

**REGULATION****of the Ministry of Environment of the Slovak Republic**

from 1 September 1993

**on Designing, Carrying on and Evaluating of Geological Works**

The Ministry of Environment of the Slovak Republic, according to Article 26 par. 1 of the Act of the Slovak National Council No. 52/1988 Coll. on geological works and on the Slovak Geological Institute and after agreement with the Ministry of Economy of the Slovak Republic according to 26 par. 2 of this Act in wording of the Act of the Slovak National Council No. 497/1991 Coll. and according to Article 39 par. 3 of the Act No. 44/1988 Coll. on protection and utilisation of mineral resources (the Mining Act) in wording of the Act of the Slovak National Council No. 498/1991 Coll. stipulates the following:

**THE FIRST PART****TERMS****Article 1**

- (1) Geological prospectus is an economic, scientific or technical goal, which should be assured by geological works.<sup>1)</sup>
- (2) A geological task is a material, particular and time determination of the set of items from the geological prospectus, which should be solved by a set of geological works.
- (3) Prognostic sources of minerals are represented by the quantities of minerals, which are not verified and estimated, but which existence is assumed on the basis of knowledge on the geological structure of the area considering the laws of the origin and formation of the mineral. The principles of their assessment are stated in Annex No. 1 to this Regulation.
- (4) The reserves of the deposit are the ascertained and verified quantities of minerals<sup>2)</sup> in the deposit or in the part thereof regardless losses, which occur during their mining. The classification of the exclusive deposits<sup>3)</sup> is stipulated in the separate regulation.<sup>4)</sup> The conditions for evaluation of the reserves of the non-exclusive deposit will be stated by the contracting party of geological works.
- (5) An underground water is water in earth cavities and earth water-bearing beds.<sup>6)</sup> Sources of natural medicinal water, sources of natural potable mineral water, that are declared according to separate regulations,<sup>7)</sup> water, which are exclusive raw materials,<sup>8)</sup> and mine water<sup>9)</sup> are not considered to be underground water.
- (6) The reserves of underground water are the ascertained and verified quantities of underground water in earth cavities and earth water-bearing beds. The principles of assessment of underground water reserves are stated in Annex No. 2 to this Regulation. These principles are not used for hydrogeological exploration of sources of natural medicinal water and sources of natural potable mineral water.
- (7) The contracting party of geological works is either a legal or a natural entity, who places an order for the solution of geological task, or for the development of the project documentation of geological works (hereafter as the "contracting party" only).
- (8) The organisation implementing geological works (hereafter as the "contractor" only) is either a legal entity or a natural person, who develops the project documentation of geological works, solves the geological tasks according to the project of geological works (hereafter as the "project" only) and evaluates the results in the report on results of geological works (hereafter as the "final report" only).
- (9) The responsible expert of the geological task is a professionally qualified worker<sup>10)</sup> appointed by the contractor for comprehensive solution of the geological task (hereafter as the "responsible expert" only).

(10) Technical operations mean, for purpose of this Regulation, mainly pits, boreholes, workings and related operations, construction and erection jobs, which are carried out as a part of the set of geological works.

(11) The working place of technical operations is the place of their implementation.

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1) Article 2 of the Act of the Slovak National Council No. 52/1988 Coll. on geological procedures and on the Geological Office in wording of the Act of Slovak National Council No. 497/1991 Coll.

2) Article 2 of the Act No. 44/1988 Coll. on protection utilisation of mineral resources (the Mining Act).

3) Articles 6 and 13 of the Act No. 44/1988 Coll. In wording of the Act of the Slovak National Council No. 498/1991 Coll.

4) Article 14 of the Act No. 44/1988 Coll. in wording of the Act of the Slovak National Council No. 498/1991 Coll.

The Regulation of the Slovak Geological Institute No. 6/1992 Coll. on classification and estimation of reserves of exclusive deposits.

5) Article 3 of the Act No. 44/1988 Coll. in wording of the Act of the Slovak National Council No. 498/1991 Coll.

6) Article 2 par 1 of the Act no 138/1973 Coll. on water (the Water Act).

7) Articles 47 and 49 of the Act No. 20/1966 Coll. on care for national health in wording of the Act of Slovak National Council No. 419/1991 Coll.

Articles 2 and 7 of the Regulation of the Ministry of Health of the Slovak Republic No. 15/1975 Coll. on protection and development of natural medical spas and natural medical sources in wording of the Regulation No. 77/1983 Coll.

8) Article 3 par. 1 letter m) of the Act No. 44/1988 Coll. in wording of the Act of the Slovak National Council No. 498/1991 Coll.

9) Article 40 of the Act No. 44/1988 Coll. in wording of the Act of the Slovak National Council No. 498/1991 Coll.

10) Article 5 par. 4 of the Regulation of the Slovak Geological Institute No. 415/1992 Coll. on granting permissions for conducting geological works and on the manner of verification of professional qualification of workers.

## **THE SECOND PART**

### **STAGES AND COMPLETENESS OF GEOLOGICAL WORKS**

#### **Article 2**

(1) Geological works are implemented by stages. The stage of geological works is a determined segment of implementation of the geological prospectus, which corresponds to its purposeful division according to gradual cognition; it is expressed in the form of a geological task.

(2) If the division of cognition process is not purposeful, it is possible to carry out geological works without their division to stages, or it is possible to join the stages.

(3) The stage of geological works can be implemented by parts, which reduces the risk of works and contributes to their further orientation.

#### **Article 3**

##### **Geological Research**

(1) Geological research includes basic geological research and regional geology.

(2) Basic geological research includes a set of geological works, by which the origin and activity of geological processes, which condition the geological structure of the area and its development, are investigated.

(3) Regional geology is an independent stage of geological works, and includes their set, by which

a) the geological structure of the area is studied, evaluated and documented and the laws of their development are clarified; it is depicted on maps of the area studied and in sections through this area,

b) the tasks are solved in order to make more precise the knowledge on the laws and elements of the geological structure of the area, to determine and quantify inferred reserves of raw materials (Annex No. 1), usable reserves of underground water (Annex No. 2) to protect them, to evaluate rock structures from the point of view of their suitability for underground storage of gases, liquids and waste, to study the rock environment and its characteristics and properties and to evaluate geological factors affecting the environment including impacts on these factors that are caused by human activities.

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 11) Article 34 of the Act No. 44/1988 Coll. in wording of the Act of the Slovak National Council No. 498/1991 Coll.

12) Article 35 of the Act No. 44/1988 Coll. in wording of the Act of the Slovak National Council No. 498/1991 Coll.

13) Article 2 par. 1 letters b) and e) of the Act of Slovak National Council No. 52/1988 Coll.

Article 11 of the Act No. 44/1988 Coll. in wording of the Act of the Slovak National Council No. 498/1991 Coll.

#### **Article 4**

##### **Geological Exploration**

(1) Geological exploration is divided into deposit exploration including exploration for special interventions into the earth's crust<sup>11)</sup> and exploration of the old workings<sup>12)</sup>, hydrogeological exploration, engineering geological exploration and exploration of geological factors affecting the environment.

(2) Should the geological task solve several types of geological exploration according to par. 1, the contractor shall determine its type based on prevailing type of exploration.

#### **Article 5**

##### **Deposit Exploration**

(1) Deposit exploration<sup>13)</sup>

a) at prospecting and exploration of mineral deposits, it is divided into the stages of prospecting, detail and mining exploration respectively,

b) at exploration for special interventions into the earth's crust, it is divided into the stages of prospecting and detail exploration,

c) at exploration of the old workings, it is limited to the stage of prospecting only,

(2) The stage of deposit prospecting includes a set of geological works, whose purpose is

a) at prospecting and exploration of deposits of exclusive minerals, to assess possible occurrence of deposits, to determine approximate size of the deposit found out, to estimate probable reserves of the category Z-2<sup>4)</sup>, at least in its part, and supposed reserves of the category Z-3<sup>4)</sup> or inferred reserves for the rest of the deposit. At prospecting and exploration of the deposits of non-exclusive minerals, to assess the area from the point of view of the occurrence of mineral deposits, to ascertain and verify their approximate size and to estimate reserves at least in one of its parts,

b) at exploration for special interventions into the earth's crust, to ascertain the occurrence and probable size of the suitable rock structures and underground spaces,

c) at exploration of the old workings to ascertain and verify their occurrence, extent, possibilities of their influence on the surface and geological conditions for their protection or liquidation, should they endanger the public interest.

(3) The stage of detail deposit exploration includes a set of geological works, whose purpose is

a) at exploration of mineral deposits, to verify the reserves of the deposit in the quantity, which is necessary for its mining, which is anticipated for exclusive minerals in the category of explored reserves Z-1<sup>4</sup>), to obtain and verify the data, which are necessary for the development of the project of mine or quarry construction and of opening, preparatory work and mining of the deposit considering the requirements for the protection of the environment.

b) at exploration for special interventions into the earth's crust, to obtain and verify the data, which are necessary for establishment of the facility for storage of gases, liquids or waste, or for industrial utilisation of thermal energy of the earth's crust.

(4) The stage of mining deposit exploration includes a set of geological works, which are used during mining of the deposit to make the knowledge on the quantity and quality of reserves of the deposit and on geological and technical conditions of mining more precise in order to transfer the reserves according to the requirements for making them more precise, or specialities of the development of the deposit, or conditions for its rational mining are clarified.

## Article 6

### Hydrogeological Exploration

(1) Hydrogeological exploration<sup>14</sup>) is divided in the stages of prospecting, preliminary, detail and complementary exploration.

(2) The stage of hydrogeological prospecting includes a set of geological works, which are necessary for prospecting of natural sources of underground water and for verification of their usable resources of the C<sub>2</sub> category (Annex No. 2) with preliminary evaluation of their quality and for identification of pollution sources, or for identification of geological conditions of leakage of pollutants<sup>15</sup>) into underground water.

(3) The stage of preliminary hydrogeological exploration includes a set of geological works, which are necessary for verification of the source of underground water, for obtaining the data for assessment of its suitability for water management, balneological or other utilisation, for verification of its usable reserves of C<sub>2</sub> and C<sub>1</sub> categories (Annex No. 2) and for solution of protection of underground water against their pollution, including the proposal for preliminary determination of protection zones, or for assessment of possibility of drainage and disposal of mineralised and thermal water.

(4) The stage of detail hydrogeological exploration includes a set of geological works, which are necessary for verification of usable reserves of underground water for the given water management, balneological or other purpose, at least a part of them in the B and A categories (Annex No. 2). These procedures must give a comprehensive basis for the development of the project of the construction of water management construction work, natural medical spa, or source facility, with the proposal for technology of treatment and regime of utilisation of the underground water source, with proposal for determination of the protection zones, or with the proposal for manner of drainage and disposal of mineralised and thermal underground water.

(5) The stage of supplementary hydrogeological exploration includes a set of geological works, that are necessary for making the existing knowledge more precise at the construction or operation of a water management work, mainly for protection and effective utilisation of underground water sources, or for an increase of their usable reserves, or to avoid the decrease of their yield.

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14) Article 2 par. 1 letter c) of the Act of Slovak National Council No. 52/1988 Coll.

15) The Regulation of the Ministry of Forest and Water Management of the Slovak Republic No. 23/1977 Coll. on quality protection of surface and underground water.

16) Article 2 par. 1 letter d) of the Act of the Slovak National Council No. 52/1988 Coll.

17) Article 2 par. 1 letter f) of the Act of the Slovak National Council No. 52/1988 Coll. in wording of the Act of Slovak National Council No. 497/1991 Coll.

## **Article 7**

### **Engineering Geological Exploration**

(1) Engineering geological exploration<sup>16)</sup> is divided into the stages of preliminary, detailed and supplementary exploration.

(2) The stage of preliminary engineering geological exploration includes a set of geological works, which are necessary for obtaining the basic geological, engineering geological, geotechnical and hydrogeological conditions of the area and for the principal assessment of possibility and suitability of the area for construction or for other utilisation. Causes of deformation and assessment of needs of their stabilisation or rescue are studied in the sliding areas.

(3) The stage of detailed engineering geological exploration includes a set of geological works, which are the basis for determination of the conditions for construction in sliding areas or for buildings endangered by a slide, the conditions for rescue are determined with such details, which are necessary for the development of the rescue project.

(4) The stage of supplementary engineering geological exploration includes a set of geological works, that are necessary to make the existing geological knowledge more precise and monitoring of the behaviour of the construction work and impacts of its operation on the environment under particular geological conditions.

## **Article 8**

### **Exploration of Geological Factors Affecting the Environment**

(1) Exploration of geological factors affecting the environment<sup>17)</sup> is divided into the stage of preliminary and detailed exploration.

(2) The stage of preliminary exploration of geological factors affecting the environment includes a set of geological works, that are necessary to obtain basic characteristics of these factors, that influence the creation and protection of the environment including human influences.

(3) The stage of detailed exploration of geological factors affecting the environment includes a set of geological works, that are necessary to ascertain and verify these factors affecting the environment, including human influences. The set of these works provides a comprehensive basis for the development of the environmental project for given territory including possible impacts on this territory from the point of view of deteriorated condition of the environment; it can also include monitoring of these impacts.

## **Article 9**

### **Completeness of Geological Works**

(1) Completeness of geological works includes methods and means, which are necessary for complete, on time and economic solution of the geological task and evaluation of all obtained geological knowledge and results in the final report.

(2) At conducting and evaluating geological works, the ascertained geological facts, which are necessary for solution of geological task, and lithological, petrological, mineralogical, stratigraphical and tectonic knowledge, which are important for geological structure of the studied area from scientific standpoint are evaluated. At the same time, the ascertained occurrences of mineral deposits and underground water sources are also evaluated, even if their prospecting and exploration were not the objective of geological works.

(3) If any facts exceeding the objective of geological procedures were ascertained at conducting geological works, which are of scientific or economic significance, and if these requires more detail verification, the contractor shall notify the contracting party and the Ministry of Environment of the Slovak Republic (hereafter as the "Ministry" only).

## **THE THIRD PART**

### **DESIGNING OF GEOLOGICAL WORKS**

#### **Article 10**

Project documentation of geological works

- (1) The procedure and conditions of professional, rational and safety solution of the geological task are determined in the project documentation of geological works.
- (2) The project documentation consists of the project, and if it is required by the extent and complexity of the geological task, also the preparatory documentation of geological works (hereafter as the "preparatory documentation" only).
- (3) The project documentation is limited to the inevitable extent corresponding to the nature and complexity of the geological task and geological works, which are necessary for its solution.
- (4) The project documentation includes the name of the geological task, its number, date of its development, stage of geological works, the name of the contractor and signature of its statutory body or of its authorised representative.

#### **Article 11**

##### **Development of Project Documentation**

- (1) At the development of the project documentation, the designer shall consider all results of research and exploration carried out previously, as well as geological knowledge on the area and its natural conditions and shall perform necessary reconnaissance in the field. Should the preparatory documentation (Article 13) be developed, the designer shall utilise its conclusions.
- (2) At the development of the project, the designer shall discuss with the contracting party the proposal of solution of geological task, or variants thereof.

#### **Article 12**

##### **Interests Protected by Special Regulations**

- (1) The project designer must find out if the planned geological works, or utilisation of their results, are not in conflict with the an interest protected by special regulations,<sup>18)</sup> and he or she must select such a solution of the geological task, in order to proceed in accordance with legal regulations for their protection. The project designer shall solve the conflict of interests, which are protected by special regulations in the project, should they not be considered in proceedings in determination of the exploration area of exclusive minerals. Finding out a conflict of interests, which are protected by special regulations, can also be provided by the contracting party, who will furnish them to the project designer.
- (2) If the project designer finds out any interests protected by special regulations, which prevent performance of geological works, or the future utilisation of their results, he or she shall notify the ascertained facts without any delay to the contracting party. Other conflicts of interests shall be stated in the project together with the proposal for their solution.

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18) For instance the Act of the Slovak National Council No. 1/1995 Coll. on state protection of nature in wording of later regulations, the Act No. 51/1965 Coll. on railways in wording of later regulations, the Act No. 110/1964 Coll. on telecommunications in wording of later regulations, the Act No. 20/1966 Coll. on care of national health in wording of later regulations, the Act No. 138/1973 Coll., the Act No. 50/1976 Coll. on territorial planning and on building order (the Building Act) in wording of later regulations, the Act No. 61/1977 Coll. on forests in wording of later regulations, the Act of the Slovak National Council No. 27/1987 Coll. on state care of historical monuments, the Act No. 44/1988 Coll. in wording of the Act of the Slovak National Council No. 498/1991 Coll., the Act No. 17/1992 Coll. on the environment, the Act of the

Slovak National Council No. 307/1992 Coll. on protection of agricultural land, the Regulation of the Ministry of Transport and of the Central Mining Authority No. 28/1967 Coll., which stipulates the rules for contact of the railways with mining activity, the Regulation No. 15/1972 Coll. in wording of the Regulation No. 77/1983 Coll.

### **Article 13**

#### **Preparatory Documentation**

(1) The preparatory documentation is developed in the form of a general solution or in the form of a preliminary study. The contracting party shall decide on its development, who shall also determine their contents and structure.

(2) General solution

- a) determines the geological prospectus within wide economic, technical or scientific context,
- b) proves purposefulness, feasibility and rationality of the geological prospectus,
- c) states survey of procedures with their reasoning, calculation of the cost and the proposal of division of geological works by their stages and sources of financing,
- d) states documents, which are necessary for concepts and proposals of long-term prospects and plans of geological works,
- e) provides documents for co-operation of bodies and organisations at implementation of the geological prospectus.

(3) Preliminary study

- a) evaluates and makes more accurate prognostic sources of minerals and underground water and assesses their promising value and expected economic contribution,
- b) proposes and reasons the optimum location of geological exploration considering the interests, which are protected by special regulation,<sup>18)</sup>
- c) analyses and suggests various methodical and technical procedures for solution of the geological task,
- d) makes assessment of the economic contribution of the planned geological works and prepares documents for economical reasoning of geological works,
- e) offers geological works to the contracting party according to published conditions of public tender.<sup>19)</sup>

### **Article 14**

#### **Project**

(1) The project includes determination and manner of solution of the geological task, its provision, time schedule and anticipated results of geological works. The budget and economic reasoning are a part of the project of geological works, which are financed from the state budget of the Slovak Republic.<sup>20)</sup>

(2) In the project, it is possible to determine that the works will be carried out only in determined sections, while any continuation of the geological procedures may be conditioned by partial results. It is also possible to determine sequential evaluation of results of geological works by partial final reports (Article 35 par. 2).

(3) The scope of the project will be adapted to the requirements of the contracting party.

### **Article 15**

#### **Determination of Geological Task**

The determination of the geological task includes in addition to the requirements specified in Article 10 par. 4 of this Regulation:

- a) the name and identification number of the cadastral area, <sup>21)</sup> the name and code of the district, or other topographical determination of investigated territory or object,

- b) the objective of geological works specifying range of issues, which are necessary to be solved considering the future economic, technical or scientific utilisation of their results.
- c) the reference to the previous stage of geological works, if they have been implemented and to the related geological tasks.

## **Article 16**

### **Manner of Solution of the Geological Task and its Assurance**

- (1) The manner of solution of the geological task (hereafter as the "geological part" only) includes
- a) the initial data on the area and on geological factors that condition its solution,
  - b) relation to the creation and protection of the environment,
  - c) solution procedure and its reasoning,
  - d) the type, specification, quantity and scope of geological works including technological and special works and tests and time schedule of their implementation,
  - e) the qualitative conditions for conducting geological works and specifications of checking works in duration of solution.
- (2) Geological task solution assurance (hereafter as the "technical part" only) includes
- a) determination of technological procedures and technical parameters of the designed geological works including assurance of the qualitative conditions for conducting geological works,
  - b) specification of technical means for solution of geological task,
  - c) specification of preparation of the working place, transport, water and power supply and other jobs, which are necessary for conducting geological works,
  - d) determination of the place and manner of deposition of raw materials, samples, drill cuttings, drilling fluid used and other substances, which are formed at conducting geological works,
  - e) solution of liquidation or protection and reclaiming works (Article 26),
  - f) measures for assurance of the interests protected by special regulations<sup>18)</sup> and for reduction of damages at conducting geological works and way of their reimbursement,<sup>22)</sup> which require extra costs, or other measures for assurance of safety of labour, operation and sanitary and hygienic facilities.
- (3) Maps, sections and drawings shall be attached to the technical part according to par. 1 and 2 that express the objective of geological works and manner of solution of the geological task and its provision. In addition, documents on results of solution of conflict of interests, which are protected by special regulations,<sup>18)</sup> shall be attached to it.

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19) Articles 281 to 288 of the Commercial Code.

Articles 847 to 849 of the Civil Code.

20) Article 6 par. 1 of the Act of the Slovak National Council No. 52/1988 Coll. in wording of the Act of Slovak National Council No. 497/1991 Coll.

21) Article 3 of the Regulation of the Federal Statistical Office and of the Federal Ministry for Technical and Investment Development No. 120/1979 Coll. on spatial identification of information.

22) Article 14 par. 1 and Article 16 par. 1 to 3 of the Act of Slovak National Council in wording of the Act of Slovak National Council No. 497/1991 Coll.



## **Article 17**

### **Price and Budget of Geological Works**

- (1) The price of geological works<sup>23)</sup> also includes the expenses for the utilisation of real estates and of liquidated inevitable damages.<sup>22)</sup>
- (2) The budget of geological works, that are financed from the state budget of the Slovak Republic includes the cost of works incorporated into the project according to par. 1 including to the agreed reserve for covering expenses, which could not be foreseen in the project.

## **Article 18**

### **Economic Reasoning of Geological Works**

- (1) Economic or other need for solution of the geological task and the contribution of solution evidenced with comparison with the budgeted cost are specified in economic reasoning of geological works, which are financed from the state budget of the Slovak Republic. Should several variants of solution of the geological task be considered, or its solution using unusual manner is proposed, it is also necessary to reason economically the manner of solution of the geological task and its provision.
- (2) The economic reasoning is based on the geological task considering the geological prospectus and mainly geological works, which will be necessary in the next stages of geological exploration, or subsequent investments and possible utilisation of the works done for other purposes after completion of geological exploration.
- (3) A reference to the approved preparatory documentation, or to the final report on the previous stage of geological works, if it also includes the economical reasoning of the next stage of geological works, can consider to be an economical reasoning.

## **Article 19**

### **Special Requirements of the Project Documentation of Some Geological Works**

The project of geological exploration shall include, in addition to the requirements specified in Articles 14 to 16, Article 17 par. 2 and Article 18 of this Regulation

a) at deposit exploration

1. the data on inferred reserves and on explored reserves in the explored deposit by categories with conditions of utilisation of reserves,<sup>4)</sup> according to which they were evaluated,
2. the expected quantity and quality of the increases in the deposit reserves by categories, parameters for determination of the deposit and for estimation of its reserves, mainly conditions of their utilisation,
3. the requirements according to the special regulation<sup>24)</sup> in the specified cases

b) at hydrogeological exploration

1. the data on usable reserves of underground water in the area of question and the date on actual take off,<sup>25)</sup>
2. the expected quantity and quality of reserves of underground water by categories, if the objective of geological works is to verify reserves of underground water,
3. evaluation of the impact of the anticipated engineering work on hydrogeological conditions in the area of question (for instance the impact of the road cutting on underground water).

## **THE FOURTH PART**

### **CONDUCTING GEOLOGICAL WORKS**

## The first section

### Procedure in conducting geological works

#### Article 20

#### Commencement of Geological Works

(1) Geological works may be commenced and carried out only on the basis of the approved project.<sup>26)</sup> The contractor may exceptionally to commence conducting geological works with the consent of their contracting party before approval of the project, during its development.

a) should they prevent or moderate the impacts of possible breakdown of disaster, or should they be inevitable for removal of results of a breakdown or disaster.

b) should the later commencement of geological works cause damages to real estate or other damages, which will be prevented in this way.

(2) If geological works have been commenced exceptionally before the approval of the project, the project must be approved at the latest within three month from the day on which they were commenced, otherwise they must be stopped.

(3) In specified cases, it is possible to commence geological works only after determination of the exploration area.<sup>27)</sup>

(4) The contractor must before commencement of geological works

a) submit the application for registration of geological works,<sup>28)</sup> if they subject to it,

b) negotiate in accordance with special regulations<sup>18)</sup> the interventions into the rights of the eligible subjects, or obtain approval of bodies, within whose scope of competence their protection is,

c) inform in writing at least 14 days beforehand the owner, administrator or renter on entering his or her real estate and on its use.<sup>29)</sup>

d) obtain the permit of the Subdistrict Mining Office for prospecting and exploration of the explosive deposit using workings according to the special regulation<sup>24)</sup> this permit must also be obtained for protection and liquidation of the above workings,

e) report the geological works, for which reporting applies, to the Subdistrict Mining Office according to the special regulation.<sup>30)</sup>

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23) Article2 of the Act No. 526/1990 Coll. on prices.

24) The Regulation of the Slovak Mining Agency No. 89/1988 Coll. on rational utilisation of exclusive deposit and on permission and reporting the mining activity and on reporting the activity carried out by mining manner in wording of the Regulation No. 16/1992 Coll.

25) Article3 of the Regulation of the Ministry of Forest and Water Management of the Slovak Republic No. 170/1975 Coll. on duties of organisations to submit reports on finding out underground water and to report data on their take off.

26) Article6 of the Act of the Slovak National Council No. 52/1988 Coll. in wording of the Act of Slovak National Council No. 497/1991 Coll.

27) Articles 4 to 4c of the Act of the Slovak National Council No. 52/1988 Coll. in wording of the Act of Slovak National Council No. 497/1991 Coll.

28) The Regulation of the Slovak Geological Institute No. 9/1989 Coll. on registration of geological works, on submitting their results and on making them accessible, on detection of old workings and in keeping their register in wording of the Regulation No. 5/1992 Coll.

#### Article 21

### **Conditions for Conducting Geological Works**

- (1) At conducting geological works, the contractor
- a) proceeds according to the time schedule of geological works; first it shall carry out works and tests, whose results can serve for subsequent geological works,
  - b) proceeds according to technical requirements and technological conditions, which are specified in the project, according to technical standards, as well as according to legal regulations for assurance of occupational health and safety,
  - c) provides, or prepares maps and surveys geological works according to special regulations<sup>31)</sup> and technical standards<sup>32)</sup> with their accuracy corresponding to purpose of their use.
- (2) At conducting geological works, the implementing organisation must proceed in such a way to intervene in the rights and interests protected by the law of the owner, administrator or renter of real estates as little as possible and in order to prevent damages.

### **Article 22**

#### **Management of Geological Works**

- (1) The contractor continuously checks at conducting geological works, if the designed solution of the geological task is in compliance with the facts ascertained by geological works, and if the projected methodical procedures and works meet the given conditions. It manages geological works through the responsible expert of the geological task so as the solution of the geological task is professional, rational and safety.
- (2) Responsible expert
- a) provides the transferring of geological works in field, mainly of works of technical nature,
  - b) checks correctness of conducting geological works,
  - c) assures geological documentation,
  - d) co-ordinates link-up of individual geological works,
  - e) adapts the solution of the geological task and carrying out geological works to natural conditions and knowledge obtained during their implementation,
  - f) proposes changes in the project, or suspension of works, if it is not possible to achieve their goal,
  - g) co-operates with the contracting party of geological works, or with the future user of their results.

### **Article 23**

#### **Operating Records**

- (1) The working place for technical works shall keep operating records in the form of a daily report, drilling journal, working face report or building diary journal. The first names and surnames of persons, who carry on geological works, quality and duration of these works, data on designs and actual technical performance and technological parameters, places of taking of samples and type of samples, type, time and results of tests and measurements, description of special geological and other phenomena such as inrushes of water, gas, quicksand, hydrocarbons, loss of drilling fluid and caverns shall be entered into them. Moreover, the instructions and measures of managing, supervising and inspecting bodies related to the guidance of works at the working place and occupational health and safety are entered or inserted in them.
- (2) The operating records according to par. 1 shall be kept parallel with carrying on geological works in order to evidence their course and achieved results, technical works and for needs of their inspection.
- (3) The operating records are an inseparable part of the geological documentation.
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29) Article 14 of the Act of the Slovak National Council No. 52/1988 Coll. in wording of the Act of Slovak National Council No. 497/1991 Coll.

30) Articles 10 to 13 of the Regulation No. 89/1988 Coll. in wording of the Regulation No. 16/1992 Coll.

31) for instance Article 7 of the Act No. 46/1971 Coll. on geodesy, cartography, the regulation of the Slovak Mining Agency No. 750/1972 on surveying for surface mining of ores and industrial minerals (registered in 16/1972 Coll.) in wording of later regulations, the regulation of the Slovak Mining Agency No. 3800/1986 on surveying documentation in underground mines (registered in 27/1986 Coll.), the regulation of the Slovak Mining Agency No. 2750/1974 on surveying for geological exploration and for exploitation of oil and natural gas deposits.

32) ČSN 01 3410 Maps at large scales. Basic maps and maps for special purposes. Drawing and symbols, ČSN 73 0415 Geodetic points.

## **Article 24**

### **Change in the Project**

The contractor must propose the change in the project at carrying on geological works, if they has ascertained that

- a) it is necessary to select principally different methodical or technical approach to the solution of the geological task than that specified in the project, or it is necessary to carry out larger extent of geological works than that approved,
- b) it is not possible to achieve the objective of geological works by the respective project, mainly if the geological facts and results of geological works differs essentially from the assumptions specified in the project.

## **Article 25**

### **Proposals and Notices**

(1) The contractor at carrying on geological works

a) presents to the Ministry

- 1. the proposal for issuance of the certificate of exclusive deposit,<sup>33)</sup>
  - 2. the proposal for determination, marking and safe-keeping of the important prospecting and exploration workings,<sup>34)</sup>
  - 3. the notice on detection of the old working or on its impact on the surface,<sup>35)</sup>
- b) notifies the Geofond in Bratislava (hereafter as the "Geofond" only) in the specified cases, the change in the registered geological works,<sup>36)</sup>
- c) presents the proposal for determination of the protected deposit area to the District Mining Office,<sup>37)</sup>
- d) notifies the Inspectorate of Spas and Sources of the Ministry of Health of the Slovak Republic on the detection of any source of thermal water or mineral water, gas and emanations,<sup>38)</sup>
- e) notifies the Slovak Hydrometeorological Institute in Bratislava on any detection of the source of underground water with the yield over  $1.0 \text{ l.s}^{-1}$ , or the source of underground water with piezometric level (artesian water) with the yield over  $0.5 \text{ l.s}^{-1}$ ,<sup>39)</sup>

f) notifies any archaeological finding,<sup>40)</sup> to the nearest archaeological station or to the museum directly, or through the district office.

(2) Should the contractor find out at carrying on geological works any interests protected by special regulations,<sup>18)</sup> that prevent the use of the results of geological works, or which exclude their use, he shall notify this fact immediately to the contracting party.

## **Article 26**

### **Protection and Liquidation of Technical Works**

- (1) The technical works, which have been evaluated, fulfilled their purpose and cannot be further used, must be liquidated; should their further use be anticipated, they must be protected.
- (2) The protection and liquidation of technical works must
- a) assure the safety of the surface considering even their later impacts on the surface,
  - b) assure that the usable results of geological works not to be lost, mainly the explored reserves of mineral deposits and sources of underground water, underground spaces and rock structures suitable for underground storage,
  - c) prevent impairment of underground water regime and gas conditions, free leakage of water or gas and entering surface water into underground spaces and water,
  - d) to solve protection of buildings and interests, which are protected by special regulations,<sup>18)</sup>
  - e) solve the final adaptation of dumps, depots, dumping ground for drilling fluid used and for drill cutting including reclaiming lands.
- (3) The protection and liquidation of technical works is a part of the project and the person, who has carried out them is responsible for their proper implementation.
- (4) The protocol on protection and liquidation of technical works shall be made.

## **The second section**

### **Geological Documentation of Geological Works**

## **Article 27**

### **Documenting Geological Works**

- (1) The geological documentation of geological works<sup>41)</sup> (hereafter as the "geological documentation" only) evidences in the written, graphical and material form geological, technical and other data, facts and phenomena, which were found out during carrying on geological works, which are necessary for the solution of the geological task, its checking and utilisation of its results, together with the knowledge, which is significant from the point of view of comprehensive implementation and evaluation of geological works.
- (2) Each part of the geological documentation contains:
- a) the name and number of the geological task, the date of its preparation or completion,
  - b) the name of the contractor,
  - c) marking out the place and object to which the geological task is related,
  - d) the first names and surnames of the persons, including their signatures, who worked out, completed or checked it.
- (3) The geological documentation is divided in the primary geological documentation and the summary geological documentation.

33) Article 6 of the Act No. 44/1988 Coll. in wording of the Act of the Slovak National Council No. 498/1991 Coll.

Article 3 of the Regulation of the Slovak Geological Institute No. 86/1988 Coll. on procedure at prospecting and exploration of exclusive deposit from the point of view of protection and rational use of mineral resources and on reporting of the occurrence of the deposit of exclusive mineral, on its remuneration and on the compensation of the cost in wording of the Regulation No. 3/1992 Coll.

34) Article 15 of the Act of the Slovak National Council No. 52/1988 Coll. in wording of the Act of Slovak National Council No. 498/1991 Coll.

35) Article 35 of the Act No. 44/1988 Coll. in wording of the Act of the Slovak National Council No. 498/1991 Coll.

Article 10 of the Regulation No. 9/1989 Coll. in wording of the Regulation No. 5/1992 Coll.

36) Article 5 par. 1 of the Regulation No. 9/1989 Coll.

37) Articles 10, 16, 17 and 18 of the Act No. 44/1988 in wording of the Act of the Slovak National Council No. 498/1991 Coll.

Article 4 of the Regulation of the Slovak Mining Agency No. 79/1988 Coll. on protected deposit areas and on mining reservations in wording of the Regulation No. 533/1991 Coll.

38) Article 31 of the Regulation No. 15/1972 Coll. in wording of the Regulation No. 77/1983 Coll.

39) Article 1 of the Regulation No. 170/1975 Coll.

40) Article 23 of the Act of the Slovak National Council No. 27/1987 Coll.

41) Article 9 par. 5 of the Act of the Slovak National Council No. 52/1988 Coll.

## **Article 28**

### **Primary Geological Documentation**

(1) The primary geological documentation is written and graphical one and it also includes the material documentation.

(2) The primary geological documentation records data, facts and phenomena obtained in the investigated area, or object. It includes mainly written and graphical or photographic records documenting geological works, description and marking out of samples collection, results of their analyses and tests, protocols on liquidation of technical works and on destroying geological documentation, record books and operating records.

(3) The primary geological documentation is carried out a) in order the data, facts and phenomena ascertained during carrying on geological works, as well as their changes in dependence on time (for instance hydrogeological observation, pollution, gas bursts) are recorded,

b) in order geological works could be oriented according it,

c) in order the documented places could be identified even after a certain time interval and in order their correctness could be checked subsequently,

d) in order to prevent deterioration or destruction of samples at their collection, transport and storage,

e) in order its durability is assured within terms specified in Article 32 herein.

## **Article 29**

### **Primary Written and Graphical Geological Documentation**

(1) In addition to the requirements specified in Article 27 par. 2 herein, the primary written and graphical geological documentation includes

- a) the type and marking of the documented object, its topographical projection, scale of projection or its spatial course, as well as the date of its beginning and finishing,
  - b) observed and ascertained geological facts and phenomena, mainly mineralogical, petrological, stratigraphic, structural, tectonic, economic geological, hydrogeological and engineering geological ones,
  - c) points of samples collection with marking out the type of the sample and the results of its analyses and tests,
  - d) the other data obtained, e.g. by hydrogeological observations and measurements, by inclinometry and logging and by geophysical and geochemical works.
- (2) The original of the primary written and graphical geological documentation shall be made in such a way that its permanent documentary value will be preserved.

### **Article 30**

#### **Material Geological Documentation**

- (1) The material geological documentation includes samples, mainly mineralogical, paleontological, chemical, physical and geotechnical analyses and tests, as well as thin sections and polished sections from these samples and samples to document significant geological facts and phenomena.
- (2) In addition to the requirements specified in Article 27 par. 2 herein, the material geological documentation includes
  - a) designation of the sample, point of its collection, sizes or its weight,
  - b) the manner of sample collection and its purpose,
  - c) reference to the primary written and graphical geological documentation,
  - d) the protocol on sample collection should it be specified by the technical standard or by the project,
  - e) the date of shifting the sample for tests and analyses  
and the date of receiving their results.
- (3) Should the sample be processed in a laboratory, the record book is kept containing the requirements specified in Article 27 par. 2 letter a) and Article 30 par. 2 letters a), b) and e) herein and the results of the control analyses. The laboratory keeps records on the duplicates of the samples and stores them, keeps copies of testing sheets with the results of their analyses and tests and keeps the record book.
- (4) The contractor must verify the correctness of analyses and tests of samples using control tests and analyses, and if it is necessary, even control sampling. The principles of this control shall be specified in the project of geological works.

### **Article 31**

#### **Summary Geological Documentation**

- (1) The results of the primary geological documentation are evaluated in the summary geological documentation, they are summarised into summary units in such a way that the further solution of the geological task can be oriented according to it from the point of view of fulfilling the goal of geological works specified in the project.
- (2) The summary geological documentation is written and graphical one. It includes mainly geological surface maps and mining maps, vertical and horizontal sections, drawings and other sets and units with details and specifications in accordance with the goal of geological works with necessary descriptions, legends and reports and with evaluation of results of analyses and tests of samples.
- (3) In addition to the requirements of Article 27 par. 2 herein, the summary geological documentation includes
  - a) type and designation,
  - b) topographical projection of documented objects with different marking of the objects taken from previous geological works and the scale of the projection,

c) other data used at development and evaluation of the geological documentation, which are necessary for summarisation of the facts found out, as well as for expression of the assumptions on the basis of these facts.

(4) The summary geological documentation is projected to the surveying documentation, which is developed according special regulations<sup>31)</sup> in such a way to have the permanent documentary value.

## **Article 32**

### **Terms for the Elaboration of Geological Documentation**

(1) The primary written and graphical geological documentation shall be made parallel with carrying on geological works, at the latest within one month from their implementation. Its completing and making more accurate shall be carried out according to the results of analyses and tests of samples within one month from their receiving. Should a delay in elaboration of the primary geological documentation prevent its subsequent processing, or should it prevent taking samples, or if it is required by occupational health and safety, some sections of exploration works must be documented immediately.

(2) Samples of the material geological documentation shall be taken and shifted for analyses and tests in accordance with special regulations.<sup>42)</sup> However, it is necessary to take samples immediately from those sections of the exploration works, where any delay would prevent their taking, or where the samples would be deteriorated, or where the possibility of orientation of further geological works according to the results of their analyses and tests would be endangered.

(3) The samples of the material documentation are processed in laboratories within the terms specified in the time schedule of geological works, and the samples, which are decisive for orientation of further geological works are processed within the term required by the responsible expert. Any delay in processing the samples must not caused their deterioration or destruction.

(4) The summary geological documentation shall be elaborated from commencement of carrying on geological works, and it shall be completed once per six months including elaboration and completing of the topographical surveying and mapping.

## **Article 33**

### **Record-keeping and Retention of Geological Documentation**

(1) Record-keeping of geological documentation gives a survey of its origin, elaboration, handling, place and manner of its retention.

(2) The contractor is responsible for safety and clear retention of the material geological documentation and for its record-keeping up to its presentation to the contracting party or to the Geofond.<sup>43)</sup> Should the material geological documentation of some minerals (mainly of halite, coal and radioactive minerals) require a special manner of its retention, the conditions for it must be specified in the project.

(3) The duties specified in par. 2 are also related to the person, who will take over the geological documentation.

## **Article 34**

### **Discarding of Geological Documentation**

(1) The geological documentation that does not give any further geological or technological information, and is not necessary either for documentation and reasoning of the solution of the geological task or for control of geological works shall be discarded.

(2) Discarding of the written and graphical geological documentation is governed by special regulations.<sup>44)</sup>

(3) Discarding of the material geological documentation is carried out after the proper written and graphical documenting the technical works, or after the approval of the results of geological works.



(4) The contractor or the contracting party are responsible for proper and regular discarding of the material geological documentation. The consent of the Ministry or of the organisation appointed by the Ministry, which the general regulations on administrative proceeding<sup>45)</sup> are not related to, is necessary for discarding of the material geological documentation after approval of the results of geological works at geological research and deposit and hydrogeological exploration.

(5) After cessation of the contractor or of the contracting party, the duties to care of discarding of the material geological documentation are transferred to their successors, or to the bodies appointed for their liquidation.

(6) The material geological documentation, which was determined for destruction at discarding, can be used only as the industrial waste, should another manner of its destruction is not determined considering its special nature.

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 42) The regulation of the Central Mining Authority and of the Central Geological Institute of 31st January 1962 No. 1000/1962, by which the Regulation on carrying and completing geological documentation is issued (registered in 42/1962 Coll.) in wording of the Regulation of the Slovak Geological Institute No. 97/1988 Coll. and the Regulation of the Slovak Mining Agency of 12th September, 1990 No. 2680 (announced under the number of 400/1990 Coll.)

43) Articles 7 and 8 of the Regulation No. 9/1989 Coll. in wording of the Regulation No. 5/1992 Coll.

44) The Act of the Slovak National Council No. 149/1975 Coll. on archiving in wording of the Act of Slovak National Council No. 571/1991 Coll. (complete wording No. 332/1992 Coll.).

The Regulation of the Ministry of Interior of the Slovak Republic No. 63/1976 Coll., which specifies criteria for evaluation of written documents as archive materials, which regulates some details for discarding written documents.

45) The Act No. 71/1967 Coll. on administrative proceeding (Administrative Order).

## **THE FIFTH PART**

### **EVALUATION OF GEOLOGICAL WORKS**

#### **Article 35**

##### **Results of Geological Works**

(1) The contractor must evaluate the results of geological works in the final report, even the goal has not been achieved, or if geological works were carried out only partially. The results of geological works, which were carried out within the geological task by another organisation than the implementing one, shall be evaluated in the extent agreed with the contractor.

(2) Should the solution of the geological task result in finding out or verification of several independently usable mineral deposits, sources of underground water or should the solution contain other independently usable part of the geological task, these partial results can be evaluated by partial final reports.

#### **Article 36**

##### **The Final Report**

(1) The final report contains, documents and reasons the results of geological works in relation to their project, including the budget, if the project has included the budget. Its contents, extent and annexes shall be adapted to the goal of geological works, to the carried out geological works, requirements of the contracting party and needs of utilisation of the achieved results. The requirements for the contents of the final report are given in Annex No. 3 to this Regulation.

(2) The final report shall be undersigned by the statutory body of the contractor or by the authorised worker and by the responsible expert.

### **Article 37**

#### **Special Requirements on the Final Report**

- (1) In the final report with the estimation of reserves of the exclusive deposit, the reserves are assessed and classified according to special regulations.<sup>44</sup> The "passportization" of the exclusive deposit reserves shall be attached to the final report. It contains identification data on the deposit, its topographical position, mineral composition, data on the degree of geological exploration with geological characteristic and description of the deposit, conditions and manners of its protection and utilisation, the quantity of reserves, and conditions for their utilisation, which were used for their assessment.
- (2) The final report from the stage of the prospecting of the exclusive deposit shall also contain, in addition to the requirements according to par. 1, the requirements according to special regulations.<sup>46</sup>
- (3) In the final report with the estimation of reserves of underground water, the reserves shall be assessed according to the principles, which are specified in the Annex No. 2 to this Regulation.
- (4) In the final report with the estimation of inferred reserves of minerals, these reserves shall be assessed according to the conditions, that are specified in Annex No. 1 to this Regulation. The final report shall contain the record card of the inferred reserves of minerals.

## **THE SIXTH PART**

### **COMMON, PRELIMINARY AND FINAL PROVISIONS**

#### **Article 38**

- (1) The provisions of Articles 2 to 19, Article 20 par. 1 and 2 and Article 24 herein are not related to geological works aimed at obtaining additional data to designing preparation of construction works; the other provisions herein are related to them in a reasonable extent.
- (2) The geological works, which are aimed at obtaining additional data for the designing preparation of construction works are considered to be the works for precision of the knowledge on
  - a) the territory, engineering geological conditions, where the engineering geological exploration was finished at the stage of detail exploration, and if the development of the project of the construction work requires partial additional data,
  - b) the territory with simple and known geological conditions, or which are carried out for simple construction works.<sup>47</sup>

#### **Article 39**

The provisions of Articles 27 to 34 herein are related to geological works at a mining activity<sup>48</sup>), should the special regulation<sup>42</sup>) specify otherwise.

#### **Article 40**

The Regulation of the Slovak Geological Institute No. 127/1987 Coll. on designing, carrying out and evaluating geological works, and on granting the permit and on professional qualification for their implementation.

#### **Article 41**

This Regulation has been in force since 1st October, 1993.

**Jozef Zlocha** sign manual

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46) Article 3 par. 1 letters a) to f) of the Regulation No. 79/1988 in wording of the Regulation No. 533/1991 Coll.

47) Article 2 of the Regulation of the Federal Ministry for Technical and Investment Development No. 85/1976 Coll. on detailed regulation of the territorial proceeding and on the building order in wording of the Regulation No. 155/1980 Coll. and of the Regulation No. 378/1992 Coll.

48) Article 2 of the Act of the Slovak National Council No. 51/1988 Coll. on mining activity, explosions and on the state mining administration in wording of the Act of the Slovak National Council No. 499/1991 Coll.

**Annex No. 1**  
**to the Regulation No. 217/1993 Coll.**

**PRINCIPLES OF ASSESSMENT OF INFERRED RESERVES OF MINERALS**

1. The inferred reserves of minerals are estimated to the depths, which are accessible for the present or future mining according to the present economical, technical, technological or other conditions, while any possible changes in these conditions in the future are considered. The estimation is made in units of weight or volume with determination of the prognostic area.
2. The quantity of the inferred reserves of minerals is stated based on the expert's estimation within the boundaries of large regions, basins, or deposit units, or a part thereof.
3. The inferred reserves of minerals are divided to:
  - a) inferred reserves of minerals P1, whose presence is anticipated on the basis of positive evaluation of indices and anomalies ascertained during geological mapping and during geophysical, geochemical and other works in the basins, fields or geological regions, where deposits of the same formation of genetic types are known. The estimation of the inferred reserves of minerals of the anticipated deposits, and the idea about shapes and sizes of deposit bodies, their composition and quality are based on analogy with these known mineral deposits.
  - b) inferred reserves of minerals P2, whose presence is anticipated based on favourable stratigraphic, lithological, tectonic and paleogeographic facts, which have been ascertained in the evaluated region during geological mapping and by analysis of geophysical and geochemical data. The estimation of the quantity and quality of inferred reserves is based on analogy with others, regions, which have been explored in greater details, and in which the deposits of the same genetic and formation type have been found or verified.

**Annex No. 2**

**to the Regulation No. 217/1993 Coll.**

**PRINCIPLES OF ASSESSMENT OF RESERVES OF UNDERGROUND WATER**

**A. General provisions**

1. The principles of assessment of reserves of underground water (hereafter as the "principles" only) specify, how the estimated reserves of underground water are assessed.
2. Assessment of reserves of underground water means verification of hydrogeological conditions, verification and division of reserves of underground water by their individual components including their quality (item B herein).

**B. Division of reserves of underground water**

1. The reserves of underground water are divided into the following components:
  - a) natural sources - the natural dynamic component of underground water, which is expressed in volume units per time unit,
  - b) natural reserves - the static component of underground water expressed in volume units representing the inflow into the collection area as a result of artificial intervention, which is expressed in volume units per time unit.
2. Usable reserves of underground water are represented by that part of their components, which can be taken off from the rock environment, collected and utilise using technical means. This is based on the general conditions of utilisation specified in item C herein. The contracting party may specify special conditions of utilisation for the category of reserves B, or for category of reserves A respectively, for the hydrogeological unit (item C/2 herein).
3. Actual offtake of underground water shall be subtracted from usable reserves of underground water,
4. The usable reserves of underground water of category C<sub>1</sub> and of higher categories are divided according to their quality as follows:
  - a) the usable reserves of underground water that do not require any treatment of the water quality before its use,
  - b) the usable reserves of underground water that require treatment water quality before its use.

**C. Categorisation of reserves of underground water**

1. The reserves of underground water, which are divided to their components are categorised according to the degree of their verification and knowledge on hydrogeological conditions into the categories C<sub>2</sub>, C<sub>1</sub>, B and A.
2. The reserves of underground water, which are categorised into individual categories are evaluated, assessed and approved as a hydrogeological unit, or as a part of the hydrogeological unit.
3. The hydrogeological unit is the area with similar hydrogeological features of the regime of underground water according to ČSN 73 6532 Nomenclature in hydrogeology, which is determined, as a rule, by groundwater divides, or by geological boundaries. The hydrogeological unit can be identical with a groundwater zone, or form a part thereof, or it can includes several groundwater zones.
4. In estimations of reserves of underground water in a part of the hydrogeological unit of a higher category than was approved for this hydrogeological unit, the relation of the reserves of the evaluated part to the all reserves of the hydrogeological unit shall be expressed.
5. Time, which is necessary for creation of reserves of underground water of the hydrogeological unit of all categories shall be evaluated by their comparison with the ascertained natural sources. The quantity of usable reserves as a portion of natural sources, which were determined based on the respective observations lasting n-years, shall be assessed by the data on their assurance, i.e. by their assignment to the long-term climatic and hydrogeological values. Assurance of creation of reserves of underground water in a part of the hydrogeological unit shall be assessed individually at categorisation considering specific hydrogeological conditions.
6. Categorisation of reserves of underground water of the hydrogeological unit

### 6.1 Reserves of C<sub>2</sub> category

The reserves of underground water, which have been estimated on the basis of comprehensive evaluation of the existing degree of geological exploration, documents on geological, hydrogeological, hydraulic, hydrological and hydrochemical conditions and on the quality of reserves of underground water, completed with the control data in the given area, or with other technical works, are classified as category C<sub>2</sub>. Based on the processing or evaluation of these materials, the knowledge on the following data, which are necessary for general conditions of utilisation, are documented:

- 6.1.1 preliminary estimation of natural sources and qualified estimation of usable reserves of underground water using hydrogeological methods, while the regime observations lasting one year are considered to be sufficient ones.
- 6.1.2 preliminary assessment of the quality of underground, surface and rain water,
- 6.1.3 determination or precision of boundaries of the hydrogeological unit,
- 6.1.4 determination of prospective areas for water management utilisation of underground water (their collection, enrichment and protection),
- 6.1.5 notice on conflicts of interests, which affect the reserves of underground water and their quality,
- 6.1.6 preliminary draft protection of underground water reserves for the given hydrogeological conditions considering the existing sources of pollution of underground water,
- 6.1.7 survey and preliminary evaluation of actual offtakes of underground water
- 6.1.8 the relation of the new obtained knowledge to the hydrogeological zoning from the point of view of the extent of the zone and from the point of view of the quantity of reserves of underground water.

### 6.2 Reserves of C<sub>1</sub> category

The reserves of underground water, which have been estimated on the basis of comprehensive evaluation of the existing degree of geological exploration, documents and geological works. Based on their processing and evaluation, the knowledge on the following data, which are necessary for general conditions of utilisation, are documented:

- 6.2.1 estimation of the natural sources and usable reserves of underground water using at least two independent estimation methods, namely hydrological methods, while the length of regime observation is, as a rule, two years, and by hydraulic ( hydrodynamical ) methods,
- 6.2.2 possibilities of the use of natural reserves and induced sources marking out the most suitable points for collecting, enrichment and protection of underground water,
- 6.2.3 the quality of underground water with details allowing to solve the problems of their collection in the hydrogeological unit,
- 6.2.4 main laws of changes in the hydrogeological conditions (hydraulic, hydrochemical and others) and general prognosis of their development,
- 6.2.5 the optimum way of water management utilisation of underground water and their quality in the explored hydrogeological unit with prognostic estimations related to the quantity and quality of reserves of underground water,
- 6.2.6 proposal of areas, which are suitable for exploration of reserves of underground water for higher categories,
- 6.2.7 notice on conflicts of interests, which affect the reserves of underground water and their quality and draft of their solution
- 6.2.8 draft of protection of underground water reserves and their quality, recommendation of possible revision of the protection of existing collecting facilities and assessment of the influence of underground water pollution,
- 6.2.9 survey of actual offtakes of underground water and their impacts on the reserves of underground water of the hydrogeological unit,

6.2.10 assessment of the valid hydrogeological zoning from the point of view of the extent of the zone and of the quantity of underground water reserves with possible proposal for modification of zoning.

### 6.3 Reserves of B category

The reserves of underground water, which have been estimated on the basis of comprehensive evaluation of the existing degree of geological exploration, documents and geological works. Based on their processing and evaluation, the knowledge on the following data, which are necessary for general conditions of utilisation, are documented:

6.3.1 the estimation of reserves of underground water using hydraulic and hydrological methods. The estimation for the existed or anticipated initial and limit conditions and filtration parameters shall be carried out using hydraulic methods. It is necessary to estimate preliminary any changes in the quantity of reserves of underground water and of their quality and to compare them with the results of regime observations. The reserves of underground water shall be estimated using hydrological methods based on the evaluation of regime observation considering the extreme and mean values. The length of regime observations is at least two years, while the results of the previous observations of hydrometeorological phenomena must be used,

6.3.2 a draft protection of underground water before endangering their quantity and quality and analysis of possible impacts of utilisation of underground water in hydrogeological units or parts thereof,

6.3.3 a proposal of the optimum use and conditions for offtake of underground water with general economic evaluation,

6.3.4 the estimation of usable reserves of underground water with their division to natural sources, natural reserves and, if possible, induced sources using at least two independent methods,

6.3.5 the assessment of the influence of sources of pollution on the quality of underground water and anticipation of the influence of pollution on the estimated reserves of underground water,

6.3.6 a survey of actual offtakes of underground water and prognosis of their development in the given area, a proposal of solution of conflicts of interests, which affect the reserves of underground water and their quality,

6.3.7 a proposal of technology for treatment of underground water,

6.3.8 the relation of the new obtained knowledge to the hydrogeological zoning from the point of view of the extent of the zone and from the point of view of the quantity of reserves of underground water with a possible proposal for modification of zoning.

### 6.4 Reserves of A category

The reserves of underground water, which are verified by the pilot pumping and by long-term regime observations, and which have verified technology of treatment are categorised to the A category. Based on their evaluation, the following data are necessary to be documented for general conditions of utilisation:

6.4.1 determination of protection zones, which are reasoned in detail, or making them more accurate; in the case of implementation of active manners of protection of underground water taken off against hazards to their quantity and quality, it is necessary to show the effectiveness of this protection,

6.4.2 the prognostic estimation of changes in the quantity and quality of underground water during service life of collecting facilities,

6.4.3 the development of emergency plans for the case of deterioration of the reserves of underground water and of their quality,

6.4.4 general economic study on the conditions of the offtake of underground water and on protection of their quantity and quality,

6.4.5 determination of boundaries of range of influence of the permanent offtake of usable reserves of underground water.

## 7. Categorisation of reserves of underground water in a part of the hydrogeological unit

7.1 The reserves of underground water of the local nature in a part of the hydrogeological unit shall be evaluated for one or more collecting facilities, which can be mutually hydraulically affected, when the sum of their yields exceeds  $30 \text{ l.s}^{-1}$ . In the estimation, it is necessary to assess the assurance of the reserves of

underground water and of their quality, the relation of these reserves to the hydrogeological unit or a part thereof and to the existing offtakes.

#### 7.2 Reserves of C<sub>2</sub> category

The reserves of underground water estimated on the basis of the evaluation of the previous degree of geological exploration, documents on technical works in the given area or on the collection facility are categorised as the reserves of C<sub>2</sub> category. The maximum usable quantities of underground water and its quality shall be determined as analogy, while the range of influence of the offtake shall also be preliminary assessed.

#### 7.3 Reserves of C<sub>1</sub> category

The reserves of underground water estimated on the basis of the archive information on the given area and on the basis of the result of short-term pumping test on the new collecting facility, which allows to evaluate filtration parameters are categorised as the reserves of C<sub>1</sub> category. The area of the influence of the offtake shall be determined, and the quality of underground water shall be assessed.

#### 7.4 Reserves of B category

The reserves of underground water estimated on the basis of the evaluation of the hydrogeological data on the given area, while the long-term pumping test shall be carried out allowing to obtain the data, which are necessary for determination of technology of water pumping, protection of collecting facility and for assurance of stability of underground water and their quality.

#### 7.5 Reserves of A category

The reserves of underground water estimated on the basis of the evaluation of the hydrogeological data on the given area, while the pilot pumping test shall allow to assess unambiguously the offtake regime and effectiveness of protective measures for protection of the quantity and quality of underground water.

### **Annex No. 3**

#### **to the Regulation No. 217/1993 Coll.**

#### **REQUIREMENTS OF THE FINAL REPORT**

- A. Report on the solution of a geological task
  1. Geological task and data on the area
    - 1.1 data according to Article 15 of herein Regulation
    - 1.2 data on the project and its changes
    - 1.3 characteristics of the explored area and the degree of previous geological exploration
  2. Procedure of the solution of a geological task
    - 2.1 data on the implemented geological works, achieved results, including their evaluation,
    - 2.2 new geological knowledge, including that one, which is not related to the goal of the designed geological works,
    - 2.3 the estimation of the inferred reserves of minerals,
    - 2.4 the economical contribution of solution in relation to the economical reasoning of geological works in the project,
  3. Special requirements of final report according to Article 37 herein
  4. Conclusions and recommendations
  5. Data on retention of geological documentation and of separate reports, proposal for its discarding
  6. References and special sources

## B. Estimation of reserves of the mineral deposit

### 1. Spatial characteristic of the deposit

- 1.1 location of the deposit in the geological region,
- 1.2 description of the deposit and of its position,
- 1.3 internal structure of the deposit,
- 1.4 accompanying raw materials

### 2. Qualitative and technological characteristic of the deposit

- 2.1 determination of the type of raw material and of its technological types,
- 2.2 the qualitative characteristic of raw materials and of its technological types and accompanying raw materials, main and secondary utility and harmful components,
- 2.3 variability of the quality of the raw material.

### 3. Hydrogeological characteristic

- 3.1 Hydrogeological characteristic of the area,
- 3.2 water-bearing beds and zones, influence of tectonics on the hydrogeological conditions of the deposit, occurrences of karst water,
- 3.3 solution of the relation of water content of the deposit to its hanging wall, to its basement and to its surrounding,
- 3.4 chemical composition of water, possible sources of their pollution,
- 3.5 calculation of inflows of water at opening of the deposit and at its mining; the area of hydraulic influence of drainage.

### 4. Manners of elaboration and results of reserves estimation

- 4.1 the method of reserves estimation, basic parameters in relation to the conditions of utilisation of reserves,<sup>1)</sup>
- 4.2 results of control analyses,
- 4.3 principles of geometrization, extrapolation and categorisation of reserves
- 4.4 tables of estimation and total results of reserves estimation, comparison with previous reserves estimation.

### 5. Conditions for utilisation of reserves and evaluation of the relation to the environment

### 6. Proposal for the optimum utilisation of the deposit and its economic significance

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1) Article 13 of the Act No. 44/1988 Coll. on protection and utilisation of mineral resources (the Mining Act) in reading of the Act of the Slovak National Council No. 498/1991 Coll.

## C. Estimation of reserves of the source of underground water

### 1. Spatial characteristics of the source of underground water

### 2. Actual use of the source of underground water

### 3. Documents and data, which are necessary for estimation of reserves of the source of underground water

- 3.1 initial data (climatological, hydrological and hydrogeological)
- 3.2 measurements and tests performed, taking of samples
- 3.2 evaluation of the regime observation of underground water.

### 4. Hydrogeology of the area in question



- 4.1 hydrophysical properties of rocks, filtration parameters, function of tectonic zones and karst phenomena,
- 4.2 regime of underground water, migration parameters of the rock environment,
- 4.3 hydrogeological evaluation of the area from the point of view of needs of the reserves estimation of the source of underground water
- 5. Reserves estimation of the source of underground water
  - 5.1 method of reserves estimation,
  - 5.2 proper estimation and reserves evaluation,
  - 5.3 evaluation of the quality of water and of their genetic types in the structure, possible pollution, proposal for treatment of underground water.
- 6. Conditions for protection and utilisation of sources of underground water
  - 6.1 protection of the quantity and quality of the source, proposal of protection zones,
  - 6.2 proposal of establishment of observing facilities for monitoring of pollution
  - 6.3 relation of the use of the source to the conditions of the environment.
- 7. Proposal of the optimum use and protection of the source of underground water, its economic significance

D. Annexes to the final report and reserves estimation:

- 1. A topographical map of the explored area
- 2. A geological map of the explored area
- 3. Geological maps and sections
- 4. Maps and sections of blocks of reserves documenting the reserves estimation of the mineral deposit, or of sources of underground water
- 5. Maps of inferred reserves of minerals
- 6. Conditions for utilisation of the reserves of the exclusive deposits
- 7. Summary geological documentation of boreholes, workings, etc., graphs of measurements and pumping tests, data obtained by analyses of samples

The copy of the final report, which is given to the Geofond in Bratislava, and in the case of the final report with the estimation of reserves of underground water, also to the Slovak Hydrometeorological Institute in Bratislava, shall also include the record-keeping and record cards of geological tasks, boreholes, hydrogeological and geophysical works, sliding areas, etc., which are necessary for elaboration of surveys on the degree of geological exploration.