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Standard of the Geology and Mineral Industry of the People's Republic of China

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Construction Specification of Green Mines of the Gold Industry

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Introduction

This standard is drafted in accordance with the rules given by GB/T 1.1-2009.

This standard is put forward by Ministry of Land and Resources of the People's Republic of China.

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The main drafters of this standard: Li Liang, Zhang Yongtao, Zhao Guannan, Chen Hui, Yan Peng, Wang Yanping, Li Xianhai, Dai Xiaoyang, Hao Meiyang, Chu Kelei, Li Qingyun, Xiu Guolin, Zhong Junhua, Shi Wenge, Cao Jincheng, Guo Min and Lang Yaojun.

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Construction Specification of Green Mines of the Gold Industry

1 Scope

This standard specifies the basic requirements for the environment of the mining area, the resource development mode, the comprehensive utilization of resources, energy saving and emission reduction, scientific and technological innovation and digital mine, enterprise management and enterprise image of green mines in the gold industry.

This standard applies to the construction of green mines of newly-built, reconstructed and expanded and production mines in the gold industry.

2 Normative references

The following documents are essential for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including all modifications) applies.

GBZ 2.1 Occupational exposure limits for hazardous agents in the workplace Part 1: Chemical hazardous agents

GBZ 2.2 Occupational exposure limits for hazardous agents in the workplace Part 2: Physical factors

GB 8978 Integrated wastewater discharge standard

GB 12348 Emission standard for industrial enterprises noise at boundary

GB 12523 Emission standard of environment noise for boundary of construction site

GB/T 13306 Signs

GB 14161 Mine safety signs

GB 18599 Standard for pollution on the storage and disposal site for general industrial solid wastes

GB 32032 Norm of energy consumption per unit products of gold mining

GB 32033 Norm of energy consumption per unit products for mineral processing and smelting of gold

GB 50187 Code on general layout design of industrial enterprises

HJ 651 Technical specification of eco-environmental protection and reclamation for mines (trial)

TD/T 1036 Quality control standard for land reclamation

3 Terminology and definition

The following terms and definitions are applicable to this document.

3.1

Green mine

In the whole process of development of mineral resources, the scientific and orderly mining is implemented, and the ecological environment disturbance in the mining area and its surrounding is controlled within the controllable range. The mine with an ecological environment, a scientific mining mode, the efficient utilization of resources, the digital management information and a harmonious community in the mining area is realized.

3.2

Green coverage rate of the mining area

The percentage of the greening area in the mining area in the area which can be greened within the boundary, including the waste rock yard, the industrial site in the mining area, and green belts on both sides of the mining area.

3.3

Input of R&D and technical innovation

The capital investment for an enterprise to carry out R&D and technical innovation activities. The R&D and technical innovation activities include scientific research and development, technology introduction, technological innovation, transformation and promotion, equipment renewal, scientific and technological training, information exchange, scientific and technological cooperation, etc.

4 General principles

4.1 A mine shall abide by national laws and regulations and related industrial policies, and run the mine according to law.

4.2 A mine shall carry out the development concept of innovation, coordination, greening, openness and sharing; follow the principle of adjusting measures to local conditions of the mine; and realize the overall consideration and comprehensive development of the utilization of resources, energy saving and emission reduction, environmental protection, land reclamation, corporate culture and enterprise and harmony of enterprise and land in the whole process of the development of mineral resources.

4.3 A mine shall be people-oriented, protect workers' health and prevent, control and eliminate occupational hazards.

4.4 A newly built, reconstructed or expanded mine shall be built according to this standard; a production mine shall be upgraded according to this standard; and the construction of green mines shall run through the whole process of design, construction, production and closing.

5 Environment of the mining area

5.1 Basic Requirements

5.1.1 The layout of functional zonings of the mining area shall be reasonable; the mining area shall be greened and beautified, and the whole environment shall be clean and beautiful.

5.1.2 The management of production, transportation and storage shall be standardized and orderly.

5.2 Appearance of the mine

5.2.1 The mining area shall be divided into functional zones such as production area, management area, living area and ecological area. Each functional zone shall comply with the provisions of GB 50187. The production, living, management and other functional zones shall have corresponding management institutions and management systems, orderly operation and standard management.

5.2.2 The ground transportation, water supply, power supply, health, environmental protection and other supporting facilities shall be complete in the mining area; in the production area, the operating signs, illustration signs, roadmap and other signs shall be set and comply with the provisions of GB/T 13306; and the safety marks shall be set in the areas requiring safety warning, such as road intersection, mouth of a well, pit and manufacturing shop, and the safety sign shall comply with the provisions of GB 14161.

5.2.3 A mine shall take measures such as spray, watering and dust collection device to dispose of the dust produced in the process of mine production. The environment of the mining area shall be kept clean and tidy. The concentration of dust in the air in the workplace shall be consistent with the allowable concentration of dust specified in GBZ 2.1.

5.2.4 The dust removal measures shall be taken when tailings and other solid wastes are transported to the outside. When the cyanide residue is transported to the outside, the rainproof and seepage (leakage) prevention measures shall be taken.

5.2.5 The reasonable and effective technical measures shall be taken to reduce the noise of high noise equipments. The limit of noise exposure in the workplace shall comply with the provisions of GBZ 2.2. The noise emission limit at the boundary of industrial enterprises shall comply with the provisions of GB 12348, and the noise emission limit at the boundary of construction shall comply with the provisions of GB 12523.

5.3 Greening of the mining area

5.3.1 The greening of the mining area shall be harmonious with the surrounding natural environment and landscape. The greening plants shall reasonably match, and the greening coverage rate of the mining area shall reach 100%.

5.3.2 When the waste dump of tailings and open pit mines which have been closed is reclaimed and greened, the isolation green belts shall be set on both sides of the special road in the mining area according to the local conditions.

6 Resource development mode

6.1 Basic requirements

6.1.1 The development of resources shall be harmonious with environmental protection, resource protection and urban and rural construction, and minimize disturbance and destruction to the natural environment. The resource-saving and environment-friendly development mode shall be chosen.

6.1.2 According to the conditions of ore occurrence, ore properties, the ecological environment of the mining area and other characteristics, the mining and separation process shall be selected. The mining and separation technology and equipment with a small ecological disturbance and impact on the mining area, a high utilization rate of resources, a small amount of waste production and a high recycling rate of water shall be given preference to, and the requirements of clean production shall be met.

6.1.3 The principle of "mining while managing and recovering" shall be followed, the geological environment of the mine shall be timely managed and restored, and the land occupied and destroyed by the mine shall be reclaimed.

6.2 Green development

6.2.1 According to the metallogenic geological characteristics of gold deposits, the resource development mode of "scattered exploitation and centralized separation and smelting" shall be promoted according to local conditions.

6.2.2 The mining and separation technologies and equipments encouraged, supported and promoted by the state shall be adopted.

6.2.3 The green mining technologies shall be adopted. The specific requirements are as follows:

a) A scientific and reasonable mining plan adapting to the local conditions shall be made. The development and preparation work shall be reasonable and advancing. A reasonable relationship between the developed ore reserve, the prepared ore reserve and the blocked-out ore reserve shall be kept. The advance of the face in the quarry shall be balanced and orderly.

b) In the open-pit mining of a gold mine, the technology with a low stripping ratio and a high loading efficiency shall be adopted. The open pit boundary shall be adjusted dynamically according to the change of the gold market price and the production cost of the enterprise.

c) In the underground mining of a gold mine, trackless transportation, underground waste rock filling, underground gravel and other green mining technologies shall be adopted.

d) The reasonable mining methods shall be selected according to different ore occurrence conditions and the recovery rate shall be improved. The mining recovery rate shall meet the requirements of Appendix A.

e) The technical and economic demonstration of the residual ores and pillars shall be made, and the reasonable technology shall be used to recover according to the demonstration, in order to improve the recovery rate of gold resources and prolong the service life of the mine.

6.2.4 The green separation and smelting technologies shall be adopted. The specific requirements are as follows:

a) The environmentally friendly flotation and gold extraction agents shall be used for production; and the small independent cyanidation process, the small fire smelting process, the small independent heap leaching process and other technologies limited and eliminated by the state in the new, reconstructed and expanded mines.

b) For the complex wrapped gold concentrate containing arsenic and sulphur (or auriferous ores), processes such as raw ore roasting, biological oxidation and hot pressing oxidation shall be used for

pretreatment.

c) According to the different ore properties, a reasonable separation and smelting process shall be selected to improve the recovery rate of separation (smelting). The recovery rate of separation (smelting) shall meet the requirements of Appendix A.

d) The technical and economic demonstration of low-grade resources shall be made. The economically feasible low-grade resources shall be utilized rationally, and the rate of resource recovery shall be improved.

6.3 Ecological environment protection in the mining area

6.3.1 Environmental control and land reclamation shall be carried out in accordance with the geological environment protection and land reclamation plan of the mine. The specific requirements are as follows:

a) The protection and restoration of the ecological environment such as waste dumps, open pits, special roads of the mining area, industrial sites of the mine, subsidence area, waste-rock yards and contaminated site of the mine shall comply with the provisions of HJ 651.

b) The comprehensive treatment of hidden dangers in the goaf shall be made. The methods such as taking down the surrounding rocks, pillar support or waste filling shall be used to treat the goaf.

c) The land occupied or damaged by the closed mine (mining area) and the closed tailings pond shall be reclaimed within three years, and the quality of land reclamation shall comply with the provisions of TD/T 1036.

d) All kinds of sites after the recovery and management shall be safe and stable, have no threat to human and animal plants, have no pollution to the surrounding environment, and be harmonious with the surrounding natural environment and landscape; the recovered land shall have basic functions, the sustainable utilization of land shall be realized according to local conditions; and the overall ecological function of the region shall be protected and restored.

e) The geological environment management rate and the land reclamation rate of a mine shall meet the requirements of the geological environment protection and land reclamation plan of the mine.

6.3.2 An environmental monitoring and disaster emergency warning mechanism shall be established, specialized institutions shall be set up, there shall be full-time management and monitoring personnel, and the environmental and geological hazards shall be monitored. The specific requirements are as follows:

a) The stability and quality of land reclamation areas shall be monitored dynamically during and after the mining.

b) The slope and ground pressure of a mine shall be monitored, and the open-pit slope and the deep ground pressure shall be displayed dynamically, in order to prevent geological disasters.

c) The whole process of transportation, storage, disposal and utilization of cyanide residue shall be monitored, and the contingency plan for environmental protection shall be made.

7 Comprehensive utilization of resources

7.1 Basic requirements

The coexisted and associated resources shall be comprehensively developed and utilized; and in accordance with the principle of reduction, recycling and reuse, solid wastes, wastewater and others shall be scientifically used to develop the recycling economy.

7.2 Utilization of coexisted and associated resources

7.2.1 The comprehensive exploration, comprehensive evaluation and comprehensive development shall be made on the coexisted and associated resources.

7.2.2 In order to maximize the comprehensive utilization rate of coexisted and associated resources, such as silver, copper, lead, zinc and sulfur, an advanced, appropriate, economical and reasonable technology shall be chosen. The comprehensive utilization index shall meet the requirements of Appendix A.

7.2.3 The utilization project of coexisted and associated resources of a newly-built, reconstructed or expanded mine shall be designed, constructed and put into production simultaneously with the mining, separation and smelting of the dominant mineral.

7.3 Utilization of solid waste

7.3.1 The utilizability of solid wastes such as waste rocks, tailings and cyanogen residue produced by mining and separation activities shall be evaluated, and they shall be rationally utilized by classification.

7.3.2 Solid wastes from a mine shall be used as filling materials, building materials, reutilized materials, etc.

7.3.3 The comprehensive utilization rate of waste rocks in an open-pit mine shall not be lower than 3%, the comprehensive utilization rate of waste rocks of an underground mine shall not be lower than 50%, the utilization rate of tailings of a mine shall not be lower than 20%; and the utilization rate of cyanide slag of a mine (except when the heap leaching process is adopted) shall not be lower than 15%.

7.4 Utilization of wastewater

7.4.1 The advanced water-saving technology shall be adopted to ensure the circulation and sequential utilization of water. The standardized and complete water recycling treatment facilities and the drainage system in the mining area shall be constructed.

7.4.2 The clean and resource-based technology and process shall be adopted to rationally dispose of and utilize the mine water, and the utilization rate of the mine water shall be maximized. The disposal rate of the mine water shall reach 100%.

7.4.3 The wastewater produced in the process of separation shall be recycled, and the recycling rate of the separation wastewater shall not be lower than 85%. The recycling rate of the separation wastewater in arid areas shall reach 100%.

8 Energy saving and emission reduction

8.1 Basic requirements

The system of energy consumption accounting in the whole process of production of a mine shall be established. By taking measures of energy saving and emission reduction, the energy consumption, material consumption and water consumption of the unit products shall be controlled and reduced, and the emission of "three wastes" shall be reduced.

8.2 Energy saving and consumption reduction

8.2.1 Through the comprehensive evaluation of resources, energy consumption, economy and environment, the mining mode shall be determined reasonably, and the energy consumption of mining shall be reduced; the "joint separation" shall be used as the separation process, and the principle of "much crushing and less grinding" shall be followed, so as to improve the production efficiency and reduce the energy consumption of separation.

8.2.2 For an open-pit mine, the energy consumption of a unit of product shall not be higher than 0.9kgce/t; for an underground mine, the energy consumption of a unit of product shall not be higher than the threshold specified in GB 32032; and the energy consumption of a unit of product in the separation and smelting of a mine shall not be higher than the threshold specified in GB 32033.

8.2.3 New technologies and equipments with a high efficiency and energy saving shall be used. Clean energy such as solar energy, geothermal energy, water energy and potential energy (gravity) shall be used.

8.3 Solid waste discharge

8.3.1 The advanced and reasonable mining and separation process shall be selected to reduce the production of solid wastes.

8.3.2 The waste rocks, tailings and cyanogen residues produced in the mine production process shall have a special place for storage and disposal. The construction, operation, supervision and management shall comply with the provisions of GB 18599.

8.3.3 Tailings shall be discharged in a dry manner, and the area occupied by tailings shall be reduced.

8.3.4 The cyanide residue shall be dehydrogenized with physical, chemical, biological, natural degradation and other methods. They shall be piled up and reused after the treatment.

8.3.5 The domestic wastes of a mine shall be disposed of in a centralized and harmless manner.

8.3.6 The disposal rate of solid wastes shall be 100%.

8.4 Sewage discharge

8.4.1 A mine shall establish a sewage treatment station separately or jointly with other mines, and realize rainwater diversion and clean-up diversion simultaneously.

8.4.2 In front of the storage area of tailings and cyanide residue and the sewage treatment station, an intercepting drain (drainage channel) shall be set.

8.4.3 The waste water produced in the process of mining and separation shall be disposed of reasonably and discharged according to the standard.

8.4.4 The cyanide in the cyanide-containing wastewater shall be recycled, the cyanide breaking treatment shall be made before discharge, and the wastewater shall be discharged according to the standard.

8.4.5 The domestic sewage in the mining area shall be disposed of according to the standard. The treated water shall comply with the provisions of GB 8978, and be used for greening in the mining area or discharged according to the standard.

8.5 Dust and waste gas discharge

8.5.1 The wet operation shall be made in the underground mine drilling. In a dry area or an area where the wet operation is difficult, effective dustproof measures such as dry dust catching shall be taken.

8.5.2 Water shall be sprayed for the dust produced during blasting and shipment, so as to effectively control dust discharge.

8.5.3 A clean power equipment shall be used to reduce the underground gas discharge and ensure the fresh air.

8.5.4 A local gas collection system and centralized purification device shall be set to reduce discharge of sulfur dioxide, nitrogen oxides, hydrogen cyanide and other waste gas.

8.5.5 The concentration of cyanide in the air shall meet the requirement for the allowable concentration specified in GBZ 2.1 in the workplace involving the cyanidation technique.

9 Scientific and technological innovation and digital mine

9.1 Basic requirements

9.1.1 A technical R&D team shall be established, the transformation of scientific and technological achievements shall be promoted, the technological transformation shall be intensified, and the upgrading of the green industry shall be promoted.

9.1.2 A digital mine shall be built. The informationization of production, operation and management of the mining enterprise shall be realized.

9.2 Scientific and technological innovation

9.2.1 The scientific and technological innovation system with the enterprise as the main body and market orientation combining production, teaching and research shall be established.

9.2.2 The specialized scientific and technological personnel shall be recruited to research the key technologies which support the development of the main business of the enterprise and improve the technological level.

9.2.3 The investment in R&D and technical innovation shall be no less than 1.5% of the main business income of the previous year.

9.3 Digital mine

9.3.1 The automation system of mine production shall be built, and the centralized control and information linkage of subsystems such as production and monitoring shall be realized.

9.3.2 The digital resource reserve model and economic model shall be established, the dynamic management and economic evaluation of mineral resources reserves shall be carried out, and the precision management of the reserves utilization of geological and mineral resources shall be realized.

9.3.3 The safety monitoring and control system shall be established to ensure the safety in production.

9.3.4 The mechanized reduction of personnel and the automatic substitution shall be promoted. The mining mechanization and the automation of the mineral separation technology shall be realized. The numerical control rate of key production processes shall not be lower than 70%.

9.3.5 The computer, intelligent control and other technologies shall be used to build the intelligent mine and realize the deep integration of informatization and industrialization.

10 Enterprise management and corporate image

10.1 Basic requirements

10.1.1 The enterprise management system of property rights, responsibilities, management, culture and other aspects shall be established.

10.1.2 The quality management system, environmental management system and occupational health and safety management system shall be established to ensure the management of quality, environment, occupational health and safety.

10.2 Corporate culture

10.2.1 The core values of the enterprise of people orientation, innovative learning, standard behaviors, high efficiency and safety, ecological civilization and green development shall be established. The enterprise spirit of unity and struggle, optimism, innovation, pragmatic entrepreneurship and advancement shall be cultivated.

10.2.2 The vision of enterprise development shall be consistent with the goal pursued by all the staffs. The long-term development strategy of the enterprise and the personal value of employees shall be closely integrated.

10.2.3 The trade union organization shall be improved, and it shall play an effective role. The staffs' material, sports and cultural life shall be enriched. The satisfaction of the employees of the enterprise shall not less than 70%. The occupational health inspection rate of workers exposed to occupational hazards shall not be less than 90% during their work.

10.2.4 The mechanism of synchronous growth of employees' income with the performance of the enterprise shall be established.

10.3 Business management

10.3.1 The rules and regulations for resource management, ecological environment protection, safety production, occupational disease prevention and control and others shall be established. The working mechanism shall be defined and the duties shall be fulfilled.

10.3.2 All kinds of statements, standing books and archival data shall be complete.

10.3.3 The staff training system shall be established. The training plan and the training records shall be clear.

10.4 Enterprise credit

10.4.1 The production and operation activities and the performance of social responsibilities must be honest and trustworthy. The mining right owner shall fulfill the obligation to publicize the information about prospecting and mining, and relevant information shall be publicized.

10.4.2 Relevant information shall be disclosed on the company's website and other locations accessible by the public, mainly including:

a) the environmental impact report and reply for the establishment of the enterprise and subsequent construction projects;

b) the monitoring and emission data of cyanide residue, mine water, dust, noise and other pollutants;

c) the contact information of the responsible department for the safety production and environmental protection of the enterprise.

10.5 Harmony of enterprise and land

10.5.1 The mining concept of construction of the enterprise and land, sharing of interests and common development shall be established. A long-term cooperative mechanism shall be built by creating a community development platform. The resources and advantages of different parties shall be given full play to, and a multi-cooperative model of win-win for the social management of the mining area shall be established.

10.5.2 The investigation mechanism of mass satisfaction in the mining area shall be established. Support shall be provided in the aspect of education, employment, transportation, life and environmental protection. The quality of people's life in the mining area shall be improved, and the harmony of enterprise and land shall be promoted.

10.5.3 The mechanism of consultation and negotiation with the township and town (street) and village (community) of a mine shall be established, all kinds of interest disputes shall be handled in a proper and timely manner, and there shall be no major group event.

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Appendix A
(normative appendix)
"Three rate" index of the rational
development and utilization of gold
mine resources

A.1 For an open-pit gold mining enterprise, under the premise that the ore dilution rate is not higher than 10%, the mining recovery rate shall be higher than 90%.

A.2 For an underground gold mining enterprise, according to different conditions of occurrence of gold deposits, the recovery rate shall meet the requirements of the indexes in Table A.1 within the range of the designed ore dilution rate.

Table A.1 Index requirements for the mining
recovery rate of a gold mine exploited underground

Stability of surrounding rocks	Inclination of ore body	Thickness of ore body	Recovery rate %
Stable	Gently inclined and steeply inclined ore bodies	Thin ore body	92
		Ore body with medium thickness	90
		Thick ore body	87
	Inclined ore body	Thin ore body	90
		Ore body with medium thickness	87
		Thick ore body	85

Unstable	Gently inclined and steeply inclined ore bodies	Thin ore body	87
		Ore body with medium thickness	85
		Thick ore body	82
	Inclined ore body	Thin ore body	85
		Ore body with medium thickness	82
		Thick ore body	80
Extremely unstable	Gently inclined and steeply inclined ore bodies	Thin ore body	82
		Ore body with medium thickness	80
		Thick ore body	77

	Inclined ore body	Thin ore body	80
		Ore body with medium thickness	77
		Thick ore body	75
<p>Note 1: When the inclination of the ore body (α) is less than 30°, it is a gently inclined ore body. When $30^\circ \leq \alpha \leq 55^\circ$, it is a inclined ore body. When $\alpha > 55^\circ$, it is a steeply inclined ore body;</p> <p>Note 2: When the thickness of the ore body (h) is less than or equal to 0.8m, it is a thin ore body. When $0.8\text{m} < h \leq 4\text{m}$, it is a ore body with medium thickness. When $h > 4\text{m}$, it is a thick ore body.</p>			

A.3 According to the difficulty degree of processing and treatment of gold ores, the separation (smelting) recovery rate of a gold mining enterprise shall meet the requirements of indexes in Table A.2:

Table A.2 Requirements for the index of the separation (smelting) recovery rate of an gold mining enterprises

S

Type		Separation (smelting) recovery rate, %	Remarks
Easily treated ore		85 (80)	
Refractory ore	Ore easy to separate and difficult to smelt	85 (75)	
	Ore difficult to separate and smelt	(70)	
Low-grade ore		(60)	Conventional cyaniding process
		(50)	Heap leaching
<p>Note 1: If a good recovery rate can be obtained by the conventional cyanidation process, it is the easily treated ore; if the pretreatment process such as roasting, bacterial oxidation and hot pressing oxidation is required, it is the refractory ore; and the mineralized body delineated whose index is lower than the current industrial index is the low grade-ore.</p> <p>Note 2: By the production of gold concentrate or the alloy gold product, the recovery rate can be called the recovery rate of separation or the recovery rate of separation and smelting. The recovery rate of separation is outside the brackets, and the recovery rate of separation and smelting is in the brackets.</p>			

A.4 When gold coexists with other minerals, the comprehensive utilization rate of coexisted and associated mineral resources of a gold mining enterprise shall not be lower than 60%. When gold is associated with other minerals, the comprehensive utilization rate shall not be lower than 40%.

References

- [1] *The Guiding Opinions on Implementing the National Mineral Resources Planning, Developing the Green Mining and Constructing Green Mines* (Guo Tu Zi Fa [2010] No. 119)
- [2] *The Implementation Opinions on Accelerating the Construction of Green Mines* (Guo Tu Zi Gui [2017] No. 4)
- [3] *The Technical Catalogue for Encouragement, Restriction and Elimination about the Saving and the Comprehensive Utilization of Mineral Resources (Revised Edition)* (Guo Tu Zi Fa [2014] No. 176)
- [4] *The Guidance Catalogue of Industrial Restructuring (2011)* (revised in 2013)
- [5] *The National Development and Utilization Plan of Mineral Resources (2016-2020)*
- [6] *The Clean Production Evaluation Index System of the Gold Industry* (Announcement of the National Development and Reform Commission, the Ministry of Environmental Protection and the Ministry of Industry and Information Technology, No. 12 of 2016)
- [7] *The Notice about Issuing the Measures for the Publicity of Information about Exploration and Exploitation of Mining Right Owners* (Guo Tu Zi Gui [2015] No. 6)
- [8] *The Announcement about the Requirements for "Three Rate" Index for Rational Development and Utilization of Gold Resources (Trial)* (No. 29 in 2012 of the Ministry of Land and Resources)
- [9] *Regulations of the Compilation on Feasibility Study Report in the Gold Industry Projects* (YS/T 3003-2011)
-