

Emergency Preparedness and Spill Contingency Plan

APPROVED
GENERAL MANAGER

Emergency Preparedness and Spill Contingency Plan

AUTHORIZED by:

Executive Director,

**Permitting, Compliance and
Management Systems Director**

ROȘIA MONTANĂ
2nd Issue /2006

TABLE OF CONTENTS

Table of Contents	3
1 Chapter I - General INFORMATION	6
1.1 Scope	6
1.2 Domain	6
1.3 Legal framework	6
1.4 Definitions	6
2 Chapter II – Technical Report	8
2.1 User Identification Data	8
2.2 Location. Scope of Activity [09], [11]	8
2.3 Water Supply [10], [18]	9
2.3.1 Drinking Water Supply	9
2.3.2 Process Water Supply	10
2.4 Wastewater Treatment Plants, and discharge sewers for domestic, industrial and storm waters [10], [18]	10
2.4.1 Domestic and industrial wastewaters	10
2.4.2 Storm Waters	11
2.5 Decision of the company management to appoint a spill control team [01]	11
2.6 Main elements of accidental spills [01]	11
2.7 Action in case of accidental spill occurrence or in the event of imminent pollution of water resources	11
2.7.1 Emergency Preparedness and Spill Contingency Plan [01]	11
2.7.2 The Spill Warning System	11
3 Chapter III - EMERGENCY PREPAREDNESS AND SPILL CONTINGENCY PLANS for each activity sector or field	13
3.1 Brief technical summary presenting installations that might generate accidental pollution.	13
3.1.1 The Spill Warning System presented in the accidental spill warning procedure... ..	13
3.1.2 Action of the spill prevention and control responsible personnel	13
3.1.3 Spill prevention measures and related activities	13
3.2 Critical Point area plan	13
3.3 Process chart with indication of critical points	13
APPENDICES	14
Annex No. 1 METHODOLOGY oN developing EMERGENCY PREPAREDNESS AND SPILL CONTINGENCY PLANS	15
Appendix No. 2 OPERATIONAL PROCEDURE FOR THE SPILL WARNING SYSTEM. ..	17
Appendix No. 3 LOGICAL SCHEME FOR THE PROCEDURE REGARDING THE WARNING SYSTEM IN CASE OF ACCIDENTAL POLLUTION	22
Appendix No. 4	24
References	72

Tables

Table No. 1	COMPOSITION OF THE ACCIDENTAL SPILL CONTROL TEAM [01], [16], [21]	26
Table No. 2	LIST OF COMPANY CRITICAL POINTS THAT MIGHT GENERATE ACCIDENTAL SPILLS [01], [10], [11], [12], [19], [20], [21].....	31
Table No. 3	POTENTIAL POLLUTANT SHEET [01], [06], [07], [17], [20]	37
Table No. 4.0.0	MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (B) On-Site transport [01], [11], [12], [16], [21].....	42
Table No. 4.0	MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (A) Mine areas [01], [11], [12], [16], [21]	43
Table No. 4.1	MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS for: (C1) Sodium cyanide solution storage tank [01], [11], [12], [20].....	44
Table No. 4.2	MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C2) Hydrochloric acid storage tank [01], [11], [12]	45
Table No. 4.3	MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C3) Leaching tanks [01], [11], [12], [20].....	46
Table No. 4.4	MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C4) Tailings Thickener [01], [11], [12], [20].....	47
Table No. 4.5	MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS for: (C5) DETOX Cyanide Neutralization Facility [01], [11], [12], [20].....	48
Table No. 4.6	MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C6) Rich solution storage tank [01], [11], [12], [20]	49
Table No. 4.7	MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C7) Metabisulphite solution storage tank; Copper sulfate solution storage tank [01], [11], [12]	50
Table No. 4.9	MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C9) Sodium hydroxide solution storage tank [01], [11], [12].....	51
Table No. 4.10	MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C10) Lime residue storage tank [01], [11], [12]	52
Table No. 4.11	MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C11) Wet grinding [01], [11], [12], [20].....	53
Table No. 4.12	MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C12) Desorption Area [01], [11], [12], [20]	54
Table No. 4.13	MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C13) Process water storage tank; Sodium Hypochlorite storage containers [01], [11], [12], [20]	55
Table No. 4.14	MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C14) ARD Neutralization Plant – Lime Residue Reactor; Decantation Basin [01], [11], [12]	56
Table No. 4.15	MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C18) Fuel storage tank [01], [11], [12]	57
Table No. 4.16.a	MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C19) Cyanide solution handling systems ; Cyanide containing slurry handling and/or preparation systems ; Cyanide containing solution/suspension handling systems - (pipes, connections, pumps) [01], [11], [12], [20]	58
Table No. 4.16.b	MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C19) Hydrochloric acid solution handling systems; Sodium hydroxide solution handling systems (pipes, connections, pumps) [01], [11], [12]	59
Table No. 4.17	MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (D) Slurry mains; Settled water transport pipe from the TMF; ARD transport pipe	

from Cetate Water Catchment Dam to the Neutralization Plant (ARD) [01], [11], [12], [18], [19], [20], [21] 60

Table No. 4.18 MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (E) The TMF [01], [11], [12], [18], [19], [20], [21]..... 61

Table No. 4.19 MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (F) Cetate Water Catchment Dam [01], [10], [11], [12], [18], [21]..... 62

Table No. 4.20 MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (G) Waste rock stockpile [01], [10], [11], [12], [18], [21]..... 63

Table No. 5 COMPOSITION OF RESPONSE TEAMS FOR [01] 64

Table No. 6 List of necessary facilities and equipment in stopping accidental spills [01], [21]65

Table No. 7 Annual training schedule for the workers in critical points and response teams [01], [16], [21]66

Table No. 8 MANAGEMENT RESPONSIBILITIES [01], [16], [19], [21] 67

Table No. 9 LIST OF UNITS THAT PROVIDE ASSISTANCE IN CASE OF ACCIDENTAL SPILLS 68

Table No. 10 List of potentially impacted downstream users..... 69

Table of updates and revisions..... 71

1 CHAPTER I - GENERAL INFORMATION

1.1 Scope

An Emergency Preparedness and Spill Contingency Plan is developed in order to protect water resource quality. [01]

1.2 Domain

An Emergency Preparedness and Spill Contingency Plan is developed by any potential polluting user or for uses where events may cause accidental pollution of the water resource. [01], [02], [03]

The Emergency Preparedness and Spill Contingency Plan is an integral part of the Water Management Permit issued by "Administrația Națională Apele Române" (RoWater) or its local branches. [02]

1.3 Legal framework

- **The Emergency Governmental Ordinance No. 195 /2005** as amended on environmental protection;
- **Law no. 107/1996-** Water Law, amended by **Law no. 310/2004** and **Law no. 112/2006** ;
- **The Order no. 638/2005 of the Ministry of the Environment and Water Management and Order no. 420/SB/2005 of the Ministry of Administration and Interior** on the approval of the Regulation regarding the management of emergency situations caused by floods, hazardous meteorological events, accidents involving hydrotechnical structures and accidental pollutions and for the approval of the Framework for the purchase of materials and devices used for protection against floods, winter emergencies and accidental pollution
- **Order 278/1997 of MEWM** on the approval of the framework methodology for the drawing up of plans to prevent and fight accidental pollution caused by the use of potentially polluting water
- **Government Decision nr. 2288/2004** on the approval of the assignment of responsibilities undertaken by the ministries, other central institutions and non-governmental organizations regarding the prevention and management of emergency situations;
- **The Emergency Governmental Ordinance 21/2004** on the national management system for emergency situations
- **Order 161/2006 of MEWM** on the approval of the standard regarding a classification of surface water quality with a view to assessing the ecological state of water bodies

1.4 Definitions

Accidental pollution – any change of the physical, chemical, biological or bacteriological properties of water caused by an accident, failure, or other similar factor, following an error, omission, negligence or natural calamity and making the water improper for the same use as prior to pollution. As a rule, accidental pollution is high intensity and short term. [01]

Accidental pollution of surface and underground water resources is a type of risk that generates **emergencies**. [03]

State of emergency – exceptional, non-military event, that by its size and intensity, poses a threat to the life and health of the population, the environment, important material and cultural assets, and where the re-establishment of normality requires the adoption of urgent measures and actions, allocation of additional resources and consistent management of the deployed forces and facilities . [05]

Management of emergencies generated by accidental spills – identification and monitoring, stakeholder notification, public warning, assessment, containment, removal or mitigation of risk factors [03]

State of alert – refers to immediate implementation of action plans and preventive measures, public warning, containment and removal of the consequences generated by an emergency; [05]

Critical points – points within the facility where products spills may occur (semi-processed, intermediate substance in various process stages, final products, fuels or other solid or liquid materials) that, once penetrating into the water network , water supply system, sewerage systems, in the soil or discharge into natural receptors might cause accidental pollution; [01]

Potential pollutants – substances that may cause pollution; [02]

State of alert in case of an accidental spill – a state declared in cases of imminent threat or occurrence of water resource pollution and refers to immediate implementation of action plans and preventive measures, public warning, containment and removal of an accidental pollution; [01], [05]

Prevention and control of the consequences of water resource accidental pollution – all the measures and actions involving: preventive measures, response preparedness and control structures and devices, operative action in tracking the pollution wave, containment, collecting, treatment and destruction of the pollutants, measures to resume the normal situation and the ecological balance.[01], [02], [03]

2 CHAPTER II – TECHNICAL REPORT

2.1 User Identification Data

User: RMGC

Water user: RMGC

Address: Piata Street, No: 321, Roşia Montană-517615, Alba County, Romania

SRN: Commercial Register:

Telephone: Fax :

Hotline:

Watercourse collecting the wastewater discharges (please specify cadastre code):

- Corna Stream - IV-1.081.10.02.00.0
- Roşia Montană Stream - IV-1.081.10.04.00.0
- Abrud River - IV-1.081.10.00.00.0

Water user cadastre code: will be determined by SGA Alba, only after the completion of waterside or water-related facilities and/or commissioning thereof

2.2 Location. Scope of Activity [09], [11]

RMGC is located in the jurisdiction of Roşia Montană Commune, and Abrud Town, Alba County, in the watershed of Abrud stream, a right-hand side tributary of the Arieş River.

The Company is accessible through DJ 742 from DN 74 Alba Iulia – Abrud - Brad (via Corna) and DN 74A Abrud – Câmpeni (via Roşia Montană). DN 74A road provides connection to DN 75 Turda – Oradea.

The scope of activity is gold and silver exploration and mining on the Roşia Montană site (in the Metaliferi Mountains) and the metallurgical processing of such ores.

The Process Flow mainly consists of the following processes, in Company owned production capacities:

- Open cast mining works in four pits, (Cetate, Cârnic, Orlea, Jig), of which the first three already contain old mining works.
 - Ore extraction, by blasting in drilled holes
 - Loading by large capacity excavators and front-end loaders with 19.5 m³ bucket capacity and on-site transportation of the ore from the mine to the processing plant, waste rock stockpiles or low grade ore stockpiles in 150t trucks.
 - Water drainage in the open cast mines via drainage cannels, drainage wells and sub-horizontal gravitational drains
- Ore preparation, at the Processing Plant, in order to extract the metal (gold and silver) content by conventional cyanide leaching processes, electrolytic metal recovery and metallurgical processing of gold and silver alloy (doré) ingots.

A. Main processes

- Grinding and Classification of extracted ore
 - Single stage crushing of Run of Mine (ROM) ore by means of a gyratory crusher;
 - Wet grinding using a semi-autogenous grinding (SAG) mill in step I followed by two ball mills in parallel in step II)
 - Ground material grading by hydro-cyclons and volumetrically;
 - Metal extraction using the cyanide leaching technology (CIL procedure)
 - Sodium cyanide leaching of the ground ore, in the CIL tanks;
 - Gold and silver adsorption on activated carbon, within the CIL tanks;
- Gold and silver elution-stripping on the activated carbon, and storage of the rich solution
 - Hydrochloric acid washing in acid rinsing towers, of the activated carbon with the adsorbed metals, to remove calcium deposits;
 - Precious metal stripping from the activated carbon surface in elution towers, with alkaline cyanide solution and direction of the leached solution to the concentrate elute tank.
 - Activated carbon regeneration, within reactivation furnaces;

- Recovery of gold and silver from the concentrated elute
 - Concentrated elute processing by electrolysis, with stainless steel electrodes;
 - Electrode washing under water jet and press filter dehydration of the resulting sludge;
 - Thermal recovery of the mercury from the filter cake, in a mercury retort;
 - Metallurgical processing of the precipitate containing precious metals in the retort, by melting in induction electrical furnaces;
 - Doré ingot pouring and recovery of the resulting melting slag
- Tailings thickening and transportation to the neutralization plant;
 - Mixing of tailings slurry from the CIL leaching circuit with flocculants (Magnafloc 155), to facilitate settling of solids;
 - Directing the resulting overflow to the wet grinding circuit, in order to recover and reuse the cyanide content;
 - Directing thickened tailings to the neutralization (DETOX) plant;
- Tailings slurry detoxification using the SO₂/air oxidation INCO process,;
 - Dilution of the thickened slurry with water from the wastewater treatment plant;
 - Treatment of slurry with SO₂ provided as a metabisulphite solution and compressed air bubbled into the plant reactors;
 - Providing the catalytic copper ions for the oxidation reaction, by adding copper sulfate solution;

B. Auxiliary processes

- Transport of materials, final products and wastes
 - Transport from the suppliers to site;
 - Transport from the site to beneficiary;
 - On-site transport;
 - Pipe tailings transport
 - Solid (domestic and industrial) waste transport outside the site
- Energy and utilities services
 - Water supply – water catchments, water treatment plants, water transport systems;
 - Electricity supply
 - Fuel supply;
 - Domestic wastewater discharge – domestic sewers, storm water drains and Wastewater Treatment Plant (WWTPs);
- Storage of materials, final products and wastes
 - Cyanide storage;
 - Various reagent storage;
 - Explosives storage;
 - Fuel and lubricant storage
 - Heating Plant fuel storage
 - Mercury storage;
 - Low grade ore storage – in low grade ore stockpiles;
 - Waste rock disposal – in waste rock stockpiles;
 - Tailings disposal - into the Tailings Management Facility (TMF)

2.3 Water Supply [10], [18]

2.3.1 Drinking Water Supply

Intake installations and sources:

- The drinking water source is the same as for the process water, respectively the Aries River;

Treatment installations

- Treatment of some fresh water after softening will be provided in a drinking water treatment plant including filtering, chlorination and ultraviolet treatment;

Supply facilities

- Pumping station, drinking water storage tank, distribution system for internal users.

2.3.2 Process Water Supply

Abstraction sources and installations

Process water supply sources include:

- a) Arieş River, via a riverbed intake upstream of the confluence with the Abrud river, respectively a seepage gallery below the river bed, directing the water into the admission chambers of a pumping station;
 - A pumping station to direct the water to the site, located in the intake area, and equipped with three pumps, each having a 175 m³/h pumping rate;
 - Steel pipe for fresh water transport from the pumping station to the Process Plant, 250 mm in diameter and 11.6 km long;
 - Fresh water tank, located inside the Processing plant, 40 m in diameter and 12 m high – with a volume of 15,000 m³;
- b) Settled water circuit from the Corna Valley TMF endowed with floating hydraulic pumps located on the TMF lagoon and directing the settled water to an auxiliary pumping station, and into the technological water (process water) tank located into the Process Plant, through a 1.6 km long PN 8 HDPE pipeline;
- c) The Cetate Water Catchment Dam (maximum capacity of 508,000 m³), endowed with floating hydraulic pumps that direct the Acid Rock Drainage (ARD) to the Acid Rock Drainage/ Wastewater Treatment Plant (ARD/WWTP) located into the Process Plant, through a main pipeline, 356 mm in diameter and 1.8 km long ;
- d) Drainage collection dam on Cârnic stockpile, having a maximum volume of 10,000 m³, where the water gets pumped to the WWTP;
- e) Storm water retention dam in the Processing Plant, having a maximum storage volume of 16,500 m³, where the water gets pumped to the Processing plant, in order to be used in the process;

Treatment installations

- a) Fresh water from the Arieş River
 - – Filter, softening installation
 - Softened water storage tank
- b) Recycled process water from the tailings management facility is not additionally treated before storage into the process water tank ;
- c) Cetate Water Catchment Dam' water is treated at the ARD/WWTP by neutralization/ precipitation using lime slurry
- d) Water from the Cârnic Waste Rock Drainage Pond is treated at the ARD/WWTP
- e) Water from the storm water retention dam at the Processing Plant is not treated, and is used for tailings dilution prior to pumping into the TMF;

Supply facilities

- a) Pumping stations, storage tanks, internal users distribution system

2.4 Wastewater Treatment Plants, and discharge sewers for domestic, industrial and storm waters [10], [18]

2.4.1 Domestic and industrial wastewaters

- a) Domestic wastewaters will be directed through the domestic WWTP and then discharged into the TMF through a connection to the neutralized slurry TMF discharge pipe;

- b) Acid Rock Drainage (ARD) from historic mine operations, waste rock piles and low ore stockpiles of the operating mines, after passing through the WWTP will be discharged either into the Corna or the Roşia Montană Valleys, should additional water be needed to ensure the ecological flow;
- c) Wastewaters from the cyanide leaching circuit will be discharged into the TMF once with the DETOX neutralized slurry and then recycled into the process water supply system;
- d) Settled water from the TMF will be recycled as process water and discharged into the Corna stream after treatment in a secondary cyanide treatment plant only in case of extreme weather conditions, i.e. occurrence of two consecutive Maximum Probable Precipitation events.

2.4.2 Storm Waters

- a) Storm waters on the Process Plant area will be collected into a retention dam located on the site, in order to be used, without treatment, in the grinding process.
- b) Surface storm water drainage from the two slopes of Roşia Montană valley and underground drainage through historic galleries are collected in the Cetate Dam, and then treated at the ARD/WWTP.
- c) Storm waters on the Cărnic area are collected into the Cărnic drainage pond and directed to the ARD/WWTP.
- d) Storm waters from areas adjacent the TMF will be collected into the TMF.
- e) Storm waters off site are diverted by drains, so as to circumvent the site and potentially contaminating areas, then gravitationally discharged into the Roşia Montană and Corna streams, downstream of the two dams.

2.5 Decision of the company management to appoint a spill control team [01]

The General Manager will sign a decision on the establishment of the emergency preparedness and spill contingency team, which will be attached to this plan.

A table listing the nominal composition and responsibilities of this team shall be attached to this decision. (**Table No. 1**)

2.6 Main elements of accidental spills [01]

- Critical Points – water pollution (**Table No. 2**)
- Potential pollutants – presentation sheets (**Table No. 3**)

2.7 Action in case of accidental spill occurrence or in the event of imminent pollution of water resources

2.7.1 Emergency Preparedness and Spill Contingency Plan [01]

Methodology for the development of Emergency Preparedness and Spill Contingency Plans

The methodology shows how to develop an Emergency Preparedness and Spill Contingency Plan for each sector or field of activity involving accidental spills, as per **Annex No. 1**, based on an inventory of the activities, work places, and installations identified as Critical Points in **Table No. 2**, and the potential pollutant sheets presented in **Table No. 3**;

*General Site Plan of the Company, with the location of the main facilities 1:25000 scale (**Plan no. 1**)*

*General process flow chart, with critical point location (**Plan no. 2**)*

2.7.2 The Spill Warning System

Presentation of the operational procedure for the Spill Warning System (POM) (Annex no.2)

Flow chart of the procedure for the Spill Warning System (Annex no.3)

Table containing designated persons on various levels of responsibility in the Company that need to be notified in case of spill occurrence (Table no. 1) and in every activity sector or field (Table no. 8)

Table of competent authorities that need to be notified in case of accidental spill occurrence (Annex no. 4)

Table of the support providing units in case of accidental spill occurrence (Table no. 9)

Table of downstream units that may be impacted by accidental pollution (Table no. 10)

3 CHAPTER III - EMERGENCY PREPAREDNESS AND SPILL CONTINGENCY PLANS FOR EACH ACTIVITY SECTOR OR FIELD

3.1 Brief technical summary presenting installations that might generate accidental pollution.

3.1.1 The Spill Warning System presented in the accidental spill warning procedure

3.1.2 Action of the spill prevention and control responsible personnel

- a) Remove the causes of spill generation in order to stop pollution
- b) Contain spreading
- c) Remove pollutants
- d) Collect, transport and intermediate environmentally safe storage (Tables No. 5, 6, 7, 8)

3.1.3 Spill prevention measures and related activities (Table No. 4)

3.2 Critical Point area plan

3.3 Process chart with indication of critical points

Note: This chapter to be detailed based on the detailed technical projects, the completion of the SOPs and the final organizational structure upon commissioning. In finalizing, detailed major accident scenarios of extreme impact on local water resources and downstream propagation will also be developed.

APPENDICES

Table No. 1 - Composition of the accidental spill control team

Table No. 2 - List of Critical Points that might generate accidental pollution

Table No. 3 – Potential pollution sheets

Table No. 4 - Scheduled measures and activities for the prevention of accidental spills

Table No. 5 - Composition of response teams

Table No. 6 – List of necessary facilities and equipment in ceasing accidental spills

Table No. 7 – Annual training schedule for the workers in critical points and response teams

Table No. 8 – Management responsibilities

Table No. 9 - List of the support providing units in case of accidental spill occurrence

Table No. 10 – List of potentially impacted downstream users

ANNEX NO. 1 METHODOLOGY ON DEVELOPING EMERGENCY PREPAREDNESS AND SPILL CONTINGENCY PLANS

Based on the need to organize spill prevention and control activities, under the relevant laws, for the facilities that use water or conduct water-related operations, Emergency Preparedness and Spill Contingency Plan (PPCPAs) have to be developed and/or updated, as the Company is a potential polluter of the local water resources, with regional and, under extreme conditions, even transboundary impacts.

In this regard, activities, sectors of activity (work places) and installations –called Critical Points – that may cause accidental pollution to the environmental factor **WATER** have to be inventoried and reviewed.

Consideration must be given to all installations, permanent and temporary storage facilities of substances and materials used in the technological processes, permanent and temporary waste disposal facilities for company generated waste, where product loss might occur and cause accidental pollution of ground or surface waters if in any way washed into wastewater or storm drainage sewers, or into natural watercourses.

Based on this inventory, Critical Points will be established and included in the Company PPCPA making the object of specific plans.

Critical Point inventory shall be made by the environmental responsible personnel of the respective activities or sectors, while Critical point review and establishment in view of specific plan development must be conducted by the Environmental Department together with the Technical Management of the Company.

Once Critical Points have been established, the specific Emergency Preparedness and Spill Contingency Plan for each activity or sector of activity will be developed.

Each specific PPCPA shall include:

1. **Technical Summary** – brief presentation of the activity/sector, and of the Critical Points where spills might occur, and how to act in case of accidental spill, as follows:
 - Specify that the warning system for accidental spill is that presented in the Operational Procedure on Warning, a procedure that must be analyzed with the entire personnel.
 - Show how the spill control personnel will act and what they will have to do in order to:
 - Remove the causes of the spill;
 - Contain the spread of pollutants;
 - Remove the contaminants by using adequate technical devices;
 - Collect, transport and temporarily safely store the pollutants for further use or neutralization/disposal, as applicable.
2. **Tables** – fill out Tables 1 – 8 of. MO 278/1997
3. **Layout Plan** – A4 format presentation of a plan showing the location for which the plan was designed (to include sections, workshops, access ways, sewerage systems and drains, etc.)
4. **Process flow** – A4 or A3 format presentation of the process flow in the installation, with indication of critical points.

This methodology will be communicated to the coordinators of all activities and sectors of activity in the Company that may cause accidental spills.

The Environmental Department shall provide additional information on how to develop correct specific plans whenever necessary.

Specific PPCPAs shall be signed for every activity by: the technical coordinator of the respective process, the environmental responsible person and the person who developed it, then submitted to the Environmental Department for validation.

The Company PPCPA must be signed by the General Manager, Executive Director, and the Permitting, Compliance and Management Systems Director

APPENDIX NO. 2 OPERATIONAL PROCEDURE FOR THE SPILL WARNING SYSTEM

1. SCOPE

This procedure aims to establishing methods, responsibilities, and information flow that ensure implementation of the accidental spill warning system. This Procedure is part of the RMGC's Emergency Preparedness and Spill Contingency Plan.

2. DOMAIN

This procedure shall apply to all activities or sectors of activity in the Company where accidental spills may occur, or where responsibilities have been provided in relation to the spill warning system.

3. DEFINITIONS AND ACRONYMS

3.1. Definitions

Critical points – points within the facility where products loss may occur (semi-processed, intermediate substance in various process stages, final products, fuels or other solid or liquid materials) that, once penetrating into the pluvial system, water supply, sewerage systems, in the soil or into direct water discharges into natural receptors might cause accidental environmental pollution.

Accidental pollution – any change of the physical, chemical, biological or bacteriological properties of water caused by an accident, failure, or other similar factors, as a result of an error, omission, negligence or natural calamity and making the water improper for the same use as prior to pollution;

Accidental pollution of surface and ground water resources is a type of risk that generates **emergencies**.

Level I emergency – no offsite impact, may be solved by the site personnel, without the intervention of special teams (EP, HAZMAT, EM);

Level II emergency – no offsite impact, may be solved by the site personnel, with the help of the intervention of special teams (EP, HAZMAT, EM);

Level III emergency – no offsite impact, may be solved by the site personnel, with the support of special teams intervention (EP, HAZMAT, EM), but requires evacuation of the site personnel;

Level IV emergency – potential offsite impact threatening the environment and public health; cannot be solved by site personnel and special intervention teams (EP, HAZMAT, EM) and requires support of extreme emergency response teams, while action is correlated with the actions included in the Emergency Plans for Flood Control and Extreme Natural Events, , Accidents Involving Hydrotechnical Contructions and Accidental Spills of affected communities

Competent authorities to be notified in case of accidental pollution: AR TU, GM AB, IJSU AB, DSP AB.

Company management: General Manager, Executive Director, Community Relations Director, Permitting, Compliance and Management Systems Director

3.2. Acronyms

1. AR TU – A.N. Apele Române (RoWater)- S.G.A. Alba – S. H. Arieș-Turda
2. GM AB – National Environmental Guard – Alba Commissariat
3. IJSU AB – Alba County Inspectorate for Emergencies
4. DSP AB – Public Health Directorate
5. PPCPA – Emergency Preparedness and Spill Contingency Plan of RMGC
6. DM – Environmental Department
7. DSS – Health & safety Department
8. DSEC – Security Department
9. DI – Maintenance Department
10. DO – Operations Department
11. CSU – Emergency coordinator
12. CI – Fire Commander
13. CCOM – Communications coordinator
14. EP – Fire Brigade
15. HAZMAT–Emergency Response Team for Hazardous Materials
16. EM–Medical Emergency Response Team

4. REFERENCE DOCUMENTS. RELATED DOCUMENTS

Law No. 107/1996 – the Water Law, amended by **Law No. 310/2004** and **Law No. 112/2006**;

The Order no. 638/2005 of the Ministry of the Environment and Water Management and Order no. 420/SB/2005 of the Ministry of Administration and Interior on the approval of the Regulation regarding the management of emergency situations caused by floods, hazardous meteorological events, accidents involving hydrotechnical structures and accidental pollutions and for the approval of the Framework for the purchase of materials and devices used for protection against floods, winter emergencies and accidental pollution

Order 278/1997 of MEWM on the approval of the framework methodology for the drawing up of plans to prevent and fight accidental pollution caused by the use of potentially polluting water;

Government Decision nr. 2288/2004 on the approval of the assignment of responsibilities undertaken by the ministries, other central institutions and non-governmental organizations regarding the prevention and management of emergency situations

The Emergency Governmental Ordinance 21/2004 on the national management system for emergency situations

Order 161/2006 of MEWM on the approval of the standard regarding a classification of surface water quality with a view to assessing the ecological state of water bodies.

The Emergency Governmental Ordinance No. 195 /2005 as amended on environmental protection;

5. RESPONSIBILITIES

As per **Table No. 1**

6. OPERATING PROCEDURE

6.1. A person who notices an accidental pollution event must immediately notify (as per the pre-established communication flow), using a special telephone line or over the radio, using dedicated frequency, the Security Officer in the Security Department (DSEC) of the Company, who must provide a person on duty round the clock (24/7) or the Emergency Coordinator (CSU) directly.[21]

All RMGC personnel will be trained on information and information flow in case of observed equipment flaws, risk situations that may trigger a negative environmental impact or any accidental spill that may occur, as they will be individually and solitarily liable for the effects of events involving serious impacts on human life and health. They will also be informed on how to act and behave in case of an accidental spill in which they are/are not involved. [16]

The employee will then immediately report the incident to his/her direct supervisor.

Employees not adequately trained will not try to respond to the accident in attempting to stop the spill, collect spilled materials or clean up the premises. [21].

6.2. The Security Officer will immediately notify the Emergency Coordinator (CSU) or one of his/her replacements, by telephone or radio, as well as the Head of the respective department on the occurrence of an accidental spill and also fill out Form 1.0 – First emergency response log [21]

Once the CSU has been directly notified of an accidental spill, he/se will contact the Security Officer to perform the registration of the incident related data, to be kept in the database. [21]

Upon the request of the CSU, the latter will notify the DSEC Director to call on more security officers, in order to secure the pollution impacted site and to organize and supervise the evacuation of the site personnel.

The Security Officer shall ensure transport of the persons responsible for accidental spill control to/from the Company, if the accidental spill occurs outside normal working hours.

6.3. The Emergency Coordinator shall contact the Head of the department where the accidental spill has occurred and the DM Manager, then notify (using the pre-established communication flow) the Permitting Compliance and Management Systems Manager, and the Executive Director about the occurrence of pollution, and the latter will inform the General Manager.

Company management will call a meeting of the company level committee organized for accident spill control to review the situation, based on its gravity.

6.4. At the same time, the CSU shall collect all the information from those who were the first who notice the incident, from the Heads of Departments and from other sources, if necessary, in order to assess the emergency level, decide on the type of response and start the necessary and appropriate alarms.

For Level I or Level II emergencies, CSU may decide to fill the position of Incident Commander (CI) as well, and in this case will notify the appropriate response teams (EP, HAZMAT, EM) directly or via the DSEC to intervene at the accident site and will mobilize necessary forces and resources to address the situation.[21]

For Level III or Level IV emergencies, he/she will immediately designate and notify the Incident Commander from among the persons nominated to fill in this office on every shift. The CI will immediately call the appropriate special response teams (EP, HAZMAT, and EM) and lead them in their response;

The Head of Department and the DM will be informed on the emergency level, type of response and CI nomination.

6.5. In parallel, the Department Head will collect all the information from the department personnel present at the incident location, as well as from those who first noticed the incident (if the latter are from outside the department), in order to review the situation, and will call their own response team, in accordance with the pre-established tasks and responsibilities detailed in the procedures and training, and act in cooperation and under the coordination of the Incident Commander. These to be established based on the detailed technical projects, completion of the SOPs and final organizational structure upon commissioning.

The DM will fill out Form 2.0 – Incident Report for the spill and, if necessary, Form 3.0 – Agency Notification Report, to be forwarded to the competent authorities after approval by the Company management.

6.6. The Company management will notify the competent authorities on the accidental spill occurrence. Annex No. 3 shows the appropriate telephone and fax numbers.

Moreover, the potentially impacted units downstream will be notified on the occurrence of the accidental spill, as per Table No. 10 of the PPCPA as well as the local authorities of jurisdiction over the site. [01]

6.7. The CSU and Department Heads will ensure the undertaking of pollution control activities according to the specific PPCPA for the critical point where pollution occurred. Throughout the accidental pollution control actions, they will inform the Company management, the accident pollution control team, the DM on the response actions, while the Company management and the DM will keep in contact with the competent authorities in order to inform them on the deployment of pollution stoppage and control and impact mitigation measures.

6.8. The Company management will inform the competent authorities on the stop of accidental pollution, once the causes of pollution have been removed and the threat of spreading contaminants has stopped.

6.9. Should pollution stoppage, spread containment and impact mitigation measures not be achievable with own resources, they will call on the support of other organizations, as listed in the appropriate Table of the PPCPA (Table No. 9) which the Company has concluded written agreements with; the Company management will contact the contact personnel in order to initiate joint intervention.

6.10. Should pollution spread towards adjacent or downstream areas, the potentially impacted units and the respective local governments will be notified in order to adopt their own Emergency Preparedness and Spill Contingency Plan and control measures. Warning will be given for the units listed in the appropriate Table of the PPCPA (Table No. 10), and ensured by the Company management in cooperation with the competent authorities that manage accidental spills.

6.11. Once the emergency has been completely resolved, the DM and the representatives of the department where the accidental spill has occurred, as well as those of DSS, DI, DO will draft a findings report that will include the following information:

- The location where the spill occurred (critical point)
- Date and time of the incident;
- Description of the incident;
- Cause of the accidental spill;
- Magnitude of the event;
- Response measures to remove the causes of the spill;
- Response measures in containing contaminant spill;
- Response measures in removing the contaminants by using adequate techniques;
- Response measures in collecting, transporting and intermediate storage environmentally and health safety of the pollutants for subsequent neutralization or destruction;
- Corrective measures in solving similar incidents;
- Preventive measures to avoid recurrence.

6.12. DM will monitor the measures recorded in the findings report;

6.13. The Company management will designate those responsible for accidental spill prevention and control to cooperate with the competent authorities in establishing liabilities and parties to be held responsible for the accidental spill event.

7. REVISION

These procedures shall be revised every 2 years or whenever necessary.

8. RECORDS

8.1. Form 1.0 - First emergency response log: original is to be kept by the DSEC and a copy by DM.

8.2. Form 2.0 –Spill event report: original is to be kept by the DM and one copy in the section/sector.

8.3. Form 3.0 –Agency notification report: original is to be kept by the Permitting, Compliance and Management Systems Director, and one copy by the DM;

8.4. Findings reports: originals are to be kept in the sections and copies by DM.

8.5. Monitoring reports: originals to be kept by DM and copies in the sections.

8.6. PPCPA Distribution LIST: kept by the DM;

8.7. Table of updates and revisions: kept by the DM.

APPENDIX NO. 3 LOGICAL SCHEME FOR THE PROCEDURE REGARDING THE WARNING SYSTEM IN CASE OF ACCIDENTAL POLLUTION

APPENDIX NO. 4

TABLE OF COPETENT AUTHORITIES TO BE INFORMED IN CASE OF ACCIDENTAL WATER POLLUTION

Competent authority	Address and Telephone no.	Dispatcher on duty
AR TU – A.N. Apele Române-S.G.A. Alba- S.H. Arieș-Turda	Turda, Str. Stadionului, 12 Tel. 0264 313461 0264 313463 Fax 0264 313462	0264 313461
GM AB – Garda Națională de Mediu [National Environmental Guard]– Comisariatul Județean Alba	Alba Iulia, Str. Lalelelor, 7A Tel. 0258 816834 Fax 0258 816834	-
IJSU AB – Inspectoratul Județean pentru Situații de Urgență Alba [County Inspectorate for Emergencies]	Alba Iulia, Str. A.I.Cuza, 10 Tel. 0258 810411 0258 810497 Fax 0258 810425	0258 810497
DSP AB – Direcția de Sănătate Publică Alba [Public Health Inspectorate Alba]	Alba Iulia, Bld. Revoluției, 23 Tel. 0258 821636	-
PR ABR – Primăria oraș Abrud [Abrud Townhall]		
PR RM – Primăria com. Roșia Montană [Roșia Montană Townhall]		

Note:

- As per the regulations of **Water Law No. 107/1996** this activity is organized by Romanian Waters (Apele Române) through its River Basin branches, based on both river-basins wide plan, and own plans of the potentially polluting water users. [01]

- As per **Law No. 310/2002** – that amends Law No.107/1996 [02] :

“Romanian Waters” National Administration, through its Water Directorates, organizes and conducts accidental pollution prevention and remediation activities based on plans developed according to the specific circumstances of those watersheds and on the nature of pollutants that might be accidentally spilled.

Legal entities using water or water-related uses shall develop their own spill prevention and control plans, for pollution events that might be caused by their activities, and implement them as required.

Legal entities using water or water-related uses that caused pollution shall take immediate measures to remove the causes thereof, limit and contain their effects and immediately inform the nearest water management unit about the pollution.

The owners of specific spill response equipment for water pollution shall make use thereof, regardless of the cause of the pollution event.

The polluter shall also bear the costs entailed by pollution wave monitoring, by the determination of the type of pollutant, and by the findings on the pollution impacts.

- As per The Order no. 638/2005 of the Ministry of the Environment and Water Management and Order no. 420/SB/2005 of the Ministry of Administration and Interior on the approval of the Regulation regarding the management of emergency situations caused by floods, hazardous meteorological events, accidents involving hydrotechnical structures and accidental pollutions and for the approval of the Framework for the purchase of materials and devices used for protection against floods, winter emergencies and accidental pollution [3]:

Implementation of the strategy and professional technical coordination, at the national, river-basin or county level, of preventive and operative action for flood control, hazardous weather events, accidents in hydrotechnical structures and **accidental spills**, shall be provided by “Romanian Waters” National Administration and its territorial units.

Legal entities using water or of water-related uses that caused pollution event shall take immediate measures to remove the causes thereof, limit and contain their effects and

immediately inform the nearest water management unit. Any expenses generated by pollution containment and control actions shall be undertaken by the polluters, as per the "polluter pays" principle.

The owners of specific spill response equipment for water pollution shall make use thereof, regardless of the cause of the pollution event, following the decision of the County Emergency Committee.

Table No. 1 COMPOSITION OF THE ACCIDENTAL SPILL CONTROL TEAM [01], [16], [21]

No.	Name and Surname	Position	Address and Telephone no.	Responsibilities
1.		Managing Director		<ul style="list-style-type: none"> - decides to call the spill control team to review the situation and trigger the alert situation - decides to notify the SGA and other competent authorities on the occurrence of an accidental spill, and on the regular information thereof on the deployment of action until the pollution has stopped.- asks for external support if it is found that the available own forces and resources are not sufficient to stop pollution and/or mitigate its effects.
2.		Executive Director		<ul style="list-style-type: none"> - notifies the managing director on the occurrence of a spill and decides, in case of emergency situations, to stop the operation of certain installations, production units, sectors that contribute to the ongoing generation of pollution or may cause accidents with serious impacts on the environment and population
3.		Community Relations Director		<ul style="list-style-type: none"> - provides coordination of own response actions with the community response plans - ensures public communication of the emergency for accurate information thereon - decides data collection and the participation of the Communication Coordinator in formulating answers related to the causes of the spill, in order to provide accurate information to the external agencies, the media, the families of those involved, and the public in general.
4.		Permitting, Compliance and Management Systems Director		<ul style="list-style-type: none"> - decides on the evaluation of the causes and monitoring by the DPM of the actions to remove the causes of the spill and mitigate the effects of accidental pollution - decides on investigating the incident and monitor the site personnel or public protection and rescue operations by the DSS - provides coordination of the response teams from company departments, if necessary, in case of severe accidental pollution
5.		<u>Emergency Coordinator</u> (CSU) (2 replacements are also designated for this office, as these responsibilities need to be fulfilled 24/7)		<ul style="list-style-type: none"> - evaluates the level and type of emergency determined by the spill, and decides the type of response and appropriate warning/alarm - decides on the need to appoint an Incident Commander, to be called in for operative action. - notifies the Executive Director, the Permitting, Compliance and Management Systems Director, and the Community Relations Director on the occurrence of the spill. - calls on the response teams (EP, HAZMAT< EM and other special additional teams) to stop the causes of pollution and mitigate its effects - provides necessary response equipment and materials on and off site - collaborates efficiently with the external response organizations in the impacted communities, either local or regional, if required to respond in the control of pollution.
6.		Environmental Department Manager (DM)		<ul style="list-style-type: none"> - provides assistance to the CRU in determining the nature and causes of the spill, and its potential impacts on the environment and humans on site and on adjacent areas, and on those located downstream or downwind.

No.	Name and Surname	Position	Address and Telephone no.	Responsibilities
				<ul style="list-style-type: none"> - provides monitoring by the DM of the actions to remove the causes of the spill and mitigate its effects - ensures the formulation of a competent answer, both technical and for the public, based on the analysis and interpretation of all the available information on the generation of the spill - regularly communicates to the management and to the spill control team any serious event that might occur and how the response has been deployed - ensures notification of the competent authorities on any substantial hazardous discharge into the environment, and on the generation or potential generation of water pollution on and off site. - ensures sampling and laboratory analysis of the specific pollution indicators, registration, result analysis and communication to the competent authorities - provides technical support for environmental remedial action, rehabilitation or cleanup after any spill that has occurred - ensures communication of pollution stoppage to all the stakeholder authorities within and outside the company
7.		Health & Safety Department Manager (DSS)		<ul style="list-style-type: none"> - provides assistance to the CSU in determining the nature and causes of the spill, as it relates to non-compliance with the H&S techniques, and its potential impacts on other installations, on humans on site and on adjacent areas, and on those located downstream or downwind of the pollution. - provides monitoring personnel and public rescue operations. - ensures formulation of a competent answer, both technical and for the public, based on the analysis and interpretation of all the available information on the generation of the spill, the H&S technical norms and health issues raised by the spill - ensures collaboration with external response and rescue organizations - regularly communicates to the management and to the spill control team any serious event that might occur and how the specific response has been deployed
8.		Security Department Manager (DSEC)		<ul style="list-style-type: none"> - ensures organization of reception, registration and dissemination of (telephone and radio) messages related to emergencies using a special telephone line or dedicated frequency - decides on ensuring site security, impacted site personnel evacuation and the access control to the incident location - provides spill control personnel transport to/ from the company
9.		<u>Incident Commander</u> (CI) designated by the Emergency Coordinator		<ul style="list-style-type: none"> - together with the CSU, asses resource needs and the need to involve additional emergency response teams, within the company or among the external response organizations - coordinates operative actions of own response teams and collaborates with external response teams

No.	Name and Surname	Position	Address and Telephone no.	Responsibilities
		based on the type and magnitude of the incident) This is a temporary position and only filled during emergencies		<ul style="list-style-type: none"> - together with the CSU, initiates and decides on evacuation of the impacted site (locally, across the entire company site, from adjacent sites or downstream of the pollution wave) - supervises and directs the use of equipment during response actions - stays in control until it is considered that the emergency has stopped and any other emergency is under control, with minimal probability of occurrence - participates in emergency investigation and evaluation, in adoption corrective and preventive measures
10.		Communications Coordinator: (CCOM)		<ul style="list-style-type: none"> - collects information from the critical points and informs the DM and the Community Relations Director, and helps formulate answers related to the pollution - assist the Emergency Coordinator in communicating with the public and other stakeholders, acting as contact person in relation to the media, competent authorities, external emergency response organizations, personnel families, etc.
11.		Head of Section/Sector/ Area of activity		<ul style="list-style-type: none"> - mobilizes the response teams in the critical points of the respective section and provides the necessary response equipment and facilities; - notifies the DM, DSS and Executive Director on the occurrence of a spill; - collaborates with the CSU in determining the causes and nature of the spill, and of its impacts - collaborates with the DPM, DSS, and CCOM in pollution monitoring, investigations on how it occurred, and in formulating answers related to the generation of the spill
12.		Shift Head Technician		<ul style="list-style-type: none"> - notifies own response teams and directs them in operative actions under the coordination of the Incident Commander; - provides own response equipment and facilities; - informs the Department Head on the response deployment;
13.		Maintenance Department Manager		<ul style="list-style-type: none"> - coordinates assessment of the buildings and utility control devices in order to ensure safety in occupation thereof and of neighboring facilities. - provides additional utilities/ facilities to the emergency response personnel; - provides construction services if required as emergency measures; - ensures repairing of equipment and facilities after pollution ceasing, in order to reset production operations;
14.		Operations Department Manager		<ul style="list-style-type: none"> - ensures cessation of utility services (gas, water, electricity supply) according to pre-established procedures, and notifies the suppliers thereof - provides additional emergency preparedness equipment - ensures resumption of normal operating parameters of the facilities and operations as per the pre-established procedures - coordinates and ensures performance of cleanup operations;
15.		Fire Brigade Leader (EP)		<ul style="list-style-type: none"> - ensures regular inspection and testing of the emergency response equipment involving hazardous substances and the maintenance of the operational state of the

No.	Name and Surname	Position	Address and Telephone no.	Responsibilities
				<p>technology</p> <ul style="list-style-type: none"> - acts under the instructions of the Incident Commander in situations that involve: discharges or spills of chemicals, hazardous materials or waste, independently, or in collaboration with the other response teams. - mobilizes the response team and provides the necessary response materials, equipment and tools for deployment of specific actions. - performs research in establishing the extent of contamination, defining the impacted area and estimating the number of affected persons. - provides operative action at the accident location in order to remediate any flaws or breakdowns, evacuate the personnel from the contaminated area and contain the impact of pollution, in full compliance with the specific operational procedures or as instructed by the <i>incident commander</i>
16.		HAZMAT Team Leader		<ul style="list-style-type: none"> - ensures regular inspection and testing of the emergency response equipment involving hazardous substances and the maintenance of the operational state of the technology. - acts under the instructions of the Incident Commander in situations that involve: discharges or spills of chemicals, hazardous materials or waste, independently, or in collaboration with the other response teams. - mobilizes the response team and provides the necessary response materials, equipment and tools for the deployment of specific actions. - performs research in establishing the extent of contamination, defining the impacted area and estimating the number of affected persons. - provides operative action at the accident location in order to remediate any flaws or breakdowns, evacuate the personnel from the contaminated area and contain the impact of pollution, in full compliance with the specific operational procedures or as instructed by the <i>incident commander and participate on sampling from the affected area</i>
17.		Medical Team Leader (EM)		<ul style="list-style-type: none"> - acts as decided and instructed by the Incident Commander - mobilizes the medical assistance team and provides the necessary response materials, equipment and tools for the deployment of specific actions. - organizes and provides first medical aid and transport of the wounded to the assembly and evacuation points. - ensures the installation of assembly, triage and evacuation points for the wounded and those contaminated. - participates in the application of prophylactic and epidemics control actions - fulfills other actions and missions in the impacted area: <ul style="list-style-type: none"> • participates in providing the necessary water, food and medicine supplies; • participates in the removal of disaster consequences and the medical

No.	Name and Surname	Position	Address and Telephone no.	Responsibilities
				rehabilitation of the impacted area; <ul style="list-style-type: none"> • implements technical and medical measures of decontamination in the areas where dead bodies were found. • ensures collection of samples in the contaminated sector (water, animal products, vegetal products) and sample transfer to the nearest health laboratory.

General Manager,
Stamp

Note: The final version and level of detail to be established based on the detailed technical projects, the completion of the SOPs and the final organizational structure upon commissioning.

Table No. 2 LIST OF COMPANY CRITICAL POINTS THAT MIGHT GENERATE ACCIDENTAL SPILLS [01], [10], [11], [12], [19], [20], [21]

No.	Point where a spill may occur	Potential causes of pollution	Potential pollutants	
			Name	Comments
a	<i>Mining Operations Areas</i>	The appearance of an aquifer in the operations area and failure to adequately capture it.	Suspensions	
		Damage to the pit/quarry equipment and potential spill of fuel onto the soil.	ARD	
		Failure resulting in spilled content	Oil products	
b	<i>On site transport</i>	Potential fuel spills on soil.	Ammonium Nitrate	
c	<i>Process Plant</i>			
1	<u>Sodium Cyanide storage tank</u>	Severe damage, resulting in the spillage of contents. It may occur during a terrorist or armed attack cracks in the tank wall due to high mechanical stress.	NaCN	20 % Solution
	<u>ISO transport container</u>	Failure resulting in spilled content.	NaCN	Solid
2	<u>HCl solution storage tank</u>	Severe damage, resulting in the spillage of the contents. It may occur under terrorist attack, as a break in the tank due to high mechanical stress (seism, accidental hitting, accidental break of the bottom nozzles, of the discharge piping, faulty material).	HCl	32 % solution
	<u>Hydrochloric acid transport tanker</u>	Failure resulting in spilled content. May occur during on-site transport or unloading.	HCl	32 % solution
3	Leaching tanks	Severe damage, resulting in the spillage of contents. It may occur under terrorist attack, or a crack developing in the tank wall due to very high mechanical stress (seism, important contraction/expansion of the tank building material at abnormally low/ high temperatures, break of the screws that fasten the manhole cover, etc.).	Slurry	Suspensions with about 200 mg/l free cyanide
4	Thickener	Severe damage, resulting in the spillage of the contents. It may occur under terrorist attack, or a crack developing in the tank wall due to very	Slurry	Suspensions with about 150 mg/l free cyanide

No.	Point where a spill may occur	Potential causes of pollution	Potential pollutants	
			Name	Comments
		high mechanical stress (seism, important contraction/expansion of the tank building material at abnormally low/ high temperatures, break of discharge nozzle).		
5	DETOX plant	Serious damage to the slurry treatment tanks, resulting in the spillage of the entire content of one or both reaction vessels. It may occur under terrorist attack, or a crack developing in the tank wall due to very high mechanical stress (earthquake, important contraction/expansion of the tank material at abnormally low/ high temperatures, break of the screws that fasten the manhole cover, break of the discharge nozzles).	Slurry	Suspensions with about 10-100 mg/l WAD cyanide
		Inadequate slurry treatment before discharge (high cyanide content) due to operating errors and/or flaws in the controls of physical and chemical parameters in the slurry	Slurry	Suspensions with more than 10 mg/l WAD cyanide in the TMF discharge
6	Rich solution storage tanks	Severe damage, resulting in the spillage of contents. It may occur under terrorist attack, or a crack developing in the tank wall due to very high mechanical stress (earthquake, important contraction of the tank material at abnormally low temperatures).	Rich solution:	3 % NaCN 2 % NaOH
7	Copper sulphate solution storage tank	Failure resulting in spilled content It may occur under terrorist attack, or a crack developing in the tank wall due to very high mechanical stress (seism, important contraction of the tank material at abnormally low temperatures).	Copper sulphate solution	15% CuSO ₄
	Metabisulphite storage tank	Failure resulting in spilled content It may occur under terrorist attack, or a crack developing in the tank wall due to very high mechanical stress (earthquake, important contraction of the tank material at abnormally low temperatures).	Metabisulphite solution	20% Na ₂ S ₂ O ₅
8	Reagent storage area	Accidents in the storage areas resulting in spills onto the soil in the handling areas (bags or	Copper Sulphate Metabisulphite	Original packaging

No.	Point where a spill may occur	Potential causes of pollution	Potential pollutants	
			Name	Comments
		bottles break)	Sodium hypochlorite; Sodium hydroxide	
9	Sodium Hydroxide storage tank	Severe damage, resulting in the spillage of the contents. thereof and /or of the dissolving vessel It may occur under terrorist attack, or a crack developing in the tank wall due to very high mechanical stress (earthquake, important contraction of the material at abnormally low temperatures compounded by freezing of the entire contents, especially of the screws that fasten the manhole cover).	Sodium hydroxide	20 % NaOH
10	Lime residue storage tanks	Severe damage, resulting in the spillage of the contents. of lime wash preparation vessel It may occur under terrorist attack, or a crack developing in the tank wall due to very high mechanical stress (earthquake, important contraction/expansion of the tank material at abnormally low/ high temperatures, break of discharge nozzle).	Lime residue	15 % CaO
11	Wet grinding:	Failure of the ore grinding and/or grading equipment resulting in spills of handled suspensions	Cyanide containing water suspensions	Total cyanide maximum 219 mg/l
12	Desorption/ Processing Area	Failure of the ore elution and/or electrolysis equipment resulting in spills of hazardous fluids	Rich solution: Diluted HCl solutions Diluted NaOH solutions	3 % NaCN 2 % NaOH
13	Process water storage tank	Severe damage, resulting in the spillage of contents. It may occur under terrorist attack, or a crack developing in the tank wall due to very high mechanical stress (earthquake, important contraction/expansion of the tank material at abnormally low/ high temperatures, break of the screws that fasten the manhole cover, break of the discharge nozzles).	Process Water	Max. 5 mg/l total cyanide pH= 8-11
	Sodium hypochlorite solution storage containers	Break caused by knocking on plastic barrels or leaks during poor handling	Sodium hypochlorite;	12 % active chlorine

No.	Point where a spill may occur	Potential causes of pollution	Potential pollutants	
			Name	Comments
14	ARD Neutralization Plant – Lime Residue Reactor	Damage, resulting in the spillage of contents. It may occur under terrorist attack, or a crack developing in the tank wall due to very high mechanical stress (earthquake, important contraction/expansion of the tank 2material at abnormally low/ high temperatures, break of discharge nozzle).	Lime residue	15 % CaO
	ARD – Decanter	Damage resulting in the spillage of the entire content thereof. It may occur during a terrorist or armed attack due to very high mechanical stress (earthquake).	Suspensions	
18	Fuel tanks	Breakdown and/or fire due to terrorist attack or incompliance with the operating rules or faults in the protection systems.	Oil products	Diesel Petrol
19	Cyanide solution handling systems (pipes, fittings, pumps)	Failure resulting in spills that may occur throughout the operating period, especially during pump startup and in areas provided with sealing devices - glands, flanges)	NaCN	Soil 20 %
	Cyanide containing slurry handling and/or preparation systems (pipes, fittings, pumps)	Failure resulting in spills that may occur throughout the operating period, especially during pump startup and in areas provided with sealing devices - glands, flanges)	Slurry	Suspensions with about 150 mg/l free cyanide
	Cyanide containing solutions/suspension handling systems (pipes, fittings, pumps)	Failure resulting in spills that may occur throughout the operating period, especially during pump startup and in areas provided with sealing devices - glands, flanges)	Slurry Process Water Rich solution:	Suspensions with about 10-100 mg/l WAD cyanide Max. 5 mg/l total cyanide pH= 8-11 3 % NaCN 2 % NaOH
	Hydrochloric acid solution handling systems (pipes, fittings, pumps)	Failure resulting in spills that may occur throughout the operating period, especially during pump startup and in areas provided with sealing devices - glands, flanges)	HCl	32 % solution
	Sodium hydroxide solution	Failure resulting in spills that may occur	Sodium hydroxide	20 % NaOH

No.	Point where a spill may occur	Potential causes of pollution	Potential pollutants	
			Name	Comments
	handling systems (pipes, fittings, pumps)	throughout the operating period, especially during pump startup and in areas provided with sealing devices - glands, flanges)		
d	<i>Pipeline routes</i>	Slurry pipeline crack due to erosion, especially in sensitive areas (joints, flanges, potentiometers, valves)	Slurry	Suspensions with a max. of 10 mg/l WAD cyanide
		Crack in the settled water pipeline from the TMF to Process Plant due to wear or tear of the flexible pipe (between the barge and the fixed pipe on the ground) also due to the fast and sizeable oscillations of the free liquid levels in the pond.	Process Water	about 6 mg/l WAD cyanide
		Breakdown in the ARD piping system from the Cetate Water Catchment Dam to the ARD/WWTP may be caused by faults in the material, malfunction of the riding systems or expansion potentiometers, or by "hammering" at pump start.	ARD	pH below 4 sulfates Heavy metals
e	<i>Tailings Management Facility TMF</i>	Development of breaches in the dam wall due to potential hypothetical causes: a. Overload b. Seismic Events c. Structural Faults, Foundation Failure d. Suffusion e. Erosion and slope Instability f. Liquefaction g. Armed or Terrorist Attack	Process solution, potentially containing suspended matter	Max. 10 mg/l CN WAD
		Breakdown resulting in dam overflow. It may only occur if the operating parameters (of the beach and minimum freeboard) fail to be complied with systematically and over the long term and/or if the drainage or decant water discharge systems become damaged for long periods of time.	Process solution	Max. 10 mg/l WAD CN
		Failure of the secondary containment dam or exceeded containment capacity and discharge	Process solution	Max. 10 mg/l WAD CN

No.	Point where a spill may occur	Potential causes of pollution	Potential pollutants	
			Name	Comments
		of excess water into the outlet (Corna Valley).		
f	<i>Cetate Water Catchment Dam</i>	Dam break resulting in the development of breaches may occur in case of terrorist attacks or a classic or nuclear attack, an earthquake, etc.	ARD with potential suspensions	pH below 4 sulphates Heavy metals
		Failures resulting in dam overflow may only occur if the operating parameters are not complied with and are compounded by extreme weather conditions (heavy rain, extremely low temperatures).	ARD	pH below 4 sulphates Heavy metals
g	<i>Waste rock stockpiles</i>	Accidents involving the break or seal-off of the storm water drains, resulting in spills of such waters into the diversion channels and then into the outlet.	Suspensions, in potentially acid rock drainage	

Unit Manager
Stamp

Table No. 3 POTENTIAL POLLUTANT SHEET [01], [06], [07], [17], [20]

No.	Pollutant name	Acceptable limits			Handling hazards		Control (removal) options	
		Surface Water mg/l	Drinking water mg/l	Groun dwater	Hazardous characteristics <i>Risk phrases</i>	Precautionary Measures <i>Safety phrases</i>	Action	Required means
1	<i>Sodium cyanide</i> - Total Cyanides. - Free cyanides		0,05 0,01		Very toxic <i>R 26/27-28-32-50/53</i>	Avoid contact with acid solutions <i>S 14- 18- 23 - 45 - 46 - 53- 61 -20-20/21 -29/56 - 36/37/39</i>	Collection Neutralization	Containment vessel Detox Plant
2	<i>Hydrochloric acid</i> - Chlorides - pH	100 6,5-8,5	250 6,5-9,5		Toxic, corrosive <i>R 35-37</i>	Avoid contact with cyanide <i>S 14 - 18- 23 -25- 26-29/56 - 36/37/39</i>	Collection Neutralization	Containment vessel ARD Plant
3	<i>Sodium hydroxide</i> - pH - sodium		6,5-9,5 200		Corrosive <i>R 35-36-37</i>	<i>S 24- 26- 28 -S24/25 -29/56 - 36/37/39</i>	Collection	Containment vessel
4	<i>Cyanide containing slurry</i> - Total Cyanides. - Free cyanides - pH - Copper - Zinc - Cadmium	6,5-8,5 0,02 0,1 0,001	0,05 0,01 6,5-9,5 0,1 5 0,005		Toxic <i>R 51</i>	Avoid contact with acid solutions <i>S 14- 20- 29-45 - 46 - 53- 61 -20/21- 29/35</i>	Collection Neutralization	Containment vessel Impoundments Detox Plant
5	<i>Cyanide rich solution;</i> - Total Cyanides. - Free cyanides - pH - sodium	6,5-8,5 50	0,05 0,01 6,5-9,5 200		Toxic <i>R 28-32-50</i>	Avoid contact with acid solutions <i>S 14 - 20- 29 -45 - 46 - 53- 61 -20/21-29/35 - 36/37/39</i>	Collection Process recycling Neutralization	Containment vessel Pumping sump Detox Plant
6	<i>Process Water</i> - Total Cyanides. - Free cyanides - pH - Copper - Zinc - Cadmium - sulphates	6,5-8,5 0,02 0,1 0,001 150	0,05 0,01 6,5-9,5 0,1 5 0,005 250		Toxic <i>R 51-53</i>	Avoid contact with acid solutions <i>S 14- 29 S45-46 -53 -61 -29/35</i>	Collection Process recycling Neutralization	Containment vessel TMF Pumping sump Barge Detox Plant

No.	Pollutant name	Acceptable limits			Handling hazards		Control (removal) options	
		Surface Water mg/l	Drinking water mg/l	Groundwater	Hazardous characteristics <i>Risk phrases</i>	Precautionary Measures <i>Safety phrases</i>	Action	Required means
7	Ammonium Nitrate - nitrates - Ammonium	3 0,3	50 0,5		Oxidant <i>R 8-9</i>	Avoid contact with diesel <i>S 14 -4- 16 - 17- 3/9/14/49 -29/56</i>	Collection Safe disposal	Special storage
8	Lime residue - pH - Calcium	6,5-8,5 150	6,5-9,5 -		Corrosive <i>R 38-53</i>	<i>S 26-24/25</i>	Collection	Containment vessel Collection tank
9	Diesel Fuel - Oil hydrocarbons - PAH	100 -	- 0,0001		Flammable <i>R10</i>	No open fire <i>S 16- 33- 61</i>	Collection	Containment vessel Impoundments Absorbent materials
10	Petrol - Oil hydrocarbons - PAH	100 -	- 0,0001		Flammable <i>R 11</i>	No open fire <i>S 16- -33- -61</i>	Collection	Containment vessel Impoundments Absorbent materials
11	Sodium hypochlorite; - pH - sodium - Chlorides - free residual chlorine	6,5-8,5 50 100 -	6,5-9,5 200 250 0,5		Toxic/oxidant <i>R8-31-34-51</i>	Avoid contact with solid cyanide <i>S 14 -26- 28 - 3/9/14/49-24/25 -29/35</i>	Collection	Containment vessel
12	Metabisulphite - pH - sodium - sulphates	6,5-8,5 50 150	6,5-9,5 200 250		Toxic/irritant <i>R22-31-41-51</i>	<i>S 26- 28 - 29 -46 - 61 -24/25 - 29/56 -36/37/39</i>	Collection Process recycling	Containment vessel Pumping sump
13	Copper Sulphate - pH - Copper - sulphates	6,5-8,5 0,02 150	6,5-9,5 0,1 250		Toxic/irritant <i>R22-36/38-50/53</i>	<i>S 26- 29 -61 -29/56</i>	Collection Process recycling	Containment vessel Pumping sump

No.	Pollutant name	Acceptable limits			Handling hazards		Control (removal) options	
		Surface Water mg/l	Drinking water mg/l	Groun dwater	Hazardous characteristics <i>Risk phrases</i>	Precautionary Measures <i>Safety phrases</i>	Action	Required means
14	ARD - pH - sulphates - Copper - Iron - Manganese - Cadmium - Arsenic - Zinc - Lead	6,5-8,5 150 0,02 0,1 0,05 0,001 0,005 0,1 0,005	6,5-9,5 250 0,1 0,2 0,05 0,005 0,01 5 0,01		Toxic <i>R 51</i>	avoid contact with cyanides S <i>14 -29 -61</i>	Collection Neutralization	Cetate Pond Containment vessel Collection tank ARD Plant

Unit Manager
Stamp

Meaning of used risk phrases

R8 - Contact with combustible material may cause fire.

R9 - Explosive when mixed with combustible material.

R10 – Flammable

R11 – Highly flammable.

R22 – Harmful if swallowed.

R28 – Very toxic if swallowed.

R31 – Contact with acids liberates toxic gas.

R32 – Contact with acids liberates very toxic gas.

R34 – Causes burns.

R35 – Causes severe burns.

R36 – Irritating to eyes.

R37 – Irritating to respiratory system.

R38 – Irritating to skin.

R41 – Risk of serious damage to eyes.

R50 – Very toxic to aquatic organisms.

R51 – Toxic to aquatic organisms.

R53 – May cause long-term adverse effects in the aquatic environment.

R26/27 – Very toxic by inhalation and in contact with skin.

R36/38 – Irritating to eyes and skin.

R50/53 – Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R51/53 – Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Meaning of used safety phrases

S4 – Keep away from living quarters

S14 – Keep away from ... (*incompatible materials to be indicated by the manufacturer*).

S16 – Keep away from sources of ignition -- No smoking..

S17 – Keep away from combustible material.

S18 – Handle and open container with care.

S20 – When using do not eat or drink.

S23 – Do not breathe vapors/spray

S24 – Avoid contact with the skin.

S25 – Avoid contact with eyes.

S26 – In case of contact with eyes, rinse immediately with plenty of water and seek medical advice..

S28 – After contact with skin, wash immediately with plenty of water.

S29 – Do not empty into drains..

S33 – Take precautionary measures against static discharges.

S45 – In case of accident or if you feel unwell, seek medical advice immediately (*show the label where possible*).

S46 – If swallowed, seek medical advice immediately and show container or label.

S53 – Avoid exposure -- obtain special instructions before use.

S61 – Avoid release to the environment. Refer to special instructions/safety data sheets.

S3/9/14/49 – Keep only in the original container in a cool, well-ventilated place away from ... (*incompatible materials to be indicated by the manufacturer*).

S20/21 – When using do not eat, drink or smoke.

S24 /25– Avoid contact with skin and eyes

S29/35 – Do not empty into drains; dispose of this material and its container in a safe way.

S29/56 – Do not empty into drains, dispose of this material and its container at hazardous or special waste collection point.

S36/37/39 – Wear suitable protective clothing, gloves and eye/face protection.

Table No. 4.0.0 MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (B) On-Site transport [01], [11], [12], [16], [21]

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission	Comments
1	Regular inspection of the transportation vehicles and repairs schedule	Fuel and lubricant leak prevention and removal	Relevant head of sector or department for these vehicles To be determined the relevant sector or department for these means of transportation.	Monthly or Based on specific SOP	Idem

Unit Manager
Stamp

Table No. 4.0 MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (A) Mine areas [01], [11], [12], [16], [21]

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission.	Comments
1	Additional inspection of the mine areas in order to detect unknown water accumulations	Prevent or remove leaks from aquifers encountered in the mining area	Relevant head of sector or department for these activities To be determined the relevant sector or department for these activities	Monthly or Based on specific SOP	Special inspection forms to be filled out for each inspection
2	Regular inspection of mining equipment and compliance with the maintenance and repairs schedule	Fuel and lubricant leak prevention and removal	Idem	Monthly or Based on specific SOP	Idem
3	Regular inspection of AMFO explosive preparation equipment; storage and handling of ammonium nitrate	Prevent and remove ammonium nitrate spills in contact with water	Idem	Monthly or Based on specific SOP	Idem

Unit Manager
Stamp

Table No. 4.1 MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS for: (C1) Sodium cyanide solution storage tank [01], [11], [12], [20]

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission.	Comments
1	Regular inspection of the tank and its supports, containment vessel, ISO containers transporting solid cyanide	Sodium cyanide solution leak prevention or removal	Relevant head of sector or department for these systems To be determined the relevant sector or department for these systems	Weekly or Based on specific SOP	Special inspection forms to be filled out for each inspection [20]
2	Inspection and maintenance of the tank level indicator	Prevent overflow of the storage tank and sodium cyanide leaks	Idem	Quarterly or Based on specific SOP	Idem
3	Inspect the integrity of the protective enclosure of the cyanide unloading and storage area	Prevent unauthorized access that might cause breakdown or deterioration of the tank or containers	Idem	Monthly or Based on specific SOP	Idem

Unit Manager:
Stamp

Table No. 4.2 MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C2) Hydrochloric acid storage tank [01], [11], [12]

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission.	Comments
1	Regular checks of the tank, its supports, containment vessel	Hydrochloric acid leak prevention or removal	Relevant head of sector or department for these systems To be determined the relevant sector or department for these systems	Weekly or Based on specific SOP	Special inspection forms to be filled out for each inspection
2	Inspection and maintenance of the tank level indicator	Prevent overflow of the storage tank and hydrochloric acid leaks	Idem	Quarterly or Based on specific SOP	Idem
3	Inspection of the hydrochloric acid tanker	Hydrochloric acid leak prevention or removal	Idem	Daily or Based on specific SOP	Idem

Unit Manager
Stamp

Table No. 4.3 MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C3) Leaching tanks [01], [11], [12], [20]

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission.	Comments
1	Regular inspection of the CIL tanks, its supports, containment vessel	Cyanide containing slurry leak prevention or removal	Relevant head of sector or department for these systems To be determined the relevant sector or department for these systems	Weekly or Based on specific SOP	Special inspection forms to be filled out for each inspection [20]
2	Inspection and maintenance of the tank level indicator and containment vessel	Prevent overflow of the tank and remove cyanide containing slurry leaks	Idem	Quarterly or Based on specific SOP	Idem

Unit Manager
Stamp

Table No. 4.4 MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C4) Tailings Thickener [01], [11], [12], [20]

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission.	Comments
1	Regular inspection of the fuel tank, thickener and their supports, containment vessel	Cyanide containing slurry leak prevention or removal	Relevant head of sector or department for these systems To be determined the relevant sector or department for these systems	Weekly or Based on specific SOP	Special inspection forms to be filled out for each inspection [20]
2	Inspection and maintenance of the tank level indicator and containment vessel	Prevent overflow of the tank and remove cyanide containing slurry leaks	Idem	Quarterly or Based on specific SOP	Idem

Unit Manager
Stamp

Table No. 4.5 MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS for: (C5) DETOX Cyanide Neutralization Facility [01], [11], [12], [20]

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission.	Comments
1	Regular inspection of the fuel tank, reactors and their supports, containment vessel	Cyanide containing slurry leak prevention or removal	Relevant head of sector or department for these systems To be determined the relevant sector or department for these systems	Weekly or Based on specific SOP	Special inspection forms to be filled out for each inspection [20]
2	Inspection and maintenance of the tank level indicator and containment vessel	Prevent overflow of the tank and remove cyanide containing slurry leaks	Idem	Quarterly or Based on specific SOP	Idem
3	Inspection of the pH control system	Inspect slurry cyanide neutralization process before directing it to the TMF	Idem	Daily or Based on specific SOP	Idem

Unit Manager:
Stamp

Table No. 4.6 MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C6) Rich solution storage tank [01], [11], [12], [20]

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission	Comments
1	Regular inspection of the tank, its supports, containment vessel	Prevent or remove leaks of gold and silver rich solution (with sodium cyanide and sodium hydroxide content)	Relevant head of sector or department for these systems To be determined the relevant sector or department for these systems	Weekly or Based on specific SOP	Special inspection forms to be filled out for each inspection [20]
2	Inspection and maintenance of the tank level indicator and containment vessel	Prevent overflow of the storage tank and sodium cyanide leaks	Idem	Quarterly or Based on specific SOP	Idem

Unit Manager
Stamp

Table No. 4.7 MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C7) Metabisulphite solution storage tank; Copper sulfate solution storage tank [01], [11], [12]

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission	Comments
1	Regular inspection of the solution preparation reactors and their supports	Metabisulphite and copper sulfate solution leak prevention or removal	Relevant head of sector or department for these systems To be determined the relevant sector or department for these systems	Weekly or Based on specific SOP	Special inspection forms to be filled out for each inspection
2	Inspection and maintenance of the reactor level indicators	Prevent tank overflow and remove Metabisulphite and copper sulfate solution spills	Idem	Quarterly or Based on specific SOP	Idem

Unit Manager
Stamp

Table No. 4.9 MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C9) Sodium hydroxide solution storage tank [01], [11], [12]

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission	Comments
1	Regular inspection of the tank, its supports, dissolving vessel, containment vessel	Sodium hydroxide solution leak prevention or removal	Relevant head of sector or department for these systems To be determined the relevant sector or department for these systems	Weekly or Based on specific SOP	Special inspection forms to be filled out for each inspection
2	Inspection and maintenance of the tank level indicator	Prevent overflow of the storage tank and hydrochloric acid leaks	Idem	Quarterly or Based on specific SOP	Idem

Unit Manager
Stamp

Table No. 4.10 MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C10) Lime residue storage tank [01], [11], [12]

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission	Comments
1	Regular inspection of the lime residue preparation and storage tank and its supports	Lime residue leak prevention or removal	Relevant head of sector or department for these systems To be determined the relevant sector or department for these systems	Weekly or Based on specific POS	Special inspection forms to be filled out for each inspection
2	Inspection and maintenance of the tank level indicator	Prevent overflow of the lime residue storage tank and lime residue leaks	Idem	Quarterly or Based on specific POS	Idem

Unit Manager:
Stamp

Table No. 4.11 MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C11) Wet grinding [01], [11], [12], [20]

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission	Comments
1	Regular inspection of the mills, hydro cyclones, supports thereof, containment vessel	Cyanide containing slurry leak prevention or removal	Relevant head of sector or department for these systems To be determined the relevant sector or department for these systems	Weekly or Based on specific SOP	Special inspection forms to be filled out for each inspection [20]
2	Inspection and maintenance of the containment vessel level indicator	Prevent vessel overflow and remove cyanide containing slurry leaks	Idem	Quarterly or Based on specific SOP	Idem

Unit Manager
Stamp

Table No. 4.12 MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C12) Desorption Area [01], [11], [12], [20]

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission	Comments
1	Regular inspection of the filters, elution towers, electrolytic cells, mercury retort, and their supports, containment vessel	Hydrochloric acid, sodium hydroxide diluted solution or rich solution leak prevention or removal	Relevant head of sector or department for these systems To be determined the relevant sector or department for these systems	Weekly or Based on specific SOP	Special inspection forms to be filled out for each inspection [20]
2	Inspection and maintenance of the tower and cell level indicators	Prevent overflow of the installations and remove hazardous substance acid leaks	Idem	Quarterly or Based on specific SOP	Idem

Unit Manager
Stamp

Table No. 4.13 MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C13) Process water storage tank; Sodium Hypochlorite storage containers [01], [11], [12], [20]

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission	Comments
1	Regular inspection of the process water tank, its supports, containment vessel	Prevent or remove leaks of process water (with low cyanide content) recycled from the TMF	Relevant head of sector or department for these systems To be determined the relevant sector or department for these systems	Weekly or Based on specific SOP	Special inspection forms to be filled out for each inspection [20]
2	Inspection and maintenance of the tank level indicator	Prevent overflow of the tank and remove cyanide containing recycled water spills	Idem	Quarterly or Based on specific SOP	Idem
3	Inspection of sodium hypochlorite storage containers	Prevention or removal of sodium hypochlorite spills	Idem	Weekly or Based on specific SOP	Idem

Unit Manager
Stamp

Table No. 4.14 MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C14) ARD Neutralization Plant – Lime Residue Reactor; Decantation Basin [01], [11], [12]

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission	Comments
1	Regular inspection of the lime residue neutralization reactors, decantation basin	Lime residue or neutralization sludge leak prevention or removal	Relevant head of sector or department for these systems To be determined the relevant sector or department for these systems	Weekly or Based on specific SOP	Special inspection forms to be filled out for each inspection
2	Inspection and maintenance of the dispensing and control installations	Prevent overflow of the reactors and lime residue or sludge leaks	Idem	Quarterly or Based on specific SOP	Idem

Unit Manager:
Stamp

Table No. 4.15 MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C18) Fuel storage tank [01], [11], [12]

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission	Comments
1	Regular inspection of the diesel tank, its supports, gas tank, retention vessel	Fuel leak prevention or removal	Relevant head of sector or department for these systems To be determined the relevant sector or department for these systems	Weekly or Based on specific SOP	Special inspection forms to be filled out for each inspection
2	Inspection and maintenance of the tank level indicators	Prevent overflow of the storage tanks and fuel leaks	Idem	Quarterly or Based on specific SOP	Idem

Unit Manager
Stamp

Table No. 4.16.a MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C19) Cyanide solution handling systems ; Cyanide containing slurry handling and/or preparation systems ; Cyanide containing solution/suspension handling systems - (pipes, connections, pumps) [01], [11], [12], [20]

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission	Comments
1	Regular inspection of the pipes, replacement of flanges, replacement of blocked or faulty connections	Cyanide containing solution or slurry leak prevention or removal	Relevant head of sector or department for these systems To be determined the relevant sector or department for these systems	Daily or Based on specific SOP	Special inspection forms to be filled out for each inspection [20]
2	Regular inspection of process pumps handling cyanide containing slurry or solutions, change glands, repair or replace the electric drive motors	Prevent or remove leaks of solution or slurry during pump operation	Idem	Daily or Based on specific SOP	Idem
3	Label and inspect the operation of pipelines and containment vessels for breakdown situations	Cyanide containing solution or slurry leak prevention or removal	Idem	Weekly or Based on specific SOP	Idem

Unit Manager
Stamp

Table No. 4.16.b MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (C19) Hydrochloric acid solution handling systems; Sodium hydroxide solution handling systems (pipes, connections, pumps) [01], [11], [12]

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission	Comments
1	Regular inspection of the pipes, replacement of flanges, replacement of blocked or faulty connections	Hydrochloric acid or Sodium hydroxide solution spill prevention or removal	Relevant head of sector or department for these systems To be determined the relevant sector or department for these systems	Daily or Based on specific SOP	Special checking forms to be filled out for each inspection
2	Regular inspection of process pumps handling cyanide solutions, slurry containing high or low cyanide levels, change glands, repair or replace the electric drive motors	Prevention or removal of hydrochloric acid or sodium hydroxide solution spills during pump operation	Idem	Daily or Based on specific SOP	Idem
3	Label and inspect the operation of pipelines and containment vessels for breakdown situations	Hydrochloric acid or Sodium hydroxide solution spill prevention or removal	Idem	Weekly or Based on specific SOP	Idem

Unit Manager
Stamp

Table No. 4.17 MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (D) Slurry mains; Settled water transport pipe from the TMF; ARD transport pipe from Cetate Water Catchment Dam to the Neutralization Plant (ARD) [01], [11], [12], [18], [19], [20], [21]

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission	Comments
1	Periodical inspection of pipelines, especially at crossing points over diversion canals an storm water drains	Prevent or remove leaks of cyanide containing slurry, recycled process water from the TMF, or ARD transported to the neutralization plant	Relevant head of sector or department for these systems To be determined the relevant sector or department for these systems	Daily or Based on specific SOP	Special inspection forms to be filled out for each inspection
2	Change leaking flanges, compensators, faulty vanes, worn pipe sections or beds, restore welding	Prevent or remove leaks of cyanide containing slurry, recycled process water from the TMF, or ARD transported to the neutralization plant	Idem	Daily or Based on specific SOP	Idem
3	Inspection of the containment vessels along the pipelines	Prevent overflow of the containment vessel and remove fluid leaks	Idem	Weekly or Based on specific SOP	Idem
4	Inspection of the pipe pressure decline detection systems	Prevent or remove pipe leaking	Idem	Weekly or Based on specific SOP	Idem
5	Regular inspection of the pipe transport pumps handling cyanide containing slurry, recycled process water from the TMF, ARD, change glands, repair or replace the electric drive motors	Prevent or remove leaks during pump operation	Idem	Daily or Based on specific SOP	Idem

Unit Manager:
Stamp

Table No. 4.18
[21]

MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (E) The TMF [01], [11], [12], [18], [19], [20],

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission	Comments
1	Regular inspection of the main dam, slopes, emergency spillways, dam behavior monitoring devices, water diversion channels	Prevent or repair failures that may cause cyanide containing tailings or cyanide containing settled water spills	TMF Manager	Daily or Based on specific SOP	Special inspection forms to be filled out for each inspection
2	Ongoing inspection of the operation of drainage systems, quantitative and qualitative water monitoring systems in the TMF area, the TMF settled water recycling systems	Prevent overflow of the (main and secondary containment systems) and remove tailings or water spills	Idem	Daily or Based on specific SOP	Idem
3	Strict compliance inspection of TMF operation, maintenance and repair work schedule for the different TMF components	Prevent or repair failures that may cause cyanide containing tailings or cyanide containing settled water spills	Idem	Monthly or Based on specific SOP	Idem

Unit Manager
Stamp

Table No. 4.19 MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (F) Cetate Water Catchment Dam [01], [10], [11], [12], [18], [21]

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission	Comments
1	Regular inspection of the dam, slopes, emergency spillways, dam monitoring devices, water diversion channels	Prevent or repair failures that may cause ARD spills	Relevant head of sector or department for these systems To be determined the relevant sector or department for these systems	Daily or Based on specific SOP	Special inspection forms to be filled out for each inspection
2	Ongoing inspection of the operation of the water diversion systems, drainage systems, quantitative and qualitative water monitoring systems in the dam area, the ARD pumping system to WWTP	Prevent overflow and ARD spills	Idem	Daily or Based on specific SOP	Idem
3	Strict compliance inspection of Cetate Water Catchment Dam operation, maintenance and repair work schedule for the different dam components	Prevent or repair failures that may cause ARD spills	Idem	Monthly or Based on specific SOP	Idem

Unit Manager
Stamp

Table No. 4.20
[18], [21]

MEASURES AND WORKS FOR PREVENTION OF ACCIDENTAL SPILLS FOR: (G) Waste rock stockpile [01], [10], [11], [12],

No.	Measure/ Work	Scope	Responsibilities	Due date, Inception/ Commission	Comments
1	Regular inspection of the stockpiles, adjacent slopes, stockpile monitoring devices, water diversion channels and drainage system operation	Prevention or removal of breaks or seal-off of the storm water drainage and collection systems, resulting in spills of such waters into the diversion channels and then into the outlet	Relevant head of sector or department for these systems To be determined the relevant sector or department for these systems	Weekly or Based on specific SOP	Special inspection forms to be filled out for each inspection
2	Inspection on strict compliance with the regulated disposal of the waste in stockpiles	Prevent or control material slides from the stockpiles into the diversion or stockpile runoff drainage systems	Idem	Monthly or Based on specific SOP	Idem

Unit Manager
Stamp

Table No. 5 COMPOSITION OF RESPONSE TEAMS FOR [01]

No.	Name and Surname	Address/ Telephone no.	Comments

Note: The final version and level of detail to be established based on the detailed technical projects, the completion of the SOPs and the final organizational structure upon commissioning.

Unit Manager:
Stamp

Table No. 6 List of necessary facilities and equipment in stopping accidental spills [01], [21]

No.	Equipment/ material name	Place of origin (name of section, workshop, etc.)	Who operates the equipment (name, workplace)	Who provides the material
1.	Emergency response equipment lockers	- Agents building - Office buildings - Warehouses - ARD treatment plant - Fuel storage area - Primary crusher - Gravel crusher - Mine area - storm water dam		- Section head - Shift technician
2.	Vehicles	- Mining Operations Areas		- Permitting, Compliance and Management Systems Director - Section head - CSU - Shift technician
3.	Power Equipment	- Mining Operations Areas		- Permitting, Compliance and Management Systems Director - Section head - CSU - Shift technician
4.	Emergency lighting equipment	- DSEC - Mining Operations Areas - Defense stock		- CSU - Shift technician
5.	Special vehicles (for fire and hazardous pollution control)	- DSEC		- CSU
6.	Response materials and equipment for accidental pollution mitigation	- Warehouse for each section		- CSU - Permitting, Compliance and Management Systems Director - DM Manager

Unit Manager
Stamp

Note: The final version and level of detail to be established based on the detailed technical projects, the completion of the SOPs and the final organizational structure upon commissioning.

Table No. 7 Annual training schedule for the workers in critical points and response teams [01], [16], [21]

No.	Training date	Location	Name of trainer	Participants
1	Half-yearly	Critical Points Training	DM Manager DSS Manager Permitting, Compliance and Management Systems Director	Response teams and teams who service the activity where critical points have been established
2	Annual	Critical Points Simulation	Environmental Manager DSS Manager Production Director	Response teams and teams who service the activity where critical points have been established

Unit Manager
Stamp

Table No. 8 MANAGEMENT RESPONSIBILITIES [01], [16], [19], [21]

No.	Name of critical point	Section/Section/ Area of activity	Name and Surname of the manager/ operator	Responsibilities
a	<i>Mining Operations Areas</i>	Pit		<ul style="list-style-type: none"> - <u>Section head (manager)</u> - investigates why and how the spill occurred - mobilizes own response teams to the critical point where the spill occurred - collaborates with the CI to remove the causes and minimize effects of the spill - informs the company management, the DM, and the spill control team on the ongoing response actions - ensures and participates in investigating the causes of the spill and in establishing liabilities of the guilty parties - <u>Department head (manager)</u> - participates in investigating the causes of the spill, in adopting specific department measures in the conduct of operative actions and implementation of preventative measures after the conclusion of the spill incident - <u>Shift Head Technician</u> - notifies response teams and directs them in operative actions under the coordination of the CI; - provides own response equipment and facilities; - informs the Department Head on the response deployment;
b	<i>On site transport</i>	Pit		Idem
c	<i>Process Plant</i>	Process Plant		Idem
d	<i>Pipeline routes</i>	Process Plant (slurry) TMF (settled water) Utilities (acid Rock Drainage)		Idem
e	<i>Tailings Management Facility TMF</i>	TMF		Idem
f	<i>Cetate Water Catchment Dam</i>	Utilities		Idem
g	<i>Waste rock stockpiles</i>	Pit		Idem

Unit Manager
Stamp

Note: The final version and level of detail to be established based on the detailed technical projects, the completion of the SOPs and the final organizational structure upon commissioning.

Table No. 9 LIST OF UNITS THAT PROVIDE ASSISTANCE IN CASE OF ACCIDENTAL SPILLS

No.	Unit Name	Address	Telephone/ Fax	Contact person
1	S.G.A. Alba –S.H.Arieș – Turda	Turda Str. Stadionului 12	0264 313461/ 0264 313462	Dispatcher- 0264 313461
2	S.G.A. Alba	Alba Iulia Str. Lalelelor 7	0258 833356/ 0258 834428	Dispatcher- 0258 833578
3	G. N. M. – Alba County Commissariat	Alba Iulia Str. Lalelelor 7A	Tel./fax 0258 816834	
4	Alba County Inspectorate for Emergencies	Alba Iulia Str. A.I. Cuza 10	0258 810411 0258 810497/ 0258 810425	Dispatcher- 0258 810497
5	Alba County Prefect's Office	Alba Iulia P-ta I.C. Brătianu 1	0258 813380 0258 813381/ 0258 813382	
6	Local Emergency Committee Abrud Town			
7	Local Emergency Committee Roșia Montană Commune			
8	Abrud Town Police			
9	Roșia Montană Commune Police			
10	Alba County Police Inspectorate			
11	Abrud Town Hospital			
12	Câmpeni Town Hospital			
13	Alba County Public Health Directorate	Alba Iulia Bld. Revoluției 23	0258 821636	
14	S.C. Cuprumin S.A. Abrud	Abrud P-ta Petru Dobra 1	0258 780083 0258 780712/ 0258 780296	Dispatcher-0258 780712 / 223

Unit Manager
Stamp

Note: Contact persons and contact telephone numbers to be filled in upon commissioning

Table No. 10 List of potentially impacted downstream users

No.	Unit Name	Address	Telephone/ Fax	Production profile:
1	S.C. Cuprumin S.A. Abrud - Gârde Water Intake	Abrud P-ta Petru Dobra 1	0258 780083 0258 780712/ 0258 780296	Copper ore extraction and processing
2	R.A.T.A.C.F.L. Turda – Moldovenești-Cornești-M. Viteazu water source	Turda, Str. Axente Sever, nr. ...	0264 311771	Local utility
3	A.N.I.F. Cluj – Irrigation system Mihai Viteazu – Moldovenești Water intake	Com. Mihai Viteazu		Irrigations
4	S.C. Holcim S.A. Turda – Water abstraction Turda	Turda, Str.		Cement manufacturing
5	S.C. Electroceramica S.A. Turda – Water intake Turda	Turda, Str. ..		Insulation manufacturing
6	S.C. Mechel S.A. Câmpia Turzii - Arieș water abstraction	Câmpia Turzii Str. Laminoriștilor, 145		

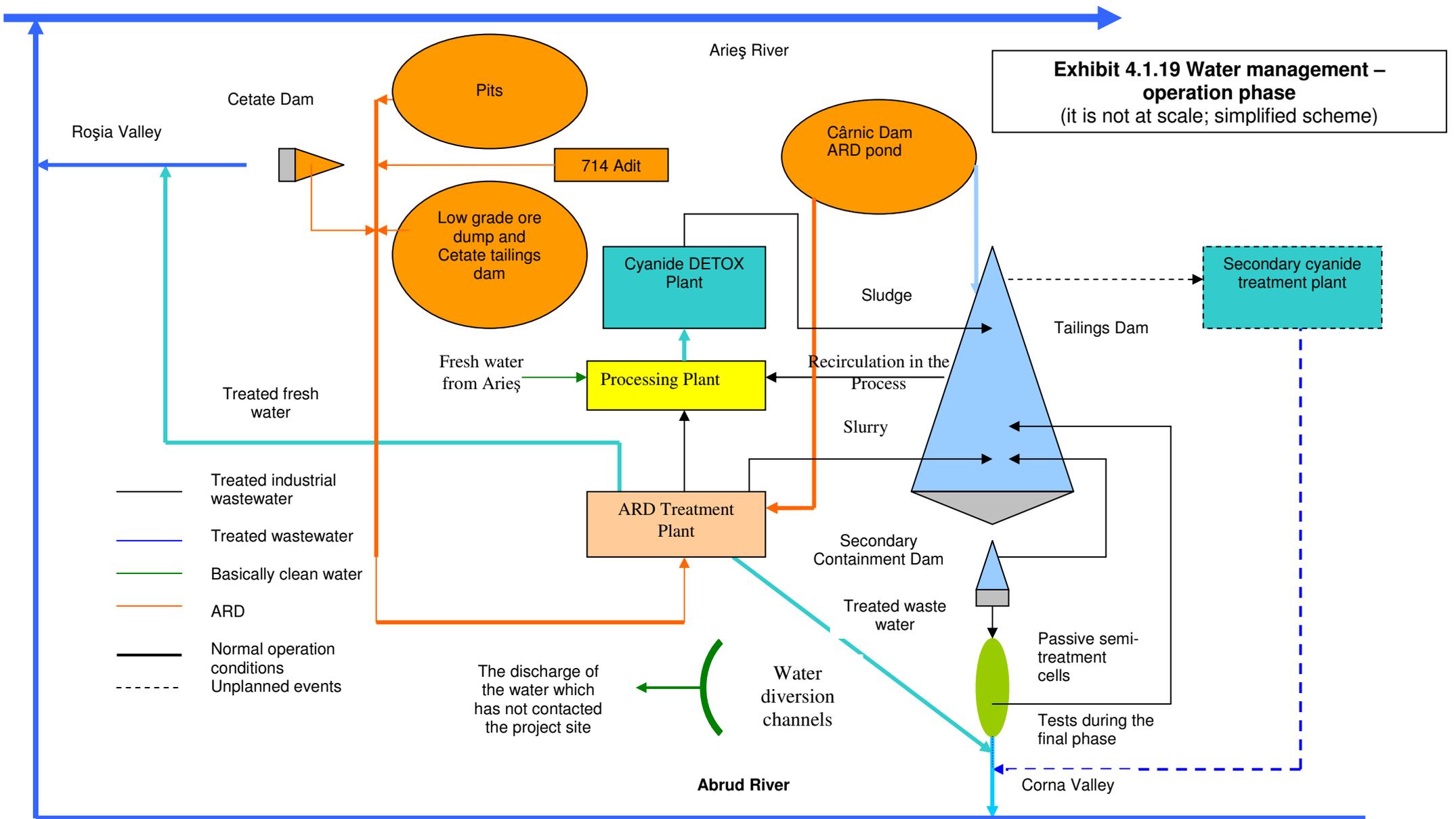
Unit Manager
Stamp

**DISTRIBUTION LIST
FOR THE SPILL PREVENTION AND CONTROL PLAN**

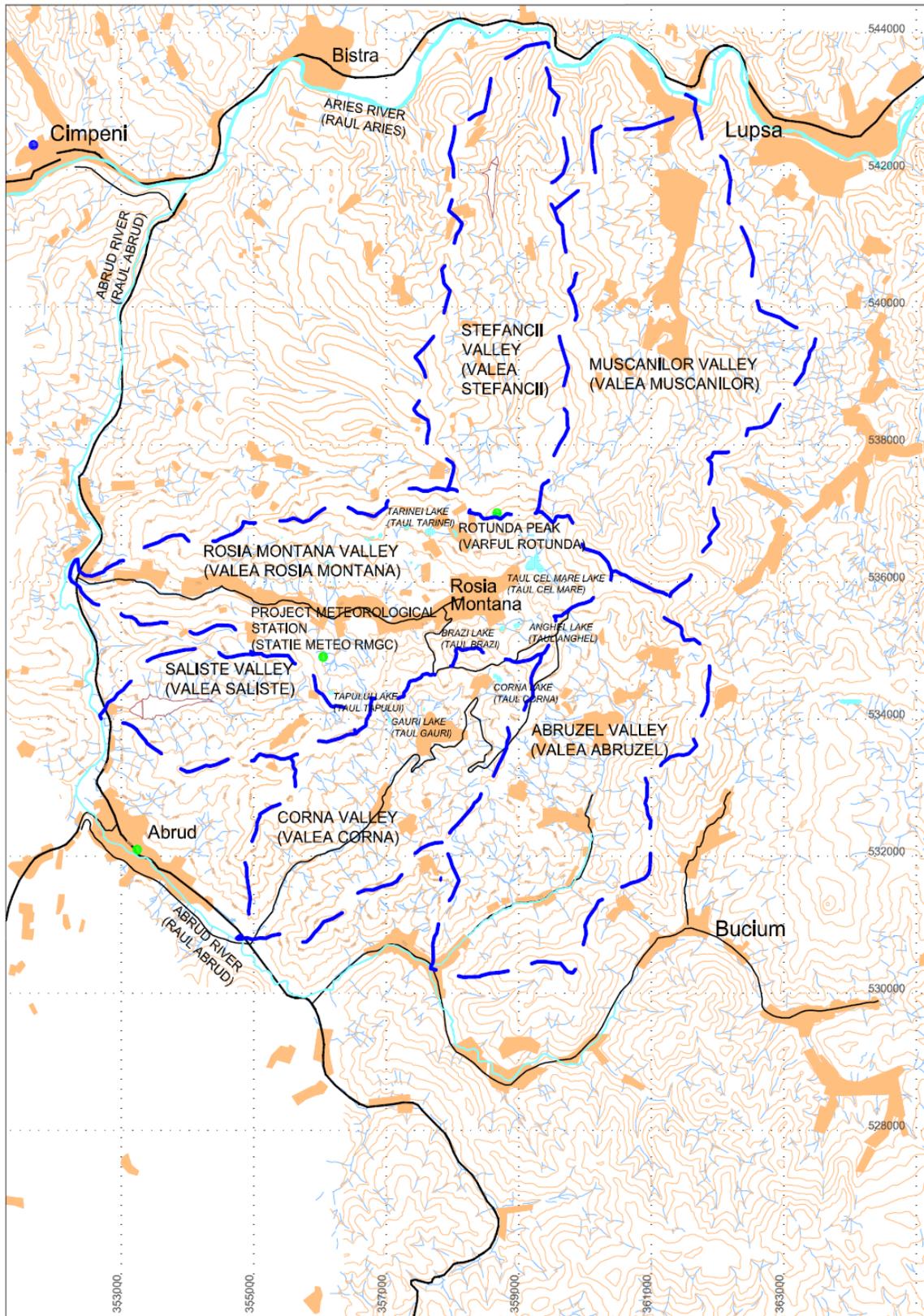
No.	Institution/ Service (section, compartment, etc.)	Name and Surname	Date	Signature on receipt	Comments
1.	DISPATCHER				
2.	ENVIRONMENTAL DEPARTMENT				
3.	HEALTH & SAFETY DEPARTMENT				
4.	EMERGENCY COORDINATOR				
5.	ALBA WATER MANAGEMENT SYSTEM				
6.	ALBA COUNTY INSPECTORATE FOR EMERGENCIES				

REFERENCES

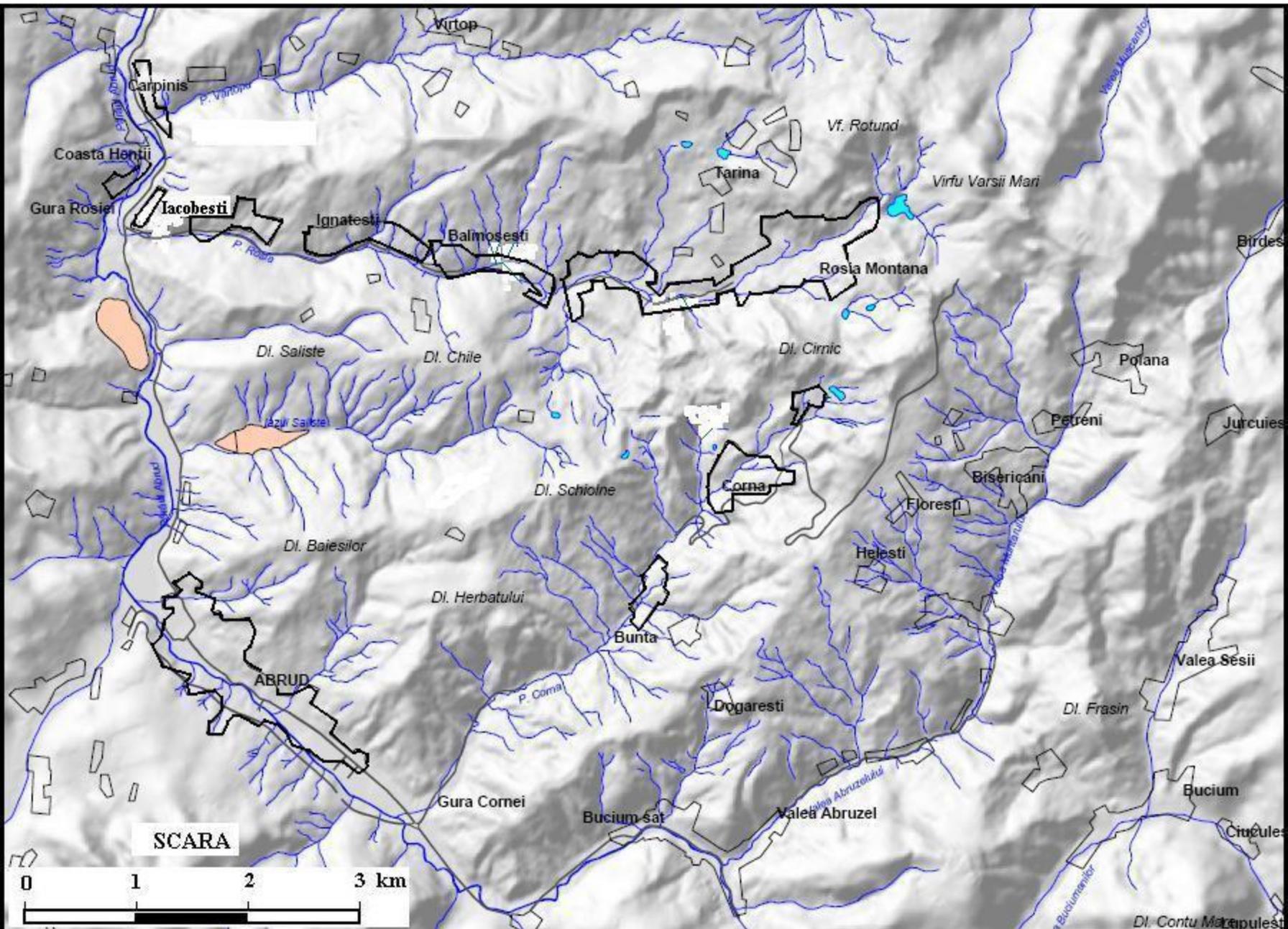
01. **Order 278/1997 of MEWM on the approval of the framework methodology for the drawing up of plans to prevent and fight accidental pollution caused by the use of potentially polluting water;**
 02. **Law no. 107/1996- Water Law, amended by Law no. 310/2004 and Law no. 112/2006.**
 03. **The Order no. 638/2005 of the Ministry of the Environment and Water Management and Order no. 420/SB/2005 of the Ministry of Administration and Interior on the approval of the Regulation regarding the management of emergency situations caused by floods, hazardous meteorological events, accidents involving hydrotechnical structures and accidental pollutions and for the approval of the Framework for the purchase of materials and devices used for protection against floods, winter emergencies and accidental pollution;**
 04. **Government Decision nr. 2288/2004 on the approval of the assignment of responsibilities undertaken by the ministries, other central institutions and non-governmental organizations regarding the prevention and management of emergency situations;**
 05. **The Emergency Governmental Ordinance 21/2004 on the national management system for emergency situations**
 06. **Government Decision No. 490/2002 approving the Methodological Norms of application of GEO 200/2000 on the classification, labeling and packaging of the hazardous chemical substances and preparations**
 07. **Order 161/2006 of MEWM on the approval of the standard regarding a classification of surface water quality with a view to assessing the ecological state of water bodies.**
 08. **The Emergency Governmental Ordinance No. 195 /2005 as amended on environmental protection;**
 09. **EIA Report for Roşia Montană Project, Chapter 1- General Information, Vol. 7, May 2006;**
 10. **EIA Report for Roşia Montană Project, Chapter 4- Potential Impacts, including transboundary impacts on the environmental media and prevention and mitigation measures, Chapter 4.1, Water, vol. 11, May 2006;**
 11. **EIA Report for Roşia Montană Project, Chapter 2- Technological Processes, Vol. 8, May 2006;**
 12. **EIA Report for Roşia Montană Project, Chapter 7- Risk Situations, Vol. 18, May 2006;**
 13. **EIA Report for Roşia Montană Project, Chapter 3- Waste, Vol. 8, May 2006 ;**
 14. **EIA Report for Roşia Montană Project, Chapter 6- Monitoring, Vol. 17, May 2006;**
 15. **EIA Report for Roşia Montană Project, Chapter 10- Transboundary Impacts, Vol. 20, May 2006;**
 16. **Roşia Montană Project Management Plans, Plan A - Environmental and Social Management Plan , Vol. 21, May 2006;**
 17. **Roşia Montană Project Management Plans, Plan A - Waste Management Plan , Vol. 22, May 2006;**
 18. **Roşia Montană Project Management Plans, Plan C - Water Management and Erosion Control Plan , Vol. 23, May 2006;**
 19. **Roşia Montană Project Management Plans, Plan F - TMF Management Plan, Vol. 25, May 2006;**
 20. **Roşia Montană Project Management Plans, Plan G - Cyanide Management Plan , Vol. 26, May 2006;**
 21. **Roşia Montană Project Management Plans, Plan I - Emergency Prevention and Control Plan , Vol. 28, May 2006;**
- Roşia Montană Project Management Plans, Plan N - Environmental and Social Monitoring Plan , Vol. 21, May 2006;**



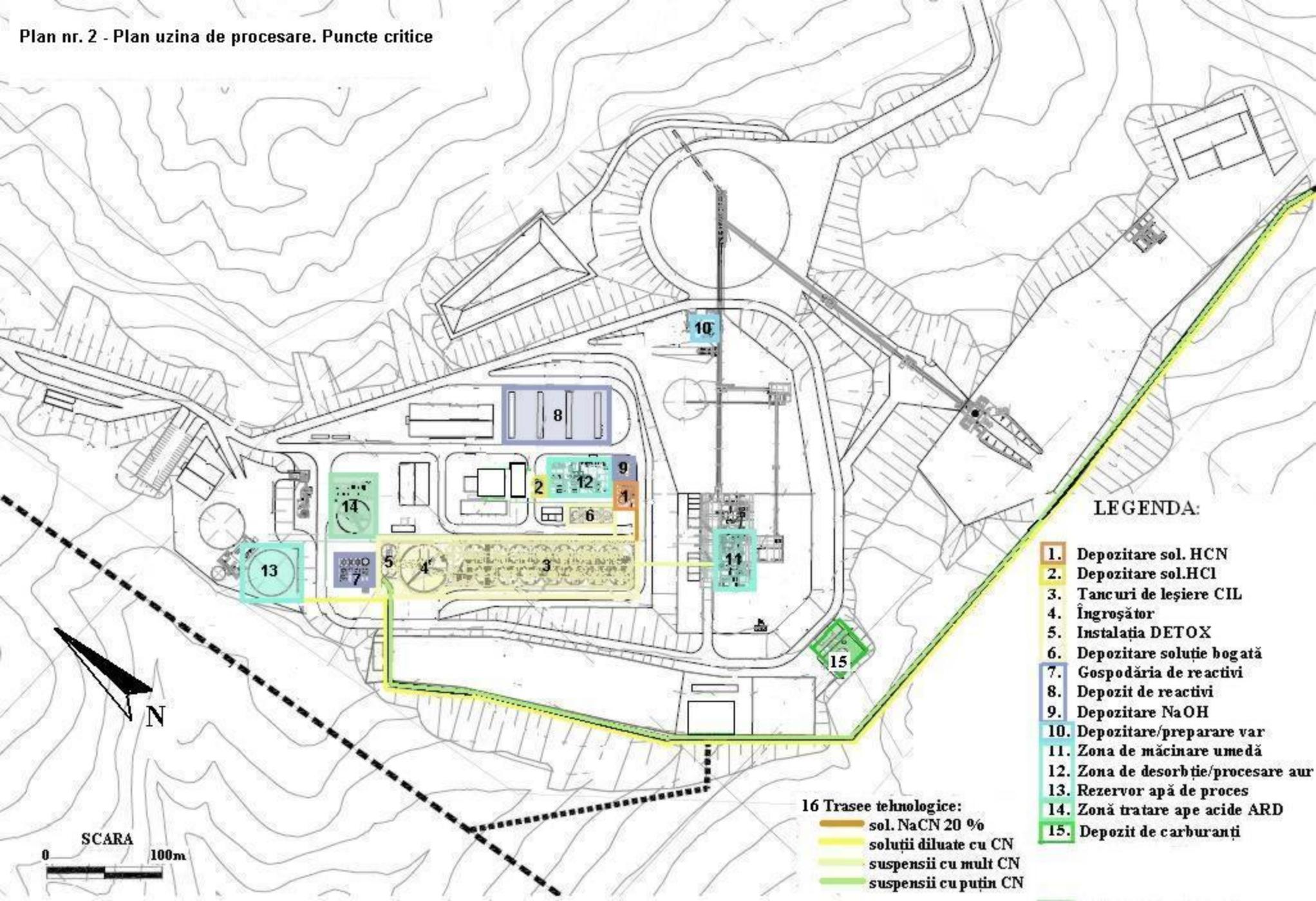
Map of river systems of the Roșia Montană Project area



Harta zonei



Plan nr. 2 - Plan uzina de procesare. Puncte critice



LEGENDA:

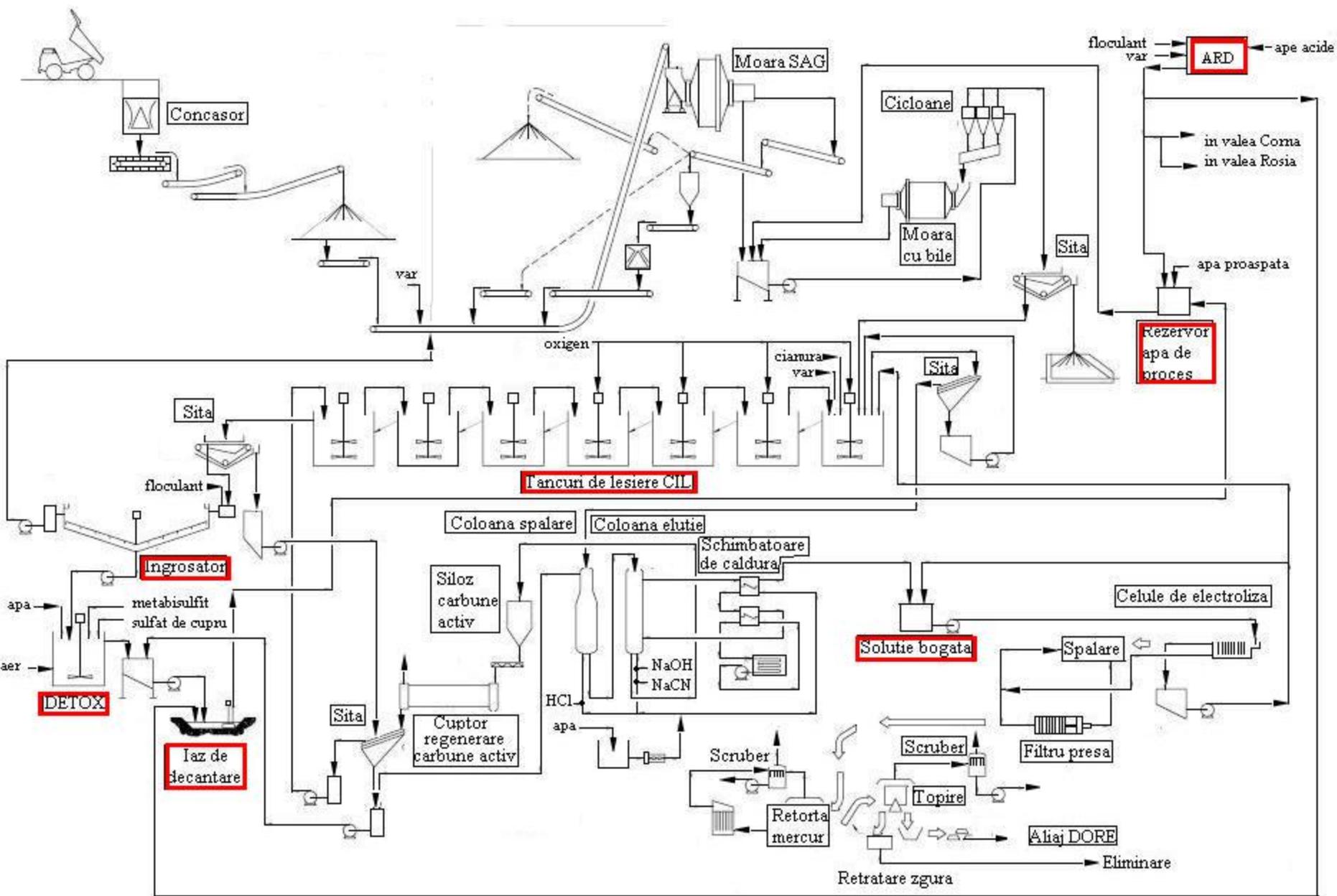
1. Depozitare sol. HCN
2. Depozitare sol.HCl
3. Tancuri de leșiere CIL
4. Îngroșător
5. Instalația DETOX
6. Depozitare soluție bogată
7. Gospodăria de reactivi
8. Depozit de reactivi
9. Depozitare NaOH
10. Depozitare/preparare var
11. Zona de măcinare umedă
12. Zona de desorbție/procesare aur
13. Rezervor apă de proces
14. Zonă tratare ape acide ARD
15. Depozit de carburanți

16 Trasee tehnologice:

- sol. NaCN 20 %
- soluții diluate cu CN
- suspensii cu mult CN
- suspensii cu puțin CN

SCARA

0 100m



Schema procesului tehnologic