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**Specification for iron, manganese and chromium mineral
exploration**

(English Translation)

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1 Scope

This standard specifies the specifications of geological exploration for iron, manganese, chrome minerals, including scope, normative references, objectives and tasks of exploration, degree of investigation and study, requirements for exploration control, exploration work and quality requirements, feasibility evaluation, classifications of mineral resources/reserves, type conditions, requirements for mineral resources/reserve estimates, etc.

This standard is applicable to geological exploration of iron, manganese and chrome ore as well as the mineral resource/reserve estimate. It is also applicable to the inspection and evaluation of exploration reports of iron, manganese, chrome mineral. It may also be used as the basis for evaluating and estimating mineral resources/reserves in such activities as mining rights transfer, financing, fund-raising, stock listing for mineral exploration and development.

2 Normative references

The provisions in following documents become the provisions of this standard through reference in this standard. For the dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this standard;

however, parties who reach an agreement based on this standard are encouraged to study if the latest versions of these documents are applicable.

For undated references, the latest edition of the referenced document applies.

GB/T 13908-2002 General requirements for solid mineral exploration

3.1 Pre-review

Through comprehensive study on geology, geophysical exploration, geochemical exploration, remote-sensing in the region, preliminary field observations, a very small

number of engineering verification results, comparison with deposits of known similar geological features, propose the select prospecting areas, to carry out pre-review work. Make evaluation for the geophysical anomalies, geochemical anomalies, remote-sensing anomalies, mineralization points, ore deposits which have ore-forming conditions in the pre-review region, to initially understand their characteristics and distribution ranges, to provide a basis for further general check.

4.1.2 General review stage

Collect such data as geological, mineral, geophysical, geochemical, remote-sensing geology, to understand regional geological features and prospects for mineralization. Roughly identify the strata, lithology, thickness, occurrence, distribution in the reviewed region. Roughly identify the distribution, scale, occurrence of larger folds, faults, fracture zones. Roughly identify the type, quantity, form, distribution of intrusive rocks or eruptive rocks. Evaluate all kinds of geophysical anomalies, geochemical anomalies, remote-sensing anomalies, ore deposits or mineralization points, to roughly identify their output characteristics and distribution range. For mineral deposits (body) with further working value in the region, it shall roughly identify the distribution, quantity, location of occurrence, thickness, scale, occurrence, ore quality. It shall roughly understand the development of the oxidation zone of the deposit (body), to provide basis for further detailed review work.

4.1.3 Detailed review stage

4.1.3.1

Regional geology. Further study such data as the stratum, structure, magmatic rocks, metamorphic rocks, minerals related to mineralization in the region. Based on such data as geophysical, geochemical, remote-sensing geology, clarify the location, regional geological features, mineralization conditions, mineralization prospects of iron, manganese, chromium minerals in regional structures as well as the major minerals in the region.

4.1.3.2

Mining region (bed) geology. Roughly identify the stratigraphic age, sequence, lithology, thickness, occurrence, distribution. For sedimentary deposits and metamorphic deposits, it shall also study the sedimentary environment of ore-bearing strata (rock series), lithofacies, rock combination, metamorphism, the distribution and change rule of ore-forming elements; determine the ore-bearing stratum as well as the spatial distribution of ore bodies in the stratum. Study the relationship between the structure of the mining area and the spatial distribution of ore bodies. Roughly identify the nature, scale, occurrence, mutual relationship, distribution law of the folds, faults, fracture zones which control the ore body. For the large faults which have large displacement and divide the ore body, it shall roughly understand its spatial position, occurrence, displacement. For the small faults, it shall, based on the surface engineering data, preliminarily describe their scope and distribution.

Study and basically identify the types, forms, scales, occurrences of intrusive rocks and eruptive rocks. Understand the intrusion (eruption) era, period, the degree of destructive impact of the structure or the veins on the ore body after the mineralization. For the main ore body of the preliminary mining section, it shall control its form, spatial location, occurrence in detail. For the small ore bodies with industrial value on the main ore body of the preliminary mining area, it shall also be controlled at the same time. If necessary, it may densify the project to improve the degree of exploration and study. For open pit mining, in order to determine the boundary of the open pit, it shall systematically control the boundary around the main ore body and the orebody at the bottom of the open pit; for the underground mining bed, it shall control the both ends, upper and lower boundaries, extension of the main orebody, to determine the location of the development project.

4.2.1 Pre-review stage

Preliminarily understand the mineral composition, chemical composition, main elements of the ore.

4.2.2 General review phase

Roughly identify the ore minerals, gangue minerals, ore grades, structural constructions, natural types of ore. Roughly understand the content and distribution of useful, beneficial, harmful components, to provide basis for determining whether it is industrially applicable.

4.2.3 Detailed review stage

Basically identify the ore minerals, types and contents of gangue mineral, ore structural characteristics. Basically identify the type, content, occurrence state, law of distribution of the useful, beneficial, harmful components. Preliminarily divide the natural types and industrial types of ores; study the law of distribution.

Provide a basis for the overall planning of the mining area, the project proposal for the mine construction, the pre-feasibility study.

4.2.4 Exploration stage

Identify the types and contents of ore minerals and gangue minerals in detail.

Study the interrelationship and distribution of ore minerals. Identify the content, occurrence state, distribution of useful, beneficial, harmful components in detail.

Study the structure and distribution characteristics of ore in detail. Identify the grain size and embedding characteristics of iron, manganese, chromium minerals and major gangue minerals. According to such factors as the mineral composition, content, structure and oxidation degree of the ore, determine the natural types in detail. Determine the boundary of oxidation zone, the mixed zone, the original ore. On the basis of dividing the natural type