Management responsibility .............................................................................12
      4.2.2.2 Management actions taken by the general entrepreneur of construction works ....12
      4.2.2.3 Management actions taken by the RMGC general manager .........................13
   4.3 Air quality management during the operational period ........................................14
      4.3.1 Specific actions for each area within Project site ............................................14
      4.3.1.1 Open pits and haul roads for ores and waste rocks ..............................................14
      4.3.1.2 Process plant site ..............................................................................................15
      4.3.1.3 Tailings management facility ..........................................................................17
      4.3.1.4 Waste rock dumps sites ...................................................................................17
      4.3.1.5 Low-grade ore stockpile ..................................................................................18
      4.3.1.6 Aggregate quarries ..........................................................................................18
   4.4 Air quality management during the decommissioning/closure period ..................19
      4.4.1 Actions for air quality management ...............................................................19
      4.4.2 Managerial responsibility ...............................................................................20
   4.5 Actions of general character ...............................................................................21
      4.5.1 Monitoring and reporting actions .................................................................21
      4.5.2 Organizational actions ....................................................................................22
      4.5.3 Management actions ......................................................................................22
5. References ..................................................................................................................25

List of Figures

Figure 2-1: Structural Relationship of Management Plans in Environmental and Social Management System ............................................................................................................4
Figure 3.1: Air Quality Management Process .....................................................................6

Figure 4.1: Location of Air Quality/Meteorological Monitoring Stations
1 Introduction

The purpose of this Air Quality Management Plan is:

- To describe minimum requirements for monitoring ambient air quality and meteorological conditions in and near the Roşia Montană Project site as the basis for assessing potential air quality impacts that may be attributable to the Project on surrounding population areas, in relation to applicable Romanian ambient air quality standards¹;

- To describe minimum requirements for the routine management of sources of airborne/windborne dust during dry seasons or dry climatic conditions; and

- Provide performance feedback to Project management that may be used to refine the dust suppression programme, and to adjust blasting activities and other potentially significant air quality sources in a continuing effort to minimise the air quality impacts from all phases of Project activity.

This Plan applies only to Roşia Montană Project activities and addresses only ambient air quality management issues that involve residents in communities adjacent to the site or in habitations within specific protected zones. Workplace air quality and worker exposure assessments, controls, and mitigation measure are separately addressed in the Roşia Montană Gold Corporation (RMGC) Occupational Health and Safety Plan.

This Plan briefly summarises the parameters to be monitored, location and frequency of monitoring, sampling and calibration, data acquisition and validation, reporting requirements, records management, and (when required) corrective and preventive action.

---

¹ Applicable requirements are listed in the current RMGC Regulatory Requirement Matrix; see MP-02, “Identification of Legal and Regulatory Requirements”
2 Environmental and Social Management System Considerations

As noted in Figure 2-1, this plan is one of a suite of environmental and/or social management plans that have been developed to support the Project-specific Environmental and Social Management System described in the current version of the RMGC Environmental and Social Management Plan. Collectively, the Air Quality Management Plan and its companion plans address key operational control needs that have been established for those areas for which the Environmental and Social Impact Assessment (EIA) process [see Roșia Montană Project Environmental Impact Assessment (ESG Stantec et al., 2005)] indicates that potentially significant environmental or social impacts are either known to exist or may occur at some point in the mine life cycle.

The implementation of this Air Quality Management Plan is also supported by a number of detailed, lower-tier standard operating procedures. These procedures are compiled in the RMGC Standard Operating Procedures Manual, the development, review, approval, distribution, and update of which is controlled by the Roșia Montană Project Environmental and Social Management Plan. Other specific document distribution, change control, personnel training, records management, and periodic performance verification needs associated with the implementation of this management plan are likewise addressed through the processes and procedures defined in the Roșia Montană Project Environmental and Social Management Plan.

Figure 2-1: Structural Relationship of Management Plans in Environmental and Social Management System
3 Air Quality Management Process

3.1 Purpose and Scope

This Air Quality Management Plan describes the program that Roşia Montană Gold Corporation (RMGC) has established to manage the ambient and workplace-related air quality, noise and vibration impacts associated with its mining operations. The Air Quality Management Plan is a key component of the operational controls section of RMGC’s Environmental and Social Management System, the minimum requirements of which are documented by RMGC’s Environmental and Social Management Plan.

The Air Quality Management Plan represents the set of measures RMGC will implement during the life of the mine, to control sources of air pollution, as they relate to the development of the mine operations at Roşia Montană (referred to hereafter as the “Project”), with the objective to diminish these impacts to levels below the applicable limits concerning air quality and noise, and to avoid reaching vibration levels that could damage surrounding structures or disturb other receptors.

The fundamental purpose of the Air Quality Management Plan is to protect the health of human receptors (population living close to the Project area and Project employees) as well as the health and status of receptors that are specific to natural and built environments. The scope of this Plan is represented by the individual and collective sources of air pollution. The actions included in this Plan aim at reducing the emissions generated by these sources through the implementation of technical solutions and pollution control measures, such as: equipment designed for retaining pollutants and/or improving emission parameters, other types of measures for emission and/or impact abatement and control. All measures included in this Plan address pollution prevention and minimization, as well as maintenance of air quality, noise and vibration levels below the accepted limits, in the entire area potentially impacted by the Project.

This document contains the detailed description of the technical solutions and pollution control measures concerning air for each phase of the Project life cycle and for each source/category of sources which are characteristic for these phases. In addition, management responsibilities are described, as they relate to the implementation of the technical solutions and measures contained in this Air Quality Management Plan.
Figure 3.1: Air Quality Management Process

- Establish initial air monitoring locations per EIA air quality modeling effort.
- Conduct blasting tests (quarries & pits) as required.
- Evaluate site-specific test results.
- Prepare/update site-specific blasting plans.
- Monitor Project air quality, implement dust suppression program per Air Quality Management Plan and AQ-series SOPs.
- Validate & evaluate air quality monitoring data.
- Conduct public outreach contacts/discussions per PCDP.
- Evaluate air quality concerns or complaints.
- C/PA required?
  - Yes: Refine planning?
    - No: Adjust dust suppression program as required, per SOP AQ-09.
    - Yes: Undertake other appropriate C/PA per ESMP Section 5.2.

C/PA = Corrective/Preventive Action
EIA = Environmental Impact Assessment
ESMP = Environmental and Social Management Plan
PCDP = Public Consultation and Disclosure Plan
SOP = Standard Operating Procedure
3.2 Project Overview

RMGC is proposing to develop a gold and silver mine in the vicinity of the village and communa of Roşia Montană in Alba County, Romania. Alba County is located in west-central Romania, in the “Golden Quadrilateral” region in the Apuseni and Metaliferi ranges of the Transylvanian Alps. This region has been the most important gold-producing region of Europe for over 2000 years.

The development of the Roşia Montană mine will involve a wide range of activities, including ongoing local and regional mining exploration; development of open pit mines, processing operations, a tailings management facility, and various support facilities; management and mitigation of the environmental and social impacts of mining activities; restoration and rehabilitation of mined areas; assistance in the closing of the current government-subsidized mining operations; resettlement and relocation activities; archaeological surveys, assessments, and other cultural heritage preservation activities; mitigation of environmental impacts caused by historical mining operations; support for various local and regional development planning efforts; and other activities. More detailed background discussions of the scope of the project may be found in the Roşia Montană Project Environmental Impact Assessment (ESG et al, 2003).

3.3 Environmental and Social Management System considerations

As noted in Figure 1, this plan is one of a suite of environmental and/or social action plans that have been developed to support the Environmental and Social Management System separately described in the current version of RMGC’s Environmental and Social Management Plan. Overall, The Air Quality Management Plan and the other environmental and social action plans refer to the fundamental technical and operational controls of atmospheric pollution sources, in order to maintain air quality in areas with sensitive receptors located outside the Project boundaries, within legally accepted limits. The implementation of this Air Quality Management Plan is also supported by a number of detailed, lower-tier standard operating procedures. These procedures are compiled in the RMGC Standard Operating Procedures Manual, the development, review, approval, distribution, and update of which is controlled by the Environmental and Social Management Plan. Other specific document distribution, change control, personnel training, and records management needs associated with the implementation of this action plan are likewise addressed through the processes and procedures defined in the Environmental and Social Management Plan.
4 Air Quality Management Plan

4.1 Introduction

The development of the Roșia Montană Mining Project will involve a wide range of activities which are specific both to the mining operations and to various stages of Project implementation: construction, operation and closure/rehabilitation phases. The Project implies the open pit mining of a gold-silver ore deposit and the complete processing of ores within the Project plant site. These main activities assume a series of inherent auxiliary operations such as waste rock pilling, low-grade ore stockpiling and tailings deposition.

In order to perform these activities, the Project will employ a construction period with the following objectives: opening of pits and aggregate quarries, construction of the road infrastructure, construction of the processing plant and related facilities, construction of the tailings management facility (including the dam), construction of catchment dams for run-off collection from low-grade stockpile and waste rock dumps, preparation of future low-grade and topsoil stockpiles and waste rock dumps areas.

On completion of mining and ore processing operations, a closure/rehabilitation period will follow, during which specific activities will be carried out, such as: decommissioning of operational equipment and facilities as well as rehabilitation of the environment in formerly active areas.

Further details concerning the Project activities are provided in Chapter 2 of the Environmental Impact Assessment Study.

In their great majority, the activities mentioned above represent sources of atmospheric pollutants. In fact, all earth and rock works involving ores and aggregates, hauling of topsoil, waste rock and ores, and all active surfaces exposed to wind erosion, constitute sources of air pollution.

Regardless of the Project implementation/development period concerned, the main pollutant associated with mining activities is dust, in the structure of which particulates of mineral origin with a wide dimensional range are included. Particulates with diameters over 50 μm settle rapidly around sources whereas smaller particulates can be found in the atmosphere, as suspended particulates.

It is of particular importance for the dust pollution to clarify the effects of various particulate classes on human health. Thus, the following dimensional classes can be distinguished:

- Particulates with equivalent aerodynamic diameter of 1 – 50 μm, called “total suspended particulates” (TSP), with potentially adverse effects on human health and comfort;
- Particulates with equivalent aerodynamic diameter smaller than 10 μm (PM₁₀), called “inspirable particulates”. Approximately 80% of these particulates have diameters between 2.5 and 10 μm. These particulates settle down the trachea and in the lung sections of the bronchia.
- Particulates with equivalent aerodynamic diameter smaller than 2.5 μm (PM₂.₅), called “breathable particulates”. These particles settle in lung lobes.

The last two classes of particulates: inspirable and breathable, have implications on human health, especially on operational personnel exposed for long periods to such particulates. In conformance with the criteria of the International Standard Organization (ISO 1995) the following definitions have been adopted:

- “Inhalable fraction” – the mass fraction of the suspended particulates inhaled through nose and mouth;
- “Breathable fraction” – the mass fraction of the suspended particulates which penetrates through respiratory paths lacking cilia.

Dust generated by mining activities usually contains particulates with diameters between 1 and 100 μm.
Other aspects related to the effects of dust generated by mining activities on human health derive from its chemical composition. Dust may contain toxic metals such as arsenic, cadmium, cobalt, lead, manganese, nickel, vanadium, zinc etc. Dust containing carcinogen metals (As, Cd, Ni, etc.) are highly dangerous. Of course, it is a matter of metal-bearing particulates which can reach into the lungs.

The composition of dust generated by mining activities is dominated by quartz and various rock forming silicates, some of which may be harmful to human health.

The highest risk concerning inhalation of silica dust, follows long exposure periods of open pit workers.

The rates of dust emissions into the atmosphere depend on a series of parameters, among which, the most important may be grouped in the following classes: weather conditions (wind velocity, precipitation), soil/rock/handled material characteristics (humidity, percent of particulates smaller than 75 μm), technologies and equipment used, equipment capacity and process features. The emission rates also depend on the efficiency of dust abatement techniques and of other pollution control measures.

Other pollutant emissions which are specific to all three Project main periods refer to exhaust gas from mobile equipment and haul vehicles. The pollutants are: nitrogen oxides (NOx, N2O), carbon oxides (CO, CO2), sulphur oxides, volatile organic compounds (methane and non-methane organic compounds), volatile and condensable polycyclic aromatic hydrocarbons (in case of equipment), metal-bearing particulates (Cd, Cu, Cr, Ni, Se, Zn; Pb emissions will be insignificant due to the use of equipment and vehicles powered by Diesel engines).

The emission rates of pollutants from mobile equipment depend mainly on the technology used in manufacturing the engines. The driving engines of mobile equipment and vehicles used in the Project will be technologically advanced, they will have low fuel consumption rates and will be provided with emission suppression systems. Thus, the emissions will be reduced with at least 40 – 70 % in comparison with those generated by mobile sources currently used in Romania for similar activities.

The majority of air pollution sources related to the Project, are by their very nature open, free unducted dust sources, with variable geometry (surface, linear).

The air quality management in general, and the dust management in particular, represent key elements of the Environmental and Social Management System which will be adopted and implemented by RMGC.

The dust management – as a key component of the Air Quality Management Plan contains the provisions concerning the abatement of dust emissions for all sources related to the Project phases: from construction and operation, to mine closure and environmental rehabilitation.

RMGC is aware that such an Air Quality Management Plan established for “the entire life cycle of the mine” is beneficial both to the operator company and to the community as it may result in cost cutbacks, profit increase, better cooperation with authorities and with communities concerned, as well as in an easier access to future resources and financing.

The Air Quality Management Plan was established starting from the identification of potential air polluting sources, and it was based on the principle of minimising pollutant emissions, through the use of technical, operational, monitoring and management controls identified during the design period.

The Air Quality Management Plan provides performance feedback to Project management that may be used to refine the dust suppression programme, and to adjust blasting activities and other potentially significant air quality sources in a continuing effort to minimize the air quality impacts from all phases of Project activity.

The Air Quality and Noise Management Plan is structured into three components corresponding to the three main Project phases and addresses all the areas of Project activity.

Each component includes the technical solutions and the effective measures that will be implemented for air pollution control, as well as the related management responsibilities, in order to ensure the achievement of the plan's objectives during the entire life of the mine.
The actions contained in the *Air Quality Management Plan* include design and operational requirements for a more efficient control of emission sources and for avoiding and reducing air pollution or for maintaining the air pollution levels below the regulatory limits for protection of humans and biotic or abiotic components of the natural and anthropogenic environment. The technical solutions and measures adopted are consistent with the best practices applicable to environmental protection.

The design requirements concerning the Project's *Air Quality Management Plan*, are the following:

- To ensure equipment for impure air/gas collection at all sources where such systems can be applied;
- To ensure equipment for particulates/gases emission control: catchment systems for ducted sources, in order to comply with the regulatory requirements, specific systems for emission abatement at unducted sources;
- The use of mobile equipment and vehicles provided with low-polluting engines;
- The use operational technologies able to eliminate or minimize emissions.

The operational requirements concerning the Project's *Air Quality Management Plan*, are the following:

- The implementation of specific measures for reducing emissions from linear and surface unducted sources;
- The implementation of measures for maintaining equipment and facilities for emission catchment/abatement, within nominal operational parameters;
- The implementation of a system to ensure surveillance of sources, monitoring of emissions and air quality, as well as prediction of pollution levels in order to comply with the regulatory requirements and to continuously improve the *Air Quality Management Plan*.

### 4.2 Air quality management during the construction period

The specific activities of the construction phase which are or may be related to air pollution sources are mainly represented by earth, aggregate and rock handling, i.e., diggings and fillings. These activities will consist of:

- **Diggings:**
  - Vegetation removal
  - Top soil removal
  - Excavation and stockpiling of overburden
  - Rock excavation

- **Fillings:**
  - Construction of road beds
  - Construction of plant platform and of other work platforms
  - Construction of dams

Such activities will involve excavation, loading/unloading and hauling of material, leveling, compacting and stockpiling of material. Beside these activities, the construction period will imply other air polluting activities, such as:

- Concrete mixing
- Processing of quarry aggregates
Construction activities will take place within Project site, in all future operational areas, namely:
- Access and haul roads – construction activities
- Open pit areas – opening works
- Processing plant site – site preparation and construction works, concrete and mortar preparation
- Aggregate quarries – opening works, and aggregate processing
- Tailing management facility – site preparation works, construction of starter dam
- Low-grade ore, waste rocks and top soil stockpiles
- Acid rock drainage catchment dams – preparation and construction works, including dam construction

In their great majority, the air pollution sources that are specific to the construction phase are unducted, open, ground, surface or linear sources which by their nature, do not allow mechanical capture or control of pollutants by means of treatment equipment. The emission abatement measures which will be implemented, are operational measures, specific to each category of sources. The only sources allowing emission and air pollution control by means of capture equipment for impure air and equipment for abatement of emissions will be represented by the cement and lime silos.

The main pollutant specific to construction activities will be the dust of natural origin. Beside this pollutant, other emissions such as exhaust gases from mobile equipment and vehicles will occur.

The actions envisaged for the control of pollution generated by sources from the different areas are of operational type.

### 4.2.1 Actions for pollution control

The actions for control of pollution from sources in various areas, during the construction period, are presented further on.

#### 4.2.1.1 Actions entailing design requirements
- Use of a modern concrete and mortar batch plant, provided with indoor batching and mixing facilities;
- Use of electrical generators provided with nonselective catalytic reduction systems and stacks;
- The crusher for aggregate will be provided with a dry fog system for dust control;
- The cement and lime silos will be provided with 99.9% efficient bag filters, for particles collecting and control.

#### 4.2.1.2 Operational actions
- Use of mobile equipment and vehicles provided with low fuel consuming engines and with systems for emission abatement;
- Washing of equipment and vehicle wheels on exiting the main plant;
- Use of tarpaulins on haul vehicles transporting earth and aggregates;
- Permanent cleaning of access and plant site roads, and of working platforms;
- Dust control programme for unsealed road surface in dry seasons via water spray trucks and use of inert dust suppression chemicals;
- Water spraying of aggregate and earth;
4.2.2 Management actions

The facilities and equipment for air pollution control will be managed such as to maintain them in proper running order.

4.2.2.1 Management responsibility

Construction works will be carried out by a general entrepreneur, but the responsibility for implementing and improving the Air Quality Management Plan is of the general manager of RMGC, including those aspects concerning the air quality monitoring. In accordance with the Air Quality Monitoring Plan (Chapter 6 of EIA), the monitoring network and program will be implemented as early as the construction period or, to the extent possible, even before this period. The monitoring network and program will be the same during all three Project phases.

4.2.2.2 Management actions taken by the general entrepreneur of construction works

- Assuming the provisions of the Air Quality Management Plan for the construction period, as a minimum set of requirements concerning the air quality and the compliance with applicable regulations. The general entrepreneur is responsible for complying with the legal standards.

- Creation of a group and appointment of a group leader within the Department for Environmental Protection, assigned with responsibilities concerning the air quality.

- Appropriate operation and maintenance of equipment and facilities for air pollution control; periodic revision of their effectiveness and compliance with regulatory requirements. Direct responsibility is of workplace supervisors and equipment operators, wherever such control devices are installed.

- Applying the provisions of the Air Quality Management Plan in all areas where construction activities are carried out. Direct responsibility is of workplace supervisors and operators.

- Response to regulatory changes concerning air quality.

- Reviewing of the Air Quality Management Plan implementation and related reporting. Direct responsibility is of managerial levels above workplace supervisors and of chiefs of the Environmental Protection Department, Health and Safety Department and Air Quality Group.
Facilitating the installation by RMGC of air quality monitoring equipment, protecting the equipment against damaging by own operators. Direct responsibility is of persons appointed by the general manager.

Facilitating the emission inventories updates by RMGC personnel, by providing the required data and ensuring field access. Emission inventories will be developed by specialized personnel of the general contractor, in cooperation with RMGC. Direct responsibility is of persons appointed by the general manager.

Signing of a cooperation agreement with RMGC for air quality monitoring within the Project site, with appropriate provisions concerning the activities to be undertaken and the due responsibilities of each party in order to achieve the objectives of the Air Quality Monitoring Plan during the construction period. The agreement will be made available for environmental protection authorities. The responsibility is of the general managers of the two companies.

Developing work plans for workplace air quality monitoring. The responsibility is of workplace supervisors and of the chief of Health and Safety Department.

Development of detailed emission monitoring programs. Direct responsibility is of the chief of the Environmental Protection Department and of the chief of Air Quality Group. The development of programs will be done in cooperation with competent authorities for environmental protection.

Development of internal reports concerning sources and emissions of pollutants, with highlighting of special situations. The chief of the Environmental Protection Department and the chief of the Air Quality Group are directly responsible for these reports.

Development of periodic reports concerning pollutant emissions and air quality. Direct responsibility is of the chief of Environmental Protection Department and of a specially appointed person.

Identification of any non-conformance concerning the regulatory pollutant levels in emissions and environmental air, identifying of internal causes and implementation of immediate remedial measures. The chief of the Environmental Protection Department and the chief of the Air Quality Group are directly responsible for identifying the non-conformances and reporting the causes. The responsibility for response is of the persons in charge with implementing the Air Quality Management Plan.

Informing the competent authority for environmental protection, the local public health authority and other relevant local authorities interested in the air quality and its management plan. Direct responsibility is of the person appointed by the general contractor and of the person in charge with RMGC Public Relations.

 Updating the Air Quality Management Plan in response to the actual situation. Direct responsibility is of operational managers, the chief of the Health and Safety Department and the chief of the Air Quality Group.

### 4.2.2.3 Management actions taken by the RMGC general manager

- **Imposing the provisions of the Air Quality Management Plan concerning the construction phase, as a fundamental condition for the eligibility of the general entrepreneur.**
- **Providing the general entrepreneur with the Air Quality Management Plan for the construction period.**
- **Reviewing the implementation of the provisions contained in the Air Quality Management Plan for the construction phase.**
4.3 Air quality management during the operational period

The activities related to ore mining and processing and which are or may be associated to air pollution sources, will take place in the following areas within Project site:

- Cetate, Cârnic, Orlea and Jig open pit sites;
- Haul roads for ore and waste rocks;
- Processing plant site;
- Tailings management facility;
- Waste rock dumps;
- Low grade ore stockpile;
- Aggregate quarries.

The Air Quality Management Plan includes provisions for controlling the specific pollution of each site and of each significant source. In addition, the Plan contains a series of general actions to ensure its own effectiveness and updating.

4.3.1 Specific actions for each area within Project site

This section presents the areas within the Project site, the related actions which may potentially generate air pollution as well as the measures envisaged for air pollution control.

4.3.1.1 Open pits and haul roads for ores and waste rocks

The open pits will host specific mining activities including: drill hole, blasting, loading of ores and waste rock into vehicles and haulage of these materials.

The main pollutant is represented by particulates, accompanied by NO\textsubscript{x}, SO\textsubscript{2}, CO generated by blasting and by exhaust gases from mobile equipment and vehicles.

The sources having the highest potential to generate suspended particulates are those related to blasting activities and to ore and waste rocks hauling.

The sources related to open pits and haul roads are surface and linear ones, which by their nature hinder the mechanical catchment of pollutants and their control by means of treatment equipment.

The abatement measures which can be implemented are operational measures, specific to these categories of sources.
**Actions envisaged by RMGC for air pollution control:**

- The use of a new blasting technology. Thus, the blasting will be carried out sequentially along bench faces, leading to a lower upraise of the pollutant plume in comparison with the classic technology. By implementation of this new technology, the particulates emissions will have a substantially lower upraise, with the majority of the dust settling within the blasting area. This will result in diminishing the quantity of particulates carried by air currents. The access of employees to the blasting area will be allowed only after settling of generated particulates, to avoid the risk of exposures to high workplace pollution levels.

- Cessation of dust-generating activities in very high-wind situations or when automatic PM₁₀ monitor placed in Roșia Montană Protected Area indicates an alert situation.

- Implementing the dust control programme for unsealed road surface in dry seasons via water spray trucks and use of inert dust suppression chemicals.

- Minimizing the drop height in material handling/placement.

- The use of mobile handling equipment and haul vehicles, provided with low fuel consuming engines and with emission abatement systems.

- Establishment and enforcement of vehicle speed limits.

- The use of low-sulphur diesel fuel.

- Implementing schedules for periodic routine maintenance of vehicle, motorized equipment, and crushers.

- Air quality monitoring (according to the Air Quality Monitoring Plan).

- Implementation of additional measures for pollutant emission control in case of noncompliances related to air quality. Such measures may consist of water spraying of ore and waste rocks during loading into vehicles.

**4.3.1.2 Process plant site**

Within the process plant site, a multitude of activities specific to ore processing, gold and silver recovery, mercury recovery, and casting of metals into ingots, will take place. The main pollutant is represented by particulates and exhaust gases from mobile equipment and vehicles.

The details concerning the activities and processes are presented in the Technical Memorandum and in the EIA study. The details concerning the air pollution sources are presented in Chapter 4.2 of the EIA study.

Based on the pollution control measures, the following two categories of sources will exist in the processing plant:

- Sources which allow the pollutant emission control and the air pollution control by means equipment for catchment impure air/gases, in order to improve workplace related quality and emission parameters, and/or equipment for emission abatement.

- Sources of emission which can controlled only by means of operational methods.

Therefore, the actions envisaged for the control of pollution generated by sources within the processing plant refer both to design and operational requirements.

**Actions entailing design requirements:**

- Providing the area of ore unloading from haul trucks or from front loader into the crusher with an emission control system (dry fog system) with an efficiency of 96 %.

- Providing the crusher with an emission control system (dry fog system) with an efficiency of 96 %
The belt conveyors for crushed ore will be encased. The areas of ore discharge from the two belt conveyors are fitted with emission control systems (dry fog system) with an efficiency of 96%.

The belt conveyor for transfer of crushed ore from stockpile will be encased. The underground tunnel fitted with a system for evacuation of unpurified air, at a flow rate of 13000 Nm³/h. Evacuation of air will be done through a 0.8 metres diameter stack, at 5 m above ground. The area of the three feeders will be fitted with dry fog systems (96% efficiency) for particulate emission control.

The grinding circuit will be placed indoors. The mills are encased, and the discharged ore will be sprayed with a weak cyanide solution. The two secondary crushers will be fitted with emission control systems (dry fog dust suppression – 96 % efficiency) and local installations for collecting of polluted air, each with an air flow rate of 12,000 Nm³/h exhausted through 0.8 metres diameter stacks, at 8 metres above the ground.

In the leaching tanks and clarifier (located outdoors) will be maintained a highly alkaline (pH 10.5 or higher) environment which will significantly limit the formation and release of HCN into the atmosphere. Redundant pH monitors, process set points, and HCN alarms will be installed to ensure that plant operators have the means of maintaining high pH levels.

The use of LPG fuel at the elution column heaters and at the thermal plant. The heaters will be fitted with separate stacks (30 m high and internal top diameter of 1.0 m). The thermal plant will be fitted with stack (30 m high and internal top diameter of 1.0 m).

Providing a wet scrubber (90 % efficiency, flow rate of 46,280 Nm³/h, stack with 1.4 m internal diameter, and 15 m high) as control system for emission from: carbon reactivation kilns, electro-wining cells, mercury retort, slag crusher and pulveriser.

Providing a wet scrubber (95 % efficiency, flow rate of 11,000 Nm³/h, stack with 0.6 m internal diameter, and 12 m high) as control system for emission from smelting furnaces.

The two lime silos will be fitted with emission control systems (bag house, 90 % efficiency).

The lime slaking mill will be fitted with a local collecting installation for pollutants, air flow rate 5,000 Nm³/h, connected to a wet scrubber, 90 % efficient. Evacuation of treated air will be done through a stack with 0.4 metres internal top diameter, at 8 m above the ground.

The copper sulphate mix tank and the sodium metabisulphite storage tank will be fitted with local collecting-evacuation system for pollutants, at an airflow rate of 1,000 Nm³/h.

Gasoline tanks and delivery pumps associated will be provided with fuel vapour recovery systems.

The use of an electrical generator provided with nonselective catalytic reduction systems and stack.

Operational actions:

- Permanent cleaning and water spraying of the platforms and access roads;
- The ROM ore stockpile will employ mobile equipment fitted with low fuel consuming engines and emission abatement systems;
- Water spraying of ore in cases of high wind velocities and prolonged dry periods;
- Implementation of a periodic maintenance programme for all equipment, installations, emission control systems, vehicles.
- Periodic monitoring of pollutant emissions from ducted sources, on the basis of a program developed in cooperation with the competent authority for environmental protection;
- Air quality monitoring in accordance with the Air Quality Monitoring Plan (Chapter 6 of the EIA report).

### 4.3.1.3 Tailings management facility

Two types of activities will be carried out within the tailings management facility, during the operational phase:

- Deposition of tailings
- Progressive dam raisings activities

The main pollutant is represented by particulates accompanied by exhaust gases generated by mobile equipment and vehicles.

The actions for pollution control which may result from the tailings deposition activities reflect both design and operational requirements.

#### Actions entailing design requirements:

- Tailings deposition will be carried out such as to ensure a permanent humidity of the deposit, in order to eliminate wind erosion effects on dried surfaces and related particulate emissions. This measure will eliminate particulate emissions on the surface of the tailings management facility.
- The tailings will contain very low concentrations of cyanide, thus determining very low potential concentration of HCN.

#### Operational actions:

- Monitoring the facility in order to prevent dried surfaces from occurring during high temperature and dry periods or in the case of failure of tailings delivery systems;
- Damping of dried surfaces and remediation of tailings delivery systems.

**Pollution control actions** which may result from progressive raising of the dam are operational actions and consist of:

- Permanent maintenance, cleaning and water spraying of haul roads and working platforms during dry periods;
- The use of mobile handling equipment and haul vehicles, provided with low fuel consuming engines and with emission abatement systems.
- Implementation of additional measures for pollutant emission control in case of non-compliances related to air quality. Such measures may consist of water spraying of waste rocks during loading into vehicles;
- Rehabilitation of construction areas, re-establishment of topsoil cover and revegetation.

### 4.3.1.4 Waste rock dumps sites

Waste rocks will be deposited in two stockpiles: Cetate and Cârnic.

The activities which will be carried out on these sites and which will generate atmospheric pollutant emissions are:

- Unloading of rocks from vehicles;
- Stockpile grading.
- An additional emission source is represented by wind erosion on working platforms and on stockpile surfaces.
The main pollutant is represented by particulates and by exhaust gases generated by mobile equipment and vehicles. By their nature, the air pollution sources in the waste rock dumps areas do not allow mechanical catchment and control of pollutants by means of treatment equipment. The measures envisaged for emission abatement are operational measures, specific for these sources.

**The actions** envisaged by RMGC for air pollution control, are the following:

- Cleaning and water spraying of working platforms during dry periods;
- The use of mobile handling equipment and haul vehicles, provided with low fuel consuming engines and with emission abatement systems;
- The activities will be restricted to the working platforms in order to avoid the disturbance of additional areas which could generate particulate emissions through wind erosion.

### 4.3.1.5 Low-grade ore stockpile

The potentially polluting activities related to the low-grade stockpile will be the following:

- Unloading of vehicles and stockpile grading, during the first 14 years of operation;
- Loading of ore into vehicles and hauling to the Processing plant;
- An additional emission source will be represented by wind erosion of the platform and stockpile surfaces.

The main pollutant is represented by particulates, and subordinately by exhaust gases from mobile equipment and vehicles. By their nature, the air pollution sources related to the low-grade ore stockpile do not allow mechanical trapping of pollutants and their control by means of treatment equipment. The measures envisaged for emission abatement are operational measures, specific for these categories of sources.

**Actions envisaged by RMGC for air pollution control:**

- Cleaning and water spraying of the working platform during dry periods;
- The use of mobile handling equipment and haul vehicles, provided with low fuel consuming engines and with emission abatement systems;
- The activities will be restricted to the stockpile platforms in order to avoid the disturbance of additional areas which could generate particulate emissions through wind erosion.

### 4.3.1.6 Aggregate quarries

The activities which will generate air pollution sources are the following:

- Mining of aggregates by blasting and/or excavation;
- Crushing, classification and storage of aggregates (Pig Valley Quarry).

The main pollutant is represented by particulates, and subordinately by exhaust gases from mobile equipment and vehicles.

**Actions envisaged by RMGC for air pollution control:**

- The use a dry fog system to control the dust emission from the crucher;
- The use of an electrical generator provided with nonselective catalytic reduction systems and stack;
- Cleaning and water spraying of working platforms and hauling roads during dry periods;
- Water spraying of aggregates during dry periods;
- The use of mobile handling equipment and haul vehicles, provided with low fuel consuming engines and with emission abatement systems;
- The activities will be restricted to the aggregate quarries in order to avoid the disturbance of additional areas which could generate particulate emissions through wind erosion;
- Implementing the dust control programme for unsealed road surface in dry seasons via water spray trucks and use of inert dust suppression chemicals.
- Minimizing the drop heigh in material handling/placement.
- Establishment and enforcement of vehicle speed limits.
- The use of low-sulphur diesel fuel.
- Implementing schedules for periodic routine maintenance of vehicle, motorized equipment, and crushers.
- Implementation of additional measures for pollutant emission control in case of noncompliances related to air quality. Such measures may consist of water spraying of aggregates during loading into vehicles.

4.4 Air quality management during the decommissioning/closure period

The specific activities of the closure/rehabilitation period and which are or may be related to air pollution sources are represented mainly by earth, aggregate and rock handling.

The most important works which will represent sources of atmospheric pollutants are:
- Stabilization of waste rock stockpiles by regrading of slopes;
- Covering the waste rock dumps, the tailings management facility the dams and the formerly operational areas with topsoil. This activity involves filling operations (hauling, unloading, grading and compacting).

The main pollutant is represented by dust, and subordinately by pollutants contained in the exhaust gases generated by mobile equipment and haul vehicles. In their great majority, the air pollution sources that are specific to the closure/rehabilitation phase are unducted, open, ground, surface or linear sources which by their nature, do not allow mechanical capture or control of pollutants by means of treatment equipment. The emission abatement measures which will be implemented are operational measures, specific to each category of sources.

4.4.1 Actions for air quality management

The actions are valid for all areas undergoing closure/rehabilitation works, and consist of:
- Use of mobile equipment and vehicles provided with low fuel consuming engines and with systems for emission abatement;
- Washing of equipment and vehicle wheels on exiting the main plant;
- Use of tarpaulins on haul vehicles transporting earth and aggregates;
- Permanent cleaning of access and plant site roads, and of working platforms;
- Dust control programme for unsealed road surface in dry seasons via water spray trucks and use of inert dust suppression chemicals;
- Water spraying of aggregate and earth;
- Minimizing the drop high in material handling/placement;
- Establishment and enforcement of vehicle speed limits;
Cessation of dust-generating activities in very high-wind situations or when automatic PM10 monitor placed in Roșia Montană Protected Area indicates an alert situation;

- Periodic routine vehicle/equipment maintenance;
- Use of low-sulphur diesel fuel;
- Avoiding spillage in fuelling operations;
- Avoiding to the extent possible, heavy haul vehicles traffic inside localities;
- Strict delimitation of working areas around building sites, with appropriate warning signs restricting any overstepping of site boundaries, in order to avoid affecting other areas which could be exposed to wind erosion.

- Rehabilitation of disturbed areas around built sites, immediately after completion of construction activities.
- Monitoring of air quality, in accordance with the Air Quality Monitoring Plan.

### 4.4.2 Managerial responsibility

The Project's general manager will have the responsibility to implement, verify and update the provisions of this Air Quality Management Plan, during the closure/rehabilitation period.

**Managerial actions:**

- Implementation of Air Quality Management Plan in all areas undergoing closure/rehabilitation; responsibility is of workplace supervisors and equipment operators;

- Verification of Air Quality Management Plan implementation and elaboration of related reports; direct responsibility is of chiefs of the Environmental Protection Department and Air Quality Group;

- Maintenance and operation of equipment and sites used during the operational period for monitoring air quality and meteorological parameter; the responsibility is of the chief of the Environmental Protection Department.

- Monitoring of air quality according to the Air Quality Monitoring Plan.

- Updating the monitoring requirements concerning emissions and air quality, in response to regulatory requirements; direct responsibility is of the chief of the Environmental Protection Department and of the chief of Air Quality Group.

- Updating of the data base for air quality; direct responsibility is of the chief of the Environmental Protection Department and of the chief of Air Quality Group.

- Elaboration of internal reports regarding inventories of pollutant sources and emissions and highlighting special situations; direct responsibility is of the chief of the Environmental Protection Department and of the chief of Air Quality Group.

- Elaboration of periodic reports regarding pollutant emissions and air quality; direct responsibility is of the chief of the Environmental Protection Department and of a person specially appointed for this purpose.

- Identification of any noncompliance with regulatory provisions concerning the concentration of pollutants in emissions and ambient air, identification of internal causes and implementation of immediate remediation measures. The chief of the Environmental Protection Department and the chief of the Air Quality Group are directly responsible for identifying the noncompliances and reporting the causes. The responsibility for response is of the persons in charge with implementing the Air Quality Management Plan.

- Informing the public, the competent authority for environmental protection, the local public administration and health authorities and other relevant local authorities.
interested in the air quality and its management plan. Direct responsibility is of the person in charge with RMGC Public Relations.

- Updating of the Air Quality Management Plan in response to the actual situation. Direct responsibility is of the chief of the Health and Safety Department, the chief of the Environmental Protection Department and the chief of the Air Quality Group.

Transferring the monitoring equipment for air quality and meteorological data to the competent authority for environmental protection or to the local public administration, on completion of rehabilitation works. The direct responsibility is of the person appointed by the general manager.

4.5 Actions of general character

The sources of air pollution present in the Project site will generate a certain impact on the air quality in the surrounding localities and surrounding areas.

As mentioned before, the Air Quality Management Plan has the fundamental objective to protect health of human receptors, as well as the health and status of biological and non-biological receptors in the environment.

The actions of general character address both the review of the effectiveness of adopted technical solutions and operational measures for pollutant emission control, and the updating of the Air Quality Management Plan, in order to maintain the pollution levels below the regulatory limits and to verify the compliance with the applicable regulations.

These actions involve two important categories of components referring to: monitoring and reporting of results, and the organizational structure. Although the monitoring and reporting actions were partially presented in previous sections, they will be briefly reiterated in this section, too. Given the multitude of sources, the high variability of emission parameters, the large area of source dissemination and the scale of activities, the air monitoring activities will be particularly ample.

4.5.1 Monitoring and reporting actions

- Periodic monitoring of pollutant emissions from stationary ducted sources, including the verification of the effectiveness of emission sources control (Air Quality Monitoring Plan, Chapter 6 of EIA);

- Continuous monitoring of air quality and meteorological parameters (Air Quality Monitoring Plan, Chapter 6 of EIA), in order to create the possibility of assessing the contribution of Project related pollution sources;

- Monitoring of all production activities and of the implementation of the Air Quality Management Plan, in order to evaluate the emissions, especially those from unducted sources (which are the major sources), to identify new sources and to correlate them with the measurements concerning air quality;

- Periodic develop and update of emission inventories for all sources from all areas;

- Correlation of emission, meteorological, and air quality data on the basis of specific dispersion models, in order to assess correctly the Project’s impact on local air quality and to update the Air Quality Management Plan;

- Calibration of dispersion models on the basis of air quality data measured in order to ensure the accuracy of the assessments;

- Periodic prediction of air pollution levels on the basis of updated emission inventories and meteorological data;

- Mathematical modeling of concentration fields on the basis of local meteorological data measured for different emergency situations, and comparing with the measured real situations, in order to update the emergency response plans;
4.5.2 Organizational actions

- Creation of a central laboratory for air quality within the plant site. The laboratory will be provided with the necessary equipment for application of the Air Quality Monitoring Plan;
- Formation of a specialized group for air quality, within the Environmental Protection Department, and appointment of a chief of this group;
- Creation of supporting facilities for the air quality monitoring network and for the implementation of the Air Quality Monitoring Plan.

4.5.3 Management actions

Managerial responsibility

The Air Quality Management Plan addresses the whole Project site and the surrounding areas. Therefore, the Project's general manager will have also the responsibility to implement, verify and update this Plan. The General Manager of RMGC will appoint the responsible for drafting and implementation of short-term and long-term intervention procedures, should any noncompliance with the legal limit values occur. Short-term and long-term intervention will consist of holding-up Cârnic and/or Jig operations when the wind direction is oriented from one of the open pits to the Protected area, and the PM$_{10}$ concentrations maintain for three consecutive hours at 150 µg/m$^3$. All activities in the given open pit (including haulage of ore and waste rocks) will be stopped until the situation gets back to normal in terms of air quality.

Managerial actions:

- Appropriate operation and maintenance of air pollution control equipment and facilities, periodic verification of their effectiveness and compliance with regulatory requirements; direct responsibility is of workplace supervisors and production equipment operators, wherever such facilities and equipment are installed.
- Implementation of Air Quality Management Plan in all active areas; responsibility is of workplace supervisors and production equipment operators.
- Verification of Air Quality Management Plan implementation and elaboration of related reports; direct responsibility is of the person in the management level above the workplace supervisors and of chiefs of the Environmental Protection Department and Air Quality Group;
- Elaboration of detailed programs for monitoring emissions; direct responsibility is of the chief of Environmental Protection Department and of the chief of the Air Quality Group. The programs will be elaborated in cooperation with representatives of the competent authority for environmental protection.
- Detailed selection of sites for the installation of monitoring equipment for air quality and meteorological parameters; direct responsibility is of the chief of the
Environmental Protection Department. Selection of sites will be carried out together with representatives of the competent authorities for environmental protection and a specialized consultant.

- Training of personnel from the Air Quality Group, Environmental Protection Department on all matters concerning the Air Quality Monitoring Plan (equipment installation and operation, creation of a data base, data acquisition and processing, elaboration of emission inventories, application of mathematical modeling, report writing, etc.). Direct responsibility is of the processing plant manager (the central laboratory for air quality will be in operation at the plant site). Training will be sustained by relevant experts and consultants.

- Appropriate installation and operation of the equipment for air quality and meteorological data monitoring; direct responsibility is of the chief of the Environmental Protection Department and of the chief of Air Quality Group.

- Updating the monitoring requirements concerning emissions and air quality, in response to regulatory requirements; direct responsibility is of the chief of the Environmental Protection Department and of the chief of Air Quality Group.

- Acquisition of a software application for modeling the specific dispersion with regard to the local topography, agreed by the central authority for environmental protection; direct responsibility is of the chief of the Environmental Protection Department and of the chief of Air Quality Group. The decision concerning the acquisition will be taken based on consultation with relevant experts.

- Acquisition of equipment for air quality monitoring, based on the reference methods provided by the applicable law; direct responsibility is of the chief of the Environmental Protection Department and of the chief of Air Quality Group. The choice of technical specifications will be done based on consultation with relevant experts.

- Creation of an own air quality data base; direct responsibility is of the chief of the Environmental Protection Department and of the chief of Air Quality Group.

- Elaboration of reports regarding inventories of pollutant sources and emissions and highlighting special situations; direct responsibility is of the chief of the Environmental Protection Department and of the chief of Air Quality Group.

- Elaboration of periodic reports regarding pollutant emissions and air quality; direct responsibility is of the chief of the Environmental Protection Department and of a person specially appointed for this purpose.

- Identification of any non-conformance with regulatory provisions concerning the concentration of pollutants in emissions and ambient air, identification of internal causes and implementation of immediate remediation measures. The chief of the Environmental Protection Department and the chief of the Air Quality Group are directly responsible for identifying the noncompliances and reporting the causes. The responsibility for response is of the persons in charge with implementing the Air Quality and Noise Management Plan.

- Warning of responsibilities appointed by the RMGC General Manager for implementing the short-term intervention measures for emergency situations related to air quality; direct responsibility is of the chief of the Environmental Protection Department and of a person specially appointed for this purpose.

- Informing the competent authority for environmental protection, the local public administration and health authorities and other relevant local authorities interested in the air quality and its management plan. Direct responsibility is of the person in charge with RMGC Public Relations.
Updating of the *Air Quality Management Plan* in response to the actual situation, assessed by means of measurements and modeling. Direct responsibility is of the chief of the Environmental Protection Department and the chief of the Air Quality Group.
5 References

EXTERNAL REFERENCES

None; see current RMGC Regulatory Requirements Register for listing of currently applicable regulations.

RMGC ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM REFERENCES

Roșia Montană Project Environmental Impact Assessment (ESG Stantec et al., 2005)
Roșia Montană Project Environmental and Social Monitoring Plan
Public Consultation and Disclosure Plan
RMGC Occupational Health and Safety Plan
RMGC Standard Operating Procedures Manual

- AQ-01, “Operation, Maintenance, and Calibration of the Total Solid Particulates (TSP) Sampler”;
- AQ-02, “Operation, Maintenance, and Calibration of the PM₁₀ Sampler”;
- AQ-03, “Operation, Maintenance, and Calibration of the NO – NOx Automatic Analyser”;
- AQ-05, “Operation, Maintenance, and Calibration of the Meteorological Station”;
- AQ-06, “TSP Metals Sampling and Analysis”;
- AQ-07, “Operation and Maintenance of the Wet/Dry Deposition Monitor”;
- AQ-08, “Air Quality Data Validation”;
- AQ-09, “Dust Suppression Programme”;
- MP-02, “Identification of Legal and Regulatory Requirements”;
- MP-03, “Environmental and Social Management System Training”;
- MP-06, “Preparation of Standard Operating Procedures”;
- MP-10, “Corrective and Preventive Action for Environmental and Social Action Program Non-conformances”;
- MP-11, “Management of Environmental and Social Management System Records”

Note: all documents listed are controlled documents per Section 4.5 of the Roșia Montană Project Environmental and Social Management Plan; current approved versions shall be assumed to apply in all cases.