Explanatory Note no. 4.1 – Ptential Impact, Water

Contents:

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Detailed Contents:

1. Assessment of the impact on the Project and/or EIA Report due to the alteration of the relevant legal framework

Following an analysis of the current legal framework, compared to the legal framework existing at the date of preparing and submitting the EIA Report that was applicable to the Chapter entitled "Water", it has been acknowledged the fact that its evolution – considering here all the regulations (laws, ordinances and decisions issued by Romanian Government, orders, instruction, procedures or norms that have a technical approach issued by relevant ministers or by other authorities with regulating competencies) that are applicable to "water" environmental factor, it represents a direct and natural consequence of the evolution of the community legal framework and of the need to correctly and fully transpose the community *acquis* existing at the date of EIM Report within the national legislation. Among these regulations, the most important regulations stipulated under EIM Report within this chapter and that have been amended, we can mention the followings:

- Law no. 107/1996 – has been largely altered and amended through the Governmental Emergency Ordinance no. 3/2010, the alterations and amendments being justified by the legislation *expresis verbis* through the need to fully transpose the Directive 2000/60/EC[1] and by the need to transpose Directive 2007/60/EC[2].

The main alterations and amendments are stipulated for thoroughness purposes that were aimed in the impact assessment: the establishment of the National Plan on the Protection of Underground Waters against Pollution and Deterioration, the ban on storing wastes within protection areas, the alterations brought to the monitoring plans, introduction of a new chapter – risk management for flooding, and alteration of different annexes.

- Another law considered within the impact assessment that is clearly stipulated due to its relevance within the legislation framework is Law no. 458/2002 on the drinking water quality, as altered by the Governmental Ordinance no. 11/2010, and endorsed by Law no. 124/2010, where the main alterations are aimed at Annex no. 1 "Drinking water quality parameters" and Annex no. 2 "Control and Audit Monitoring". After studying the

[1] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, published in the Official Journal of the European Communities serial L, no. 327 of 22 December 2000.

[2] Directive 2007/60/EC on the assessment and management of flood risks entered into force on 26 November 2007, published in the Official Journal of the European Communities serial L no. 288 of 6 November 2007

alteration of these annexes, it results that the respective legislative alterations have no impact on the Project and/or on EIA Report;

- During the development of EIA Report, for the purpose of assessing the surface water quality, the standard values provided by STAS 4706/88 Standard and Order no. 1146/2002 issued for the endorsement of the Norms regarding the reference sites on ranking surface waters. The legislative alterations occurred on surface waters quality after the submission of EIA Report are included in Order no. 161/2006 issued for the endorsement of the Norm regarding the ranking of surface waters quality in order to establish the ecological state of water bodies. These alterations lead to the need to reassess the results depending on the quality class as defined by the abovementioned Norm.
- It is also mentioned the fact that another reference piece of legislation, Governmental Decision no. 100/2002 on the approval of Quality Norms of Surface Waters that are to be used for drinking and the Norm on the measurement methods and the frequency of sampling and assaying of the surface waters samples collected from waters that are aimed at producing drinking water, although formally it was altered, these alterations are not aimed in any way at the activities proposed through the Project, but only the way in which the competent public central authority reports towards the European Commission.

2. Updates of Chapter 4.1 – "Water"

2.1. Updates of Sub-chapter 1 – "Meteorology"

Data regarding precipitations as included in the baseline conditions study and obtained from National Weather Administration (ANM, the former National Institute of Meteorology and Hydrology – INMH) have been completed for the 2006-2010 period with fresh data from ANM – Regional Meteorological Center Southern Transylvania. The data have been measured at Rosia Montana Weather Station (Rotundu) and presented in the following table.

Monthly Precipitations (mm) - ROSIA MONTANA (01.01.2006-31.08.2010)

Data acquired from Rosia Montana Weather Station – Rotundu with respect to the Monthly Precipitations

Year	Year Total	January	February	March	April	May	June	July	August	September	October	November	December
(all values presented in mm)													
2006	**952.6**	**34.1**	48.6	122.9	125.2	107.5	130.5	105.0	171.7	37.3	30.6	20.8	18.4
2007	**867.8**	93.4	62.6	42.7	11.6	149.3	78.8	69.4	84.4	100.2	61.7	89.1	24.6
2008	**835.1**	17.9	14.6	109.0	70.0	81.1	80.8	154.6	33.2	58.4	65.4	70.6	79.5
2009	**816.2**	36.9	59.8	47.1	19.0	69.4	138.6	69.0	84.8	17.8	94.8	91.2	87.8
2010		99.5	47.2	38.8	67.9	146.8	127.8	141.6	42.4				
Maxima înregistrată	**952.6**	99.5	62.6	122.9	125.2	149.3	138.6	154.6	171.7	100.2	94.8	91.2	87.8
Minima înregistrată	**816.2**	17.9	14.6	38.8	11.6	69.4	78.8	69.0	33.2	17.8	30.6	20.8	18.4
Media înregistrată	**867.9**	56.4	46.6	72.1	58.7	110.8	111.3	107.9	83.3	53.4	63.1	67.9	52.6

After comparing the data obtained for the period comprised between 2006 and 2010 with the data presented in Table 4.1-2 "Precipitations (mm) in Rosia Montana and Abrud" from Chapter 4.1 "Water", one can note the fact that the average values recorded for this period are observing the variation interval for the data recorded between 1983 and 2005, as provided in EIA Report.

These variations of precipitations do not lead to the alteration of the designing parameters of the Tailings Management Facility (TMF) that is designed to retain two probable maximum precipitations (PMP) occurred within a 24 h interval; 1 PMP = 450 mm "Drobot-2004".
The updated drawings for precipitations are presented below:

Figure 4.1.2. (updated) – Monthly Precipitations at Rosia Montana (Rotundu Weather Station), 1983-2010

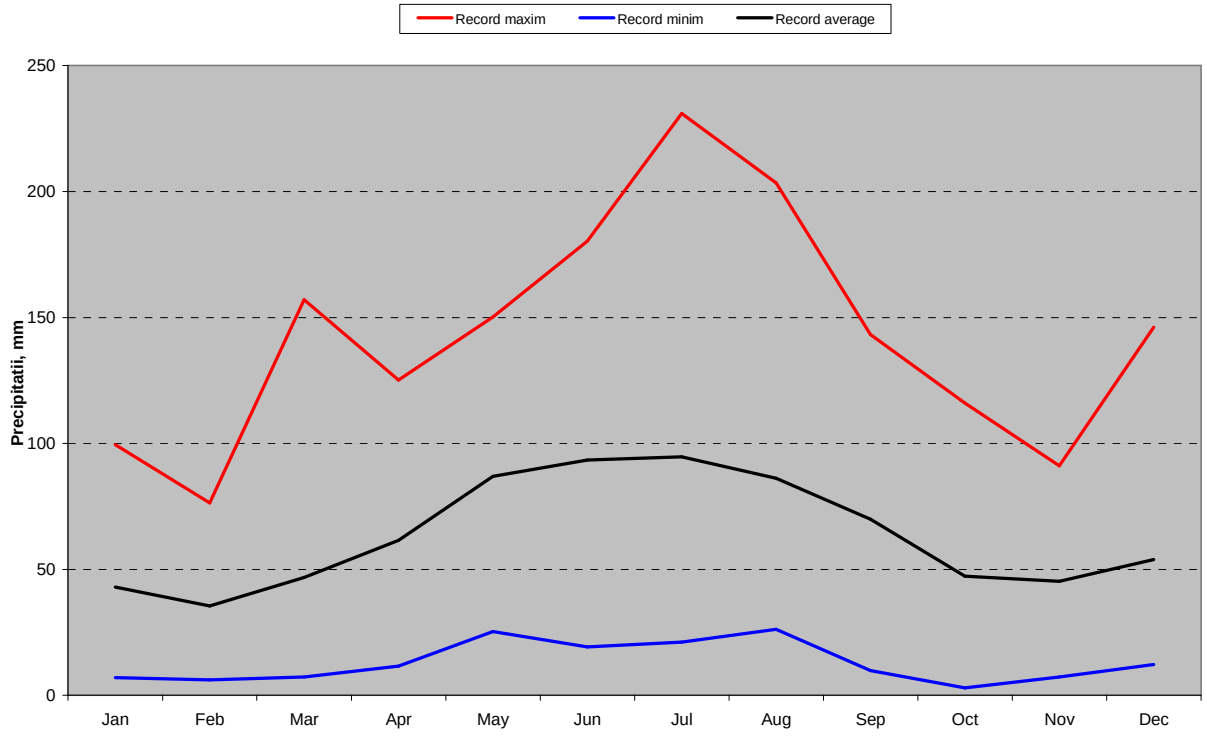


Figure 4.1.3. (updated) - Monthly Precipitations at Rosia Montana (RMGC Weather Station), 2001-2008

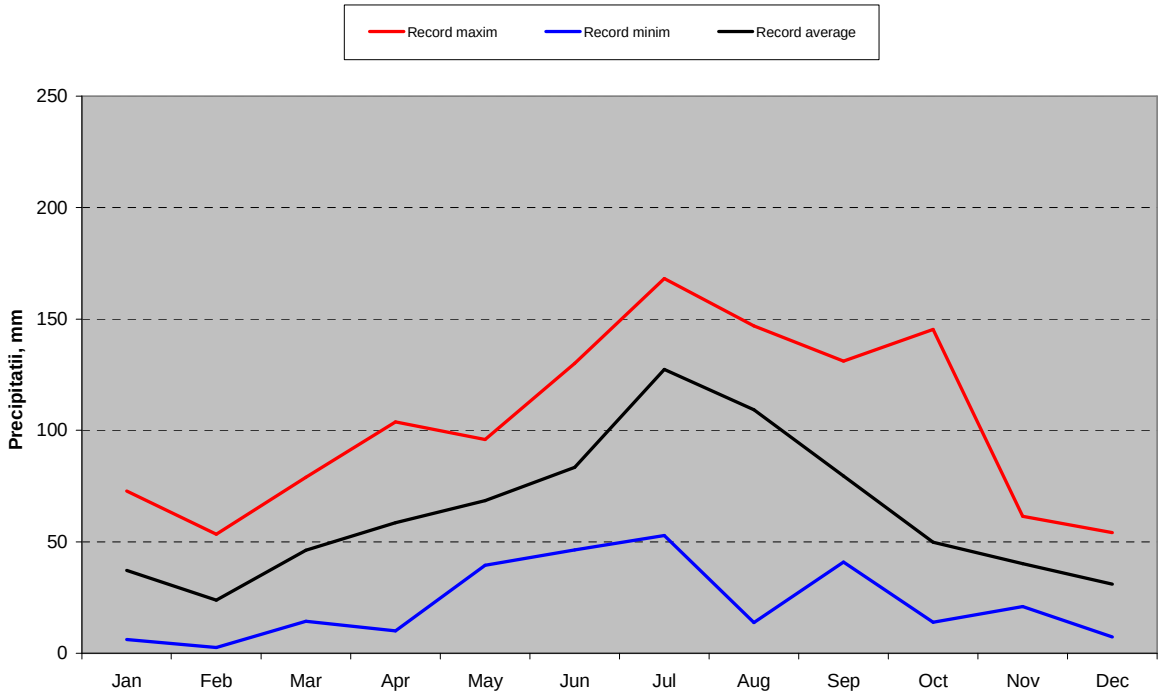


Figure 4.1.5. (updated) - Correlation between the monthly precipitations measured at Rotundu and RMGC Stations

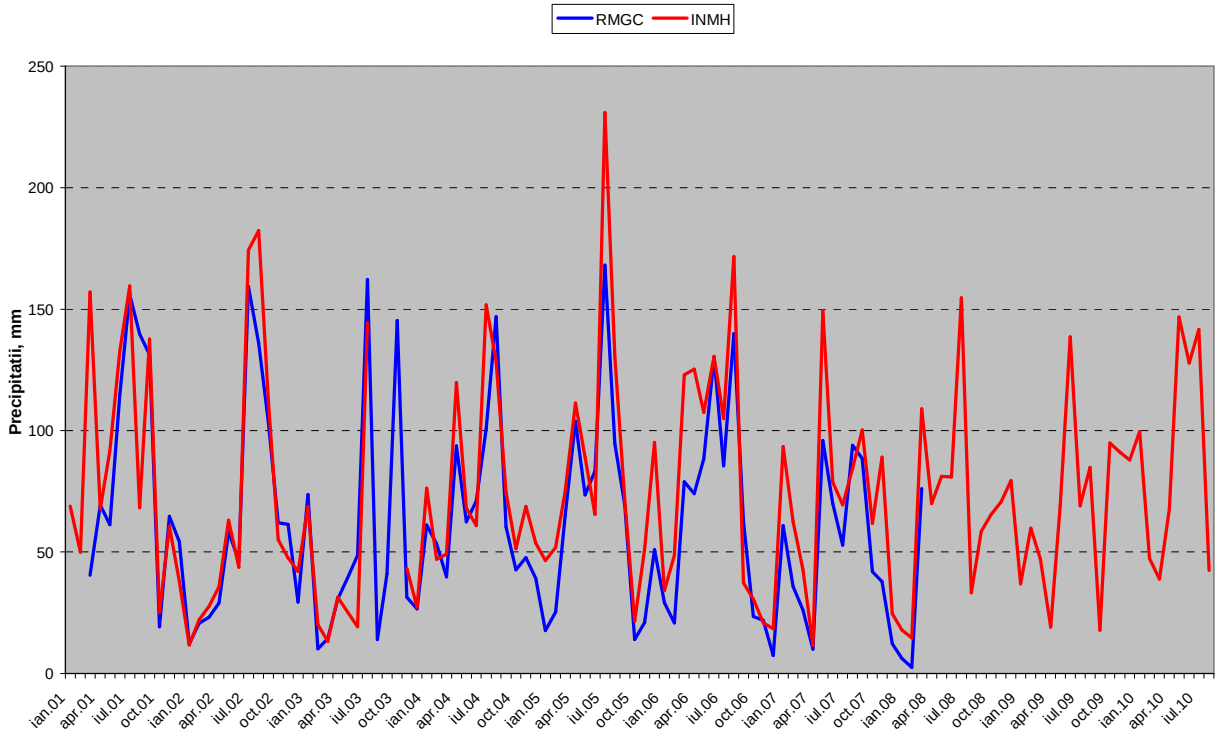
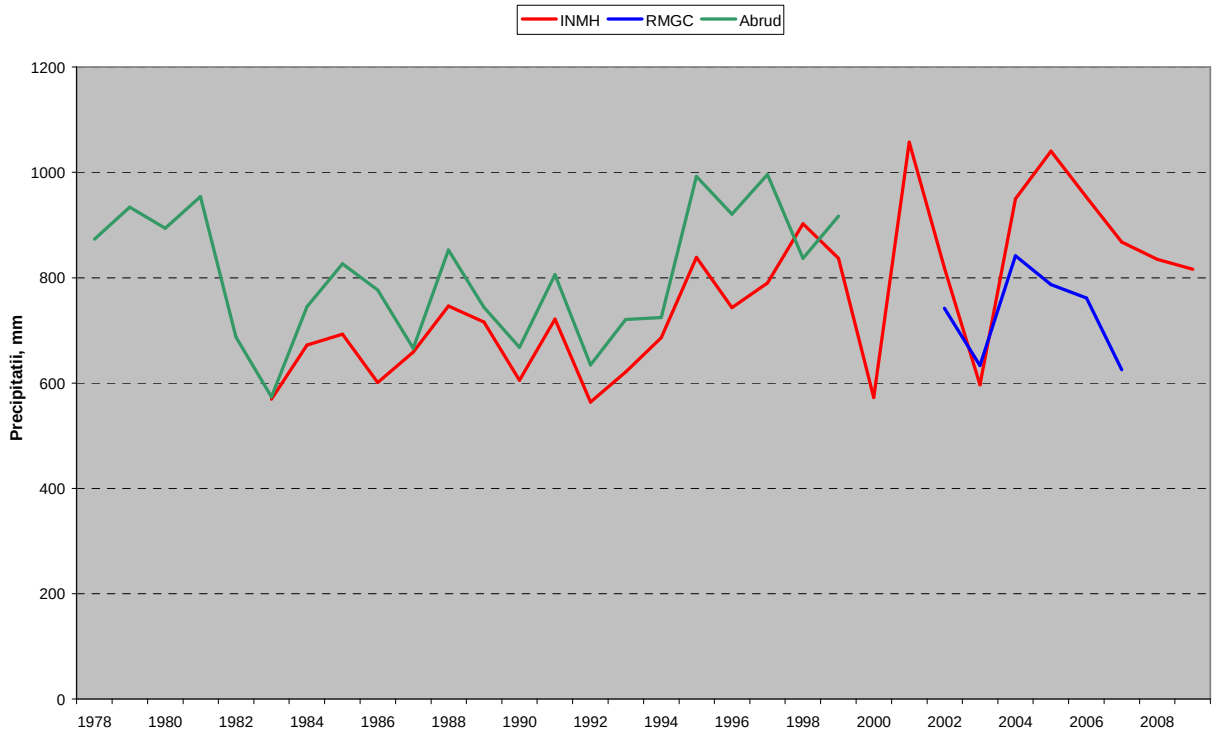


Figure 4.1.7. (updated) - Annual series of precipitation data



2.2. Updates of Sub-chapter 2 – "Surface Waters"

The study regarding water baseline conditions within the proposed site has been launched within the development process of EIA Report.

As presented under the EIA Report, the activities were launched in 2000 with an inventory of the water sources located within the Project's potentially impacted area. 380 locations have been inventoried within Rosia Montana, Corna, Bucium, Seliste, Abrud and on Aries River. Based on this inventory, a monitoring network for the water quality has been designed that consisted of 81 monitoring points (See Drawing 6.1 of Chapter 6 "Monitoring"). The monitoring has been conducted between 2003 and 2006, at 3 times per year and in 2007 at two times per year by a certified laboratory. 69 physical and chemical parameters have been analyzed within the monitoring process and they were inputted into a database.

Except for the physical and chemical assays, the flows of Rosia, Corna, Seliste and Abrud Valleys have been monitored.

All monitoring data have been initaly stored within a MS Access Database, and subsequently (in 2007) the database was created with Oracle – "ALWIS". The monitoring program was downsized starting with 2008 (due to the impossibility claimed by Ministry of Environment and Sustainable Development to continue the EIA procedure and the analysis of the quality of EIA Report of Rosia Montana Project); however, the monitoring of water quality within the main locations placed downstream of Rosia Montana Project continued.

Based on the monitoring data, the results of a study that has been updated in 2007 have been included in EIA Report so as to answer the questions raised during public disclosure process.

The monitoring of water quality continued throughout 2008 and 2010 at certain relevant sampling points so as to assess the impact of existing sources on the quality of surface waters. The results obtained within these monitoring campaigns together with all data resulted from the 2001-2007 monitoring process have been processed and they are presented under *Annex NE_Cap 4.1_01 – Quality of Surface Waters within Rosia Montana Project*. In principle, the sampling points considered to conduct the assessment of impacts of existing sources on surface water quality have been selected as follows:

- Step I: The water courses present within Project site have been selected, as follows: Rosia and Corna Streams, water courses that are under direct impact of the existing sources which are associated with the historic mining works and are also tributaries of Abrud River. Moreover, Abrud River has been selected in order to establish the influence of the pollutants carried by these tributaries.
- Step II: Monitoring points have been selected on these three valleys, upstream of the existing pollution sources and downstream at their confluence with Abrud River. Monitoring points have been selected on Abrud Ricer within the sections of the confluences, as well as before the confluence with Aries River. Moreover, a monitoring point has been selected on Aries River upstream of the confluence with Abrud River.

The monitoring program consisted of indicators that will allow framing the respective streams within the quality classes defined in accordance with Order no. 161/2006. The results emphasize the fact that the values of concentrations recorded by an indicator within a monitoring point have large fluctuations in time, and they do not allow identification of a particular trend.

The main issue identified consists of the fact that the presence of historic pollution sources is altering greatly the quality of surface waters, the modification of the quality class being observed mainly from class I (upstream of the pollution sources) to class III-V (downstream of the pollution sources) for all indicators. The most significant modification of surface waters quality has been noticed on Rosia Valley.

The results on water quality of Abrud River emphasize the powerful influence of the contaminants resulted from the historic pollution sources and carried by the three aforementioned tributaries, at least on the section downstream of the confluence with Corna and Rosia streams. The concentrations of pollutants lead to framing Abrud River in Quality Classes III – V for the relevant pollutants associated with the historic pollution sources located within Project site. Analyzing the timing of the pollutants, one can see that although the Rosia Montana Mine closed in 2006, the quality of local waters remained as polluted as

they are described within the EIA Report. After closure of Minvest – Rosiamin mine, no significant changes have been recorded for the water quality of surface waters that are impacted by the ARD resulted from the waste dumps (18 dumps) or from the underground galleries network that totals 140 km. The inappropriate quality of the water from Abrud River maintains until its confluence with Aries River. The results indicated a major difference between the qualities of these two rivers, Aries River being in general included in Quality Class I, having no major alterations of its quality conditions as it was presented under EIA Report.
In accordance with the Management Plan of Mures Drainage Basin (2009), the current chemical status of Abrud, Corna, Rosia and Bucium streams is considered as being poor, and the term for the improvement of its quality being established for year 2015. Implementation of Rosia Montana Project shall contribute to the significant improvement of water quality within Rosia and Corna streams by capturing and treating the acid waters generated from the current site, as well as from the proposed site that is practically overlapping the existing site and consequently shall contribute to the improvement of water quality of Abrud River.

2.3. Updates of Sub-chapter 3 – "Underground Waters"

The flowing of underground waters has been monitored through the use of several piezometers installed within Project area.
The hydrologic baseline conditions prepared in 2005 has been updated in 2007 so as to answer the questions raised during the public consultation and disclosure stage.
The observation hydro-geological drillings (piezometers) presented under Annex C of the Hydro-geological baseline conditions study for the period comprised between 2001 and 2008 have been conducted so as to establish the level of the underground waters within all piezometers installed within Project perimeter, as well as the correlation between the flows of the water sources (measured by using hydrographs) and the level of the underground water in the piezometers installed within the impact area of these water courses; they have been also updated and presented under *Annex NE_Cap 4.1_02 – Hydro-geological Observation Drillings* Rosia Montana.
The continuous monitoring of underground waters from qualitative and quantitative points of view after May 2006 when the EIA Report has been sent to competent environmental authorities has not emphasized major changes of the monitored parameters with respect to the information presented already under the EIA Report.

2.4. Updates of Sub-chapter 4 – "Waste Waters Management"

In order to establish the ARD potential of the rocks located on the site of the future Project, 26 rock samples have been collected that have been placed in plastic vessels and exposed to environmental factors.

Periodically, within several semester monitoring campaigns, water samples were collected from the water washing the exposed rocks under similar environmental conditions with the conditions existing within the Project license perimeter in order to discover the ARD potential. Following the researches that have been conducted during those 5 years, several data resulted that were relevant within the characterization of the ARD potential. A summary of the results of the research has been presented within the EIA Report, Chapter 4, Section 4.5 Geology. The monitoring continued also after completing and submitting the EIA Report with the environmental authority (at a slower pace between 2008 and 2010), but no significant changes have been recorded for the monitoring parameters that have been presented in the summary/conclusion from EIA Report. The results of the physical-chemical tests conducted between 2003 and 2008 are managed within a database periodically audited. Under *Annex NE_Cap 4.1_03 – ARD potential of rocks from different areas of Rosia Montana Project* – the updated status of monitoring of each sample/indicator analysis of ARD potential is presented.

Following the concerns raised by the stakeholders during public consultation and disclosure stage conducted within July and August 2006 or by the CAT members within the meetings organized in July-August 2007, concerns/observations referring to the supply of additional information/details on acid waters treatment technology as described within EIA Report chapters 2 and 4.1 respectively, a decision was taken in 2007 to continue researches in order to optimize the treatment technology of mine waters that have ARD potential, and the researches have been developed with the stages of laboratory testing up to pilot testing. Laboratory researches/testworks have been developed during 2010 with 2 partners: a Romanian company (ECOIND) and a German one (WISUTEC).

The results of the physical and chemical tests conducted on waste waters treated by using this technology have confirmed the fact that the solution proposed by RMGC within its EIA Report is appropriate for the intended aim, i.e. to make the quality of the treatment station effluent compliant with the maximum values accepted under NTPA-001 of Governmental Decision no. 188/2002, amended and altered through Governmental Decision no. 352/2005.
The treatment technology, tested at pilot scale, whose efficiency has been confirmed by the physical and chemical tests on the effluent, shall mainly consist of the following technological steps:

1. Oxidation and precipitation with lime to remove metal ions
2. Settling and discharging precipitation sludge
3. Precipitation with ettringite to remove calcium ions and sulphates
4. Neutralization by using CO_2 barbotation
5. Settling and precipitation sludge filtering

2.5. Updates of Sub-chapter 8 – "Monitoring"

The monitoring program of the environmental factor entitled "water", as it was presented under section 8 of sub-chapter 4. 1 "Water" has not been altered/updated to reflect the provisions under current in force regulations; the following notes need to be made:

- Monitoring the underground water quality and the assessment of that quality have been conducted in accordance with provisions of Drinking Water Law no. 458/2002 amended and altered by Law no. 311/2005 and Law no. 124/2010.
- The strategy of monitoring the quality of surface waters and their quality assessment have been prepared based on the provisions of the Minister's Order no. 161/2006 issued for the endorsement of the Norm regarding the ranking of surface water qualities in order to establish the ecologic status of water bodies.
- The monitoring plan of the quality of the industrial and urban waste waters that have been released in natural receptors and the assessment of their quality has been prepared based on the provisions under Governmental Decision no. 188/2002 amended and altered through Governmental Decision no. 352/2005, NTPA 001. The monitoring indicators and the assaying methods established to conduct the physical and chemical assays on surface and underground waters collected during the monitoring program are presented in Table 4.1-22. of Chapter 4, sub-chapter 4.1 "Water" of EIA Report and updated with the standards used for physical – chemical assays and their detection limits (The updated table is presented under Explanatory Note to Chapter 6 – Monitoring – Table 6.2).
- The indicators and the methods shall be periodically assessed and updated as the case may be, in parallel with the periodic assessment and the updates of the Environmental and Social Monitoring Plan. The analytical data are inputted into RMGC Environmental Database so as to allow identifying and addressing any typos and data reporting, as well as the trends recorded by the indicators at every sampling point or group of sampling points.