SAMPLING PLAN
in accordance with standard EN 14899
compliant with EU Commission Decision of of 30 April 2009 (2009/360/EC)
and MONITORING PLAN

I. Purpose of Data Collection

To generate a database of sufficient size and detail for characterisation of the mining wastes (mine rock and flotation tailings from ore processing, which will be co-disposed in an integrated mine waste facility (IMWF)),

Note:
The mine rock will be used to construct the foundation for the facility (starter platforms) and retain the tailings (cells constructed from the mine rock). Samples of drill core will be tested for characterisation of the mine rock.
The thickened tailings will be placed within the cells constructed from mine rock. Samples created during expensive laboratory-scale flotation testwork by SGS and Golder will be tested for characterisation of the tailings.
Characterization testwork can take 12-18months if there is any indication that acid generation potential exists and kinetic testing is required. Testwork should be completed before the facility is commissioned.
The proposed monitoring is only a recommendation and should finally be confirmed and approved upon commissioning of the facility

specifically:

I.1. Geological background of deposit that is developed (*characterisation of the underground mineral resources by production blocks)*

1. Mineralogical description;
2. Chemical Properties;
3. Hydrothermal Alteration of the Mineralisations and the Host Rocks;
4. Weathering and Supergene Alteration Processes;
5. Physical and geotechnical properties such as specific gravity, density, porosity, compression strength, jointing (RQD), water content;
6. Acid drainage potential (defined as the ratio between the neutralising potential and the acid potential, and determined on the basis of a static test prEN 15875);
7. Change in the level of confidence in the mineral resourse as the mining progresses;
8. Marginal and low grade mineralised inventory;
9. Surface water properties.

I.2. Mining Waste Characterization

1. partcle size distribution of solids; pulp density (% of solids), solids density; stability/plasticity:

    a. Laboratory tests on disturbed samples;
2. Liquid and solid chemistry:
    a. Laboratory testwork for determination of the chemical composition of thickened tailings and mine rock including:
        i. The content of substances potentially harmful to the environment or human health in the waste, and in particular As, Cd, Co, Cr, Cu, Hg, Mo, Ni, Pb, V and Zn, whose levels exceed the limits set in the Regulation on the Terms and Conditions for Classification, Packaging and Labelling of Chemical Substances and Preparations approved by CoM Decree No 316 of 2002 (promulgated in SG 5 /2003, amended in SG 66/2004), 50 and 57/2000, issue 20/2007, and 4 and 51 of 2008);
        ii. The content of substances potentially harmful to the environment or human health in the waste, and in particular As, Cd, Co, Cr, Cu, Hg, Mo, Pb, Ni, V, and Zn, including any fine particles alone of the waste,in concentrations exceeding the maximum allowable limits specified in Appendix 3 to Regulation 3/2004 on Waste Classification (SG issue 44/2004);
3. Acid generating potential:
    a. Laboratory tests on samples:
        i. Acid drainage potential (defined as the ratio between the neutralising potential and the acid potential, and determined on the basis of a static test prEN 15875).
        ii. Humidity cell or Column tests if material shows acide generation potential.
4. Geochemical characterisation (evaluation of metals, seepage behaviour):
    a. Laboratory testing on samples of drill core from the project open pit and samples of thickened tailings;
    b. Short-term Leach testing
5. Interstitial water:
    a. Laboratory testwork on disturbed and undisturbed samples;
6. Behaviour under consolidation:
    a. Modeling of undisturbed samples;
7. Kinetic testwork:
    a. Laboratory liquefaction tests. Graphic presentation of results:
    b. Humidity cell or Column tests if material shows acide generation potential
8. Mineralogical description:
    a. Analythical determination of mineral composition.
9. Surface water properties:
    a. Laboratory tests for characterisation of drainage and seepage, and runoff from the open pit.
10. Geotechnical characterisation of the process tailings:
    a. Geotechnical stability parameters:
        i. Laboratory geotechnical testing of mine rock (specific gravity, density, porosity, shear strength, permeability) – tests for maximum and minimum density in a modified Proctor mould;

ii. Laboratory testwork on an undisturbed sample for cohesion and angle of internal friction in a triaxial test unit;

b. Anticipated changes during storage and assessment of their impact on the stability of the mining waste storage facility:
   i. Permeability laboratory testwork;
   ii. Laboratory testwork on the compression and elasticity modulus;
   iii. Analythical determination of the degree of consolidation.

11. Geochemical characterisation of the process tailings:
    a. Evaluation of the mineralogical and chemical properies of the mining waste and the residuals remaining in the waste from the primary processing:
       i. Laboratory testwork;
    b. Estimation of the potential for drainage and seepage of substances and chemicals which have a negative impact on the environment and the public health and safety on the basis of:
       i. Evaluation of metals, oxyanion and salt leachability over time by pH dependence leaching test, and/or percolation test and/or other suitable testing;
          1. Laboratory testwork on drillcore from various depths and a sample of thickened slurry;
       ii. Anticipated changes during mining waste delivery and storage from any external influence and evaluation of their impact on the environment and public the health and safety, and the stability of the facility.
12. Determination of sulphide sulphur content;
13. Mining waste classification;
14. A summary report of completed testwork.

II. Testing Programme and Sampling Requirements

II.1. Types of Mine Samples (Underground Mineral Resources)

Sampling situations:

a) Field:
- Drilling works:
  - ✓ Drill core (cut in two perpendicular to the core long axis) - element determinations.
  - ✓ Drill core (cut in two perpendicular to the core long axis) - composite sample for element determinations.

b) Laboratory:
- Specific gravity, density, porosity, compression strength, jointing (RQD), water content;
- Acid drainage potential (defined as the ratio between the neutralising potential and the acid potential, and determined on the basis of a static test prEN 15875).

II.2. Types of Samples from the Integrated Mine Waste Facility

1. Sampling situations:

Laboratory:

- Physical property determinations BNS 2761:1986;
- Strength properties BNS EN 13286-7:2004**;**
- Compression properties BNS 8992:1984**;**
- Permeability BNS 8497:1975**;**
- Determination of the water soluble salts and their content BNS 11301:1973;
- Water quality. General requirements to the physical and chemical methods for determination of water composition and quality BNS 17.1.3.09:1988;
- Determination of the leaching behaviour of waste under specified conditions CEN/TS 14429;
- Characterization of waste. Assaying of eluates. Determination of pH, As, Ba, Cd, Cl-, Co, Cr, Cr Vl, Cu, Mo, Ni, NO^{2-}, Pb, total S, SO_4^{2-}, V and Zn BNS EN 12506:2003**;**
- Characterization of wastes. Sampling of waste materials. Framework for the preparation and application of a Sampling Plan BNS EN 14899:2006.

2. According to the sampling method:

a) Surface - physical parameters, coefficient of filtration, consolidation, elasticity and compressive properties, modelling;
b) Drillhole - physical parameters, shear, coefficient of filtration, consolidation, elasticity and compressive properties, modelling;

II.1. Type of samples

II.1.2. Waste Product

For waste characterisation:

- ❖ Undisturbed and disturbed samples from laboratory testwork;
- ❖ Undisturbed and disturbed samples from exploration drilling;

For monitoring:

- ❖ average daily fresh composite sample of thickened tailings (sampling at 1-hour intervals);
- ❖ monthly composite balance sample of thickened tailings;
- ❖ annual composite balance sample of thickened tailings;
- ❖ drilling samples from the facility to determine the behaviour of the mine wastes in depth (drillholes) - deep undisturbed samples of mine rock and thickened tailings;
- ❖ samples from a max. of four locations across the facility - surface disturbed samples of mine rock and thickened tailings.

II.1.3. Waters (surface waters - 6 samples; shallow groundwaters - 10 samples; wastewaters - 3 samples) including:

- ❖ Virovitsa (Kessebir) River upstream of confluence with the Topolnitsa River;
- ❖ Krumovitsa River downstream of confluence with Virovitsa (Kessebir), upstream of the IMWF;

- Krumovitsa upstream of Guliika drinking water abstraction, downstream of the IMWF in easterly direction;
- Krumovitsa upstream of Krumovgrad drinking water abstraction, downstream of the open pit in easterly direction;
- Krumovitsa downstream of Krumovgrad;
- Kaldzhikdere downstream of the IMF and open pit in westerly direction;
- shallow groundwater:
  - 5 observation wells constructed as piesometers;
  - 3 drinking water abstractions at Guliika and Krumovgrad;
  - 1 proprietary fresh water abstraction at confluence of Kessebir with Krumovitsa;
  - a spring at Zvunarka;
- IMWF drainage and seepage (2 collecting sumps at the toe of the IMWF);
- runoff (1 collectin sump at the open pit);

II.2 Type of assay

Type of sample	Parameter/ substance subject to sampling	Unit	Sampling					
			Sampling point no.	Sampling point accessibility	Frequency	Standard (reference values)	Assay method/procedure	Testing organisation (laboratory name, accreditation, validity)
Drill core, ore sample	Au	% (ppm) g/t (ppm)	no. 1÷20	accessible	when drilling is performed/ every shift during operation	fire assay (FA) or gravimetric fire assay atomic absorption spectrometry (AAS) or iodometry muffle furnace combustion AAS	fire assay (FA) or gravimetric fire assay atomic absorption spectrometry (AAS) or iodometry muffle furnace combustion AAS	SGS CEMI, Canada Eurotest Control AD
	Ag	g/t (ppm)						
	S (total)	%						
	As; 52 elements listed; Specific gravity; Jointing (RQD) and water content	% (ppm) kg/m^3 % %				BNS 644	BNS 644	
Drill core, mine rock sample	Au Ag S (total) As	% (ppm) g/t (ppm) g/t (ppm) % % (ppm)	no. 21÷37	accessible	when drilling is performed	fire assay (FA) or gravimetric fire assay atomic absorption spectrometry (AAS) or iodometry muffle furnace combustion AAS	fire assay (FA) or gravimetric fire assay atomic absorption spectrometry (AAS) or iodometry muffle furnace combustion AAS	

Type of sample	Parameter/ substance subject to sampling	Unit	Sampling					
			Sampling point no.	Sampling point accessibility	Frequency	Standard (reference values)	Assay method/procedure	Testing organisation (laboratory name, accreditation, validity)
bulk sample, including of mine rock	density, porosity; compressive strenght; static test prEN 15875	g/cm^3 % x 10^5Pa mol/kg	no. 1÷37	accessible	one-off	BNS 646 and 647 BNS 647 BNS 11484 prEN 15875	BNS 646 and 647 BNS 647 BNS 11484 prEN 15875	
daily fresh composite sample (sampling at 1-hour intervals) of flotation tailings	**Liquid phase determinations:** pH total dissolved solids (TDS) Fluorides (F) Sulphates (SO_4) Chlorides (Cl) Total organic carbon Dissolved organic carbon (DOC) Vanadium (V) Chromium (Cr) Cobalt (Co) Nickel (Ni) Copper (Cu) Zinc (Zn) Arsenic (As) Molybdenum (Mo) Cadmium (Cd) Antimony (Sb) Barium (Ba) Lead (Pb)	 pH units mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	no. 38	accessible	Once every 3 months	 BNS EN 12506 BNS EN 872 BNS EN ISO 10304 BNS EN ISO 10304 BNS EN ISO 10304 BNS EN 1484 BNS EN 1484 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN ISO 11885	 BNS EN 12506 BNS EN 872 BNS EN ISO 10304 BNS EN ISO 10304 BNS EN ISO 10304 BNS EN 1484 BNS EN 1484 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN ISO 11885	Eurotest Control AD

Type of sample	Parameter/ substance subject to sampling	Unit	Sampling					
			Sampling point no.	Sampling point accessibility	Frequency	Standard (reference values)	Assay method/procedure	Testing organisation (laboratory name, accreditation, validity)
	Mercury (Hg)	mg/kg				BNS EN 12506	BNS EN 12506	
	Selenium (Se)	mg/kg				BNS EN 12506	BNS EN 12506	
		mg/kg				BNS EN 1483	BNS EN 1483	
		mg/kg				BNS EN ISO 11885	BNS EN ISO 11885	
	Solid phase determinations:							
	pH	pH units				BNS ISO 10390	BNS ISO 10390	
	Vanadium (V)	mg/kg				BNS EN 13656	BNS EN 13656	
	Chromium (Cr)	mg/kg				BNS EN 13656	BNS EN 13656	
	Cobalt (Co)	mg/kg				BNS EN 13656	BNS EN 13656	
	Nickel (Ni)	mg/kg				BNS EN 13656	BNS EN 13656	
	Copper (Cu)	mg/kg				BNS EN 13656	BNS EN 13656	
	Zinc (Zn)	mg/kg				BNS EN 13656	BNS EN 13656	
	Arsenic (As)	mg/kg				BNS EN 13656	BNS EN 13656	
	Molybdenum (Mo)	mg/kg				BNS EN 13656	BNS EN 13656	
	Cadmium (Cd)	mg/kg				BNS EN 13656	BNS EN 13656	
	Antimony (Sb)	mg/kg				BNS EN 13656	BNS EN 13656	
	Barium (Ba)	mg/kg				BNS EN 13656	BNS EN 13656	
	Lead (Pb)	mg/kg				BNS EN 13656	BNS EN 13656	
	Total sulphur (S)	%				ETC V3I1/7.1-3	ETC V3I1/7.1-3	
	Sulphide sulphur (S)	%				ETC V3I1/7.1-3	ETC V3I1/7.1-3	
	Sulphate sulphur (S)	%				ETC V3I1/7.1-3	ETC V3I1/7.1-3	
	Tempering losses	%				BNS EN 12879	BNS EN 12879	

Type of sample	Parameter/ substance subject to sampling	Unit	Sampling					
			Sampling point no.	Sampling point accessibility	Frequency	Standard (reference values)	Assay method/procedure	Testing organisation (laboratory name, accreditation, validity)
	Eluate determinations:							
	pH	pH units				BNS EN 12506	BNS EN 12506	
	total dissolved solids (TDS)	mg/kg				BNS EN 872	BNS EN 872	
	Fluorides (F)	mg/kg				BNS EN ISO 10304	BNS EN ISO 10304	
	Sulphates (SO_4)	mg/kg				BNS EN ISO 10304	BNS EN ISO 10304	
	Chlorides (Cl)	mg/kg				BNS EN ISO 10304	BNS EN ISO 10304	
	Dissolved organic carbon (DOC)	mg/kg				BNS EN 1484	BNS EN 1484	
	Vanadium (V)	mg/kg				BNS EN 12506	BNS EN 12506	
	Chromium (Cr)	mg/kg				BNS EN 12506	BNS EN 12506	
	Cobalt (Co)	mg/kg				BNS EN 12506	BNS EN 12506	
	Nickel (Ni)	mg/kg				BNS EN 12506	BNS EN 12506	
	Copper (Cu)	mg/kg				BNS EN 12506	BNS EN 12506	
	Zinc (Zn)	mg/kg				BNS EN 12506	BNS EN 12506	
	Arsenic (As)	mg/kg				BNS EN 12506	BNS EN 12506	
	Molybdenum (Mo)	mg/kg				BNS EN 12506	BNS EN 12506	
	Cadmium (Cd)	mg/kg				BNS EN 12506	BNS EN 12506	
	Antimony (Sb)	mg/kg				BNS EN 12506	BNS EN 12506	
	Barium (Ba)	mg/kg				BNS EN 12506	BNS EN 12506	
	Lead (Pb)	mg/kg				BNS EN ISO 11885	BNS EN ISO 11885	
	Mercury (Hg)	mg/kg				BNS EN 1483	BNS EN 1483	
	Selenium (Se)	mg/kg				BNS EN 12506	BNS EN 12506	
		mg/kg				BNS EN 1483	BNS EN 1483	
		mg/kg				BNS EN ISO 11885	BNS EN ISO 11885	
Monthly composite balance sample	**Solid phase determinations:**		no. 39	accessible	Once per month			Eurotest Control AD
	Gold (Au)	g/t				AAS	AAS	
	Silver (Ag)	g/t				AES-ICP	AES-ICP	

Type of sample	Parameter/ substance subject to sampling	Unit	Sampling					
			Sampling point no.	Sampling point accessibility	Frequency	Standard (reference values)	Assay method/procedure	Testing organisation (laboratory name, accreditation, validity)
	Copper (Cu) Arsenic (As) Total sulphur (S)	% % %				AAS AES-ICP LECO	AAS AES-ICP LECO	
Annual composite balance sample	**Solid phase determinations:** pH Vanadium (V) Chromium (Cr) Cobalt (Co) Nickel (Ni) Copper (Cu) Zinc (Zn) Arsenic (As) Molybdenum (Mo) Cadmium (Cd) Antimony (Sb) Barium (Ba) Lead (Pb) Total sulphur (S) Sulphide sulphur (S) Sulphate sulphur (S) Tempering losses	 pH units mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg % % % %	no. 40	accessible	Yearly	 BNS ISO 10390 BNS EN 13656 BNS EN 13656 BNS EN 13656 BNS EN 13656 BNS EN 13656 BNS EN 13656 BNS EN 13656 BNS EN 13656 BNS EN 13656 BNS EN 13656 BNS EN 13656 BNS EN 13656 ETC V3I1/7.1-3 ETC V3I1/7.1-3 ETC V3I1/7.1-3 BNS EN 12879	 BNS ISO 10390 BNS EN 13656 BNS EN 13656 BNS EN 13656 BNS EN 13656 BNS EN 13656 BNS EN 13656 BNS EN 13656 BNS EN 13656 BNS EN 13656 BNS EN 13656 BNS EN 13656 BNS EN 13656 ETC V3I1/7.1-3 ETC V3I1/7.1-3 ETC V3I1/7.1-3 BNS EN 12879	Eurotest Control AD
	Eluate determinations: pH total dissolved solids (TDS)	 pH units mg/kg				 BNS EN 12506 BNS EN 872	 BNS EN 12506 BNS EN 872	

Type of sample	Parameter/ substance subject to sampling	Unit	Sampling					
			Sampling point no.	Sampling point accessibility	Frequency	Standard (reference values)	Assay method/procedure	Testing organisation (laboratory name, accreditation, validity)
	Fluorides (F) Sulphates (SO_4) Chlorides (Cl) Dissolved organic carbon (DOC) Vanadium (V) Chromium (Cr) Cobalt (Co) Nickel (Ni) Copper (Cu) Zinc (Zn) Arsenic (As) Molybdenum (Mo) Cadmium (Cd) Antimony (Sb) Barium (Ba) Lead (Pb)	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg				BNS EN ISO 10304 BNS EN ISO 10304 BNS EN ISO 10304 BNS EN 1484 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN ISO 11885 BNS EN 1483 BNS EN 12506	BNS EN ISO 10304 BNS EN ISO 10304 BNS EN ISO 10304 BNS EN 1484 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN ISO 11885 BNS EN 1483 BNS EN 12506	
drilling samples from the facility to determine the behaviour of the mine wastes in depth (drillholes) -	1. Determining the strength and deformation properties in different zones of an undisturbed sample. 2. Static test prEN	Friction angle (φ ^{o}) Cohesion (MPa) Compression modulus (MPa) Elesticity modulus (MPa)	no. 41 and 42	accessible	one-off	BNS 2761:1986 BNS EN 13286-7:2004 BNS 8497:1975 BNS 8992:1984	BNS 2761:1986 BNS EN 13286-7:2004 BNS 8497:1975 BNS 8992:1984	Geotechnika Engineering OOD Golder, Canada;

Type of sample	Parameter/ substance subject to sampling	Unit	Sampling					
			Sampling point no.	Sampling point accessibility	Frequency	Standard (reference values)	Assay method/procedure	Testing organisation (laboratory name, accreditation, validity)
deep undisturbed samples of mine rock and thickened tailings;	15875 (average sample)	mol/kg				prEN 15875	prEN 15875	Eurotest Control AD
samples from a max. of four locations across the facility - surface disturbed samples of mine rock and thickened tailings.	**Solid phase determinations:** pH Vanadium (V) Chromium (Cr) Cobalt (Co) Nickel (Ni) Copper (Cu) Zinc (Zn) Arsenic (As) Molybdenum (Mo) Cadmium (Cd) Antimony (Sb) Barium (Ba) Lead (Pb) Mercury (Hg) Total sulphur (S) Sulphide sulphur (S) Sulphate sulphur (S) Tempering losses Total organic	 pH units mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg % % % 	no. 43, 44, 45 and 46	accessible	4 times per annum (in January, April, July and October)	 BNS ISO 10390 BNS EN 13657 BNS EN 13657 BNS EN 13657 BNS EN 13657 BNS EN 13657 BNS EN 13657 BNS EN 13657 BNS EN 13657 BNS EN 13657 BNS EN 13657 BNS EN 13657 BNS EN 13657 BNS EN 13657 ETC V3I1/7.1-3 ETC V3I1/7.1-3 ETC V3I1/7.1-3 BNS EN 12879	 BNS ISO 10390 BNS EN 13657 BNS EN 13657 BNS EN 13657 BNS EN 13657 BNS EN 13657 BNS EN 13657 BNS EN 13657 BNS EN 13657 BNS EN 13657 BNS EN 13657 BNS EN 13657 BNS EN 13657 BNS EN 13657 ETC V3I1/7.1-3 ETC V3I1/7.1-3 ETC V3I1/7.1-3 BNS EN 12879	Eurotest Control AD

Type of sample	Parameter/ substance subject to sampling	Unit	Sampling					
			Sampling point no.	Sampling point accessibility	Frequency	Standard (reference values)	Assay method/procedure	Testing organisation (laboratory name, accreditation, validity)
	carbon/TOC static test prEN 15875	% mg/kg mol/kg				BNS EN 13137 prEN 15875	BNS EN 13137 prEN 15875	
	Eluate determinations: pH total dissolved solids (TDS) Fluorides (F) Sulphates (SO_4) Chlorides (Cl) Dissolved organic carbon (DOC) Vanadium (V) Chromium (Cr) Cobalt (Co) Nickel (Ni) Copper (Cu) Zinc (Zn) Arsenic (As) Molybdenum (Mo) Cadmium (Cd) Antimony (Sb) Barium (Ba) Lead (Pb) Mercury (Hg) Selenium (Se)	 pH units mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg				 BNS EN 12506 BNS EN 872 BNS EN ISO 10304 BNS EN ISO 10304 BNS EN ISO 10304 BNS EN 1484 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN ISO 11885 BNS EN 1483 BNS EN 12506 BNS EN 1483	 BNS EN 12506 BNS EN 872 BNS EN ISO 10304 BNS EN ISO 10304 BNS EN ISO 10304 BNS EN 1484 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN 12506 BNS EN ISO 11885 BNS EN 12506 BNS EN 12506 BNS EN 1483	

Type of sample	Parameter/ substance subject to sampling	Unit	Sampling					
			Sampling point no.	Sampling point accessibility	Frequency	Standard (reference values)	Assay method/procedure	Testing organisation (laboratory name, accreditation, validity)
		mg/kg				BNS EN ISO 11885	BNS EN ISO 11885	
Drainage and seepage waters	pH	pH units	no. 47 and 48	accessible	4 times per annum	BNS 3424	BNS 3424	Eurotest Control AD
	conductivity	µS/cm				BNS EN 27888	BNS EN 27888	
	dissolved O_2	mg/dm^3				BNS 17.1.4.04	BNS 17.1.4.04	
	chemical oxygen demand (COD)	mgO_2/dm^3				ISO 6060	ISO 6060	
	suspended solids (SS)	mg/dm^3				BNS 17.1.4.04	BNS 17.1.4.04	
	dissolved solids (DS)	mg/dm^3				BNS 17.1.4.04	BNS 17.1.4.04	
	Copper (Cu)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Arsenic (As)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Iron (Fe)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Manganese (Mn)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Zinc (Zn)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Aluminum (Al)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Nickel (Ni)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	ammonia ion ($NH_{4)}$	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	nitrites (NO_2)	mg/dm^3				BNS ISO 7150-1	BNS ISO 7150-1	
	nitrates (NO_3)	mg/dm^3				BNS EN ISO 10304	BNS EN ISO 10304	
	total nitrogen (N (total))	mg/dm^3				BNS EN ISO 10304	BNS EN ISO 10304	
	sulphates (SO_4)	mg/dm^3				BNS EN ISO 11905	BNS EN ISO 11905	
	phosphates (PO_4)	mg/dm^3				BNS EN ISO 10304	BNS EN ISO 10304	
	Calcium (Ca)	mg/dm^3				BNS EN ISO 10304	BNS EN ISO 10304	
	Magnesium (Mg)	mg/dm^3				BNS ISO 6058	BNS ISO 6058	
	Cadmium (Cd)	mg/dm^3				BNS 7211	BNS 7211	
	Chlorides (Cl)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Chromium (Cr (VI))	mg/dm^3				BNS EN ISO 10304	BNS EN ISO 10304	

Type of sample	Parameter/ substance subject to sampling	Unit	Sampling					
			Sampling point no.	Sampling point accessibility	Frequency	Standard (reference values)	Assay method/procedure	Testing organisation (laboratory name, accreditation, validity)
		mg/dm^3				BNS EN ISO 11083	BNS EN ISO 11083	
runoff (1 collection sump at the open pit);	pH	pH units	no. 49	accessible	4 times per annum	BNS 3424	BNS 3424	Eurotest Control AD
	conductivity	µS/cm				BNS EN 27888	BNS EN 27888	
	dissolved O_2	mg/dm^3				BNS 17.1.4.04	BNS 17.1.4.04	
	chemical oxygen demand (COD)	mgO_2/dm^3				ISO 6060	ISO 6060	
	suspended solids (SS)	mg/dm^3				BNS 17.1.4.04	BNS 17.1.4.04	
	dissolved solids (DS)	mg/dm^3				BNS 17.1.4.04	BNS 17.1.4.04	
	Copper (Cu)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Arsenic (As)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Iron (Fe)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Manganese (Mn)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Zinc (Zn)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Aluminum (Al)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Nickel (Ni)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	ammonia ion ($NH_{4)}$	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	nitrites (NO_2)	mg/dm^3				BNS ISO 7150-1	BNS ISO 7150-1	
	nitrates (NO_3)	mg/dm^3				BNS EN ISO 10304	BNS EN ISO 10304	
	total nitrogen (N (total))	mg/dm^3				BNS EN ISO 10304	BNS EN ISO 10304	
	sulphates (SO_4)	mg/dm^3				BNS EN ISO 11905	BNS EN ISO 11905	
	phosphates (PO_4)	mg/dm^3				BNS EN ISO 10304	BNS EN ISO 10304	
	Calcium (Ca)	mg/dm^3				BNS EN ISO 10304	BNS EN ISO 10304	
	Magnesium (Mg)	mg/dm^3				BNS ISO 6058	BNS ISO 6058	
	Cadmium (Cd)	mg/dm^3				BNS 7211	BNS 7211	
	Chlorides (Cl)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Chromium (Cr (VI))	mg/dm^3				BNS EN ISO 10304	BNS EN ISO 10304	

Type of sample	Parameter/ substance subject to sampling	Unit	Sampling					
			Sampling point no.	Sampling point accessibility	Frequency	Standard (reference values)	Assay method/procedure	Testing organisation (laboratory name, accreditation, validity)
		mg/dm^3				BNS EN ISO 11083	BNS EN ISO 11083	
Surface water	pH	pH units	no. 50÷55	accessible	4 times per annum	BNS 3424	BNS 3424	Eurotest Control AD
	conductivity	µS/cm				BNS EN 27888	BNS EN 27888	
	dissolved O_2	mg/dm^3				BNS 17.1.4.04	BNS 17.1.4.04	
	chemical oxygen demand (COD)	mgO_2/dm^3				ISO 6060	ISO 6060	
	suspended solids (SS)	mg/dm^3				BNS 17.1.4.04	BNS 17.1.4.04	
	dissolved solids (DS)	mg/dm^3				BNS 17.1.4.04	BNS 17.1.4.04	
	Copper (Cu)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Arsenic (As)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Iron (Fe)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Manganese (Mn)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Zinc (Zn)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Aluminum (Al)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Nickel (Ni)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	ammonia ion ($NH_{4)}$							
	nitrites (NO_2)	mg/dm^3				BNS ISO 7150-1	BNS ISO 7150-1	
	nitrates (NO_3)	mg/dm^3				BNS EN ISO 10304	BNS EN ISO 10304	
	total nitrogen (N (total))	mg/dm^3				BNS EN ISO 10304	BNS EN ISO 10304	
	sulphates (SO_4)	mg/dm^3				BNS EN ISO 11905	BNS EN ISO 11905	
	phosphates (PO_4)	mg/dm^3				BNS EN ISO 10304	BNS EN ISO 10304	
	Calcium (Ca)	mg/dm^3				BNS EN ISO 10304	BNS EN ISO 10304	
	Magnesium (Mg)	mg/dm^3				BNS ISO 6058	BNS ISO 6058	
	Cadmium (Cd)	mg/dm^3				BNS 7211	BNS 7211	
	Chlorides (Cl)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Chromium (Cr (VI))	mg/dm^3				BNS EN ISO 10304	BNS EN ISO 10304	
		mg/dm^3				BNS EN ISO 11083	BNS EN ISO 11083	

Type of sample	Parameter/ substance subject to sampling	Unit	Sampling					
			Sampling point no.	Sampling point accessibility	Frequency	Standard (reference values)	Assay method/procedure	Testing organisation (laboratory name, accreditation, validity)
Shallow groundwater	Water level	m	no. 56÷65	accessible	Once every 6 months	ETC V3I1/7.2.3-9	ETC V3I1/7.2.3-9	Eurotest Control AD
	Fluorides (F)	mg/dm^3				BNS EN 1483	BNS EN 1483	
	Mercury (Hg)	$\mu g/dm^3$				BNS EN ISO 11885	BNS EN ISO 11885	
	Lead (Pb)	$\mu g/dm^3$				BNS EN ISO 11885	BNS EN ISO 11885	
	Selenium (Se)	$\mu g/dm^3$				BNS 12578	BNS 12578	
	Uranium (U)	mg/dm^3				BNS 15398	BNS 15398	
	Sodium (Na)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Boron (B)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Antimony (Sb)	$\mu g/dm^3$				BNS ISO 6703	BNS ISO 6703	
	Cyanide (total)	mg/dm^3				BNS 3775	BNS 3775	
	total hardness	$mgeqv/dm^3$						
	permanganate oxidisable C	mgO_2/dm^3				BNS 3413	BNS 3413	
	electrical conductivity	µS/cm				BNS EN 27888 BNS 3424	BNS EN 27888 BNS 3424	
	pH	pH units						
	ammonia ion (NH_4)					BNS ISO 7150	BNS ISO 7150	
	nitrites (NO_2)	mg/dm^3				BNS EN 26777	BNS EN 26777	
	nitrates (NO_3)	mg/dm^3				BNS ISO 7890	BNS ISO 7890	
	sulphates (SO_4)	mg/dm^3				BNS 3588	BNS 3588	
	Chlorides (Cl)	mg/dm^3				ISO 9297	ISO 9297	
	phosphates (PO_4)	mg/dm^3				BNS EN ISO 6878	BNS EN ISO 6878	
	Cadmium (Cd)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Copper (Cu)	$\mu g/dm^3$				BNS EN ISO 11885	BNS EN ISO 11885	
	Nickel (Ni)	mg/dm^3				BNS EN ISO 11885	BNS EN ISO 11885	
	Chromium (Cr (VI))	$\mu g/dm^3$				BNS EN ISO 11885	BNS EN ISO 11885	
		$\mu g/dm^3$				BNS EN ISO 11885	BNS EN ISO 11885	
	Aluminium (Al)	$\mu g/dm^3$				BNS EN ISO 11885	BNS EN ISO 11885	
	Iron (Fe)	$\mu g/dm^3$				BNS ISO 6058	BNS ISO 6058	
	Calcium (Ca)	mg/dm^3				BNS 7211	BNS 7211	

Type of sample	Parameter/ substance subject to sampling	Unit	Sampling					
			Sampling point no.	Sampling point accessibility	Frequency	Standard (reference values)	Assay method/procedure	Testing organisation (laboratory name, accreditation, validity)
	Magnesium (Mg) Manganese (Mn) Zinc (Zn) Arsenic (As)	mg/dm^3 µg/dm^3 mg/dm^3 mg/dm^3				BNS EN ISO 11885 BNS EN ISO 11885 BNS EN ISO 11885	BNS EN ISO 11885 BNS EN ISO 11885 BNS EN ISO 11885	
	Benzene Benzo[a]pyrene 1,2-Dichloroethane Polycyclic aromatic hydrocarbons (PAHs) Tetrachloroethylene and Trichloroethylene Pesticides Pesticides (total)		no. 56÷65	accessible	Once every 2 years			EEA
	oil products	mg/dm^3	no. 56÷65	accessible	one-off background assessment	BNS EN ISO 9377-2	BNS EN ISO 9377-2	Eurotest Control AD

III. Sampling Situations (Including Sampling from Drill-Cores, Excavation Face, Conveyor Belt, Heap, IMWF, or Other Relevant Situation)

III.1 Ore/Host rock

- sampling of *drill core including waste rock;*
- mapping and sampling of *face samples* from both mineralisation zones;
- *bulk samples including* waste rock.

III.2. Tailings

- daily fresh composite sample (sampling at 1-hour intervals) of flotation tailings - taken from a sampling box at the tailings thickener discharge end;
- average annual composite balance flotation tailings samples - from monthly average composite balance samples;
- average monthly composite samples - from the daily composites;
- drilling samples from the facility to determine the behaviour of the mine wastes in depth (drillholes) - deep undisturbed samples of mine rock and thickened tailings;
- samples from a max. of four locations across the IMWF - surface disturbed samples of mine rock and thickened tailings.

III.3. Wastewaters

- Drainage and seepage waters from two collecting sumps at the toe of the IMWF North and South catchments;
- runoff (1 collectin sump at the open pit);

III.4. Surface waters and shallow groundwaters

- Virovitsa (Kessebir) River upstream of confluence with the Topolnitsa River;
- Krumovitsa River downstream of confluence with Virovitsa (Kessebir), upstream of the IMWF;
- Krumovitsa upstream of Guliika drinking water abstraction, downstream of the IMWF in easterly direction;
- Krumovitsa upstream of Krumovgrad drinking water abstraction, downstream of the open pit in easterly direction;
- Krumovitsa downstream of Krumovgrad;
- Kaldzhikdere downstream of the IMF and open pit in westerly direction;
- shallow groundwater:
    - 5 observation wells constructed as piesometers;
    - 3 drinking water abstractions at Guliika and Krumovgrad;
    - 1 proprietary fresh water abstraction at confluence of Kessebir with Krumovitsa;
    - a spring at Zvunarka;

IV. Procedures and Recommendations for Sample Numbers, Size, Mass, Description and Handling

IV.1. Sampling of drill core including mine rock: these are the exploration holes that will be drilled as part of the advanced exploration of the minesite;

- Description: After orientation, geotechnical and geologic description, marking of sampling situations and photocopying of the drill core from the respective drillhole, a resource geologist or a geology technician number the samples. A table format is created –**FD-16-03**– Drill Core Log, where each sample is recorded with its sequential and batch numbers, drillhole number, sampling interval, type - normal or duplicate (check), samples taken for specific gravity testing, core size and the locations of the standard and check samples are marked. A standard sample is prepared rock material of equal particle size and known (pre-assayed) chemical composition. It is written down in its column in **FD-16-03**– Drill Core Log against every 20th normal sample from the respective drillhole. It is done by a resource geologist or a geology technician by sampling one half of the drill core. The normal practice is that to be the right half. The material is collected in special cloth bags with laces. The sample number corresponding to the number of the coupon placed in the bag and the number from **FD-16-03**– Drill Core Log is written on each bag using a permanent marker. The sample bags from which the check sample will be taken contain two coupons - one with the sequential number of the sample and the other with the check sample number. The trays with the remaining drill core halves are marked with the respective sample numbers next to the sample interval starting mark. After completion of the procedure the core is sampled for specific gravity determination and additional assays or re-sampling are performed as required. The table in **FD-16-06** Daily Logged and Cut Meters Report is completed by a resource geologist after completion of the sampling procedure;
- Sampling intervals: 1 sample per every 1.0 m; 2 samples per 20x20 cm block for moisture content determinations, which should be packed to preserve the natural moisture content;
- number of samples - 7% check samples are taken and given numbers different from the sequential numbers. Every sample that is going to be subject to internal control is marked with a "c" (check) in **FD-16-03**– Drill Core Log. They are given the respective number from the interval numbering of the samples;
- size - the specific gravity test samples are taken by a resource geologist or a geology technician after cutting and sampling of the drill core if its diameter is larger than BQ. Representative samples 10 to 14 cm long are selected from every 3-meter intervals (except for highly disintegrated intervals). They are placed in PET zip bags marked with the sample number corresponding to the interval in **FD-16-03**– Drill Core Log. They are placed in a cardboard box with a hard copy of **FD-16-05**–Specific Gravity Testing Sample Shipment Form and dispatched for testing in an external laboratory. After completion of the testing, the samples are returned and replaced where the have been taken from. A whole core piece 10 to 14 cm long (or cut in halves as the geologist may deem) is recovered from BQ core. The procedure is the same.
- mass - 5÷8 kg per sample depending on the drill core diameter;
- dispatch - after completion of the sampling procedure the sample bags are dispatched to the site assay laboratory/external laboratory. The shipment is provided with hard copies of **FD-16-03**–Drill Core Log for the respective drillhole and **FD-16-07**–Assay Laboratory Protocol;

- ❖ storage - Special hard copy logbooks – **FD-16-04**–Sample Logbook, which have sample numbers corresponding to the sequential numbers in the **FD-16-03**– Drill Core Log and columns for drillhole number, sampling interval (from÷to) and the required element determinantions, which are filled in accordance with the completed **FD-16-03**– Drill Core Log. They contain the coupon of every number. Prior to commencing the sampling process, the logbook coupons are placed in the trays at the end of the interval ready for sampling. These coupons are placed in the cloth bags with the core samples for the purpose of identification at the assay laboratory.

IV.2. Sampling of RC drillholes including mine rock: these are the exploration holes that will be drilled as part of the advanced exploration of the production blocks; The holes are drilled in a grid, which will depend on the required blasthole spacing within the respective production area.

- ❖ Reverse Circulation (RC) drilling is done to a high standard, employing strict quality control procedures to minimize contamination and ensure high sample recovery.
- ❖ The RC drilling employs blow backs per metre with the cyclone cleaned and controlled by a geologist or the geology technician;
- ❖ The RC drilling and sampling is supervised by the Mine Geologist at all times;
- ❖ Face sampling hammer, with the bit size recorded on daily shift reports.
- ❖ The RC drilling is sampled at intervals depending on the lift of the respective production area;
- ❖ Each metre sample is collected in a fresh plastic bag – clearly labeled with Hole ID and depth (from/to).
- ❖ The lower lip of the cyclone is dusted clean before each new sample bag is attached.
- ❖ Plastic sample bags awaiting use are placed with their openings facing away from the cyclone exit chute and covered with a plastic sheet. Water misting systems are used to suppress dust from the cyclone chimney and the outside return hose.
- ❖ Each RC sample is weighed then split at 1 m intervals at the drill site using a Jones Riffle Splitter;
- ❖ The split samples, which weigh 2 to 3 kg, are delivered daily to the laboratory loading bay area in sealed and signed bags.
- ❖ The RC drilling is supervised at all times by a competent geologist assisted by field assistants, who operate the sample splitter and weigh each individual metre sample bag. A representative portion of RC cuttings from each successive metre is sieved clean and stored in neatly labeled chip trays.

  Key technical features of the RC geological logging correspond to:
- ❖ Logging is carried out per metre paying particular attention to oxidation type, rock type, tectonic/structural fabrics, veining/intensity, alteration/intensity, sulfides/intensity, and moisture content.
- ❖ The geologist must record voids, cavities, or insufficient samples.
- ❖ The rig side geologist carries a set of working sections, drill hole plan, and drill summary sheet (i.e., location of duplicates, depth of key geological contacts, average sample weight, and other special comments).
- ❖ Ensure a blank sample is used as the first sample of each drill hole.

- ❖ Ensure each RC sample bag is weighed (note: check regularly that the scales are zeroed).
- ❖ Ensure a clean plastic sheet/bag is placed over the grate of the splitter prior to emptying the RC sample bag into the splitter.
- ❖ Ensure the splitter is cleaned to a very high standard after each sample.
- ❖ Ensure the 1 m split samples are taken in the correct sequence, with a duplicate sample taken as required.
- ❖ If the sample is of poor weight re-split the sample until a representative amount is collected.

IV.2 Grade Control:

Mapping

- ❖ Description: Studying the geometry and grade distribution of the orebodies aimed at optimising the mineral inventory database. The comparison between the fully developed blocks and the results from the exploration/grade control drilling will enable creation of a detailed resource block model. Once the production block is accessed and developed to 25 (twenty-five) m along strike or fully developed, its board/walls and bottom may be mapped. They are fully mapped and sketched before applying the grade control model to the respective zone and before the respective area/block is pre-drilled.

Face sampling

- ❖ Description: After a face is visited logging is carried out, the sample locations are recorded and a mine geologist or sampler proceed to numbering the samples. A field log spreadsheet is created - Face Sample Log, where each sample is recorded with its number, block code, level, type of sampling, type of sample (normal or duplicate), samples taken for specific gravity determination. A standard sample is prepared rock material of equal particle size and known (pre-assayed) chemical composition. It is logged in its column in the Face Sample Log against every 20th normal sample. Logging is performed by a mine geologist or sampler. The material is collected in special plastic bags with laces. The sample number corresponding to the number of the coupon placed in the bag and the number from the Face Sample Log is written on each bag using a permanent marker. The sample bags from which the check sample will be taken contain two coupons - one with the sequential number of the sample and the other with the check sample number. After completion of the procedure the core is sampled for specific gravity determination and additional assays or re-sampling are performed as required.
- ❖ sampling intervals - every shift;
- ❖ number of samples - 5-10;
- ❖ size 5-30 mm;
- ❖ weight - 5-8 kg;
- ❖ transport - vehicle;
- ❖ storage - laboratory;

IV.5 Bulk samples

- ❖ Described above as face samples;

- sampling intervals - as required;
- number of samples - 50-80;
- size 5-30 mm;
- weight - 5-8 kg;
- transport - 4x4 vehicle to laboratory;
- storage - not subject to storage.

IV.6. Daily fresh composite sample (sampling at 1-hour intervals) of flotation tailings

- description: the QC operators in the concentrator sample the process stream by cutting the stream using a special sampler called "stream cutter" and prepare the samples according to their designation;
- sampling intervals: process stream sampling is performed at 1 hour intervals during plant operation;
- number of samples: a daily composite sample for the period starting at 12am and ending at 11 pm on a given day;
- size: the size of each hourly sample is 150 mL (the volume of the stream cutter). Each hourly sample is collected in a bucked with a cover to make up the daily composite sample;
- mass - dewatering of large volume samples (over 1 L) by filtration in a press filter. After dewatering, the sample is placed onto a tray marked with the sample ID and the tray is put into a drying oven. The drying temperature in the oven should not exceed 105°C. After drying, the sample is spread and homogenised by rolling. The homogenised sample is reduced by a rotary splitter to a single 300g sample. - assay sample The 300g split sample is placed in a grinder. It is ground to 100% passing 90 microns (0.09 mm) and its granulometry is controlled by screening with a 90 micron screen;
  The remainder of the assay sample is kept at the Metallurgical Laboratory and used to compose the monthly bulk balance samples, for granulometric determinations and other testing purposes;
- storage - The prepared assay sample is split into two equal parts. The two samples are placed in identical bags, which are identified as follows: sample number, type of sample, date of collection. Both bags are sealed, one of them is delivered to the Assay laboratory after being logged in FD-13-08 List of Samples Delivered to the Assay Laboratory, and the other is kept as a duplicate. The duplicate samples turnover is monitored and recorded. The duplicates are used for check assays and stored in the QC section for two months. The sample assays are recorded in a digital report on the server and used by the metallurgists to compute the metallurgical metal balance.

IV.7 Monthly Composite Tailings Balance Sample

- Description: It is obtained from the daily composite tailings samples by weighing and mixing proportionate amounts of daily composites. The sample is homogenised and used as required.
- sampling intervals - every month;
- number of samples - 1 per month;
- weight - 300 g ground to 80% passing 80 microns fro assay purposes;

- ❖ dispatch - in a paper bag placed in a labelled plastic bag;
- ❖ storage - in a paper bag placed in a labelled plastic bag;

IV.8. Annual composite flotation tailings balance sample

- ❖ Description: It is obtained from the monthly composite tailings samples by weighing and mixing proportionate amounts of monthly composites. The sample is homogenised and used as required.
- ❖ sampling intervals - every year;
- ❖ number of samples - 1 per year;
- ❖ weight - 300 g ground to 80% passing 80 microns fro assay purposes;
- ❖ dispatch - in a paper bag placed in a labelled plastic bag;
- ❖ storage - in a paper bag placed in a labelled plastic bag;

IV.9. Drilling in the IMWF

- ❖ Description: Purpose: To investigate the behaviour of the deposited tailings in depth. The laboratory testwork established the physical properties, the strength properties and the liquefaction potential of the tailings.
- ❖ sampling interval: one-off during the hole drilling;
- ❖ number of samples: 8 samples according to the different lithological types intersected in the drillhole;
- ❖ size – 8x2m (drill core 8x30kg) and 20 kg from the consolidated zone;
- ❖ mass: 240 kg ;
- ❖ dispatch: undisturbed; separate; good foil packaging; moisture preservation;
- ❖ storage: The drill core is stored in the Krumovgrad core store until the last operation stage of the facility. After tailings deposition ceases new investigation holes will be drilled to check the stability properties of the tailings.

IV.10. Waste from the IMWF (for changes in the chemistry and geotechnical properties - from 4 locations)

- ❖ Description:
  - Chemistry:

Four samples are taken at locations with known coordinates; The sampling depth is 1.1 m max.; Each sample is the composite of three penetrations; The sampler is a manual power drill with a drill diameter of 40 mm and drill length of 1.1 m; The samples are placed in zipper plastic bags; They are labelled using self-adhesive labels with the sampling situation (facility, location) and the sample ID; A sampling protocol is prepared in two identical copies: one for the Company and the other for the testing laboratory; The protocol contains: names and signature of the sampling person and name of the testwork contractor; name and signature of the Company representative witnessing the sampling; sample ID; the date and time sample is taken; coordinates of the sampling situations.

  - Physical properties (undisturbed sample);

Four undisturbed samples are taken from a depth of 1-2 m below the surface for laboratory determination of the physical properties of the tailings.

  - Strength properties (undisturbed sample);

The strength parameters will be tested in a laboratory in a triaxial test unit. The pore pressure and the lateral compression at different loads will be logged during the test until the sample is fully destroyed.

- Deformation properties (undisturbed sample);

The deformation modulus, the elasticity modulus in compression conditions and the permeability will be determined in a compression test unit. The consolidation of the tailings over time and depth will be determined as an estimate.

- sampling frequency
  - Chemistry - 4 times per annum (every season);
  - Physical properties - once per annum;
  - Strength properties - once per annum;
  - Deformation properties - once per annum;
- number of samples
  - Chemistry – 4 samples;
  - Physical properties - 6 samples;
  - Strength properties - 6 samples;
  - Deformation properties - 6 samples;
- size
  - Chemistry - disturbed samples;
  - Physical properties - 6 samples; 40/10 cm;
  - Strength properties - 6 samples; 40/10 cm;
  - Deformation properties - 6 samples; 40/10 cm;
- mass
  - Chemistry - 4x2 kg;
  - Physical properties - 6x8 kg;
  - Strength properties - 6x10 kg;
  - Deformation properties - 6x10 kg;
- dispatch;
  - Chemistry - The samples are dispatched to the assay laboratory in black plastic bags;
  - Physical properties - The samples are dispatched in the sampling tube;
  - Strength properties - The samples are dispatched in the sampling tube;
  - Deformation properties - The samples are dispatched in the sampling tube;
- storage - one-off samples, testwork results and the precise sampling situations are recorded.

IV.11. Waters (surface and waste waters)

- Description: The samples are taken in P, PVC, PET, PTFE containers and then transferred into dispatch containers for delivery to the assay laboratory; The sampling containers are washed with drinking water after sampling. The parameters that are subject to field monitoring are pH, temperature and conductivity. The pH meter electrodes are washed with deionised water after use.
- sampling frequency - 4 times per annum (once every month for supernatant water);
- number of samples - 9; Each sample is dispatched to the assay lab in the following types of packaging: non-returnable PET bottles: one 1 LT PET bottle

for physiochemical testing; one 10 CL PET bottle for heavy metal testing (sample is preserved with 1 milliliter of concentrated nitric acid); one 25 CL glass bottle for mercury testing; The bottles are labelled using self-adhesive labels with the sampling situation (facility, location) and the sample ID; A sampling protocol is prepared in two identical copies: one for the Company and the other for the testing laboratory; The protocol contains: names and signature of the sampling person and name of the testwork contractor; name and signature of the Company representative witnessing the sampling; sample ID; the date and time sample is taken; coordinates of the sampling situations.

- dispatch - in cooling containers, whose temperature ranges from 0 to 5 ^{0}C, to the assay laboratory; The samples are opened and tested as requested on the date of delivery to the assay laboratory. If the samples are delivered late on a given day, the testwork should be undertaken on the following day.
- storage - the samples are stored in the assay lab in coolers, whose operating temperature ranges from 0 to 5 ^{0}C, until the testwork commences but not later than 24 hours after the date/time of sampling.

IV.12. Groundwaters

- description: shallow groundwaters (observation wells, drains and springs); the static water levels in the wells (piesometers) are measured prior to sampling using a 1cm-scale dipmeter which emits an audible and a light signal. The dipmeter probe is washed with drinking water before and after each measurement. The depth is measured as the distance from the contact of the probe with water to the collar of the piesometer casing tube. After completion of the static water level measurements, pumping of the piesometer is undertaken. The piesometer is sampled after the static water level has recovered to its measured level. The sampling is performed using a horizontal water pump with a hose diameter of ¾ inches for water depths of up to 8 m. Piesometers are pumped and sampled using a 90mm (3.5-inch) or 101.6mm (4-inch) submersible pump when the water depth exceeds 8 m. The pump is washed with drinking water prior to pumping. The parameters that are subject to field monitoring are pH, temperature and conductivity. The pH meter electrodes are washed with deionised water after use.
- sampling frequency - twice a year; twice a year for inorganics; biennially for organics; one-off for petroleum products;
- number of samples - 10; Each sample is dispatched in the following types of packaging: non-returnable PET bottles: one 1 LT PET bottle for physiochemical testing; one 1 LT PET bottle for natural uranium testing (sample is preserved with 10 ml of concentrated nitric acid); one 10 CL PET bottle for heavy metal testing (sample is preserved with 1 ml of concentrated nitric acid; glass bottles: one 25 CL bottle for mercury testing; one 1 LT bottle (dark) for petroleum product testing; A sampling protocol is prepared in two identical copies: one for the Company and the other for the testing laboratory; The protocol contains: names and signature of the sampling person and name of the testwork contractor; name and signature of the Company representative witnessing the sampling; sample ID; the date and time sample is taken; coordinates of the sampling situations.

- dispatch - in cooling containers, whose temperature ranges from 0 to 5 ^{0}C, to the assay laboratory; The samples are opened and tested as requested on the date of delivery to the assay laboratory. If the samples are delivered late on a given day, the testwork should be undertaken on the following day.
- storage - the samples are stored in the assay lab in coolers, whose operating temperature ranges from 0 to 5 0C, until the testwork commences but not later than 24 hours after the date/time of sampling.