1. Introduction

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1 Introduction

The Project is located near the village of Roşia Montană in Albă County, about 50 km northwest of the regional capital, Albă Iulia, and 65 km north and east of the city of Deva in west-central Romania (Exhibit 1.1 Project Location in Romania). The project location is within the Roşia Montană mining district immediately northeast of the town of Abrud. The Project is in a region known as the Golden Quadrilateral in the Metaliferi Mountains, which belongs to a larger, regional mountain unit, called the Apuseni Mountains of Transylvania (Exhibit 1.2 Project Regional Setting). The Golden Quadrilateral has been documented as an important gold producing region in Europe dating back 2,000 years.
The site is situated within the 2,388 ha Roşia Montană exploitation license (Number 47/1999) granted to S.C. Rosia Montana Gold Corporation S.A. (RMGC) (The licence agreement was concluded on 21 December, 1998 and published in the official gazette on 10 June, 1999), and is one of two mineral licences maintained by the company in the region (Exhibit 1.3 RMGC Exploitation License). The Roşia Montană exploitation licence gives the right to develop and mine economic grade gold and silver ore to create dore based on the mining parameters specified in the licence agreement.

The existing mine, currently operated by RoşiaMin ,is a small-scale open pit mining operation owned via a subsidiary of the State-owned mining company Minvest.The RoşiaMin mineral processing plant and associated facilities fall outside the current Roşia Montana exploitation license. Pre-existing environmental impacts and future liability pertaining to Minvest and its subsidiary operation Rosia Min, that are located within the exploitation license footprint # 47/1999, remains with the originator and does not form part of the proposed Rosia Montana Project that RMGC is currently seeking formal regulatory approval to develop, operate and ultimately close. The proposed project will replace the existing mine with a large scale modern mining facility comprised of four distinct pits and an advanced gold recovery plant capable of setting new operational compliance standards for the Romanian mining industry.

Project related development work was initiated in 1997 with site-based exploration activities. Upon confirmation of economic grade potential, a pre-feasibility layout review confirmed that consolidating the underground workings into an open pit mine plan would be a feasible project. A decision was then made to proceed to the permitting phase. Design changes based upon feedback from stakeholders, the public and private actors have been incorporated in the proposed project design that is presented in this EIA and is the subject of an application for formal governmental approval to proceed to the operations phase. During the public review process, development will continue through permitting and approval activities, followed by construction and commissioning activities culminating in the operations phase.

A timetable for the development of the project is shown in Exhibit 1.4. Operations will be continuous over 16 years based on the ore reserves upon which this proposed development is based. The operational period may be extended as a result of further exploration, incorporating any new reserves into an economic mine plan. The Project will comprise at least 25 years of activity incorporating the mine closure phase with subsequent monitoring and physical and chemical stability inspection work.
The proposed development comprises activities that go well beyond those associated with the mine and gold recovery plant because it also includes the following:

- Mitigation of environmental impacts related to centuries of ancient-historical and current mining activities;
- Cultural heritage baseline programs (archaeological surveys, assessments, rescue archaeological excavation, cataloguing and preservation of artefacts including *in situ* conservation of important archaeological structures);

- Assistance with the closing of the current government subsidized mining operation (RoşiaMin); and,
- Resettlement of persons and facilities in impacted areas and the social support activities related to this.

The legacy of centuries of underground mine development, the first of which pre-date the Roman period, combined with the more recent surface mining, resulted in an area of haphazard and uncontrolled waste rock disposal, open underground mine workings, active and abandoned tailings disposal sites and the accumulation of extensive acid rock drainage (ARD). Contaminated streams and land close to existing settlements characterize the site area. Heavy metal contaminants and acidic water toxicity concentrations currently exceed Romanian and international norms and has led to extensive contamination of the local rivers and watercourses. These watercourses comprise a portion of the Aries watershed and the tributary headwaters that form a part of the hydrographic Danube Basin.
The existing contamination will remain untreated without the development of the Roşia Montană project, unless an alternative plan is developed in the future. The Project includes in its scope the facilities required to mitigate these impacts through the systematic interception, containment and treatment of contaminated watercourses and waters and the isolation and later recovery of many of the waste rock piles within the project boundary. The project has been planned and is being designed to international standards and will employ Best Available Techniques (BAT) and internationally proven management practices for safe operation and environmental protection as well as to meet the objectives of minimizing the potential environmental impact of the project and improving existing environmental conditions.

Romania's mining industry has seriously declined in recent years and is still undergoing a significant downsizing and restructuring process. In 1977, Romania had over 185,000 mining employees; today there are less than 65,000. Most mines are unprofitable and further restructuring is anticipated.

The existing RoşiaMin mine is subsidized by the central government. The progressive closure of this operation has already resulted in the loss of more than 800 jobs; the planned additional loss of 500 more jobs will have a significant social, environmental and economic impact on Roşia Montană and Abrud and the surrounding communities. Another local mining operation, the Roşia Poieni open pit copper-gold mine operated by "Cupromin," situated in a nearby valley approximately 4 kilometres north-east of the proposed Roşia Montana project, is also reported as being slated for closure in the near future. The closure of the two mines will have a serious negative impact on the economic vitality of the entire region.
The Project proposed by RMGC, when undertaken in co-operation with Minvest, the Government of Romania, and local communities, will have the effect of addressing and partially mitigating some of these impacts. The Project is a large investment in Romania and its successful implementation is expected to encourage other foreign investments in natural resource projects to the region.

It should be recognised that, unlike many other industrial facilities whose designs remain fixed, mining projects, by their nature, are dynamic and will continue to evolve so as to react appropriately to environmental circumstances. RMGC will therefore institutionalize a process of continual improvement by applying an Environmental and Social Management System (ESMS), to ensure that the project design and operations, and supporting management plans and procedures, are also dynamic and adaptable toward improved compliance through the life of the project.

1.1 Project Sponsor

The Roşia Montană Project is owned and managed by RMGC. Gabriel Resources (the principal shareholder in RMGC) started exploration work in May 1995 with a drilling programme on the non-active RoşiaMin tailings dam in Gura Rosiei (Grid Reference 350278E, 535114N) to the south of the current ore processing plant at Gura Rosiei, along the Abrud Valley and parallel with the Abrud-Campeni Road. At that time, a heads of agreement was signed between Gabriel Resources Ltd and Regia Autonoma a Cuprului Deva (now Minvest) will also allow for the evaluation of and possible re-treatment of existing tailings.

In 1997, a joint venture between Regia Autonoma a Cuprului Deva, (later Minvest) (19.31%), Gabriel Resources Limited (Canada) (80%), and three minority shareholders (Cartel Bau S.A. (?), Foricon S.A. and Comat S.A., each with 0.23%) formed a new company, named S.C. Eurogold Resources S.A. (Eurogold). Eurogold was registered in August 1997 for the purpose of performing all types of exploration and development activities in the region. In 1999, Eurogold changed its name to S.C. Roşia Montană Gold Corporation S.A. (RMGC). An Exploitation Concession Licence was granted, in accordance with the Mining Law No. 61/1998, by the National Agency for Mineral Resources (NAMR) to Minvest (the titleholder) and RMGC (as an affiliated company) in December 1998 and the licence came into force in June 1999. In October 2000, the licence was transferred from Minvest to RMGC, with Minvest as an affiliated titleholder as per the terms of the joint venture agreement. As such, Minvest was entitled to continue its current small-scale RoşiaMin mining operations at Roşia Montană, while RMGC conducted exploration and preliminary development related activities. Until such time as RMGC makes a production decision in relation to the Roşia Montană Project, Minvest manages all current mining operations at RoşiaMin, unless a decision is made to cease operations before that time. All environmental liabilities related to the previous mining and processing activities, including the upcoming closure of the RoşiaMin operations, remain the responsibility of Minvest irrespective of any change in its operational status.

RMGC is carrying out and funding all exploration and development activities associated with the new Project. To operate the new facility under the licence, an amendment to the exploitation licence is necessary. The licence will be issued by NAMR, and RMGC aims to finalize the amendment application once the EIA is approved. The licence has an initial term of 20 years and is renewable for successive 5-year periods.

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3 Name and Description of the Project and its Stages

A summary of the principal features of the Project is in Table 1-1, Key Project Data.

Table 1-1. Key Project Data

Item	Description
Project Setting	• Located in Roşia Montana, Albă County, central west Romania; 50 km from Albă Iulia • A historic mining district located within a small-scale subsistence farming community in Transylvania • Mountainous terrain and narrow valleys • Continental temperate climate; temperatures from -22.5°C (Dec-Feb) to 28.7°C (Aug) • Cold winters, significant snowfall accumulation during the winter months • Annual precipitation: 600 mm to 883 mm
Existing Infrastructure	• National highways (sealed roads) to nearby major commercial and residential areas; and within 2-3 hours of airports with international service • Power: available from national grid • Water: available from the Aries River, 10 km from Roşia Montana, most of the local inhabitants rely on seeps and springs rather than piped and treated drinking water. • Sewage: most of the region does not rely on active treatment systems. • Fire Service: None • Hospital: First Aid Locally Available • Urban Core: Urban zone is in decline; buildings are in various states of function and repair.
Mine Operations	• Four open-pits: Cetate, Cârnic, Orlea and Jig • Mineable reserves 215 Mt ore, 1.46 g/t Au and 6.9 g/t Ag recovered metal production: 247.0t (7.9 M oz) Au and 898.5t (28.9 M oz) Ag • Annual ore production: between 7.3 and 15.4 Mt • Life of mine strip ratio: 1.2:1 • Conventional drill and blast - load and haul operations • 19.5 m3 hydraulic shovels and 150 t haul trucks
Ore Processing	• Duration of ore processing activity: approximately 16 years • Single stage crushing of run-of-mine ore using a gyratory crusher • Wet grinding in one SAG mill and two ball mills • Cyanide leaching of the ground ore using the conventional Carbon-in-Leach (CIL) process • Elution process to transfer precious metals into a pregnant solution while collecting carbon for reactivation • Electro-winning of precious metals from the solution and smelting to produce doré bullion • Thickening of the tailings and recycling of most of the process water • Detoxification of the cyanide in the tailings and disposal of tailings to the Tailings Management Facility

Item	Description
Process Infrastructure	• TMF with a downstream secondary containment dam • Reclaim system to pump decant water from the TMF back to the process plant • Water management dams to collect acid rock drainage from ancient mining and from project-related activities. • Wastewater treatment plant for the treat the ARD to meet discharge standards and permit use of the water in the process plant • Metallurgical laboratory • Warehouse and storage facilities • Maintenance and administrative buildings

3.1 Project Description for Pre-Construction Period

The ongoing pre-construction period includes the following:

- Continuous exploration activities throughout the local and regional area;
- Liaison with and support for Minvest in planning for the closure of the current government-subsidized mining operation;
- Identification and planning for the mitigation of the negative environmental impacts resulting from old mining and associated activities;
- Financing activities;
- Obtaining the necessary permits and authorizations to conduct the mining operation;
- Detailed engineering activities; Tendering of engineering, procurement and construction management contract(s);
- Property acquisition and concession agreements for the land required by the project;
- Cultural heritage and cultural property related activities;
- Community relocation and resettlement activities (including construction of housing, commercial, municipal, and county infrastructure);
- Support for regional and local development planning; and,
- Co-ordination with relevant stakeholders.
- Continued stakeholder communication programs including public consultation related to the formal submission of this document.

3.2 Project Description for the Construction Period

It is anticipated that RMGC will appoint a specialist engineering, procurement and construction management contractor (referred to as the “EPCM Contractor”) through a competitive tendering process, to develop and construct the Project. Any EPCM Contractor would be required to follow the legal obligations applicable to the Project and any other relevant commitments made in the context of the Project.

The proposed construction period for the Project’s development is approximately 2 to 3 years. Activities will commence with the establishment of site offices, site construction facilities, and the mobilization of principal contractors. Temporary housing will be required for

around 800 workers during this period. The primary Project activities during this period are as follows:

- Construction of the resettlement infrastructure (housing, churches, commercial premises, municipal and county administrative offices) using Romanian contractors and suppliers to the maximum extent feasible;
- Resettlement and relocation of project affected local residents;
- Preparation of the mining areas (removal and storage of surface soils);
- Development of quarries for construction materials (for roads, concrete production etc);
- Working with Minvest for the re-development and the permanent and temporary closure of the Minvest operations;
- Connection to the national high voltage electrical power network;
- Construction of a water supply pipeline from the Aries River;
- Construction of the access road to the process facilities from the Abrud Valley;
- Construction of the process facilities;
- Construction of a new access road to Roşia Poieni;
- Construction of the tailings management facility, including initial starter dam and secondary containment dams in the Corna Valley;
- Development of the temporary accommodation necessary for the construction workers;
- Construction of infrastructure;
- Construction of other water control containment structures and channels.

The construction phase will involve significant activity and the creation of a range of permanent structures and facilities. At the end of the construction phase, the Project will be commissioned and handed over to the Project management team as an operational business.

3.3 Project Description for Operations

The proposed mining activities at Roşia Montană are planned to extend over a 16-year period, and will consist of conventional open-pit mining techniques including: drilling, blasting, loading by hydraulic shovels, and hauling of ore by haul trucks.
Four open pits (Cetate, Cîrnic, Orlea, and Jig pits) will be mined. The four pits are within a single mine operation, which will feed ore to the on-site processing plant. Mining at Cetate and Cârnic will start simultaneously. By Year 9, mining will be complete at the Carnic pit, while mining at the Cetate site will continue until all the ore reserves are mined. Mining at Orlea and Jig will be initiated in Years 7 and 9 respectively.

During the first six years of operation, a low-grade ore stockpile will be developed, as higher-grade ore is initially and selectively processed. The low-grade ore stockpile will be processed during Years 14 - 16 once mining of the open pits is completed.
The proposed ore preparation and processing systems incorporate the following key elements:

- **Crushing and Stockpiling:** Ore is crushed using a gyratory crusher and then stockpiled;

- **Wet grinding:** Stockpiled ore is further ground by wet grinding;
- **Leaching and Adsorption:** Cyanide is added to the solution of water and ore before passing through a series of tanks, which agitate the solution. The gold and silver is attached to carbon in these tanks during the separation of the gold bearing content in the solution;
- **Electro-winning:** Gold and silver are extracted by passing an electrical current through the solution, which separates the gold and silver from the carbon;
- **Smelting:** The gold and silver is then heated and formed into ingots;
- **Cyanide detoxification:** The extraction of gold and silver involves the addition of water and reagents that includes cyanide in the process solution. Due to high concentrations of cyanide in the process solution which can be dangerous if released to the environment, a majority of cyanide and water will be re-cycled back to the process plant. A cyanide detoxification plant will process the thickened and partly dewatered slurry (tailings) prior to it being pumped to the Tailings Management Facility (TMF);
- **Tailings disposal:** Tailings are sent by pipeline and deposited behind the Tailings Management Facility (TMF) dam in the Corna Valley;
- **Water Reclamation**: Water from the TMF is then re-circulated to the processing plant and re-used to reduce the need for additional fresh water.

From a visual perspective the major project features will be the open pits, the Cetate Waste Rock and Mine Drainage Pond structure and the Tailings Management Facility (TMF) in the Corna Valley. The Cetate Waste Rock and Mine Drainage Pond facility located within the Roşia watershed ensures that contaminated runoff from historic and new mine workings does not enter downstream watercourses. Water pumped from this pond to an on-site water treatment facility will be re-used in the processing plant while any excess water will be released to maintain the Roşia stream watercourse levels. The treated runoff from the historic workings in the Rosia and Corna Valleys will likely result in a significantly improved water quality compared to current baseline conditions, and improvement in the visual aesthetics along these two basins and at the confluence with the Aries River.

The TMF includes a dam wall that will be constructed and raised throughout the life of the mine to accommodate the deposition of tailings arriving from the cyanide detoxification plant. The TMF includes a secondary containment dam to contain the water that is designed to seep from the TMF to allow tailings consolidation and enhance stability. This water will then be pumped back behind the TMF dam for recycle to the process plant.

A project-specific Cyanide Management Plan (the “CMP”) for Roşia Montană was prepared in accordance with the International Cyanide Management Code (the “Code”) for the gold mining industry. The Code was developed under the auspices of the United Nations Environmental Program (UNEP), to assist the global gold mining industry in improving cyanide management, thereby minimizing risks to workers, communities and the environment from the use of cyanide in gold mining, and reducing community concerns about its use.

A “Code” certified transport company will transport cyanide in solid form in specially reinforced and sealed containers to the Project site. These special containers are designed for transferring cyanide directly from the cyanide manufacturing plant to the Roşia Montană process plant without the need for the manual handling or opening of the containers.
As mentioned earlier, a modern cyanide detoxification facility will be incorporated within the process plant for the Project. This technology will reduce cyanide levels in the liquid effluent waste stream from the processing facility to levels well below the maximum level limits

designated as safe under European Union and North American guidelines, before the tailings are released from the process plant to the TMF. This proven technology is successfully used in over 70 international gold mines and continues to replace older technologies. Cyanide levels in the Roşia Montană TMF will be further reduced due to the natural degradation of the substance when exposed to sunlight.

3.4 Project Description for the Closure Phase

The Mine Reclamation and Closure Plan developed for the Project outlines a plan for decommissioning the mining and processing facilities and for mitigating any impacts once the mining and process operations are concluded. As part of the EIA and permitting process, the mine closure process, the schedule and the structure of the financial guarantee will be defined and agreed upon by local stakeholder, national and local regulators and company management. The preparation of a decommissioning and rehabilitation strategy before the development of the Project constitutes an integral part of the process.

This approach to mine planning recognizes that mining, while permanently changing portions of the local surface topography, represents a temporary land use, and that appropriate closure of the operations must accommodate the sustainable use of mineral resources. The principal objective of the closure plan and design process is to ensure that any potential environmental, safety and health impacts associated with the decommissioned mine (and the associated financial and legal liabilities) are identified and quantified at an early stage so that these effects may be minimised as a consequence of actions taken during the planning, design and operational phases of the project.

Objectives for rehabilitation need to comply with regulatory requirements, and be tailored to correspond with site-specific aspects, RMGC policies and best industry practice, which include:

- Protection of public health and welfare;
- Achievement of agreed-upon goals for post closure land use;
- Geotechnical stabilization of mine-related structures (pit slopes, rock stockpiles etc…);
- Reclamation of landscapes to minimise sedimentation, erosion, and potential environmental harm; and,
- Water quality protection.

Based on these goals, the objectives of the Project Mine Rehabilitation and Closure Plan are to:

- Assist management in ensuring the protection of public health and safety during and following the closure of the mine and associated facilities;
- To allow progressive closure activities to commence before production ceases;
- Reduce or eliminate long-term environmental impacts;
- Restore disturbed land to a productive condition as soon as practical;
- Minimise, to the extent possible, sterilisation of any remaining mineral resources;
- Serve as a resource to RMGC for Project-specific budgeting and scheduling of activities; and,
- Provide for dialogue between stakeholders and company representatives related to mine life cycle planning and closure provision

4 Energy Use during Proposed Production

Table 1-2. Energy Resource Consumption Data

Production*		Resources consumed during production		
Name	**Annual average quantity**	**Name**	**Annual average amount**	**Supplier Remove Any Suggested Supplier**
Processed ore	13,400,000t	Processing		
		Gasoline	500 L	
		Fuel Oil (and lubricants)	2,800 tonnes	
		Electricity	410,000 MW	
		Lubricants	29,000 L	
		Mining		
		Gasoline	820,000 L	
		Diesel Fuel	16,458,000 L	
		Electricity	Minimal	
		Lubricants	181,000 L	

* Production on an annual operating basis, assuming the average annual production rate.

5 Raw Materials and Chemical Substances Used

Table 1-3. Information on Raw Materials and Chemical Substances

Material name	Quantity		Classification and substance labelling **		
	Annual average amount	Current stock	Type* H/N	Risk range	Risk phase
Processing					
Activated Carbon***	410 tonnes	0	N	-	R36, R37
Flocculant	510 tonnes	0	N	-	-
Hydrochloric acid (32%) HCl	2,300 tonnes	0	H	Toxic, Dangerous for the environment	R23, R24, R25, R34, R36, R37, R38
Slaked lime (90% CaO)	54,000 tonnes	0	H	Irritant	R22, R36, R38
Sodium Cyanide (NaCN)	12,000 tonnes	0	H	Toxic	R26, R28, R32, R32, R38, R34, R51, R55
Sodium hydroxide (50%) NaOH	2,000 tonnes	0	H	Harmful	R25, R35, R36, R37
Copper Sulphate (CuSO4*5H2O)	860 tonnes	0	H	Harmful, Dangerous for the environment	R22, R36, R38, R50, R53
Sodium Metabisulphite (Na2S2O5)	13,000 tonnes	0	H	-	R22, R38
Fuel Oil***	2,800 tonnes	0		Flammable	R2, R5, R10, R18
Gasoline***	Negligible required	0		Flammable	R2, R5, R10, R18
Mining					
Ammonium Nitrate (NH4NO3)	4,660 tonnes	0	H	Oxidizing, Harmful	R20, R21, R22, R36, R37, R38
Fuel Oil (for ANFO)	518 tonnes	0		Flammable	R2, R5, R10, R18
Fuel Oil***	13,764 tonnes	0		Flammable	R2, R5, R10, R18

*According to the Governmental Emergency Ordinance no. 200/2000 on classification, labelling and packaging of hazardous chemicals and compounds, approved by Law no. 451/2001 and the Governmental Decision no.490/2002 for approval of the methodological Norms for the application of the Governmental Emergency Ordinance no. 200/2000 on classification, labelling and packaging of hazardous chemicals and compounds.
**According to Art. 7 of GEO no.200/2000 on classification, labelling and packaging of hazardous chemicals and compounds, approved by Law no. 451/2001
***According to GD 95/2003, Annex no. 2, Part I, Table no. 1, oil products may be included in the hazardous substance category if they meet the conditions related to relevant quantities under articles 6, 7 and 8.

6 Noise Emissions

Table 1-4. Physical and biological pollutants

Pollution type	Pollution source	Number of pollution sources	Maximum allowed limits	Back-ground values	Calculated pollution and mitigation measures				Mitigation measures
					In operational area	In the protected area	Residential and recreational areas		
							Without mitigation	With mitigation	
Noise pollution									
Year 9									
1	Processing plant activity	4 installations 100% used, transport vehicles	87 dB(A) at working place; 65 dB(A) on site boundaries	40 - 45 dB(A)	65 - 85 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures
2	Tailings dam aggradation activity	One piece of equipment 100% used, transport vehicles	87 dB(A) at working place; 65 dB(A) on site boundaries	40 - 45 dB(A)	60 - 85 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures
3	Cetate waste rock dump	-	-	-	-	-	–	-	-
4	Carnic waste rock dump	One piece of equipment 20% used, transport vehicles	87 dB(A) at working place; 65 dB(A) on site boundaries	40 - 45 dB(A)	60 - 85 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures
5	Cetate open pit activity	3 pieces of equipment 100% used, 4 pieces of equipment 20% used and 2 pieces of equipment 40% used, 6 transport vehicles/hr,	87 dB(A) at working place – site boundary is within project area.	40 - 45 dB(A)	65 - 85 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures
6	Cirnic open pit activity	3 sources 100% used, 4 sources 35% used and 2 sources 70% used, 6 transport vehicles/hr	87 dB(A) at working place; 65 dB(A) on site boundaries	40 - 45 dB(A)	65 - 85 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures
7	Orlea open pit activity	3 sources 100% used, 4 sources 18% used and 2 sources 36% used, 6 transport vehicles/hr	87 dB(A) at working place; 65 dB(A) on site boundaries	40 - 45 dB(A)	65 - 85 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures
8	Jig open pit activity	3 sources 100% used, 4 sources 27% used and 2	87 dB(A) at working place;	40 - 45 dB(A)	65 - 85 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures

		sources 54% used, 6 transport vehicles/hr	65 dB(A) on site boundaries						
YEAR 10									
1	Processing plant activity	4 installations 100% used, transport vehicles	87 dB(A) at working place; 65 dB(A) on site boundaries	40 - 45 dB(A)	65 - 85 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures
2	Tailings dam aggradation activity	One piece of equipment 100% used, transport vehicles	87 dB(A) at working place; 65 dB(A) on site boundaries	40 - 45 dB(A)	60 – 85 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures
3	Cetate waste rock dump	One piece of equipment 45% used, transport vehicles	87 dB(A) at working place; 65 dB(A) on site boundaries	40 - 45 dB(A)	60 - 80 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures
4	Carnic waste rock dump	One piece of equipment 0.06% used, transport vehicles	87 dB(A) at working place; 65 dB(A) on site boundaries	40 - 45 dB(A)	60 - 80 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures
5	Cetate open pit activity	3 pieces of equipment 100% used, 4 pieces of equipment 50% used and 2 pieces of equipment 100% used, 6 transport vehicles/hr	87 dB(A) at working place – site boundary is within project area.	40 - 45 dB(A)	65 - 85 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures
7	Orlea open pit activity	3 sources 100% used, 4 sources 11% used and 2 sources 22% used, 6 transport vehicles/hr	87 dB(A) at working place; 65 dB(A) on site boundaries	40 - 45 dB(A)	65 - 85 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures
8	Jig open pit activity	3 sources 100% used, 4 sources 23% used and 2 sources 46%, 6 transport vehicles/hr	87 dB(A) at working place; 65 dB(A) on site boundaries	40 - 45 dB(A)	65 - 85 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures
YEAR 12									
1	Processing plant activity	4 installations 100% used, transport vehicles	87 dB(A) at working place; 65 dB(A) on site boundaries	40 - 45 dB(A)	65 - 85 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures

2	Tailings dam aggradation activity	One piece of equipment 100% used, transport vehicles	87 dB(A) at working place; 65 dB(A) on site boundaries	40 - 45 dB(A)	60 - 85 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures
3	Cetate waste rock dump	One piece of equipment 11% used, transport vehicles	87 dB(A) at working place; 65 dB(A) on site boundaries	40 - 45 dB(A)	60 - 85 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures
4	Cirnic waste rock dump								
5	Cetate open pit activity	3 pieces of equipment 100% used, 4 pieces of equipment 16% used and 2 pieces of equipment 100% used, 6 transport vehicles/hr	87 dB(A) at working place – site boundary is within project area.	40 - 45 dB(A)	65 - 85 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures
6	Cirnic open pit activity								
7	Orlea open pit activity	3 sources 100% used, 4 sources 84% used and 2 sources 100% used, 6 transport vehicles/hr	87 dB(A) at working place; 65 dB(A) on site boundaries	40 - 45 dB(A)	65 - 85 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures
YEAR 14									
1	Processing plant activity	4 installations 100% used, transport vehicles	87 dB(A) at working place; 65 dB(A) on site boundaries	40 - 45 dB(A)	65 - 85 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures
2	Tailings dam aggradation activity	One piece of equipment 100% used, transport vehicles	87 dB(A) at working place; 65 dB(A) on site boundaries	40 - 45 dB(A)	60 - 85 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures
3	Cetate waste rock dump	One piece of equipment 46% used, transport vehicles	87 dB(A) at working place; 65 dB(A) on site boundaries	40 - 45 dB(A)	60 - 85 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures
4	Cirnic waste rock dump								
5	Cetate open pit activity	6 sources 100% used, 6 pieces of equipment 100% used, 6 transport	87 dB(A) at working place – site boundary is	40 - 45 dB(A)	65 - 85 dB(A)	65 dB(A)	–	Sub 50 dB(A)	Chap. 4, Sect. 4.3 Mitigation measures

		vehicles/hr	within project area.						
6	Cirnic open pit activity								
7	Orlea open pit activity								
8	Jig open pit activity								
Vibration pollution									
	Rock blasting	Up to 4 blasts per week	8.5 mm/s, for 3 blasts/day	–	different values depending on distance and charge	8.5 mm/s, at buffer zone limit	–	8.5 mm/s, at buffer zone limit	Chap. 4, Sect. 4.3 Mitigation measures
Air blast pollution									
	Rock blasting	Up to 4 blasts per week	133 dB (linear)	_	For a charge of 50 kg/blast 113 dB, at 500m distance	Below 113 dB	_	Below 113 dB	Chap. 4, Sect. 4.3 Mitigation measures

7 Description of Main Alternatives

The proposed design of the Roşia Montană Project resulted from numerous evaluations (including scoping studies, pre-feasibility evaluations, feasibility studies, optimisation studies, basic engineering phase studies, and value engineering assessments) conducted by RMGC to assess alternatives and to select the most viable, least risky, and environmentally, socially, and economically sustainable project option. Geographic location, topography, extent of mineralisation, physical and geochemical conditions, land ownership in the project area, environmental conditions or characteristics, stakeholder preferences, and other important factors exist that, independently or in combination, may constrain certain alternatives for each of the project elements discussed in table 1-5.

Table 1-5 provides brief introductory summaries of the alternatives considered in each category and the technical basis for the preference or rejection of each alternative. References to the appropriate sections of the fully detailed analysis of alternative options presented in Chapter 5.0 are provided in the table

Table 1-5. Summary of Alternatives Considered

Alternatives Considered (preference or rejection noted)	Technical Basis for Preference or Rejection
CATEGORY: "NULL" OR "NO ACTION" ALTERNATIVES (see Section 5.1)	
Rejected: Null or no action	Under the "Zero option" for Roşia Montană, i.e., if the RMGC mine development would not take place, substantial environmental remediation works must be carried out, while funding will have to be provided by public sources (WB mine closure project) and/or MINVEST from Romanian state budget. The cost estimates for mine closure activities required at the existing RosiaMin operations in order to achieve an environmental standard comparable to that achieved by the RMGC project can be summed up as 23,2 mil Euro(see Zero Alternative annex to the Chapter 5 Alternatives)
Rejected: Development of alternate industries	Evaluation of a range of options indicates that no potential alternate industry is capable of generating the required investment support, employment opportunities, or the level of revenue necessary to resolve historical environmental issues or create viable socio-economic benefits for the region. The proposed Rosia Montana Project does not preclude the establishment of other industries and in fact would assist overcome some of the disincentives (such as pollution and land dereliction) currently hampering development in other industry sectors.
CATEGORY: DELAYED MINING OPERATIONS ALTERNATIVE (see Section 5.2)	
Rejected: Delay of mining operations pending development of ore processing technologies with reduced environmental risk and potential impacts.	This alternative has the same negative impacts as the null alternative; as noted in Section 5.6, no alternate technology exists that is so well understood that it could be developed and proven to be effective and safe without very lengthy development and testing activities.
CATEGORY: MINE LOCATION ALTERNATIVE (see Section 5.3.1)	
Preferred: Roşia Montana Project site	The proposed Project is defined by careful modelling that considers the location of the ore body and associated project economics, and constitutes the only economically viable alternative within the associated exploration/exploitation license area. The boundaries of the licence area are the result of negotiations with (and endorsement by) local regulatory authorities.
Rejected: All other areas of the concession	See above
CATEGORY: PROCESS PLANT (MILL) LOCATION ALTERNATIVES (see Section 5.3.2)	
Preferred: Previously impacted land, as centrally located within the concession as possible	No other viable alternatives exist that would not have involved the creation of new land impacts, longer haulage routes, or locations unacceptably close to the adjacent communities.
Rejected: All other areas of the concession	See above
CATEGORY: TAILINGS MANAGEMENT FACILITY LOCATION ALTERNATIVES (see Section 5.3.3)	
Preferred: Corna Valley site	Economic, topographic, geographic, and environmental impact constraints have established a fundamental need for a tailings management structure located as close to the process plant as possible, using gravity-assisted tailings deposition schemes to the extent possible.
Rejected: Roşia Poieni tailings facility	Rejected due to operational constraints, difficulty of negotiating a co-operative access and use agreement, and concerns regarding water quality from co-mingling the Project tailings with the tailings from the Roşia Poieni copper mine. Pre-existing liabilities related to current environmental conditions and the structural integrity of the current existing dam are major obstacles to overcome in order for this option to become viable.
Rejected: Salistei Valley	The Salistei Valley is not large enough to contain the projected tailings volume, and its use would require the construction of a secondary tailings facility at another site. Very substantial geotechnical improvements would also be required to raise the strength and integrity of the existing dam structure and ensure that any dam modifications are consistent with the existing geotechnical conditions.

Alternatives Considered (preference or rejection noted)	Technical Basis for Preference or Rejection
Rejected: Abruzel Valley	The topography of the site is such that tailings would have to be pumped a substantial distance from the plant to the impoundment.
Rejected: Stefanca Valley	This option is not considered practical due to mine scheduling conflicts, and does not address the requirements for the disposal of tailings during the first 13 years of mining.
Rejected: Backfilling Open Pits	This option is not considered practical due to mine scheduling conflicts, and does not address the requirements for the disposal of tailings during the first 13 years of mining.
Rejected: Cycloning	This alternative was eliminated due to the limited cost savings afforded by the cycloning process, and the overall strength concerns and other geotechnical issues associated with a cycloned tailings (sand) dam construction, in comparison with the rock-fill placement structure.
Rejected: Combined Alternatives	Use of two sites would significantly compound and in some cases potentially double the potential technical, environmental, economic, and social impacts associated with the selected options.
CATEGORY: WASTE ROCK DISPOSAL SITE ALTERNATIVES (see Section 5.3.4)	
Preferred: Combined solution involving the placement of waste rock in nearby stockpiles, partial use as construction material, and partial use for backfilling in selected pits as part of a programme of progressive rehabilitation.	A combination of alternatives maximises the beneficial reuse of the waste rock and minimises the ambient air and noise impacts to the protected areas and adjacent communities that would be associated with completely backfilling the open pits. Partial backfilling will permit early closure of some of the areas impacted by mining operations that are closest to the protected areas. Limitations on backfilling prevent complete sterilisation of the mineral resource with regard to potential future development needs.
Rejected: Stockpiling with no backfilling or use as construction materials.	Construction materials would have to be quarried from other sources. Areas requiring re-vegetation would be greater, and pit lake volumes could not be minimised.
Rejected: Backfilling pits with no use as construction materials	The equipment costs associated with this alternative are prohibitive, do not preclude the need to develop stockpiles in the initial years of the project, would limit the possibility of early initiation of site rehabilitation activities, and would significantly increase air quality, noise, and resource impacts of the project during the later years of operation and closure. Construction materials would also have to be quarried from other sources, and un-mined mineral resources associated with the pit areas would be sterilised with regard to their potential future development.
CATEGORY: INERT WASTE LANDFILL LOCATION ALTERNATIVES (see Section 5.3.5)	
Preferred: Onsite disposal in the area of the Cârnic Waste Rock Stockpile	Location of this landfill was based on the desire to use only previously impacted land, upgradient from a facility the Tailings Management Facility (TMF) able to contain any runoff. Onsite disposal also minimises the level of truck traffic to and from the mine, especially in the construction and closure phases.
Rejected: Offsite disposal	Offsite disposal of inert waste would increase the level of truck traffic to and from the mine, especially in the construction and closure phases. Regional offsite landfill capacity is also limited, and disposal of inert wastes from the project would unnecessarily reduce the available capacity.
CATEGORY: UNDERGROUND MINING ALTERNATIVES (see Section 5.4.1)	
Preferred: Open pit with a production rate of 13 Mt/ for 14 years (With 3 years' processing of stockpiled low-grade ore)	The economic basis for the Roşia Montană Project depends on the ability to mine and process the remaining low-grade ores interspersed among historic workings, using modern large-scale open-pit mining techniques and large-scale equipment. The selected production rate and duration minimises environmental impacts while maximising the economic and social benefits.
Rejected: Conventional underground mining methods	Conventional underground mining methods are economical only if substantial quantities of high-grade ores are available.

Alternatives Considered (preference or rejection noted)	Technical Basis for Preference or Rejection
Rejected: Underground block caving mining methods	Block caving is not economically feasible due to high ore extraction costs; the method also creates greater workplace safety hazards and is intrinsically unpredictable in the expression of its impacts on the ground surface, especially if mined areas are overlain by historical workings.
CATEGORY: MINIMISING DURATION OF THE MINING ACTIVITY ALTERNATIVES (see Section 5.4.2)	
Preferred: Open Pit with a production rate of 13 Mt/ for 14 years (With 3 years' processing of stockpiled low-grade ore)	The selected production rate and duration minimises environmental impacts while maximising the economic and social benefits associated with mine construction, operation, decommissioning, and closure.
Rejected: Higher production rates (20Mt/a)	A higher production rate is likely to decrease project duration, but does not adequately balance environmental impacts with economic and social benefits. Equipment and consumable needs and fresh water requirements (and their associated environmental impacts) would increase.
Rejected: Lower production rates (8Mt/a)	A lower production rate is likely to increase project duration, and does do not adequately balance environmental impacts with economic and social benefits.
CATEGORY: MINE CLOSURE ALTERNATIVES (see Section 5.4.3)	
Overall Water Management Strategy	
Preferred: Semi-passive treatment, with partial discharge	This alternative is highly preferable, since a variety of options are retained for managing and controlling the effects of various precipitation events.
Rejected: Closed system	This alternative is intrinsically flawed and potentially unsafe; significant precipitation occurs in all seasons, and no means are provided for safely bleeding excess water from the system in extreme precipitation scenarios.
Pits	
Preferred: Progressive backfill of pits and flooding of final Cetate pit	This is the preferred alternative because it allows efficient material handling during operations and meets environmental requirements for the post-closure period. The alternative also enables early initiation of site rehabilitation.
Rejected: No action	This is not a preferred option considering that the open pits have the possibility of generating and discharging acid rock drainage (ARD).
Rejected: Partial backfilling with waste rock	This is not a preferred alternative, as more material would have to be stored on surface and potential for ARD generation would be greater..
Rejected: Backfilling of all pits with waste rock	This is not a preferred alternative because placement of the waste rock back in the final Cetate pit would generate substantially more dust, noise, and other vehicle-related environmental impacts to the protected areas and adjacent communities because of double-handling requirements
Tailings Management Facility – Main Embankment and Impounded Tailings	
Preferred: Dewatering, vegetative cover for the tailings and dam surfaces, removal of pipelines	This is the preferred alternative because it reduces the possibility of dust generation from the tailings, creates a large, flat area of usable land surface, and significantly minimises the potential for ARD generation and runoff.
Rejected: Water filling with a decant system or spillway channel	This is not the preferred alternative because if there are dry years, the surface of the tailings may be exposed and generate dust and acid rock drainage. In addition, a wet cover system would require collection and pumping of seepage water.
Rejected: No Action	This is not a preferred alternative because dust would be generated from the tailings surface during dry seasons and climatic conditions, and there is some potential that ARD runoff could be generated from the embankment.
Waste Rock Stockpiles	

Alternatives Considered (preference or rejection noted)	Technical Basis for Preference or Rejection
PreferredUse for construction and pit backfill with remainder deposited in a stockpile, segregated according to ARD generation potential; simple soil cover to permit revegetation	This is the preferred alternative because it minimises the size of the stockpile and segregation would minimise any potential for ARD generation and allow a simple soil cover to be installed. The cover system would minimise dust generation.
Rejected: Waste rock stockpiled without any mitigation measures	This is not a preferred alternative because dust would be generated by the waste rock during dry months, and without a cover system, there is potential for ARD runoff.
Rejected: As for preferred option but no segregation and use of a multiplayer cover	This is not the preferred alternative because it allows potential generation of ARD and relies on a barrier to prevent ARD migration, which is not BAT.
Rejected: Relocation of waste rock from a holding area to a final site	This is not a preferred option because it would require double handling of material and greatly extend closure works and disturbance.
CATEGORY: TECHNOLOGIES FOR ORE EXTRACTION (see Sections 5.6.1 and 5.6.2)	
Preferred: Combined process including controlled leaching in a carbon-in-leach (CIL) plant.	Much of the gold is “locked” within pyrite grains and a leaching process must be used to obtain an acceptable level of gold recovery. Encapsulated management of the cyanidation process in a CIL plant, and chemical detoxification of residual cyanide prior to releasing to the TMF is vastly preferable to heap leach processes in this case.
Rejected: Combined process using heap leach pad technology	Ore test work indicated low recoveries to , resulting in the inefficient use of the ore deposit. Significant areas of flat terrain and/or fully prepared and compacted earthworks with an engineered, impermeable barrier are therefore required. Heap leaching creates significant land and fresh water demands, creates environmental risks to avian and other species, is highly sensitive to seasonal precipitation, and requires careful management of detoxification processes that are essentially open to the environment.
Rejected: Gravity process	The gravity process is typically capable of recovering only 10% to 50% of the gold in the ore, depending on the ore type resulting in the inefficient use of the ore deposit.
Rejected: Flotation process	The tested flotation concentrate assayed only 6 to 12 g/t Au, which is less than what would be necessary for direct smelting. Current RosiaMin (Minvest) operation uses flotation with low recoveries, and involves the transport of the concentrate produced to a smelting facility to recover the gold and silver using conventional cyanide leaching techniques. Recoveries are low (~50-60%) based on the test work done for this method, resulting in the inefficient use of the ore deposit.
CATEGORY: ALTERNATIVE LIXIVIANTS (see Section 5.6.3)	
Preferred: Sodium Cyanide	All other potential alternative reagents are more costly; less effective; present considerable health and environmental risks during their transport, use and disposal; and are employed in processes that have significant uncertainties associated with them. International standards of practice have been established for the cyanide process, and the risks and necessary management and mitigation measures for cyanide are well understood by the international mining industry.
Rejected: Thiosulphate	The process chemistry is complex and the reagent consumption rate is high. The process also requires ammonia, which is toxic to aquatic life and has significant handling and storage issues. Moreover, there are currently no satisfactory commercial-scale techniques for recovery of metallic gold from the thiosulphate leach solution.
Rejected: Thiourea	The gold-thiourea complex is significantly weaker than the gold-cyanide complex. Leaching with thiourea must be done at a pH of 1 to 2, necessitating special handling equipment and materials, and substantially increasing operating costs and workplace health and safety risks. Thiourea is a suspected carcinogen and therefore is not an option without the institution of complex and extensive engineering and health and safety program controls.
Rejected: Ammonia	High temperature requirements for this process present difficult operational and process engineering issues. Ammonia is also toxic to aquatic life. Use of ammonia would present very significant handling and storage issues.

Alternatives Considered (preference or rejection noted)	Technical Basis for Preference or Rejection
Rejected: Various halide systems	The gold-halide complexes are not stable, and require a level of chemical and process control not economically achievable in a gold ore leaching facility. Additionally, halides are typically toxic to aquatic life and are associated with a wide range of storage and handling issues.
Rejected: Bioleaching	While this technique has generated interest at laboratory and pilot scales, little progress has been made in its full-scale industrial application. Development efforts would be very lengthy, and the operational parameters and environmental risks from industrial scale applications are not well understood. As a result, there is no guarantee that the application of this process to the Roşia Montana ores would be effective.
CATEGORY: ALTERNATIVE METHODOLOGIES FOR CYANIDE DETOXIFICATION PROCESSES (See Section 5.6.4)	
Preferred: SO2/air process (INCO version)	The process has been widely used for nearly 20 years and has a history of safe and effective usage; it has been successfully applied at over 50 international mine sites within the gold mining industry, and it is the most preferred option for the treatment of tailings related effluent slurries.
Rejected SO2/air process (Noranda version)	The Noranda version of the process has been used primarily on Noranda sites, and has not been as widely employed within the global gold industry as the INCO version. The Noranda process offers no technological advantages over the INCO method, and is not fully understood as a method for use in full-scale non-Noranda gold operations.
Rejected: Alkaline chlorination process	The process can potentially form chlorinated organic compounds that are potentially more toxic than cyanide; a potential exists for release of effluents with elevated levels of chlorides. Reagents required by the process are highly corrosive.
Rejected: Hydrogen peroxide process	Neither the Kastone nor the Degussa version of this process is well suited for detoxifying Weak Acid Dissociable (WAD) cyanide in slurries; these processes have higher operating costs and are not effective in removing soluble metals unless a secondary step is added.
Rejected: Biological treatment	The process is designed to apply to solutions, not slurries; it is highly costly and requires a large operational area for the oxidation and biofilm adsorption parts of the process.
Rejected: Ozonation	The ozonation process is suitable for small volumes of solutions, not slurries, and its effectiveness has yet to be proven for large operational scales.
Rejected: Activated carbon adsorption	The process is not presently capable of achieving low WAD cyanide levels, is highly costly, and has not been proven effective for use on a large scale.
Rejected: “DTOX” waste water treatment system	The DTOX process is still under development; it is unproven at commercial scales and slurry trials have yet to be performed
Rejected: “ROLB” Process	The ROLB process is suited to specific effluent streams high in thiocyanate, a circumstance that does not exist at Roşia Montana. Moreover, this technology is proprietary, and has yet to be proven at full scale within the demanding environment posed by an operating plant.
Rejected: Various other minor detoxification processes (e.g. ion flotation; electrochemical destruction; electrochemical chlorination; Prussian Blue precipitation; and fresh iron sulphide addition)	These methods are generally unproven at the scale required for this project, cannot achieve low levels of WAD cyanide, or are otherwise unsuitable for gold mining applications.
Rejected: Cyanide recovery process	Cyanide recovery is an adjunct process designed to recover and recirculate cyanide within a processing facility; secondary or tertiary treatment systems as previously described in this table are still required to achieve low WAD cyanide levels, and the process is generally not practical for an operation of the scale anticipated for the Roşia Montană Project. Some variations of the recovery process produce acidic by-products that require treatment and additional neutralisation; capital expenditures and operating costs are high, and the process is typically applied to solutions, not slurries.

Alternatives Considered (preference or rejection noted)	Technical Basis for Preference or Rejection
CATEGORY: ALTERNATIVE METHODOLOGIES FOR TAILINGS DEPOSITION (see Section 5.6.5)	
Preferred: Conventional tailings slurry	A conventional tailings slurry was specified as a result of feasibility-level testing and was factored into the development of the final Project economic model. The current Project model and preferred TMF location in part presume the availability of gravity-assisted fluidised tailings transport. Selection of a conventional tailings slurry facilitates gravity transport.
Rejected: Thickened tailings with paste additives	This deposition method is normally employed in arid climates where water availability is a significant design constraint; the Project is under no such constraints, as the site experiences precipitation in all seasons. In addition, this option does not eliminate the need for use of the Corna Valley as a deposition area, nor does it eliminate the need for some type of water retention dam and for managing seepage from the deposited material and the decant water that cannot be used in the plant. The project's economic model and the preferred TMF location partly depends on gravity-assisted tailings transport. Paste tailings would also require the development of alternate tailings transportation and deposition methods, and would create potentially significant maintenance issues for the transport system.
Rejected: Dry tailings See above	This deposition method is normally employed in arid or very cold climates where the availability, cost, and management of water are very critical design constraints. The method is also used in high seismic regions where the seismic stability of a tailings dam is a major issue. The Project site experiences substantial precipitation, is not located in a high-seismic area, and does not experience sustained, unusually cold climatic conditions. Although process water needs would be reduced, the offset in water cost would be far less than the funds necessary for the development and maintenance of the necessary infrastructure. De-watering and filtration systems would have to be developed. Conveyor systems would also have to be built, powered, and maintained. In addition, this option does not eliminate the need for use of the Corna Valley as a deposition area for tailings and filter press water and associated resettlement. A dam would still be required in the Corna valley to capture and control the ARD from waste rock stockpiles. Additional diversion channels and upstream cut-off trenches or grout curtains would also potentially have to be developed. In addition, this technology has never been employed at this production rate (13 Mt/year).
CATEGORY: ALTERNATIVE METAL REMOVAL OPTIONS, WASTEWATER TREATMENT PLANT	
Preferred: Conventional lime neutralisation/ carbon dioxide sparging process	This method is widely used internationally and is highly effective at adjusting pH and reducing metal concentrations through precipitation; sludges are readily conditioned to reduce hazardous characteristics to minimal levels. It is foreseen that an additional treatment step may be required to deal with certain non-critical chemical parameters and this complexity is fully explained in Chapter 5.
Rejected: Caustic	This method results in a hazardous, reactive sludge with attendant treatment and disposal issues.
Rejected: MgOH	This method is costly and is effective at very low pH levels, would require substantial management measures and additional infrastructure to safely handle large volumes of acids.
Rejected: Sulphide	This method results in a hazardous, reactive sludge with attendant treatment and disposal issues.
Rejected: Reverse Osmosis	The osmosis membranes require frequent replacement and a brine is generated that would require treatment and/or controlled disposal.
Rejected: Electrodialysis	Reactive brine is generated that would require treatment and/or controlled disposal.
Rejected: Ion Exchange	The regenerate created by the process is reactive and would require treatment and/or controlled disposal.

Alternatives Considered (preference or rejection noted)	Technical Basis for Preference or Rejection
Rejected: Granular activated carbon	The process is limited in effectiveness and requires periodic replacement of granular activated carbon.
Rejected: Evaporation/Distillation/ Crystallisation	The operation has costly maintenance requirements, has not been proven for use on a large scale, and creates brine treatment and/or disposal issues.
Rejected: Electrolytic	The process has a high energy demand and is metal-specific.
CATEGORY: WORKFORCE HOUSING ALTERNATIVES (see Section 5.7)	
Preferred: Combined alternative, including conversion of Roşia Valley apartments into dormitories, and use of other regional/local housing infrastructure:	A combined alternative is preferred that would provide most of the necessary accommodations for the bulk of the operations-phase workforce; these accommodations would be developed via 1) negotiations with local and regional authorities and landlords for the development or conversion of other housing, and 2) to the extent possible, the purchasing and renovation of existing apartment facilities in the Roşia Valley. Existing apartment complexes in the Roşia Valley could offer housing to roughly 500 individuals, if properly renovated and provided with necessary infrastructure improvements. Because construction would be of a more permanent nature, this alternative would improve the long-term availability of affordable housing within the local community along with a number of construction employment opportunities, minimisation of transportation and infrastructure impacts, and other benefits. A combined alternative would address the long-term needs of mine operations and closure.
Rejected: Reliance on existing local and regional housing infrastructure, with no dormitory conversions	Although local and regional workers will be hired on a preferential basis, available rental housing of serviceable quality that is within a reasonable commuting distance from the Project site is lacking. Some workers may be hired who already have suitable residences, but at least 700 individuals will have to be accommodated on a temporary (rental) basis for the two years of the construction phase; an additional 500 or so workers will need to be accommodated during construction as well as over the 16 years of the mines operation. Independent generation of this level of housing could potentially stress the capabilities of local communities causing homeowners to rent their primary residence increasing disruption of the local community
Rejected: Temporary construction camp, no dormitory conversions or reliance on existing local and regional housing infrastructure	Although such a camp could potentially be sized to house the entire 1200-man construction workforce, it is rejected as a separate alternative because it is a temporary construction and cannot, in and of itself, resolve the long-term housing needs for 500 workers over the 16 years of operation.
Rejected: Purchase and conversion of Roşia Valley apartment blocks to dormitory use, with no reliance on local and regional housing infrastructure	This option is rejected because it does not adequately address the needs of the construction phase of the project; only 500 workers could be accommodated, and the alternative would require substantial time to implement since individual property purchases would have to be negotiated with existing owners while renovation requirements may be extensive.
CATEGORY: TEMPORARY HAZARDOUS WASTE STORAGE FACILITY ALTERNATIVES (see Section 5.8)	
Preferred: Locate the temporary facility with engineered containment features, adjacent to the Demolition and Construction waste storage area, within a security perimeter, pending identification of a validly permitted offsite facility	The facility location was selected to use previously impacted land, up-gradient from a facility capable of containing any potential runoff, and sharing road access with other major facilities. The facility is designed to safely store modest quantities of properly containerised hazardous substances on an interim basis, pending identification of an appropriately permitted offsite recipient facility.
Rejected: Offsite disposal	No properly constructed and permitted hazardous waste disposal facility currently exists in Romania, currently a few hazardous storage facilities managed by private companies for their own disposal needs exist but they do not accept third party waste streams and would not meet the company's criteria for safe and secure long term disposal needs.
CATEGORY: MUNICIPAL WASTE LANDFILL ALTERNATIVES (see Section 5.9)	

Alternatives Considered (preference or rejection noted)	Technical Basis for Preference or Rejection
No alternative	No permitted municipal waste disposal facility currently exists in close proximity to the Project site. As noted in Section 3.4, in the near term, municipal waste from RMGC operations will be consolidated and transported by truck to the temporary storage area near Abrud and from there, to the TRACON Sanitary Landfill in Sibiu or to an equivalent, properly permitted facility. As a longer-term solution, RMGC is working with the local communities in a co-operative effort to site, design, and develop a regional municipal landfill at Cimpeni, in accordance with the requirements of Regional Waste Management Plan and Decision No. 162, the Landfill Waste Directive and relevant European Union regulations.
CATEGORY: PROCESS WATER SUPPLY INFRASTRUCTURE ALTERNATIVES (see Section 5.10)	
Preferred: Abstraction from the Aries River at Cimpeni (confluence) and an independent pipeline to the plant	High reliability of supply, a favourable pipeline route, and water quality is acceptable for the project process needs and does not require pre-treatment.
Rejected: Use of the existing 400-mm municipal water supply pipeline at Gura Roşia, to be pumped to the Roşia Montana plant	The option requires upgrades to a number of existing structures and requires obtaining additional permits that would be the responsibility of the water supplier who may not concur with the upgrades nor permitting plans to meet the project schedule
Rejected: Pumping directly from the Abrud River along a 5-km long pipeline	The water quality is low and the necessary water extraction level may not be permitted during low flow periods.
Rejected: Abstraction from the Aries River at Girde through an independent pipeline	This option would require a number of agreements with Roşia Poieni, i.e. permission to use part of their intake, as well as to use the capacity under the existing water abstraction licence, in addition to requiring the construction of a new pipeline along the existing Roşia Poieni conduits, within the Roşia Poieni mining concession boundary.
Rejected: Water abstraction from the Roşia Poieni water tanks with the use of a new pipeline	This option would entirely rely on the ability and willingness of the Roşia Poieni operation to continuously supply the required water to the Roşia Montană Project.
Rejected: Negotiation of an agreement with Roşia Poieni to extend their existing pipelines to the Roşia Montana plant. Under this option, Roşia Poieni would be the de facto water supplier for the Roşia Montana project.	As for the previous option, highly dependent on the Roşia Poieni pipline equipment and the good will of Roşia Poieni for operations management; low supply reliability may be expected due to an intrinsically weak negotiating position, considering the current fluctuations in water use, compared to the proposed constant water volumes that RMGC will require for the mine operation.
CATEGORY: POWER SUPPLY INFRASTRUCTURE ALTERNATIVES (see Section 5.11)	
Preferred: Obtain power from Electrica	Excess capacity exists, so it is highly preferable (and in the national interest) for the project to purchase power rather than construct and permit its own independent power plant. In addition, Electrica currently operates the existing 110 kV overhead power line.
Rejected: Tender to the market for the most favourable power supply deal	The tendering process is a very lengthy and difficult process under current market conditions in Romania and doing so does not guarantee an agreement suitable for the proposed project schedule.
Rejected: Develop a new power station dedicated to project needs	A new power station would be a costly effort with substantial and unnecessary environmental and social impacts. In addition, this alternative does not take into consideration the current overcapacity in the regional power grid
CATEGORY: BORROW SOURCES/QUARRY ALTERNATIVES (see Section 5.12)	
Preferred: Sulei and Valea Porcului quarries	Selected due to the as-tested quality of the andesite, conglomerate and sandstone, their location within the industrial protection zone boundary, and proximity to established roadways.
Rejected: Excavation of various limestone outcrops within the Project boundary	The quality of aggregate does not meet technical requirements.
Rejected: Use of other proven aggregate sources external to the Project boundary	Use of offsite sources would significantly increase off-site transportation and air/noise impacts in the communities adjacent to the Project.

Alternatives Considered (preference or rejection noted)	Technical Basis for Preference or Rejection
Rejected: Materials from pre-stripping open pit areas	The quality of the aggregate does not meet technical requirements.
CATEGORY: SITE ACCESS –SHLO TRANSPORTATION ROUTE ALTERNATIVES (see Section 5.13.1)	
Preferred: Point of entry at the Port of Constanta (sp)	Costanta, a seaport, is the preferred alternative for delivery of super-heavy lift or over-dimensional (SHLO) equipment, over the inland alternatives entering Romania through Hungary. However, all alternatives will be considered in order to retain transportation flexibility in view of weather constraints, infrastructure, traffic or social issues.
Secondary preference: Point of entry via Hungary at Bors	May be used for some specific SHLO shipments; all alternatives will be considered in order to retain transportation flexibility in view of weather constraints, infrastructure, traffic issues or social issues.
Secondary preference: Point of entry via Hungary at Nadlac	May be used for some specific shipments; all alternatives will be considered in order to retain transportation flexibility in view of weather constraints, infrastructure, traffic or social issues.
Rejected: Barging and rail options	Considered unsuitable due to the inadequacy of the infrastructure for handling the SHLO dimensions and weight.
CATEGORY: ROSIA POIENI ACCESS ROADWAY ALTERNATIVES (see Section 5.13.2)	
Preferred: Basic design alternative – Access from Bucium Valley	The southern route does not interfere with the mine operation, allows for easier construction along the ridgeline, with limited additional expropriation is required. The route is also preferable to the management of the Roşia Poieni mine.
Rejected: Access from Corna Valley (Option 1), length 8.7 km	This route interferes with the mining operation and requires four haul road crossings, as well, the route is longer than most options; some deforestation would also be required.
Rejected: Access from Corna Valley (Option 2), length 9 km	This route interferes with the mining operation and requires four haul road crossings. It is the longest option and requires deforestation.
Rejected: Access from Roşia Valley, downstream of Cetate Water Catchment Dam, length 6.6 km (“northern bypass”)	The route would require negotiation of additional property purchases, and is unacceptable for the management of the Roşia Poieni mine.
Rejected: Access from Roşia Valley, length 6.4 km	This route interferes with the mining operation and would have to be relocated during the later phases of the mine life.
Rejected: Bucium Valley Road	A large number of existing properties in the narrow Abruzel Valley would be affected, and the road is almost entirely outside the concession boundary. It would also introduce heavier traffic in a new valley and is difficult to maintain in winter.
CATEGORY: CYANIDE TRANSPORTATION ROUTE ALTERNATIVES (see Section 5.13.3)	
Preferred: marine delivery of sodium cyanide briquettes from international sources to the port of Costanza (sp.), then by truck transport to Roşia Montana	The same roadway would be used as for this alternative under the SHLO transportation category; however, all alternatives will be considered in order to retain transportation flexibility in view of weather constraints, infrastructure, traffic, safety or social issues.
Preferred: delivery of sodium cyanide briquettes from Western Europe by rail to Deva, Romania, then by truck transport to Roşia Montana	This alternative minimises road travel time relative to other Western Europe source alternatives; all alternatives will be considered in order to retain transportation flexibility in view of weather constraints, infrastructure, traffic, safety or social issues.
Preferred: delivery of sodium cyanide briquettes from Western Europe by rail to Cluj Napoca, Romania, then by truck transport to Roşia Montana	This alternative minimises road travel time relative to other Western Europe source alternatives; all alternatives will be considered in order to retain transportation flexibility in view of weather constraints, infrastructure, or traffic, safety or social issues.
Preferred: delivery of sodium cyanide briquettes from Western Europe by rail to Szeged, Hungary, then by truck transport to Roşia Montana	This alternative does not minimise road travel time, but should be held in reserve if road conditions or safety issues are encountered on the preferred routes.
Preferred: delivery of sodium cyanide briquettes from Western Europe by rail to Budapest, Hungary, then by truck transport to Roşia Montana	This alternative does not minimise road travel time, but should be held in reserve if road conditions or safety issues are encountered on the preferred routes.

Alternatives Considered (preference or rejection noted)	Technical Basis for Preference or Rejection
Rejected: delivery of sodium cyanide by truck from Romanian sources	Romanian manufacturing and transportation sources do not currently subscribe to the International Cyanide Management Code2

[2] International Cyanide Management Institute, May 2002; *International Cyanide Management Code for the Manufacture, Transport, and Use of Cyanide in the Production of Gold*

8 Land Planning and Current Land Use and Infrastructure

The general concept for project development is presented in the applications for General Urbanism Plans (PUGs) submitted to the administrative districts of Oras Abrud and Roşia Montana. The PUGs indicated the proposed location of project activities with particular reference to:

- The Roşia Montana Industrial Zone, comprising the project activities of mining, emplacement of waste rock, milling and processing of ore and gold extraction in a process plant, disposal of tailings in a TMF with corresponding tailings dam and secondary containment dam, and water management and treatment of historic and project-related mining impacted waters, using water containment dams, pipelines, conduits and a wastewater treatment plant;
- A zone for the construction of a new residential area in the Roşia Montana *comuna* for resettlement of persons, businesses and communal facilities displaced by the project; and,
- A zone of cultural heritage asset value, to be designated for protection of cultural patrimony, comprising the area of Roşia Piata, streets Brazi and Berg, the eastern part of the Roşia Montana settlement, including and a concentration of buildings declared as having architectural merit, in addition to churches and access to historical and more recent mine workings.

The Zoning Urbanism Plan (PUZ) for the Roşia Montana Industrial Development Zone was documented and submitted to the Alba County Council (Technical County Commission of Territorial Planning, Urbanism and Public Works), which issued the Sole Agreement No.7 of 1 July 2002. The ongoing project development process has required an amendment to the PUZ, and, as a result, once the Urbanism Certificate is approved, a new zoning application will be prepared in accordance with the current and approved project parameters. .
The Urbanism Certificate (Nr.78 / 26.04.2006) presents the perimeter of the Roşia Montana Industrial Zone, which comprises a total area of 1,257,31 ha. The Industrial Zone excludes the Protected Zone designated for the preservation of the area's cultural patrimony.
The total area includes small parcels of land which will not be directly impacted by project operations but which will remain isolated between different project activity areas; these areas comprise a total of 195,7 ha. The area that will be impacted by the proposed industrial activities is comprised of the following:

OBJECTIVE	THE AREA REQUIRED FOR CONSTRUCTION [m^2]
DEFINITIVE CONSTRUCTIONS	
CETATE PIT	690,836.01
CARNIC PIT	728,443.46
ORLEA PIT	450,425.28
JIG PIT	184,955.71
SULEI QUARRY	113,277.64
PARAUL PORCULUI SANDSTONE PIT	45,464.73
CETATE DAM	382,118.58
INERT WASTE DUMP	5,879.30
CARNIC DAM	1,391,605.53
PROCESSING PLANT	513,777.66
CORNA TAILINGS MANAGEMENT FACILITY	3,631,375.00
ACCESS ROAD TO THE PROCESSING PLANT	117,799.54
POWDER MAGAZINE	2,000.02
HAULAGE ROADS	230,314.76
from where: areas included by other proposed objectives	*3,797.61*
INDUSTRIAL WATER SUPPLY	58,419.90
CETATE ARD POND AND DAM	168,320.06
DRAINS / WATER DIVERSION	222,581.82
from where: areas included by other proposed objectives	*16,972.07*
ACCESS ROAD TO THE PROTECTED AREA	26,957.67
DECOMMISSIONING / DETOUR WORKS	
DECOMMISSIONING OF DJ 472	148,352.11
from where: areas included by other proposed objectives	*108,482.11*
DECOMMISSIONING OF THE Open-air transmission line	213,498.00
din care suprafata inclusa in alte obiective propuse	122,368.00
DECOMMISSIONING OF DJ 472	448,810.28
from where: areas included by other proposed objectives	*3,223.32*
DECOMMISSIONING OF THE Open-air transmission line	296,394.97
from where: areas included by other proposed objectives	34,880.97
TEMPORARY CONSTRUCTIONS	
HAULAGE ROADS	115,114.36
from where: areas included by other proposed objectives	*924.25*
LOW GRADE ORE STOCKPILE	269,743.93
SITE MOBILISATION	11,756.00
OVERBURDEN STOCKPILE, EXCAVATED FROM THE PROCESSING PLANT SITE	41,080.64
TOPSOIL STOCKPILE	397,445.46
CUMULATED AREA FOR THE PROPOSED OBJECTIVES	**10,906,748.43**
JOINT AREA FOR SEVERAL OBJECTIVES	***290,648.33***
TOTAL AREA, PROPOSED OBJECTIVES	***10,616,100.10***
UNDISTURBED AREAS AMONG THE PROPOSED OBJECTIVES	**1,957,064.33**
GRAND TOTAL FOR ROSIA MONTANA MINING OBJECTIVE	**12,573,164.43**

The Roşia Montana Industrial Zone falls within four different territorial zones: Roşia Montana, Abrud, Campeni and Bucium. The current land use within the Industrial Zone area is as follows:

Land Use Category	Surface Area (ha)
Construction areas	146,6
Forest land	234,8
Arable land	3,6
Pasture	740,5
Cemeteries	2,6
Roads	37,8
Non-productive land	79,8
Water (streams and lakes)	11,61
TOTAL INDUSTRIAL ZONE	1257,31

The National Commission of Historic Monuments of the Ministry of Culture and Religious Affairs (MCC), Bucharest, has approved the establishment of the Protected Zone, through its authorisations No.61 of February 2002 and No.178 of June 2002. The latter document required that, at a future design stage, a PUZ for the Protected Zone and a Management and Rehabilitation Plan for the Protected Zone would be prepared and submitted. The Protected Zone incorporates 33 historical monuments, including three churches, and the entrance to the mine gallery Catalina-Monuleşti. There is also the proposal to locate a new muzeum in this zone. The Zoning Urbanism Plan (PUZ) for the Protected Zone will constitute a separate submission to the Alba County Council.

Objective/Category of use	Agriculture	Constructions	Cemetery	Road	Waters	Non-productive	Forest	Meadow	Total
Processing Plant	2049	123037		11698			86114	290879.66	513777.66
Stockpile 3							12087.75	59376.14	71463.89
Stockpile 2	706.2	4080.73		1479.58			16955.29	99058.89	122280.69
Stockpile 1	357.44			1549.75			0.937	86622.99	88531.117
Stockpile 4		2306.93		1232.6			9582.35	102049.06	115170.94
Overburden stockpiled from plant site area						11305.47	10436.45	19338.72	41080.64
Site mobilisation								11756	11756
Low grade ore deposit				9348.35		10120.6	6868.97	243406.01	269743.93
Cetate ARD pond and dam	172.521	64098.429		15652.7	14715.56		27.4	73653.45	168320.06
Corna TMF	9061	482654	11253	106275.93	51724	2782.72	887285.353	2080339	3631375
Cetate Dam	929	58788		13485			32690	276226.58	382118.58
Cirnic Dam	9821	120721		51673	13411.53	234	264573	931172	1391605.53
Access road to the processing plant	490	9499		14300			46584	46926.54	117799.54
Decomissioning of the overhead power line	2700	2057		0	26		0	76219.68	81002.68
Deviation of the overhead power line	328	99722		2904	570		17199	145487.72	266210.72
Diversion of DJ 742	4230	39806		7122			115077	282575.28	448810.28
Inert waste dump						5879			5879
Powder magazine								2000	2000
Sulei Quarry	1082			333				111862.64	113277.64
Paraul Porcului Sandstone Pit		24879		130				20455.73	45464.73
Orlea Pit	868	70378	14726.3	17157	3939		102694	240662.98	450425.28
Jig Pit	685	15917		8521				159832.71	184955.71
Cetate Pit		6992		6942	927	327765	7773	340437.01	690836.01
Cirnic Pit				9617		351174	244205	123447.46	728443.46
Drains \ water diversion	999	30394		4338	3220	1041	46253	136336.82	222581.82
Decommissioning of DJ 742				7852.46					7852.46
Private roads	25	20431		11446	654	352	7292	74914.36	115114.36
Industrial water pipeline	1747.98	15391		2399.99	859.25	3873.89	5123.25	30966.66	58419.91
Access road to protected area		5380		3560				18017.67	26957.67
Industrial roads	1108.489	18056.241		6802.193	538	14534.71	52415	149451.787	242906.42
Total	**37359.63**	**1214588.33**	**25979.3**	**315819.55**	**90584.34**	**729062.39**	**1971236.75**	**6233473.55**	**10616161.7**

9 Description of the Environmental and Social Management system

9.1 General Description

RMGC will establish and maintain a documented, comprehensive Environmental and Social Management System for the life of the Roşia Montana Project. The Environmental and Social Management System will be based on the current World Bank Group/International Finance Corporation IFC guidelines, Seveso II and other European Union (EU) directives, the International Cyanide Management Code3, ISO 140014, and other recognised international standards that are referenced in this EIA report according to their area of application. The system will integrate the requirements of applicable Romanian regulations and, as appropriate, other relevant guidelines approved or published by the EU.

The primary purpose of the Roşia Montana Project Environmental and Social Management System is to:

- facilitate the implementation of appropriate management and mitigation measures for the environmental and social impacts identified in the EIA process;
- provide the management systems and procedures necessary to effectively address the environmental and social issues encountered in daily operations, during the preconstruction, construction, operation, decommissioning, and closure phases of the project;
- establish methods for ensuring that such management and mitigation measures, systems, and procedures remain relevant and appropriate in view of changing regulatory, social, environmental, and operational conditions; and
- facilitate the systematic and continual improvement of environmental and social performance standards.

As depicted in **Figure 1.1**, the Environmental and Social Management System will be elaborated upon through several tiers of policies, plans, procedures, and other documents. The overall structure of the document encompasses the suite of environmental and social management plans that form the basis of the EIA, and this suite is in turn based on a comprehensive suite of standard operating procedures which will be fully documented prior to the start of the mining operation.

The system also provides for the retention of a wide range of monitoring data, permits, correspondence, and other records that support monitoring and other actions designed to ensure the continuing adequacy and relevance of the environmental and social impact performance parameters over the entire life cycle of the project.

[3] International Cyanide Management Institute, May 2002; *International Cyanide Management Code for the Manufacture, Transport, and Use of Cyanide in the Production of Gold*

[4] ISO 14001:2004, *Environmental management systems - Requirements with Guidance for Use*; International Organisation for Standardisation, Geneva, Switzerland, 2004.

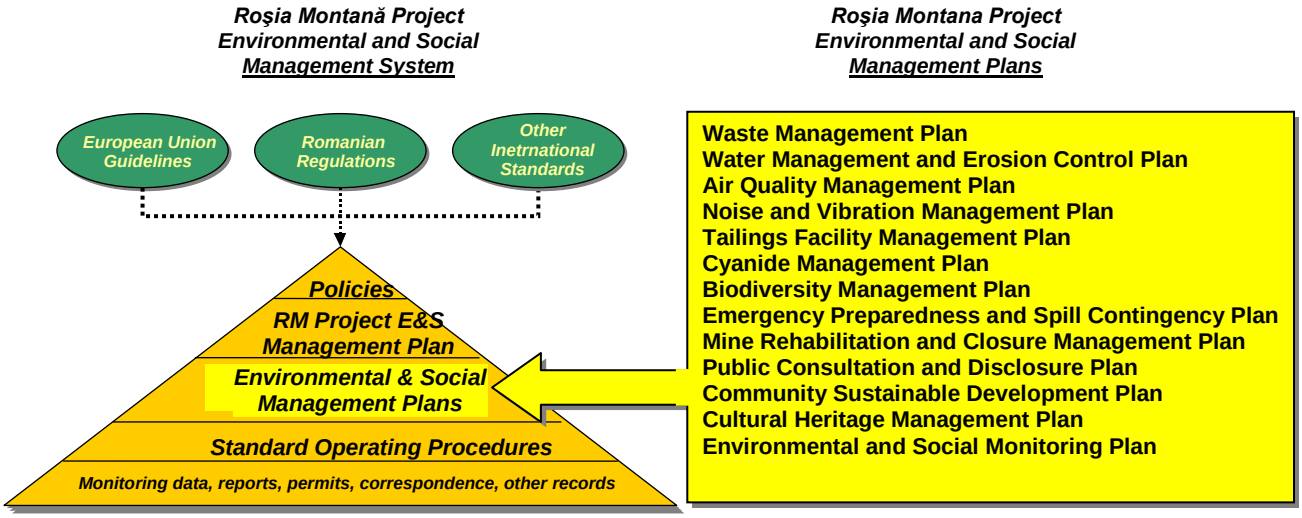

Figure 1.1. Environmental and Social Management System Model

The following paragraphs describe the major elements of the Environmental and Social Management System, as documented in the Roşia Montana Project Environmental and Social Management Plan; a full-text copy of the initial version of this document can be found in the **ESMS Plans, Appendix A**.

- **Environmental and Social Policies:** RMGC has developed a suite of environmental and social policy statements that articulate its corporate position and commitments to:

  - maintaining compliance with the applicable Romanian regulatory requirements and relevant guidelines and standards provided by the European Union, as well as those established by the World Bank Group/International Finance Corporation (which have been recently adopted by major private international banks as stated in the "Equator Principles"[5]);

  - continually seeking to refine and optimise its environmental and social management practices; and

  - management, mitigation, and (where feasible) prevention of negative environmental and social impacts.

  These policies are intended for open distribution to interested parties and will be made available through the RMGC corporate website (http://www.rmgc.ro). As noted in the Roşia Montana Project Environmental and Social Management Plan, they will be periodically evaluated via management review processes and updated as necessary to ensure their continued relevance and suitability.

[5] *The Equator Principles: An Industry Approach for Financial Institutions in Determining, Assessing and Managing Environmental & Social Risk in Project Financing*, 4 June 2003; http://www.equator-principles.com/principles.shtml

- **Planning Elements - EIA Process:** The Roşia Montana Project Environmental and Social Management Plan and the lower tier management plans noted in Figure 1.2.1 fulfil the specific objectives which underpin the EIA process as well as the long-term management functions described in this Section. The EIA process is the primary means that RMGC will use to identify the potential environmental and social issues of the Roşia Montana Project, as well as any associated negative impacts. The *Roşia Montana Project Environmental and Social Management Plan* invokes continual improvement processes to be applied to the management and mitigation of those impacts, along with the specific management changes required in addressing the review, approval, and periodic re-evaluation and update of all associated plans and procedures.

- **Planning Elements - Legal, Regulatory, and Other Requirements:** The *Roşia Montana Project Environmental and Social Management Plan* specifies the methodology by which RMGC will confirm and document the legal, regulatory, and other requirements applicable to the Roşia Montana Project, as well as ensure that the identification of such requirements remains current and accurate over the entire mine life cycle. The *Roşia Montana Project Environmental and Social Management Plan* will also define the methods by which RMGC will periodically verify its compliance status, as well as the methods that will be employed for undertaking any corrective or preventive actions necessary to achieve and maintain compliance.

- **Planning Elements - Environmental and Social Performance Improvement Process:** The *Roşia Montana Project Environmental and Social Management Plan* defines the minimum requirements for undertaking an annual performance review that will identify specific management and mitigation measures, operational controls, and improvement actions for managing the environmental and social impacts identified by the EIA. This process will be documented as a standard operating procedure, and is designed to ensure that improvement actions are prioritised on the basis of the relative magnitude of their associated impacts, the presence or absence of regulatory or stakeholder issues, the adequacy or effectiveness of current operational controls or management and mitigation measures, and other relevant factors. The procedure also requires the provision of technical guidance and appropriate scheduling information for each defined performance improvement action for the appropriate organisational levels.

- **Implementation and Operation:** The *Roşia Montana Project Environmental and Social Management Plan* defines the overall organisational structure of RMGC and describes the functional responsibilities for the key management representatives who will be primarily responsible for the implementation of the Environmental and Social Management System implementation and the associated support requirements. The necessary training procedures are also documented. These are designed to impart a general awareness of RMGC's policy commitments; the major environmental and social issues associated with the Roşia Montana Project; and the specific technical details associated with the implementation of the plans and procedures that comprise the Environmental and Social Management System. The training procedure will also provide the means to deliver speciality training for the personnel whose work will involve the management of the operational areas associated with the project's environmental and social impacts as well as the adoption of mitigation measures in light of the impacts.

The Roşia Montana Project Environmental and Social Management Plan also describes an internal and external communication programme [documented in the Public Consultation and Disclosure Plan (ESMS Plans, Appendix K) and other supporting procedures] designed to ensure that stakeholder inputs are properly sought, identified, responded to, and considered at the appropriate phases of operational planning. Communication processes to address external complaints, problem incidents, or non-conformances are also defined, and require the implementation of formal procedures for the resolution of such cases, as well as the adoption of adequate corrective/preventive measures to minimise or eliminate the likelihood of recurrence.

The Roşia Montana Project Environmental and Social Management Plan establishes a comprehensive document distribution, update, and change control system, to ensure that consistent document preparation standards and review and approval processes are applied, and that only authorised versions of system documents are distributed for project use.
Document revision management protocols are also presented that are designed to detect changing project needs and ensure that such changes are properly reflected in updates to the governing plans and procedures.

As noted in Exhibit 1.9.1, a suite of detailed, lower-tier environmental and social management plans and standard operating procedures were established to support the Roşia Montana Project Environmental and Social Management Plan. These plans and procedures also apply to the management of the mining and processing activities and those areas in which the EIA process indicates that potential environmental or social impacts are known to exist or may occur in later phases of mine life. Supporting procedures will be maintained separately in the RMGC Standard Operating Procedures Manual. Their development will be prioritised to correspond with the major phases of project activity, as shown in Exhibit 1.2.1, to ensure that an appropriate and operational procedural control is applied to address the changing management needs of the project. This section of the Roşia Montana Project Environmental and Social Management Plan also describes the integration of the mine planning process with these plans and procedures, and discusses how mine plans and process plant operations manuals and procedures will be periodically adjusted or modified to incorporate environmental and social performance feedback.

The Roşia Montana Project Environmental and Social Management Plan also establishes a comprehensive emergency preparedness and spill response programme, which will be documented by the Emergency Preparedness and Spill Contingency Plan (ESMS Plans, Appendix I), the Cyanide Management Plan (ESMS Plans, Appendix G), and other plans and supporting procedures that describes the prevention or mitigation of environmental impacts associated with reasonably foreseeable emergencies or accidents. The RMGC Occupational Health and Safety Plan and procedures that define minimum health and safety standards for all RMGC operations will also support this program.

- **Monitoring and Corrective Action Processes:** The *Environmental and Social Monitoring Plan* (**ESMS Plans, Appendix N**) identifies the planning, execution, and reporting actions associated with the applicable voluntary standards or regulation-based environmental and social monitoring requirements, invoked as a result of the Roşia Montana Project operations. The sources of these requirements include:

    - the current environmental water monitoring program set up by RMGC;

- supplementary environmental and social monitoring parameters as identified under governing regulations;

- other specific inspection or monitoring requirements, as established by any additional individual management plans or by the *Roşia Montana Project Environmental and Social Management Plan;* and

- monitoring requirements associated with the full implementation of the relevant management and environmental/operational mitigation measures as recommended by the EIA process.

Any non-conformances noted by the monitoring process will be resolved through the implementation of uniform process invoking corrective and preventive action, as noted in Section 5.3 of the Roşia Montana Project Environmental and Social Management Plan.

The Environmental and Social Monitoring Plan also describes the preparation, review, approval, and issue of a periodically updated master database designed to facilitate the planning and timely execution of necessary monitoring and reporting activities. Database content updates are directly linked to the management review and subsequent document change control processes described in Section 6.0 of the Roşia Montana Project Environmental and Social Management Plan.

To ensure the ongoing fulfilment of RMGC compliance commitments, regulatory compliance verification procedures will also be established as part of the Roşia Montana Project Environmental and Social Management Plan. Issues noted in regulatory compliance verification activities will be resolved in a timely manner through the corrective and preventive action procedures previously described.

The Roşia Montana Project Environmental and Social Management Plan also contains procedures for the identification, management, and filing of detailed project records, as may be required by the governing regulations, or as otherwise needed to support compliance and system performance verification processes as part of the overall implementation of the Environmental and Social Management System.

The Roşia Montana Project Environmental and Social Management Plan establishes a periodic internal performance verification process, based on international standards, designed to ensure that all the documents of the Environmental and Social Management System remain relevant and up-to-date for the needs of the project. Issues noted in the performance verification process will be promptly resolved through the application of the corrective and preventive action procedures described previously.

- **Management Review Process:** The *Roşia Montana Project Environmental and Social Management Plan* establishes procedures for ongoing management performance reviews to evaluate the continuing suitability and overall adequacy of the Environmental and Social Management System from a senior management perspective. The management review process is the means by which the need for major changes to the planning activities for the mine exploration/exploitation can be identified, analysed, and reviewed, and where appropriate, lead to the adoption of revised procedures. The process is also designed to engage upper management in refining environmental and social policies and reviewing and approving any specific continual improvement practices, elaborated in conformity with the environmental and social performance procedures previously described.

9.2 Environmental and Social Management Plans

The scope and purpose of each environmental and social management plan (invoked to support the continuing management and mitigation of the environmental and social impacts associated with the project) are summarised in the following paragraphs. Each plan will be reviewed, approved, issued, and kept current in accordance with the applicable Environmental and Social Management System requirements. Full text copies of the initial version of each action plan are included for information in the **ESMS plans, Appendices B - P**. Comprehensive procedural support to the management plans will be provided through the *RMGC Standard Operating Procedures Manual* as previously noted.

- **Waste Management Plan:** The Roşia Montana Project *Waste Management Plan* (see **ESMS plans, Appendix B**) is the first iteration of a comprehensive plan describing how RMGC will manage the major waste streams resulting from the mining operations, in accordance with applicable regulations and the established hierarchy of waste management practices. In keeping with current Romanian regulations, these streams are categorised as extractive and non-extractive waste. The extractive waste category incorporates the wastes derived from the mining and the mineral extraction process. The “non-extractive” waste category includes packaging waste, waste oil and grease, lead acid batteries and accumulators, end-of-life vehicles, non-hazardous inert waste, electric/electronic waste, used tyres, and medical waste. The *Waste Management Plan* defers to the guidance provided in other management plans for cyanide wastes, waste rock, waste soil, and tailings. It provides guidance for the preparation and maintenance of a detailed waste inventory and waste minimisation plan for each major waste stream. In addition, it details processes for the collection, segregation, storage, and disposal of waste. Where third-party waste management contractors are to be used, the plan invokes a mandatory surveillance inspection process to ensure that the contractors exercise a similar level of control over their operations.

- **Water Management and Erosion Control Plan:** The *Water Management and Erosion Control Plan* (see **ESMS plans, Appendix C**) is the first iteration of a comprehensive description of the measures RMGC will implement to satisfy the objectives of the project as they relate to water management and erosion control. These objectives consist of minimising impacts to the environment while at the same time satisfying the operational water quantity and quality requirements over the life of the mine. The *Water Management and Erosion Control Plan* addresses the necessary elements of design, construction and operation of the facilities contemplated in the project for water management and erosion control. The water management portion of the plan describes how each facility will be used for water management purposes and provides plans and procedures for managing each facility in accordance with standard international mining practices and environmental standards. The erosion control portion of the plan is based on best management practices typical of major international mining operations. Monitoring and quality assurance/control activities associated with water and soil management(to prevent erosion) are also addressed.

- **Air Quality Management Plan:** The initial version of the *Air Quality Management Plan* is in **ESMS plans, Appendix D**, and describes the measures that will be taken to identify, monitor, and manage both ambient and workplace-related air quality

issues associated with the construction, operation, decommissioning, and closure of the mine, mill, selected roads, and other ancillary facilities.

- **Noise and Vibration Management Plan:** The *Noise and Vibration Management Plan* (see **ESMS plans, Appendix E**) describes the specific measures that will be applied, together with the RMGC *Occupational Health and Safety Plan,* to monitor and minimise, to the extent possible, the impacts of noise and vibration on both the surrounding community and the workforce.

- **Tailings Facility Management Plan:** The *Tailings Facility Management Plan* (**ESMS plans, Appendix F**) is the first iteration of the plan that RMGC will implement to minimise the risks associated with the operation of the Tailings Management Facility. The *Tailings Facility Management Plan* conforms to applicable international and Romanian standards and describes the overall design, construction, operation, monitoring, and closure of the Tailings Management Facility. It addresses the specific measures RMGC will employ to manage the facility in a safe and environmentally conscientious manner, both in the short term and over the life of the mining operation.

- **Cyanide Management Plan:** The *Cyanide Management Plan* (See **ESMS plans, Appendix G**) documents the measures RMGC will implement to minimise the risks to employees, adjacent communities, and the environment from the routine use of cyanide in the mineral extraction (milling) process. The *Cyanide Management Plan* conforms to the requirements of the *International Cyanide Management Code for the Manufacture, Transport, and Use of Cyanide in the Production of Gold* (International Cyanide Management Institute, May 2002), to which RMGC is a signatory.

The Cyanide Management Plan addresses the necessary elements of design, construction, and operation of RMGC facilities for the unloading and storage of cyanide, its use in the gold recovery process, and its eventual removal through a process plant-based detoxification process before the tailings are released to the Tailings Management Facility. Programs for employee safety and training are discussed, as are the necessary plans and procedures for responding to any potential cyanide exposure and the potential release of the chemical at the process plant site and adjacent chemical storage facilities. The plan underscores RMGC's commitment to the public disclosure of relevant cyanide-related information. It also requires that the manufacturers and transporters of all cyanide used on the project demonstrate, through appropriate means, that their activities are conducted in a safe and environmentally protective manner.

- **Biodiversity Management Plan:** The *Biodiversity Management Plan* (see **ESMS plans, Appendix H**) describes measures that will be taken by RMGC to conserve biological diversity within the project zone. Detailed baseline analyses conducted by RMGC as part of pre-construction activities revealed that the area is of low conservation priority; watercourses are severely degraded from historical mining operations and other causes; the area of natural forests is decreasing; and, populations of wildlife are dwindling.The intent of the *Biodiversity Management Plan* therefore extends beyond maintaining biological diversity to improving upon the existing ecological conditions, which have been degraded by centuries of mining activity.

  The *Biodiversity Management Plan* outlines the legal and regulatory framework pertinent to biodiversity conservation in Romania (including international conventions), and uses data derived from the *Ecological Baseline Report* (see

Baseline Reports, Appendix 7) to describe the existing conditions in the project area. Management measures to conserve and enhance local biodiversity revolve around specific restorative and rehabilitative activities include enhancing riparian habitats, planting of native species in the buffer zone, establishing a network of migration corridors, and relocating affected rare plants to suitable habitats. Interventions will be monitored and evaluated according to World Bank standards, so as to measure, and, if possible, improve the effectiveness of the *Biodiversity Management Plan* in actual practice.

- **Emergency Preparedness and Spill Contingency Plan:** The *Emergency Preparedness and Spill Contingency Plan* (see **ESMS plans, Appendix I**) is a comprehensive guidance document containing the first iterations of the measures RMGC will use to prevent, prepare for, and implement in response to emergency situations that could potentially occur during mining and mining-related activities. Prevention and preparedness is critical to RMGC's ability to minimise the extent and impact of emergency situations that may potentially occur. The *Emergency Preparedness and Spill Prevention Plan* is meant to operate in conjunction with existing community emergency response plans and the RMGC *Occupational Health and Safety Plan*. It conforms to the guidance of the UNEP *APELL for Mining: Guidance of the Mining Industry in Raising Awareness and Preparedness for Emergencies at Local Level,*[6] current European Union Council directives on the control of major accident hazards, as well as best management practices (BMPs) typically implemented by major international mining operations.

  The cornerstone of the *Emergency Preparedness and Spill Contingency Plan* is the RMGC "Major Accident Prevention Policy." The *Emergency Preparedness and Spill Contingency Plan* also addresses emergency response elements including identification of potential emergency scenarios, emergency response organisation and responsibilities, co-ordination with external/governmental emergency response organisations, emergency alarms and communication, emergency response procedures (including evacuation procedures), emergency response equipment, post-emergency mitigation, spill prevention, inspections, training, and drills for the operation of all Roşia Montana Project facilities.

- **Mine Rehabilitation and Closure Plan:** The *Mine Rehabilitation and Closure Plan* (**ESMS Plans, Appendix J**) presents the first version of a comprehensive plan for reclaiming mined areas and other areas affected by mining operations. This plan will be implemented concurrently with active mining operations as well as during the mine closure phase. The mine closure objectives and the design criteria that will be implemented during the mine closure phase are described as discrete elements of the plan. The closure and design objectives presented in the plan meet or exceed international and Romanian standards pertaining to mine closure and Rehabilitation. The *Mine Rehabilitation and Closure Plan* will be periodically reviewed and adjusted to accommodate changes in mining operations, regulatory requirements, and other factors affecting Rehabilitation or closure that may change over the life of the mine.

- **Public Consultation and Disclosure Plan:** The *Public Consultation and Disclosure Plan* (see **ESMS plans, Appendix K**) is designed to ensure that adequate and timely

[6] UNEP, 2001; *APELL for Mining: Guidance of the Mining Industry in Raising Awareness and Preparedness for Emergencies at Local Level*

information about RMGC activities is provided to the external stakeholder community; that sufficient opportunity is granted to stakeholders to present their questions and opinions, and to empower external stakeholders to make a meaningful contribution to the EIA process and its outcome, as well as a contribution to the project over its entire life cycle. The *Public Consultation and Disclosure Plan* provides the framework for the dissemination of information, the public consultation process, as well as disclosing the communication tools that will be used during the different phases of the project for each of the key stakeholders groups. The *Public Consultation and Disclosure Plan* will be kept current through the change management processes defined in the *Roşia Montana Project Environmental and Social Management Plan*.

- **Community Sustainable Development Plan (Plan L)** The aim of the Community Sustainable Development Programme (CSDP) is to contribute to creating a viable, comfortable Community in a beautiful well preserved natural setting under the principles of sustainable development. The CSDP contains a framework of initiatives, instruments and tools to create an enabling business environment for people in the Community to develop economically and environmentally sustainable businesses. The CSDP will be implemented by an independent Foundation set up by a grant from Rosia Montanã Gold Corporation and managed by a Board of Directors comprised of Community stakeholders. Crucial to the success of the CSDP is the proactive and prolonged involvement of people and stakeholders through the use of the tools offered by the CSDP for the benefit of the Community's future. The Foundation and the CSDP is designed to provide assistance and development support beyond the life of the mine and to be 100% independent of RMGC.

- **Cultural Heritage Management Plan:** The *Cultural Heritage Management Plan* (see **ESMS plans, Appendix M**) describes the measures that RMGC will take to protect the important cultural features in the Roşia Montana area. The *Cultural Heritage Management Plan* was prepared in accordance with Romanian law and World Bank Operational Policy Note 11.03: "Cultural Property" (World Bank, 1999) [7]which defines cultural property as including sites having archaeological (prehistoric), palaeontological, historical, religious, and unique natural features. The *Cultural Heritage Management Plan* documents information on the local people and culture, and provides a comprehensive summary of the historic and archaeological features of the project area (i.e. cultural landscapes; historical and protected buildings; churches and cemeteries; and other archaeological features.

  The *Cultural Heritage Management Plan* addresses the necessary measures for protecting these features, including: the approach to cultural properties management through the identification /protection of these properties(by situating the project parameters away from these structures) at the design stage. The *Cultural Heritage Management Plan* describes the various components of the archaeological program, including an Archaeological and Historical Features Database, and provides for *in situ* conservation and relocation/replication of important cultural features as well as measures compensating for the potential loss of individual gravesites. The need for rehabilitating cultural landscapes is also described, and is closely integrated with the *Mine Rehabilitation and Closure Plan* (see **ESMS plans, Appendix J**).

[7] World Bank, 1999; World Bank Operational Policy Note 11.03: "Cultural Property"

- **Environmental and Social Monitoring Plan:** As previously noted, the *Environmental and Social Monitoring Plan* (see **ESMS plans, Appendix N**) addresses the development and maintenance of a database documenting the planning, execution, and reporting requirements associated with all voluntary or regulation-based environmental or social issue-related monitoring requirements invoked for the Roşia Montana Project. The sources of these requirements include current environmental monitoring protocols; additional environmental and social monitoring parameters as identified by governing regulations; progress-monitoring requirements associated with actions related to the implementation of the management and mitigation measures recommended by the EIA process; and other monitoring requirements established by the *Roşia Montana Project Environmental and Social Management Plan* or the other individual management plans. Database updates are directly linked to the management review and subsequent document update processes described in Section 6.0 of the *Roşia Montana Project Environmental and Social Management Plan.*

10 References

The Equator Principles: An Industry Approach for Financial Institutions in Determining, Assessing and Managing Environmental & Social Risk in Project Financing, 4 June 2003; http://www.equator-principles.com/principles.shtml

International Cyanide Management Institute, May 2002; *International Cyanide Management Code for the Manufacture, Transport, and Use of Cyanide in the Production of Gold*

International Finance Corporation, June 1990; International Finance Corporation Operational Directive OD 4.30, “Involuntary Resettlement”

ISO 14001:2004, *Environmental management systems - Requirements with Guidance for Use*; International Organisation for Standardisation, Geneva, Switzerland, 2004

UNEP, 2001; *APELL for Mining: Guidance of the Mining Industry in Raising Awareness and Preparedness for Emergencies at Local Level*

World Bank, 1999; World Bank Operational Policy Note 11.03: “Cultural Property”