

# Problems and Countermeasures in the geological exploration of deep mineral

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**Abstract:** In view of the needs of the geological exploration of the deep mineral resources, the necessity, problems and Countermeasures of the geological exploration of the deep mineral resources are explored.

**Keywords:** Deep Mineral resources; geological exploration; problems; Countermeasures

## 1. the necessity of strengthening geological exploration of deep mineral resources

Current , the demand for mineral resources is increasing. , so in order to satisfy the The actual production needs , Mining enterprises tend to carry out deep mineral resources mining . before the mining of deep Mineral Resources , often need to geology exploration work , to better identify engineering geological problems , and Provide rationalization suggestions for mining of deep Mineral Resources , finally make sure deep mine The role of resource-producing geological exploration is effectively played.

## 2. Main features of geological prospecting for deep mineral resources

Given the need for geological exploration of deep mineral resources , We must have a special The point has a basic understanding of . The specific features of the are mainly reflected in the following areas : ①

More complex formations . This is because the geological structure of the deep mineral resources is very much complex , drill needs to be deep in depth , More often than not, crosses stone layers , in Drilling Process , Once there are hard and loose layers of different geological structures , There is no effective way to enhance the resolution to it , and different measures tend to save problems with a problem . ② drill hole offset Large . for shallow drilling drills, and for geological prospecting , Small due to borehole skew distance , So the drilling angle is not too large change , to meet the actual needs of geological prospecting . But in deep mineral resources Quality survey , because drilling depth is very deep , at this point the drilling skew distance increases , that drilling stops are hard to confirm., leading to geological prospecting of deep mineral resources The implementation of the is affected by . ③ There are many disturbances in data acquisition , This is because drilling areas tend to be ground ups , and covered more vegetation , surface and There are many obstacles outside of , brings greater disturbance to field construction and signal reception ,

plus the elevation of the exploration depth and the increase in signal-to-noise ratio , both currently No tradeoff unification , plus presence of subsurface media .to make deep mining resource geological prospecting is difficult. <sup>[1]</sup>.

### **3. Modern Deep mineral resources geological exploration technology and shortage**

The purpose of geological prospecting for deep mineral resources is mainly to better search for minerals , The can be mined only on the basis of prospecting . and geological prospecting is the first step .

So we have to be clear about its technical points . The following are the main points of the specifically .

#### **3.1 Drilling prospecting technology**

The need for deep geological prospecting for prospecting , in deep Mineral resources Quality survey , Common drilling and prospecting techniques mainly include deep geological drilling and prospecting. technology . The main three types of common are : ① Reverse-cycle continuous sampling . This drilling technique mainly compress air as its loop media , when drilling operations are continuously solid apply , so that the drill will hit the surrounding rocks , plus high-speed airflow from the center of the Arms drill , to bring cuttings to the surface in time , and combined with to the order of the surface , Collect cuttings. , with label , To become the geological development of the Survey analysis sample <sup>[2]</sup> . ② controlled directed technology . This drilling technique is not only precision higher , and can be accurately and comprehensively surveyed on the inner wall of the slope steep and tunnels, as well as on the site of the exploration , to find the right hole position , Reduce the amount of drilling work to promote the purpose of reducing this effect . so you can effectively avoid traditional drilling techniques problem with insufficient precision . ③ Rope Request Core . This technique is mainly to use diamond as drill bit , not only deep depth of drilling , and has good comprehensive geological drilling effect . But the problem is low job efficiency and high cost , General domestic gold drill bit lifetime only m .

#### **3.2 Geochemical prospecting technology**

Application of this method in geological exploration of deep mineral resources , is primarily a base on the theoretical basis of ion absorption , and dynamic comprehensive analysis and research underground rock ion form in , and then Judge Mineral location . under ion theory , The ions have no external force. , It's in a balanced state , but in after we have an instrument , Break the ion balance State , Take advantage of set to absorb a certain amount of time , to form a new equilibrium state , and Then The ions collected by the Carry out analysis and research .

#### **3.3 Remote sensing technology**

The key point of geological exploration of deep mineral resources is to find blind mines , and prospecting More difficult , So in deep geological exploration of mineral Resources , increasingly focused on remote apply . The first is based on the tonal basis of a remote-sensing image circle. analysis , Find special image targets , and the object being surveyed is mainly a form exception image Body . followed by the construction of mineral prospecting models with geological environment . is again through on the basis of multiple technical and multi-element information analysis , to derive the law of mineralization , is on Mining deep Mineral resources to lay the foundation . finally combined with remote sensing imagery data and prediction rules

2017 Year One under World nonferrous Metals The law extends to the basic scope of the mining area , to accurately predict the deposit range .

### **4. Problems in geological exploration of deep mineral resources**

#### **4.1 Technical Issues**

Although the geological exploration of deep mineral resources with more and more new technologies of the apply without constant improvement , But the technology that exists in practical applications There are more problems with than . because new technology results are primarily compared to traditional exploration techniques , At present, the high resolution technical equipment required for geological prospecting of deep mineral

Resources also requires continuous improvement . The makes the precision of the Geological Survey further elevated .

## 4.2 Cost Issues

Cost and technical issues have historically been a game of conversation . to reduce costs , is often the cost of reducing the survey precision , and to improve survey accuracy , bound consumes more cost . So the trade-off in this area is often a matter of deep mineral Resources quality Exploration issues of great importance , causes the center of gravity to work to deviate from .

## 5. Several countermeasures for strengthening geological exploration of deep mineral resources

### 5.1 Improved drilling technology is a key to future development

Deep Geological prospecting for mineral resources requires professional drilling technology as a support , While professional drilling technology often consumes a lot of cost . to better locate The reason these questions , We should continue to focus on drilling technology innovation , ensure drilling device more complete , Technical level more integrated . The increases the investment to it. appear particularly necessary . targeted actions , Conquer current deep Mineral Resources problems facing the quality survey , to better ensure that the resulting geological data is more

Dark mineral eclipse becomes calcite , Sun Stone , Green mud stone, etc. , calcite to microscope It's grainy Yang Shi is fibrous , A small number of columns , may be a hornblende eclipse Change account to , for Eclipse Crystal ; The green clay is irregular flake output , Uneven evenly . The quartz is later formed . after rock alteration , on surface oxidation , mass Iron precipitation , Formation of limonite , and along rock microcracks or micro-veins .

quartz veins : The quartz veins have two forms of output, single and complex , Microscopic features shows two , early quartz veins contain large impurities and small inclusions , semi-Self -shape granular , size 3 mm around ; Advanced quartz

veins colorless , It is fine-grained , size - 3 less than mm , Has a tiny pulse output , local cut through early quartz particles . metamorphism : The metamorphism of mining area is a regional shallow metamorphism , metamorphic rock with Low-level mud , Sand Slate ,Crystalline Limestone is the primary . Wall rock alteration : area surrounding rock erosion becomes very development , forming banded distribution along deep and pinnatefaults , Break cut through different rock formations , changes are also different . is closely related to gold mineralization is silicide , sericite , pyrite , Galena , Flash zinc mineralization , poison sanding .

3 metallogenic Analysis

(1) construct Conditional analysis . Long Water gold deposit located in Niushan of the flower---- page All Au ,Ag,Pb , Zn Multi-metal metallogenic belt , The break has a long Active History , not only controls the formation of sedimentary formations in the area , and Clear control of magma activity , This regional fracture caused the crust between The migration of minerals into the , provides a channel and a gathering place for the migration of ore fluids . its South disk wide-developed secondary north West , North cc to pinnate break , control orebody space spread of , form and scale .

(2) stratigraphic condition Analysis . deposit in Upper Ordovician Baiyun Mountain Group , on

Science , detailed , provides authoritative data and basis for mining of deep mineral resources .

### 5.2 Research and development of deep geological prospecting equipment for mineral Resources

is currently , to better meet the needs of geological prospecting for deep mineral resources , on exploration technology at the same time , More research on exploration equipment development ,, in particular, equipment required for deep mineral exploration is often small and High precision . in the future we should increase its depth and precision as well as its ability to resist infection and resolution as the main direction of the development of geological prospecting equipment for deep mineral Resources ,Can better adapt to the increasingly complex geological conditions of stereo exploration needs .

### 5.1 Strengthening the cultivation of talents for geological exploration of deep mineral resources

Talent is often the first a Core Force , So in the deep geological exploration of mineral resources in , to better address current difficulties , in Human resources and people to develop strategic also need continuous improvement and optimization , effectively strengthen with university for , For geological prospecting and Mineral resources development to lay a solid foundation for human Resources .

## 6. Epilogue

To summarize , in deep geological exploration of mineral resources , Existing problems primarily technical issues and cost issues , This requires technical , devices and talent for a focal point , at the same time on the current geological exploration technology of deep mineral resources point with insufficient analysis , To better improve the technology in the continuous improvement of the .

(1) Chenhao East . Application of geological prospecting and Remote sensing technology in geological work of

hydraulic ring J ]. Technology Innovation with apply ,2016 (5).

(2) Nie Xianpeng . Application of geological prospecting and Remote sensing technology in geological work of hydraulic ring [J]. Big Technology , 2015 .

The total thickness of the mesh section is 1808 m , Total volcanic rock thickness 773 m , accounts for the total thickness of the section 40%. Au,Ag, Pb,Zn etc metallogenic elements has varying degrees of enrichment in it .

(3) lithologic combination and Metallogenic analysis . metallogenic to rock no obvious choice sex , But mineralization tends to be more andesite , diorite and granitic diorite , This is consistent with the size of these rocks in the mining area . quartz vein ore with altered rock type The ore belongs to different metallogenic periods , has different mineralization characteristics . surrounding rock alteration conditions analysis . alteration mainly affected by fracture , Near East-West right line deep break in wrong to form a pinnate subordinate segment of the north-south direction , surrounding rock alteration controlled by fracture , away from The more near

the break, the greater the alteration. , mineralization stronger , vice , then mineralization is weak , in two break crack intersection site , Alteration Enhancements , mineralization also enhanced .

(4) magmatic condition Analysis . huali Mid-term flower hillock diorite , variscan Late second-longest granite Au,Ag , Pb , Zn has a rich . is a deposit multi-period main material provider in metallogenic process . and gold and silver lead-zinc enrichment correlation not obvious , The survey area may be two-phase mineralization , The first phase is gold mineralization , is primarily with tectonic mineralization , for tectonic alteration rock type ; The second phase of the is lead-zinc-silver Mining , main with intrusion of rock mass , to hot-liquid , Sublevel Enrichment rules are obvious .

## 7. Summary

Mining Belt ( Body ) strictly under break control , The body of the orebody is produced without exception . Rip ,, and the enrichment degree of the ore body is closely related to the variation of the fracture occurrence. . rich "" the orebody is located at the turning point of the fracture- shaped wavy undulation . in mate

## References

1. Gansu Asia Peak Mining Co., Ltd. long running gold mine 2013 A detailed report of the year .
2. Gansu Province nonferrous geological Prospecting Bureau Zhangye four teams long running gold mine 2006 Annual Census Report .134 World nonferrous Metals 2017 Year One under.