

VIETNAM GEOLOGICAL DEPARTMENT



Annual Geological Report 2023



Hanoi, March 2024

TABLE OF CONTENTS

Contents

INTRODUCTION.....	3
I. WORK OF DEVELOPING INSTITUTIONAL DOCUMENTS AND LEGAL DOCUMENTS	5
1. Regarding the task of developing the Law on Geology and Minerals (geology part).....	5
2. Circulars of the Minister	6
3. Develop economic-technical norms, standards and regulations.....	7
II. TASK TO BUILD A STRATEGY FOR GEOLOGY, MINERALS AND MINING INDUSTRY TO 2030, WITH A VISION TO 2045; TASKS FOR ESTABLISHING PLANNING FOR BASIC GEOLOGICAL INVESTIGATIONS OF MINERALS FOR THE 2021-2030 PERIOD, WITH A VISION TO 2050	8
1. Building a geological, mineral and mining industry strategy to 2030, with a vision to 2045	8
2. Planning for basic geological surveys of minerals in the period 2021-2030, with a vision to 2050.....	11
III. RESULTS OF BASIC GEOLOGICAL INVESTIGATION OF MINERALS.....	16
1. Results of implementation of Government schemes and projects.....	16
2. Results of implementation projects on Ministry	22
IV. INFORMATION WORK, ARCHIVES, MUSEUMS SERVE THE COMMUNITY	26
1. Geological museum.....	26
2. Geological information and archives	29
V. WORK OF DEFINING MINERAL RESERVE AREA; DEFINING DISTRIBUTED AND SMALL MINERAL AREAS	31
1. Delineating national mineral reserve areas: Promoting sustainable development of the mining industry.....	31
2. Regarding delineation and announcement of areas with scattered and small minerals.....	35
VI. RESULTS OF SCIENCE TECHNOLOGY ACTIVITIES AND INTERNATIONAL COOPERATION.....	36
1. Science and technology	36
2. International cooperation.....	38
VII. JUSTICE INSPECTION WORK IN THE FIELD OF GEOLOGY; RESULTS OF SUPERVISION OF THE INVESTIGATION AND MINERAL EXPLORATION PROJECT	40
1. Judicial appraisal work in the field of geology	40
2. Results of monitoring mineral investigation and exploration projects.....	42

INTRODUCTION

2023 is the first year that the Vietnam Geological Department implements a new model after being separated from the Vietnam General Department of Geology and Minerals. The Department is assigned to carry out many new urgent tasks to serve its programs. The country's major socio-economic development program, including the project "Evaluation of sea sand resources to serve highway and transport infrastructure projects in the Mekong Delta".

As soon as it came into operation (from January 1, 2023), the Vietnam Geology Department urgently and comprehensively deployed tasks; Complete and stabilize the apparatus; Carry out staff rotation and job position changes to ensure requirements according to regulations on preventing corruption and negativity, and at the same time perfecting titles to ensure they are suitable for job positions and meet task requirements. service. By the end of 2023, basically the tasks have been carried out on schedule and with guaranteed quality.

According to Decision 2958/QĐ-BTNMT dated November 2, 2022 of the Minister of Natural Resources and Environment (MONRE) stipulating the functions, tasks, powers and organizational structure of the Vietnam Geology Department, the Department has 5 Functional departments and offices, 12 affiliated units with nearly 2,000 officers, civil servants, public employees and workers, ...

1. Office.
2. Division of Planning - Finance
3. Division of Personnel Organization.
4. Division of Basic Geology.
5. Division of Applied Geology.
6. Division of Geological Assessment and Exploration.
7. Northern Geological Map Federation.
8. Southern Geological Map Federation.
9. Northeast Geological Federation.
10. Northwest Geological Federation.
11. North Central Geological Federation.
12. Central Geological Federation.
13. Federation of Radiation Geology - Rare.
14. Federation of Geophysics.
15. INTERGEO Federation.
16. Federation of Marine Geology and Minerals.
17. Center for Information, Archives and Geological Museum.
18. Center for Geological Analysis and Verification.

The Vietnam Geological Department would like to respectfully introduce the main operational results of the Vietnam Geological Department in 2023.

VIETNAM GEOLOGICAL DEPARTMENT

I. WORK OF DEVELOPING INSTITUTIONAL DOCUMENTS AND LEGAL DOCUMENTS

1. Regarding the task of developing the Law on Geology and Minerals (geology part)

In Resolution No. 16/NQ-CP dated February 9, 2023 (thematic session on law making in January 2023), the Government agreed to submit to the National Assembly for comments on the Draft Law on Geology and Minerals at the 7th Session (May 2024) and approved at the 8th Session (October 2024).

Implementing this Resolution, the Ministry of Natural Resources and Environment has organized the development of the Law on Geology and Minerals in accordance with the process of developing a Law project according to the provisions of the Law on Promulgation of Legal Documents.

Accordingly, in 2023, the Vietnam Geology Department is assigned the task of coordinating with the Vietnam Minerals Department to develop the Law on Geology and Minerals. Determining this as a particularly important political task, the Department has actively completed the draft geological component of the Law to ensure on schedule and with prescribed steps. Accordingly, the Department established a geological component drafting team¹, organized 25 meetings and seminars to collect opinions from domestic and foreign experts and scientists on the content of the draft Law, and completed the draft geological component. (including 16 Articles from Article 20 to Article 35), coordinate with the Vietnam Minerals Department to pair, supplement and complete content related to the field of geology in the entire draft law². The Department has coordinated closely with the Vietnam Minerals Department to complete the entire dossier submitted to the Government. At the end of 2023, the draft Law on Geology and Minerals was submitted to the Government by the Ministry of Natural Resources and Environment in Report No. 106/TTr-BTNMT dated December 28, 2023.

Draft Law layout: The Draft Law is built with 117 articles and is arranged into 12 chapters, an increase of 01 chapter and 31 articles (compared to the 2010 Minerals Law), an increase of 01 chapter and a decrease of 19 articles (compared to the Proposed Law). outline has been approved).

¹ Decision No. 257/QĐ-ĐCVN dated February 20, 2023.

² On July 28, 2023, the Vietnam Minerals Department submitted to the Ministry a draft document of the Ministry of Natural Resources and Environment requesting the Government Office and the Government Electronic Information Portal to publicly post the Draft Law on Geology and Minerals, Draft submission on the Government Electronic Information Portal for comments; Official dispatch sent to relevant ministries and agencies with comments on the draft Law and draft Proposal (Proposal No. 335/PT-KSVN dated July 28, 2023).

The draft Law closely follows the five policies submitted to the National Assembly by the Government, including: (1) Policy on geological and mineral resources; basic geological investigation, geological investigation of minerals; geological and mineral information and data; (2) Complete policies on protecting geological and mineral resources; geological and mineral strategies and planning; (3) Complete policies on mineral areas; (4) Improve policies in managing mineral exploration and exploitation activities; (5) Improve financial policies on geology and minerals. In addition, the Government agreed with the proposal to change the name of the Law project to the Law on Geology and Minerals.

Scope of regulation This law regulates basic geological surveys and geological surveys of minerals; protect geological resources and unexploited minerals; mineral activities; mineral recovery; State management of geology and minerals within the mainland, islands, internal waters, territorial sea, contiguous zone, exclusive economic zone and continental shelf of the Socialist Republic of Vietnam .

The project on the Law on Geology and Minerals will be submitted to the National Assembly for consideration at the 7th Session (May 2024) and is expected to be approved at the 8th Session (October 2024). Up to now, all preparations for the examination of this Law project are being urgently carried out by the Committee for Science, Technology and Environment, Ministry of Natural Resources and Environment, with the highest sense of responsibility.

2. Circulars of the Minister

In 2023, although the Ministry has not included in the program for developing legal documents in 2023, the Department has proactively deployed the development of 06 circulars³; Assign specific presiding units and implementing individuals. Up to now, 06 draft Circulars have been completed and submitted to the Ministry for appraisal and promulgation.

2.1. Circular promulgating economic and technical norms for determining the content of some chemical elements by coal chemical analysis method, smelting method and inductive plasma emission spectroscopy method (ICP-OES). *Old name: Circular promulgating economic - technical norms for sample processing and sample analysis (Ministry agreed to change the name of Circular at Official Dispatch No. 4900/BTNMT-KHTC dated June 23, 2023):* Submitted to

³ Not included in the 2023 Legal Documents Program of the Ministry of Natural Resources and Environment.

the Ministry Appraisal No. 2365/DCVN-DCCB dated December 1, 2023 and *Submission No. 88/PT-DCVN* dated December 29, 2023.

2.2. Circular promulgating economic - technical norms for excavation works and sampling at excavation works in basic geological surveys of minerals and mineral exploration: Submitted to the Ministry for appraisal in Official Dispatch No. 2181/DCVN-KHTC dated December 13, 2023.

2.3. Circular promulgating economic - technical norms for a number of work items in the investigation and assessment of sea sand mineral resources as leveling material: Submitted to the Ministry for appraisal in Official Dispatch No. 2185/DCVN- DGTD November 14, 2023.

2.4. Circular promulgating technical regulations on exploration and decentralization of sea sand reserves: Submitted to the Ministry for appraisal in Official Dispatch No. 2135/DCVN-DGTD dated November 8, 2023.

2.5. Document amending and supplementing a number of regulations of Circular No. 01/2016/TT-BTNMT dated January 13, 2016 on technical regulations on exploration of sand and gravel in river beds and soil and rock for leveling materials. Filling: Submitted to the Ministry for appraisal in Official Dispatch No. 2101/DCVN-DGTD dated November 3, 2023 and Official Dispatch No. 2580/DCVN-DGTD dated December 29, 2023.

2.6. Circular amending and supplementing Circular No. 62/2014/TT-BTNMT dated December 9, 2014 of the Minister of Natural Resources and Environment promulgating National Technical Regulations on quality control of analytical results Geological and mineral samples: Submitted to the Ministry for appraisal in Official Dispatch No. 1897/DCVN-DCUD dated October 4, 2023.

3. Develop economic-technical norms, standards and regulations

In 2023, the Department is assigned to develop 20 national standards and technical regulations in the field of geology (10 standards in the field of experimental analysis, 10 standards in the field of geophysics⁴); The Department has completed and is submitting to the Ministry of Science and Technology for appraisal and promulgation on schedule.

Complete and submit to the Ministry for promulgation: "Technical regulations for investigation and assessment of sea sand resources as leveling material"⁵; Deploying "Building economic - technical norms for a number of work

⁴ Official Dispatch No. 2508/DCVN-KHTC dated December 20, 2023.

⁵ Decision No. 432/QĐ-BTNMT dated March 1, 2023.

items in the investigation and assessment of sea sand mineral resources as leveling material".

II. TASK TO BUILD A STRATEGY FOR GEOLOGY, MINERALS AND MINING INDUSTRY TO 2030, WITH A VISION TO 2045; TASKS FOR ESTABLISHING PLANNING FOR BASIC GEOLOGICAL INVESTIGATIONS OF MINERALS FOR THE 2021-2030 PERIOD, WITH A VISION TO 2050

1. Building a geological, mineral and mining industry strategy to 2030, with a vision to 2045

In 2023, the Department completed the dossier to submit to the Ministry of Natural Resources and Environment to submit to the Government for approval the Geology, Minerals and Mining Industry Strategy to 2030, with a vision to 2045. The Strategy has been approved by the Prime Minister. The Government approved in Decision No. 334/QĐ-TTg dated April 1, 2023. After the Decision took effect, the Department urgently coordinated with relevant units and localities to complete the Implementation Plan and submit it to the Ministry of Natural Resources and Environment for promulgation (Decision No. 2455/QĐ-BTNMT dated December 25). August 2023).

*** Strict management, economical and effective use of mineral resources**

The overall goal of the Strategy is to basically complete the geological investigation and assessment of strategic and important minerals on the mainland; investigation of geology and minerals in coastal waters and islands; detect and investigate minerals in deep sea and offshore areas; Investigate other geological conditions to meet the needs of socio-economic development, national mineral reserves, ensure national defense and security, and prevent natural disasters.

Exploration to meet the needs of mineral exploitation and use until 2045 for minerals: coal, uranium, titanium - zircon, rare earths, apatite, copper, nickel, tin, bauxite, glass sand and some minerals other products; Balancing exploitation with national mineral reserves for a number of strategic, important, large-scale minerals (uranium, rare earths, apatite, bauxite, titanium, coal, white sand, white marble) is the basis foundation for sustainable economic and social development.

Strict management, economical and effective use of mineral resources; Investing in mineral exploitation and processing technology to reach the level of advanced countries in Asia and developed countries, forming an advanced and modern mining industry associated with environmental protection and economic

model circular, green economy, adapting to climate change and aiming to achieve carbon neutrality; put an end to fragmented mineral exploitation and processing facilities, outdated technology, low economic efficiency, and environmental pollution.

*** Forming an advanced mining and mineral processing industry**

The goal is to complete 85% of the geological and mineral mapping area at a scale of 1:50,000 of the mainland by 2030; Complete investigation and assessment of mineral potential at prospective structures in the North Central and South Central regions.

Investigate, evaluate and map geological hazards and environmental geology in provinces in mountainous areas and coastal areas of the Mekong Delta; survey and map geological heritage nationwide; Complete investigation and mapping of environmental geology of areas containing toxic and radioactive minerals; Investigate and evaluate sand, gravel, and construction materials in river basins.

Complete geological investigation and assessment of mineral potential in coastal areas with potential for placer minerals and construction materials; Geological investigation at a scale of 1:500,000 in some deep sea areas and adjacent international waters, associated with searching and discovering deep sea minerals (concretions, iron-manganese shells, gas hydrates,...) .

Form mineral processing industrial parks with advanced technology, with a scale commensurate with the potential of each type of mineral, synchronous with regional infrastructure development; Promote the development of mining and processing projects for a number of bauxite, titanium-zircon, rare earth, and nickel minerals.

Complete the comprehensive transformation of technology and equipment of small-scale mineral mining and processing facilities and small-scale stone processing for construction materials to ensure safety and minimize environmental pollution before 2030. ; Developing technology for deep processing of minerals on the basis of promoting internal resources, promoting cooperation in scientific and technological research, technology transfer, training and development of human resources in geology and minerals to mainly serves the needs of the economy.

Strive by 2045 to form an advanced and modern mining and mineral processing industry associated with a circular economy and green economy model equivalent to advanced countries in Asia.

*** Focus on investigating and forecasting geological disasters in mountainous and midland provinces**

According to development orientation, in terms of *geology*, priority is given to implementing and completing mineral geological mapping at a scale of 1:50,000 of the mainland and islands; Geological investigation of marine minerals at a scale of 1:500,000, investigation, discovery, and delineation of areas with mineral prospects, especially strategic and important minerals.

Focus on investigating and forecasting geological disasters in mountainous and midland provinces; Establish a comprehensive remote sensing identification technology system for areas with potential geohazard risk, risk zoning, synthesis and formation of a geohazard risk management model to serve the work. prevention and mitigation of natural disasters. Carry out monitoring and early warning of typical dangerous areas with potential geological disasters, build a national geological disaster monitoring and early warning network...

*** Mining and processing of minerals must use advanced technology and equipment**

Regarding *minerals*, review and delineate national mineral reserve areas (coal, apatite, chromite, lead - zinc, titanium, bauxite, iron laterite, white marble, white sand, rare earth) must be on the basis of results of basic geological surveys of minerals, complying with current legal regulations; balance between planned use needs and long-term reserves for socio-economic development, ensuring national defense, security, and environmental protection. Exploration activities comply with planning, in accordance with the potential of each type of mineral.

Regarding *the mining industry*, mineral exploitation and processing activities comply with planning, use advanced technology and equipment, in accordance with the potential of each type of mineral; Maximize recovery of useful ingredients, control and protect the environment.

For minerals with large scale and concentrated reserves, mining projects must be associated with deep processing projects using advanced technology, modern equipment, and sustainable environmental protection.

Research and use advanced technology in exploiting construction materials at the foot of hillsides, mountains, along national and provincial highways to protect landscape, environment, security and national defense.

Mineral use must ensure balance and harmony between export and import, first of all ensuring domestic demand, providing raw materials for processing projects, and only exporting processed minerals. Meet export standards according to regulations, ensuring economic efficiency.

2. Planning for basic geological surveys of minerals in the period 2021-2030, with a vision to 2050

In 2023, the Department completed the task of preparing the "Planning for basic geological surveys of minerals for the period 2021 - 2030, with a vision to 2050" on schedule, ensuring proper implementation of current regulations. The above planning has been approved by the Prime Minister in Decision No. 680/QĐ-TTg dated June 10, 2023.

In July 2023, the Vietnam Geology Department and the Ministry of Natural Resources and Environment held a conference to announce the "Basic geological investigation planning for minerals".

*** Main contents of the Planning**

- **The Plan's viewpoint** is that basic geological surveys of minerals must be one step ahead and must be conducted on the entire land and sea areas, and the continental shelf of Vietnam; fully investigate and evaluate geological conditions, mineral resource potential and other geological resources. Information, data, and results of geological and mineral investigations must be centrally and uniformly managed and provided promptly and effectively for the needs of socio-economic development, national defense and security.

At the same time, focus on investigating and evaluating strategic and important minerals; Investigating geological hazards to respond to climate change, investigating urban geology, environmental geology, and geological heritage; Statistics, inventory, and full accounting of the value of national mineral resources. Strengthen the application of scientific and technological advances, digital transformation, build a database system, geological and mineral information, and synchronously integrate with national and local geographic databases. General data of the natural resources and environment sector, ensuring compliance with the e-Government Architecture of the natural resources and environment sector.



Photo: Mr. Tran Binh Trong, Director of the Vietnam Geology Department, introduces the main content of the Plan

In addition, the state prioritizes budget allocation and has policies to attract investment resources for basic geological and mineral investigations. Mobilize domestic resources to diversify investment capital sources. Strengthen international cooperation in science and technology to improve the quality and technological level of basic geological surveys of minerals.

- The overall goal of the Plan is to complete the 1:50,000 scale mineral geological map and assess the mineral potential of the mainland; investigation of geological hazards, environmental geology, toxic minerals, radiation, urban geology, geological heritage; Investigate and evaluate mineral resources in Vietnam's seas, islands, exclusive economic zones and continental shelf; Timely update and integrate information and results of geological and mineral investigations into the national database.

- **Regarding specific goals**, by 2025, the ongoing tasks will be completely completed, including 4 tasks of creating mineral geological maps at 1:50,000 scale; 2 geophysical measurement flight missions; 4 tasks of investigating geological hazards and environmental geology; 9 tasks to investigate and evaluate mineral potential; 4 tasks of marine mineral geological investigation. Among them, there are 6 urgent tasks (Government projects) that must be prioritized for completion, including: (1) Overall investigation of minerals and completion of the 1:50,000 scale geological map of the Northwest region to serve the needs of the Northwest region. sustainable socio-economic development plan; (2) Overall assessment of mineral potential in the Central Central region to serve socio-economic development; (3) Magnetic-gravity measurement flight at scale 1:250,000 of Vietnam's seas and islands (phase I); (4) Research, investigate, evaluate, and delineate geological structures with gas hydrate potential and prospects in Vietnam's sea areas (150,000km²); (5) Investigate and evaluate the characteristics of geological structures and engineering geology, propose solutions for exploiting and using the territory, serving the construction and development of infrastructure along Vietnam's coastline; (6) Evaluation of mineral resources, serving sea sand exploitation, meeting the need for leveling highway projects and transport and urban infrastructure projects in the Mekong Delta.

The goal by 2030 is to complete 85% of the land's geological and mineral mapping area at a scale of 1:50,000; Complete investigation and assessment of mineral potential in prospective structures in the North Central and Northeastern regions; Complete additional investigation, update and complete the urban geological database at a scale of 1:25,000 to serve socio-economic development planning of centrally run cities.

Complete detailed investigation, assessment and zoning to warn of landslide and flash flood risks in high-risk mountainous provinces; map geological hazards and environmental geology for provinces in mountainous areas; zoning and warning areas at risk of subsidence in the Mekong Delta; create a nationwide geological heritage map; Complete investigation and mapping of environmental geology of areas containing toxic and radioactive minerals.

Complete geological investigation and assessment of mineral potential in coastal areas with potential for placer minerals and construction materials; Geological investigation at a scale of 1:500,000 in some deep sea areas and adjacent international waters, associated with searching and discovering deep sea minerals (iron-manganese nodules, gas hydrate,...).

Build a system of databases and information on mineral geology that is synchronous and integrated with the national database; Complete a synchronous and modern equipment system to effectively serve geological and mineral investigations; Consolidate and build streamlined geological units with professional capacity, ensuring quality and effective performance of tasks.

Vision to 2050, based on the results achieved by 2030, the Plan will be adjusted and the remaining tasks of the Plan will be implemented. Specifically, complete the survey to create mineral geological maps at a scale of 1:50,000, and evaluate minerals in the remaining prospective areas on the mainland; detect and investigate minerals in Vietnamese waters; Complete additional investigation, update and complete the urban geological database at a scale of 1:25,000 to serve the socio-economic development planning of cities; Investigate and create multi-objective geochemical maps and detailed geological hazard warnings for provinces in the mountainous, midland and coastal areas; Environmental geological investigation to serve environmental improvement and restoration after mineral exploitation.



Photo: Deputy Minister, Ministry of Natural Resources and Environment Tran Quy Kien congratulated the Vietnam Geology Department on completing and implementing the planning effectively

In addition, complete the investigation and mapping of geological heritage and geoparks nationwide; Build a team of highly qualified staff in each field of geological and mineral investigation; Complete a modern and synchronous equipment system, capable of completing geological investigation and mineral assessment tasks with high quality, efficiency and reliability.

The plan proposes 8 groups of solutions, of which, 3 breakthrough solutions include solutions on management and financial mechanisms for basic geological investigation activities of minerals; Application of science and technology; Solutions for training and capacity building.

The basic difference of this Plan is to expand the field and content of investigation into engineering geology, environmental geology, urban geology, geological heritage and geoparks to fully provide information, documents, and results serving socio-economic development, natural disaster prevention, and national defense and security. The plan also expands the number of agencies and units participating in the implementation of the plan, including participating localities to mobilize human and material resources to speed up the implementation of the Plan.

- Solutions to implement the planning include: Completing the system of legal documents and regulations on management and implementation of the Planning; Solutions on management and financial mechanisms for basic geological investigation activities of minerals; Application of science and technology; Solutions to encourage organizations and individuals to invest in basic geological surveys of minerals; Solutions for propaganda and awareness raising; Solutions for training and capacity building; Solutions for international cooperation in basic geological surveys of minerals; Solutions on organizing and implementing the Planning.

- The implementation of the Plan will achieve important results: The planning for basic geological surveys of minerals for the period 2021-2030, with a vision to 2050, is one of the early approved sector plans, along with with the Planning for exploration, exploitation, processing and use of minerals for the period 2021-2030, vision to 2050 chaired by the Ministry of Industry and Trade and currently the Ministry of Construction is also implementing the Planning for exploration, Exploiting, processing and using minerals as construction materials in the period 2021-2030, with a vision to 2050.

The implementation of the Plan will achieve important results, providing data on the potential and resources of minerals, as a premise for exploration and exploitation, and basically meeting the demand for raw materials. minerals for socio-economic development, national defense and security of the country.

The content of the Plan clearly demonstrates the viewpoints on the importance and overall goals for basic geological and mineral investigations stated in Resolution No. 10-NQ/TW of the Politburo on orientation. Geology,

minerals and mining industry strategy to 2030, vision to 2045 and Geology, minerals and mining industry strategy to 2030, vision to 2045 have been approved by the Prime Minister approved in Decision No. 334/QĐ-TTg dated April 1, 2023.

To successfully implement the Planning for basic geological surveys of minerals for the period 2021-2030, with a vision to 2050 approved by the Prime Minister, the Ministry of Natural Resources and Environment hopes to receive the attention of the Government. Government, cooperation of relevant ministries and branches in the process of implementing planning tasks in the areas.



Photo: Conference scene

III. RESULTS OF BASIC GEOLOGICAL INVESTIGATION OF MINERALS

In 2023, the Department will pay attention and direct the basic geological investigation of minerals to be implemented on schedule and effectively. Specific results are as follows:

1. Results of implementation of Government schemes and projects

a) Project "Comprehensive investigation of minerals and completion of geological map at 1:50,000 scale in the Northwest region to serve sustainable socio-economic development planning": In 2023, complete the mapping Geological and mineral maps at a scale of 1:50,000 on the entire area of 8 groups of sheets with 13,081 km² combined with investigation of geological hazards,

environmental geology, and geological heritage. In 2023, 10 summary reports of



component projects have been completed, and 02 completed reports are being submitted to the Ministry for approval. The projects under construction (14 projects) have basically completed the goals and tasks according to the set schedule, ensuring that the overall project will be completed in 2024 according to the approved schedule. The results of the

project will provide comprehensive data on geology and minerals in the Northwest region, and during the implementation process, the results of the project will promptly provide important geological and mineral data to the provinces. Related planning. Accordingly, by 2023 the project has evaluated resources and delineated 87 medium to large-scale mineral areas, of which 53 areas are included in the exploration, exploitation and processing planning. Minerals have been approved by the Prime Minister in Decision No. 866/QĐ-TTg dated July 18, 2023 and Decision No. 1626/QĐ-TTg dated December 15, 2023. The remaining mineral areas will continue to will be continuously reviewed to supplement relevant planning after the project is completed to mobilize mineral resources for construction and development of the country.

Photo: North Central Geological Federation surveys and studies tin ore in marble in Chau Hong commune, Quy Hop district, Nghe An province under the component project: Investigation and evaluation of tin - tungsten ore on the terrain Nghe An province table



b) Project "Magnetic-gravity measurement at scale 1:250,000 of Vietnam's seas and islands": In 2023, the final report has been completed and submitted to the Ministry for approval⁶. As a result of the project, the volume of work items of magnetic and gravity measurement flights at the scale of 1:250,000 has been completed with an area of 268,768 km²; Collect, synthesize, process, and analyze geophysical data to create geological structure maps based on geophysical data, zoning diagrams to predict

⁶ Official Dispatch No. 2508/ĐCVN-KHTC dated December 20, 2023.

mineral prospects, and deep crust structure diagrams. land scale 1:250,000 on an area of 616,000 km² (*including magnetic and gravity flight area of 268,768 km²*); Build a database to continue to exploit and serve other investigation and research tasks on natural conditions, resources and environment in Vietnam's coastal areas; Establish a diagram of the deep structure of the Earth's crust in the study area that fully reflects the three structural units of the Earth's crust including: continental crust, transitional crust and oceanic crust; Establish a zoning map predicting mineral prospects of some main types of marine minerals: oil and gas, flammable ice, coal and hidden magma entities, potential underground volcanoes related to fusion/concretion Polymetallic Fe-Mn shells and deep hidden solid mineral deposits.

c) Project "Investigation and assessment of geological structure characteristics, engineering geology, proposal of solutions for exploitation and use of territory to serve the construction and development of infrastructure along Vietnam's coastline" (DCCT-47): The project has completed the entire volume of field construction work items and prepared a summary report. Main results: Investigated and determined the geological structure characteristics and geological characteristics of the coastal strip of Vietnam; Established a set of geological structure maps, engineering geology and engineering geology zoning at a scale of 1:100,000 for the entire coastal strip of Vietnam (*coastal land and shallow coastal sea*); evaluated the characteristics of geological structure, engineering geology, and engineering geological zoning for 4 key regions: Nam Dinh, Thanh Hoa, Quang Tri and Ca Mau at a scale of 1:25,000; proposed planning orientations for using the coastal strip territory in accordance with the geological conditions of the project.



Photo: Checking the machine drilling work of Project 47-DCCT in the key investigation area of Ca Mau..



Photo: Checking Project 47-DCCT in the flooded area of Ca Mau peninsula



Photo: Machine drill core sample of Project 47-DCCT to construct the key investigation area of Ca Mau



Photo: Checking the offshore drilling work of Project 47-DCCT in the shallow coastal area of Ca Mau.

d) Project "Overall assessment of mineral potential in the Central Central region to serve socio-economic development": The project faces many difficulties in arranging annual funding and implementation during the During the outbreak of the pandemic, the Department promptly directed to focus on construction in areas with favorable geological conditions, promptly adjusting large-scale current status investigations when construction conditions allowed. By 2023, although the budget reaches 12% of the total budget, the project has had many new discoveries of some promising ore sites: Copper in Kon Ray, Kon Tum; gold in Sa Thay (*Kon Tum*), Phuoc Son, Nam Giang (*Quang Nam*), etc. In particular, the large-scale copper ore and associated mineral resources have been evaluated, enough to form a smelting industrial area needles in Kon Ray and Kon Tum areas. The area has been added to the Planning for mineral exploration, exploitation and processing approved by the Prime Minister in Decision No. 866/QD-TTg dated July 18, 2023. Accordingly, the planning has determined Kon Ray region is a mining industry development area with an interconnected complex from mineral exploitation to metallurgy.



Photo: Field inspection of gold ore in Phuoc Xuan, Quang Nam province of the metal component project under the project: "Overall assessment of mineral potential in the Central Central region to serve socio-economic development"

e) Project "Evaluating mineral resources, serving sea sand exploitation, meeting the need for leveling highway projects and transport and urban infrastructure projects in the Mekong Delta": Determined The sand distribution area is 160.3 km², average thickness is 4.3 m, mainly composed of fine-grained sand, average total sand content is 82.8%. Estimated resources of level 333 + level 222 reach 680 million m³, of which resource level 222 is 145 million m³. An area of 32 km² with a resource of 145 million m³, 20-30 km from the shore, has been selected, eligible for transfer and exploitation.

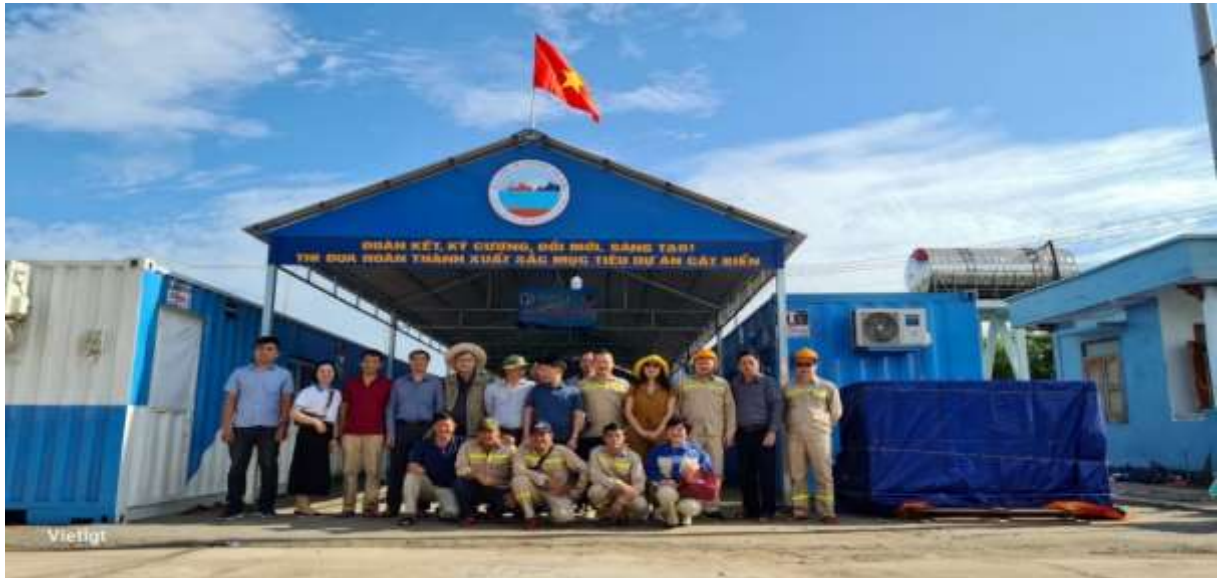


Photo: Field inspection of the sea sand project in Soc Trang

Preliminary forecasts of impacts according to exploitation scenarios based on the prediction model of wave propagation to the shore show that the impact of exploitation activities on the coastal zone is insignificant (*ocean waves increase from 2 to 4 cm*). Completed and submitted to the Ministry for approval the Report on the assessment of sea sand mineral resources in area B1 and participated in transferring the results to the People's Committee of Soc Trang province.



Photo: Federation of Geophysics constructing several samples with a vibrating tube under the Sea Sand Project

f) Task "Establish a planning component for the development and application of radiation and radioisotopes in the natural resources and

environment sector in the period 2021-2030, with a vision to 2050"⁷: Implement Decision No. 1780/QĐ-BTNMT dated March 30 June 2023 of the Minister of Natural Resources and Environment on approving the content and estimate of the task "Establishing the development planning component and application of radiation and radioisotopes in the natural resources and environment sector" . Vietnam Geology Department has coordinated with relevant units to organize the preparation of components according to regulations.

The draft component and report have received comments from 12 units under the Ministry, the Department has received, supplemented, and corrected and submitted to the Ministry of Natural Resources and Environment for consideration and appraisal as a basis for integrating the Planning⁸.

Documents submitted for appraisal include:

1. Draft Component of Planning for development and application of radiation and radioisotopes in the natural resources and environment sector in the period 2021-2030, with a vision to 2050.

2. Report on the results of the task of establishing the Component.

3. Summary Report on the results of the task of establishing the Component.

4. Explanation table for reception and editing.

2. Results of implementation projects on Ministry

a) Geological project using economic capital sources

Completed the Project "Investigation and assessment of white sand mineral potential in coastal provinces from Quang Binh to Quang Nam"⁹. The results of the project have determined that the resource level 333+334a of white sand in the study area is 8.3 billion tons, providing data to complete the Planning for exploration, exploitation and processing of minerals as materials. built in Decision No. 1626/QĐ-TTg dated December 15, 2023 (*accurate review of resources and reserves of transition areas from the old planning and addition of 25 new areas*) and delineation of national mineral reserve areas approved by the Prime Minister in Decision No. 1277/QĐ-TTg dated November 1, 2023.

b) Geological project using environmental resources

⁷ The Ministry held a meeting of the Appraisal Council, and the Department held a meeting of the Drafting Team on June 11, 2023.

⁸ Official Dispatch No. 2575/ĐCVN-ĐCUD dated December 29, 2023.

⁹ Investment capital: 2,287.0 million VND (North Central Regional Federation)

- Project "Investigation, evaluation and establishment of a set of toxic mineral environment maps in the territory of Vietnam (mainland part - phase I)": In 2023, a preliminary investigation at a scale of 1:25,000 will be carried out. Results for (*group I*): identified a number of areas with high anomalies, with total equivalent dose components greater than 6mSv/year, gamma dose rate components exceeding the standard level, soil environment components, vegetable water.... Exceeding the recommended level according to environmental standards requires further detailed assessment such as: Van Chan, Tram Tau districts, Nghia Lo town, Yen Bai province (*delineate 11 areas at risk of radioactive environmental pollution*); Central village area, Ho Mit commune, Tan Uyen district, Lai Chau (3.5 km²); 01 area on the edge of Nui Hong coal mine, Thai Nguyen; in Ha Giang 02 areas (*Lung Pu village and Hoa Son village, Thuan Hoa commune, Vi Xuyen district with a total area of 9.5 km²*); In Nghe An, 01 area has been delineated (*in Nam Giai, Hanh Dich, Thong Thu communes, Que Phong district*); In Quang Nam, 3 areas have been delineated with a total area of 7.55 km² (*An Diem, Khe Lot, Nong Son coal*); In Binh Thuan, 01 site with an area of about 1km² in Tan Thuan commune, Ham Thuan Nam district was discovered with very high radiation dose rate anomalies ($\geq 0.5\mu\text{Sv/h}$), Radon radioactive gas concentration in the weathered crust. emitted into the air ($\geq 100\text{Bq/m}^3$), this area is at high risk of pollution; Anomalies at titanium placer mines in Quang Ngai and Ke Sung, Thua Thien - Hue province. For group II: In Ha Giang, there were 210 anomalies recorded with values $> 0.3 \text{ nmmHg/m}^3$, related to antimony minerals (*Ban Trang, Phe Than, Lung Thau, Bo Moi, Mau Due*), arsenic tin, gold (*Lup Village, Sesame Village, Cao Bo*), mercury (*Khao Loc*), lead and zinc (*Na Son, Ao Xanh*); In Thai Nguyen, 5 mines and gold mine sites at risk of As pollution have been identified (*Khau Au, Da Mai, Ngan Me, Bai Vang, Suoi Gang*); Tuyen Quang identified 9/20 mines and mining sites at risk of heavy metal contamination of As, Pb, and Zn in the soil environment. Build a database of topics: Establish the dispersion processes of radioactive components into the environment (*soil, water, air*) on types of radioactive mines; Build a model of the dispersal mechanism of toxic minerals into the environment.



Photo: Geological roadmap Project "Investigation, assessment and establishment of a set of toxic mineral environment maps in the territory of Vietnam (mainland part - phase I)"

- Project "Investigation and assessment of the current status of the radioactive environment in some anomalous areas in the provinces of Kon Tum, Gia Lai and Lam Dong, proposing solutions to minimize the harmful effects of the radioactive environment ": Completed the preparation of a summary report approved by the Appraisal Council. Results of radioactive environment investigation, scale 1:25,000 in 21 areas, with a total area of 250 km² in the provinces of Kon Tum, Gia Lai and Lam Dong; Establish a set of maps including: Environmental geological map, gamma and environmental radioactive gas dose rate map, total annual equivalent radiation dose map and preliminary delineation of environmental monitoring and control rates. 1:25,000 across all 21 investigation areas. Delineate a total area of 7.35 km² with a total dose equivalent to natural irradiation from $7 \div 16.8$ mSv/year at high levels, distributed in areas of Kon Ray, Dak Ha, Sa Thay districts, Kon province Tum and a small area in Ward 4, Da Lat city, Lam Dong province. The process of measuring and mapping the radioactive environment combined with sampling and analysis of rare earth minerals, thereby discovering promising areas of ion-absorbing rare earth minerals in the Dak Ui and Sa areas. Mr. Kon Tum province to continue investigating and evaluating.

Project "Building a set of natural radioactive environment maps at scale 1:250,000 phase II (2018-2022) for northern border and coastal provinces" has

been completed and submitted to the Ministry for approval of the final report. As a result, a set of natural radioactive environment maps at a scale of 1:250,000 was established for 15 northern border and coastal provinces: Lang Son, Cao Bang, Ha Giang, Lao Cai, Lai Chau, Dien Bien, Thai Binh, Nam Dinh, Ninh Binh, Thanh Hoa, Nghe An, Ha Tinh, Quang Binh, Quang Tri, Thua Thien Hue. The typical values of schools and different school regions of the provinces have been determined; established a set of background data on the radioactive environment at a number of key locations according to the results of radioactive environment monitoring in 10 provinces; Establish a common database for projects, for each province, to help environmental managers and protectors have an overview of the radioactive environment to plan and build projects to serve the national economy of the province. and is also a database to compare radioactive environment values when there are environmental impacts and incidents.



Photo: Field inspection of the Project "Investigation and assessment of the current status of the radioactive environment in some areas with radioactive anomalies in the provinces of Kon Tum, Gia Lai and Lam Dong, proposing solutions to reduce Minimize the harmful effects of the radioactive environment" in Sa Thay province, Kon Tum province by the Southern Geological Mapping Federation

IV. INFORMATION WORK, ARCHIVES, MUSEUMS SERVE THE COMMUNITY

1. Geological museum

The Museum of Geology is a specialized museum at the National level, a cultural institution that plays an important role in museum research and geological conservation; Collect, store - preserve, display - propagate - introduce geological and mineral artifacts to serve the needs of research, study, propaganda, education, sightseeing and cultural enjoyment of the community. copper. The Museum of Geology has 2 permanent exhibition facilities in Hanoi (Hanoi Geological Museum) and Ho Chi Minh City (Ho Chi Minh City Geological Museum).

Regarding the service of sightseeing, research and study

In 2023, more than 5,000 visitors were welcomed (including nearly 500 foreign visitors); Conducted propaganda and distributed nearly 2,000 leaflets introducing the museum.

In 2023, the Museum will register visitors 2,851 times; Explanation of the display for 35 guest groups; Get opinions from geological museum visitors with more than 1,438 reference forms.

Coming to the Museum of Geology are not only researchers and specialized students, but also many schools at all levels that bring students to learn about the Earth and our country's mineral potential. The Museum's interpretation team has developed and put into operation many experience programs for different visitors. Activities "I'm a little Geologist", "Treasure hunt" for elementary school students; The activity "Test making fossils" is suitable for high school students, etc.



Photo: Member of the Coordinating Committee for East and Southeast Asia Geoscience Programs, Korean Institute of Geoscience and Mineral Resources visited and took souvenir photos at the Museum

Regarding the preservation and display of specimens

The Geology Museum has collected, stored and displayed a fairly large amount of samples. In Hanoi, geological samples are displayed in a 3-story building with a total area of 1,200 m² with 4,228 specimens of all kinds. In Ho Chi Minh City, geological specimens are displayed in rooms with a total area of 564 m² and an outdoor space with 3,400 specimens of all kinds; including rock samples, drill cores, minerals; metallic, non-metallic, rare minerals (gold, gemstones); petroleum and paleontology.

In 2023, the museum has created information on some cabinets and specimens on display in QR code format for visitors to find out the content themselves. The museum organized a mobile display for the conference: "Announcing - Planning for basic investigation of Geology and Minerals for the period 2020-2030, vision to 2050" at the headquarters of the Ministry of Natural Resources and Environment .

Preserve display samples in display cabinets and pedestals, protect display cabinets and pedestals, models, and maps; The museum also replaced etiket specimens in cabinets and display stands, including 238 new etiket; Use a sample set for practice including 33 sediment, magma, and metamorphic samples for school students.



Displaying samples at the announcement of "Planning for basic geological surveys of minerals for the period 2021 - 2030, vision to 2050"

Hanoi Museum of Geology has recorded 02 scientific video clips with scientific content related to earth science.

Regarding the preservation of specimen warehouses

In addition to the samples regularly displayed for propaganda tours, the majority of samples are kept and preserved in 8 warehouses with a total of 31,194 samples (5 warehouses in Hanoi and 3 warehouses in Ho Chi Minh City). Warehouse inventory, warehouse cleaning, and safe and secure preservation of samples were carried out well. Take 45 samples for mobile display; Enter the sample register: 56 samples of 7 collections received in 2023; Painting model numbers, preserving samples in cabinets, shelves, and warehouses: 109 samples have been painted; Taking samples to serve research and study for research subjects: 33 samples of sediment, magma, and metamorphism were taken for 6 groups of university students to visit and study; Regularly clean samples, rotate and inspect specimen preservation; Regularly sweep and sanitize warehouses, check warehouse safety, and check for termites in warehouses;

Every year, the museum conducts an inventory of specimen records, inventory and arrangement of specimen cards of the years established; Conduct a scientific inventory of specimens according to regulations: 401 specimens.

In 2023, the Museum received 07 new mineral geological sample collections belonging to individual and mineral geological projects.

Also in 2023, the Geology Museum organizes scientific research, learning, and public education; Carry out well the work of preserving and displaying specimens, the work of inventorying and preserving specimens at sample warehouses; Restore and update information regularly to put on the website to further propagate the Museum of Geology...

The system of specimens collected, supplemented, stored and displayed at the Museum of Geology has clarified the diversity and uniqueness of Vietnam's geological structure and mineral types. Geological specimens are visual teaching tools to disseminate knowledge to students, domestic and foreign visitors as well as the research work of domestic and international geologists. In addition, geological samples have greater significance, helping to detect ore deposits.

The Museum of Geology is always one of the top 10 major museums in Hanoi, a must-see destination for international and domestic tourists. Contribute to bringing the image and products of Vietnam's geology industry to a large number of domestic and international people.



Photo: Students of Hanoi National University visit the Museum

2. Geological information and archives

Customer service is carried out in accordance with current regulations, ensuring the right audience is served and the correct procedures are followed. In addition to storing specialized reports on geology and minerals, the Center annually supplements and updates new books and newspapers to meet research and study needs.

In 2023, 21 Official Dispatches and 03 Referral Letters for reference and collection of mineral geological documents were received from units inside and outside the Vietnam Geology Department, respectively serving 26 people. Volume of documents provided: 73 notes, appendices and 366 report drawings for reference; Provide digital documents including 8,135 pages of explanations and appendices of 27 reports; 717 drawings belonging to 37 reports.

In 2023, the Center will carry out the work of preserving the geological library including 19,068 books, 23,595 magazines and 498 other documents; Digital data preservation includes 13,340 library document directory records, 26,902 book and magazine information processing records, and 4,123 full-text electronic books (ebooks).

The work of checking and receiving reports is carried out in accordance with current procedures and regulations: Checking the legality of the report; Check document format and specifications; Check for matches between sets of a

report; Check and organize data on the CD set, check the match between the content on the CD and the content on paper; Issue a certificate of document submission to geological archives. In 2023, the unit has completed inspection and received 234 reports according to archive symbols, corresponding to 118.9 standard reports with preservation numbers from 5313 to 5546. However, due to state funding, the order was not enough so only 53.7 standard reports can be estimated.

Preserving the geological archive: The geological archive is currently storing 4,915 geological reports with different topics, each report stores 02 sets. In 2023, the Center transferred 234 new reports received from units inside and outside the Department to the paper document archive; Completed preservation of 477.9m² of paper archives, 2,736m² of warehouse; The warehouses are always kept neat, clean, and termite-free; Preserve 6,238 digital document storage media and clean them to prevent mold or unreadability. The Archive is protected 24/7, including days off and holidays, ensuring absolute safety for documents, preventing fire, explosion or loss. The work of releasing published geological publications is carried out regularly.



Document preservation and document checking at the Center

The warehouses are always kept neat, clean, and termite-free. The Archive is protected 24/7, including days off and holidays, ensuring absolute safety for documents, preventing fire, explosion or loss.

V. WORK OF DEFINING MINERAL RESERVE AREA; DEFINING DISTRIBUTED AND SMALL MINERAL AREAS

1. Delineating national mineral reserve areas: Promoting sustainable development of the mining industry

In 2023, the Vietnam Geology Department has completed the task of "Delineating the national mineral reserve area" according to the schedule assigned by superiors and approved by the Prime Minister in Decision No. 1277/QD-TTg dated January 1. November 2023. Some main contents of Decision No. 1277/QD-TTg are as follows: 93 reserve areas of 10 types of minerals (*1. Energy coal: 02 areas; 2. Apatite ore: 02 areas; 3. Lead - zinc ore: 01 area; 4. Chromite ore: 03 areas; 5. Titanium ore: 23 areas; White marble: 17 areas; 9. White sand: 15 areas; 10. Rare earth ores: 02 areas*), and specific regulations on mineral reserves, area, depth, resources and time for each mineral reserve area and stipulate the responsibilities of ministries, branches and localities in managing and protecting minerals in national mineral reserve areas.

Stick to the key tasks and concretize the Party's viewpoints

Implement regulations in Article 29 of the Law on Minerals, Resolution 02-NQ/TW dated April 25, 2011 of the Politburo on strategic orientation of minerals and mining industry to 2020, vision to 2030 and The mineral strategy was approved by the Prime Minister in Decision No. 2427/QD-TTg dated December 22, 2011. The Ministry of Natural Resources and Environment has delineated and submitted to the Prime Minister to issue Decision No. 645/QD-TTg dated December 6. May 2014 delineates the national mineral reserve area.

Accordingly, the Prime Minister has approved 48 national mineral reserve areas for 10 types of minerals, including: Energy coal, apatite, lead - zinc, chromite, titanium, bauxite, iron - laterite, white marble, white sand and rare earth. These are minerals that need to be reserved for sustainable socio-economic development, including some large-scale minerals (bauxite, white marble, white sand, brown coal, apatite) or regional ones. There are minerals but there are not enough conditions for effective exploitation or there are enough conditions for exploitation but there are no solutions to overcome negative impacts on the environment such as rare earths containing U and Th.

The delineation of 48 areas belonging to 10 mineral types as national mineral reserve areas in Decision No. 645/QD-TTg mentioned above has

contributed to ensuring mineral sources for the sustainable development of the mining industry. long-term, ensuring national security of mineral raw materials.

However, the surface land area in areas designated as national mineral reserves (titanium, white sand, iron - laterite, bauxite) is still favorable for implementing economic development projects - other social sectors such as tourism, wind power, solar power, industrial parks, especially for central coastal provinces such as Binh Thuan, Ninh Thuan, Thua Thien Hue, Quang Nam....

Maximizing resources, especially land in the national mineral reserve area, the construction of works and socio-economic development projects during the reserve period is necessary, the Ministry of Natural Resources and Environment has submitted The Government issued Decree No. 51/2021/ND-CP on mineral management in national mineral reserve areas, which detailed the implementation of investment projects in the area. Mineral reserves, stipulating specific contents to delineate national mineral reserve areas (scope of mineral reserve areas; resources, mineral reserves, mineral reserve time) .

The Party's guiding viewpoint in Resolution 10 dated February 10, 2022 of the Politburo on the strategic orientation of geology, minerals and mining industry to 2030, vision to 2050 clearly stated "...Mineral resources are both an important resource for the country's socio-economic development and a long-term national reserve..".

Recognizing this point of view, along with the provisions in Decree No. 51 above, the Ministry of Natural Resources and Environment has assigned the Vietnam General Department of Geology and Minerals (formerly) and the current Vietnam Geology Department to complete the Dossier for zoning off. Determine the national mineral reserve area according to the new orientation, submit to the Prime Minister to issue a new Decision to replace Decision No. 645/QĐ-TTg as the basis for mineral management in the national mineral reserve area. , at the same time to implement socio-economic development projects in the national mineral reserve area, ensuring harmony between mobilizing mineral exploration and exploitation and long-term mineral reserves .

Complete national mineral reserve regulations in the draft Law on Geology and Minerals

Carrying out assigned tasks, the Vietnam Geology Department has reviewed all geological reports, each block of resources and reserves that have been used to delineate national mineral reserve areas in Decision No. Decree No. 645/QD-TTg. From there, adjust the scope of delineating the reserve area accurately according to the distribution of resource blocks and mineral reserves.

The Department has also compiled all the results of investigation, evaluation, and exploration of minerals carried out from 2014 to present; Planning for exploration, exploitation, processing and use of minerals approved by the Prime Minister or the Prime Minister; Draft file "Planning for exploration, exploitation, processing and use of minerals in the period 2021-2030, vision to 2050" of the Ministry of Industry and Trade; draft file "Planning for exploration, exploitation, processing and use of minerals as construction materials in the period 2021-2030, vision to 2050" of the Ministry of Construction; synthesize and review the current status of projects, works, and land use in the national mineral reserve area in Decision No. 645/QD-TTg of 24 provinces/cities that have delineated mineral reserve areas nation.

At the same time, the Department worked directly with local departments and branches, relevant units of the Ministry of Natural Resources and Environment, the Ministry of Industry and Trade, and the Ministry of Construction; Advise the Ministry of Natural Resources and Environment to collect opinions from ministries, branches and localities. From there, synthesize and receive comments and complete the dossier according to the assigned schedule.

It can be seen that, along with the provisions in Decree 51, Decision No. 1277 of the Prime Minister on national mineral reserve areas is a legal basis that both ensures long-term mineral reserves and create favorable conditions for the implementation of socio-economic development projects during the reserve period to maximize resources, especially land in the national mineral reserve area, while strictly managing tight resources and mineral reserves.

To ensure stricter legality, the Vietnam Geology Department has proposed to continue to improve regulations on national mineral reserves in the draft Law on Geology and Minerals to replace the 2010 Mineral Law. The directions of the

Party and the Government have been continued to be researched and institutionalized by the Department in the provisions of the draft Law on Geology and Minerals.

**Statistics of national mineral reserve areas approved by the Prime Minister
in Decision No. 1277/QĐ-TTg dated November 1, 2023**

No	Name of mineral	Area number	Acreage (km ²)	Resources	Unit resources	Distribution
1	Coal	2	1.075,25	26.209	Million tons	Nam Dinh, Thai Binh, Hung Yen, Quang Ninh
-	Subbitumen coal	1	976,25	26.170	Million tons	Red River Delta (04 provinces: Nam Dinh, Thai Binh, Hung Yen, Hanoi)
-	Coal antraxit	1	89,00	39	Million tons	Quang Ninh
2	Apatit	2	16,66	1.400	Million tons	Lao Cai
3	Lead-zinc	1	1,51	62	Thousand tons	Tuyen Quang
4	Cromit	3	7,10	404	Thousand tons Cr ₂ O ₃	Thanh Hoa
5	Titanium placer	13	565,76	412.606	Thousand tons	Binh Thuan, Ninh Thuan
6	Bauxit	23	1.109,19	615.607	Thousand tons of essence ore	Gia Lai, Dak Nong, Lam Dong,

No	Name of mineral	Area number	Acreage (km ²)	Resources	Unit resources	Distribution
						Binh Phuoc, Binh Dinh
7	Iron-laterite	14	591,40	443	Thousand tons of essence ore	Gia Lai, Dak Lak
8	White marble	17	155,26	6.683	Million tons	Bac Kan, Tuyen Quang, Thanh Hoa
9	White sand	15	87,53	1.538	Million tons	Quang Binh, Quang Tri, Thua Thien Hue, Quang Nam
10	Rare	2	48,30	285	Thousand tons TR ₂ O ₃	Lao Cai, Yen Bai
Total (10 types of minerals)		92	3.647,96			22 Provinces/cities

2. Regarding delineation and announcement of areas with scattered and small minerals

Based on the results of mineral investigation and exploration, in 2023 the Ministry has delineated and announced 04 areas with scattered and small minerals in 04 provinces including: Dien Bien (01 roofing stone area), Quang Binh (01 placer titanium area), Quang Tri (01 placer titanium area), and Quang Nam (01 original gold area) (Appendix 01 attached).

**List of areas with scattered and small minerals identified and announced by
the Ministry of Natural Resources and Environment in 2023**

No	Name of mineral	Name of mineral area	Commune	District	Province	Acreage (ha)	Decision issued
1	Slate roofing	Na Lay	Muong Lay	Muong Lay	Dien Bien	60	1109/QD- BTNMT dated May 5, 2023
2	Titan	Cang Gian	Trung Giang	Gio Linh	Quang Tri	14,56	1324/QD- BTNMT dated May 23, 2023
3	Titan	Sen Thuy	Sen Thuy	Le Thuy	Quang Binh	25,3	1817/QD- BTNMT dated July 4, 2023
4	Original gold	Original gold	Hiep Hoa	Hiep Duc	Quang Nam	14,76	1816/QD- BTNMT dated July 4, 2023
Total: 04 areas (03 types of minerals), in 04 provinces, with a total area of 114.62 hectares							

VI. RESULTS OF SCIENCE TECHNOLOGY ACTIVITIES AND INTERNATIONAL COOPERATION

1. Science and technology

a) Science and technology topic at ministerial level

In 2023, the Department will continue to implement 05/06 transitional topics from 2022 (01 topic stopped implementation) and 05 new open topics. The topics have been implemented according to the proposed schedule and plan. The results of the topics have practical significance and immediate application for basic geological and mineral investigations, mineral exploration, environmental protection, and sustainable development. Specifically: The regional geological

structures have been divided, the relationship between magmatic formations and endogenous metal ores in the Song Chay block study area has been determined; Research the prospects of Nickel ore and associated minerals (Cu, Co, PGE) related to mafic and ultramafic formations to serve mineral investigation and exploration; Research and develop technical regulations on geophysics to serve the investigation of engineering geology, hydrogeology and urban geology; develop geophysical technical regulations in assessing mineral geological resources in lake bed, river bed and estuary areas; Research and manufacture aviation gamma spectrometry equipment using unmanned aircraft; Build a mathematical - geological - water resources model to predict and warn of stimulated earthquakes, and apply it on a trial basis in the Central Highlands region; Assess the current status of the radioactive environment in seawater and seabed surface sediments.

b) Grassroots science and technology project: Completed on schedule, goals and tasks; 0 products of science and technology topics have been applied in developing the draft Law on Geology and Minerals (Geology Part).

CS.2023.01. Researching the scientific basis and practice of perfecting regulations on management, updating and exploitation of geological information and data - MSc La Mai Son.

CS.2023.02. Research on the scientific basis and practice of regulating geological resources, other geological conditions and geologically sensitive areas - PhD. Vu Manh Hao.

CS.2023.03. Research the scientific basis and practice of building policies to attract, train and develop human resources, and remuneration regimes for officials and workers in the geology and minerals industry - MSc. Dang Quang Khai.

CS.2023.04. Research on the scientific basis and practice of building content to protect geological heritage and geoparks - PhD. Duong Ngoc Tinh.

CS.2023.05. Research on the scientific basis and practice of regulations on investment capital sources for basic geological investigations and mineral resource assessment - MSc. Le The Trung.

2. International cooperation

In 2023, the Department has promoted international cooperation activities; exchange, learn, improve knowledge and professional capacity through attending training courses, seminars and conferences abroad; Participate in bilateral and multilateral cooperation forums with organizations and specialized geological and mineral management agencies of other countries in the spirit of mutual benefit and ensuring national interests.

Develop and sign a Memorandum of Understanding (MOU) with partners with the contents of technical support and technology transfer for deep-sea mineral assessment; assessment of hidden minerals, important minerals, strategies for energy transition, green transition; Environmental impact prediction models, riverbank and coastal erosion, human resource development training with partners: KIGAM-Korea, FESCO-Russia, Deltares-Netherlands, US Embassy (MOU), METATEK -Older brother.

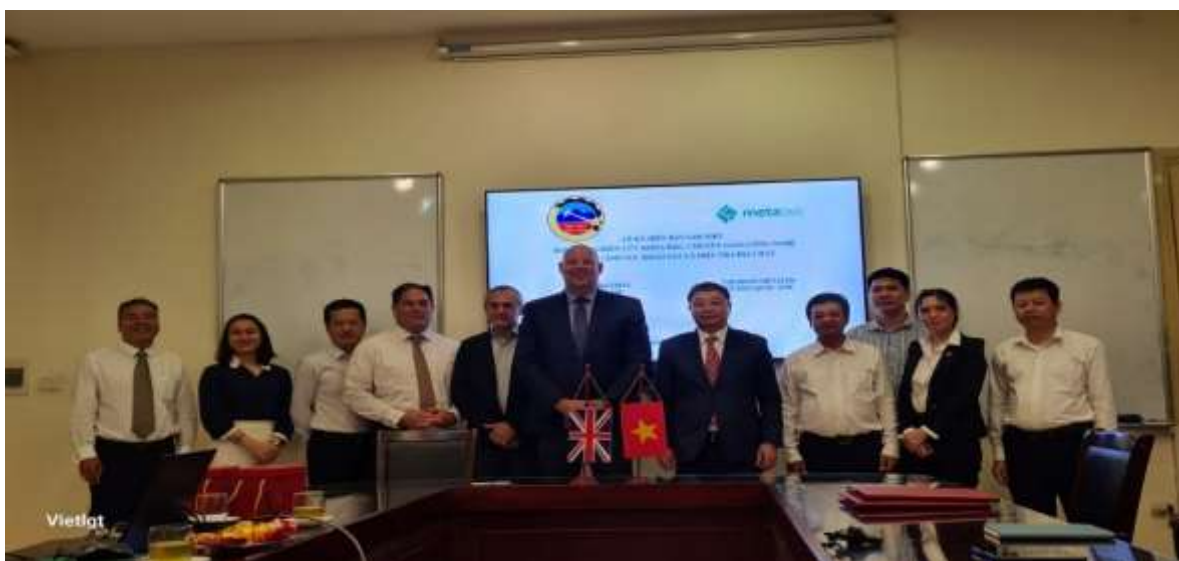


Photo: Signing the METATEK-UK Memorandum of Understanding

In July 2023, the Vietnam Geology Department signed an MOU with Metatek Group Co., Ltd., UK, with the main goals: (1) Academic exchange, introduction of modern investigation technology to improve capacity basic research and investigation of geology, minerals and other geological resources of the Vietnam Communist Party of Vietnam; (2) Develop and implement cooperative projects to transfer advanced technology on basic geological investigations, minerals and other geological resources in Vietnam.

In 2023, the Department will promote bilateral cooperation with strategic partners in the field of geology; Attended the 12th China-ASEAN Mining Cooperation Forum (CAMCF) Conference; coordinate with the Australian Embassy on cooperation in developing the Geology and Mineral Law project (geology part), with the US Embassy on cooperation in the field of Geology; develop plans and organize seminars on the results of the project to establish a geological database in Vietnam within the framework of the CCOP-KIGAM project; Cooperate with CCOP on geological projects.



Photo: Training workshop on CCOP-KIGAM geoscience data archive

On June 13, 2023, the Vietnam Geology Department and the Embassy of the Kingdom of the Netherlands in Vietnam jointly organized a workshop on "Sharing experiences and cooperation on strategic environmental assessment (SEA), Environmental and social impacts (ESIA) in offshore sand mining" with main contents: (1) Building a legal corridor, marine spatial planning policy and offshore sand mining in the Netherlands; (2) SEA and ESIA exploit offshore sand and the management role in applying favorable solutions, and minimizing impacts on the environment and society.



Photo: Receiving and working with the University of Geological Exploration in Moscow,

Russia

VII. JUSTICE INSPECTION WORK IN THE FIELD OF GEOLOGY; RESULTS OF SUPERVISION OF THE INVESTIGATION AND MINERAL EXPLORATION PROJECT

1. Judicial appraisal work in the field of geology

Implementing the Law on Judicial Expertise 2012 (amended and supplemented in 2020), Circular No. 15/2021/TT-BTNMT dated August 31, 2021 of the Minister of Natural Resources and Environment regulating judicial expertise in the field of natural resources and environment.

According to Decision No. 708/QĐ-BTNMT dated March 24, 2023 of the Minister of Natural Resources and Environment on announcing the list of case-based judicial appraisal organizations and case-based judicial experts of the Ministry of Natural Resources and Environment. In 2023, the Vietnam Geology Department has 11 organizations and 38 individuals. The capacity and expertise of organizations and judicial experts basically meet the requirements in terms of professional qualifications, skills and seniority.

According to Decision No. 276/QĐ-BTNMT dated February 10, 2023 and Decision No. 708/QĐ-BTNMT dated March 24, 2023, the recognition of judicial experts based on the case includes 02 people: (1) Mr. Nguyen Cong Cau - retired according to regime; (2) Mr. Nguyen Quang Sang - transferred job.

The Vietnam Geology Department assigns the Geological Assessment and Exploration Department to be the focal unit to monitor, urge and request individuals and assessment organizations to carry out assessment work and report progress; Specialized units directly carry out judicial appraisal work. At the same time, the Vietnam Geology Department has issued internal procedures guiding case-based judicial appraisal work in the field of geology in Decision No. 475/QD-DCVN dated July 6, 2023 to guide organizations and judicial experts to perform assessment work.

a) The Vietnam Geological Department was assigned to preside: Implementing tasks assigned by the Ministry of Natural Resources and Environment: 37 tasks (of which, 04 transitional tasks from 2022 and 33 tasks assigned in 2023).

- + Refusal to assess: 01 task (Decision No. 68/QD-DCSHS-KTMT dated June 20, 2023 of the Police Investigation Agency, Vinh Chau Town Police, Soc Trang Province);

- + Temporarily suspending implementation of: 01 task (Decision No. 155/QD-CQDTHKM dated October 4, 2023 of the Police Investigation Agency, Tan Phu District Police, Dong Nai Province);

- + Completed and handed over judicial appraisal conclusions: 26 tasks

- + Continue to perform: 09 tasks.

b) Follow the Direct Referral Decisions

Implementing cases directly solicited by the Police Investigation Agency: 15 cases (received and implemented in 2023).

- + Refusal of appraisal: 02 tasks (Decision to Solicitation of Appraisal No. 142/QD-CSDT-D1 dated September 13, 2023 of the Police Investigation Agency of Binh Thuan Provincial Police due to the time of the Solicitation Decision not enough to carry out judicial appraisal work, so the Southern Geological Mapping Federation issued Document No. 608/BDMN-KT dated September 18, 2023 to the Police Investigation Agency of Binh Thuan Province; Decision to solicit appraisal No. 312/QD-CSDT dated September 18, 2023 of the Police Investigation Agency of Ha Trung District Police, Thanh Hoa province because the time of the Decision to solicit appraisal is not enough to carry out the appraisal work. justice, so the North Central Geological Federation has issued Document No. 393/DCCBTB-KHTC dated September 20, 2023 sent to the Police Investigation Agency of Ha Trung District Police, Thanh Hoa Province);

- + Completed and handed over judicial appraisal conclusions: 12 cases

+ Continue implementation: 01 case.

c) Vietnam Geology Department coordinates implementation:
Implementing tasks assigned by the Ministry of Natural Resources and Environment: 04 tasks (including 04 transitional tasks from 2022).

+ Completed and handed over judicial appraisal conclusions: 02 cases

+ Continued implementation: 02 cases.



Photo: North Central Geological Federation conducts appraisal of the volume of minerals mined at Hao mountain mine, Nga An commune, Nga Son district, Thanh Hoa province (According to Referendum Decision No. 737/QĐ-CSKT dated December 22 December 2022 of the Police Investigation Agency of Thanh Hoa Provincial Police)

2. Results of monitoring mineral investigation and exploration projects

Supervising the construction of mineral exploration projects is necessary to protect state assets. Supervision work is carried out according to Circular 44/2016/TT-BTNMT of the Ministry of Natural Resources and Environment on construction supervision of the Mineral Exploration Project dated December 26, 20216.

In 2023, the Department will supervise 39 projects according to functions, of which 36 projects are being monitored; 02 projects have not yet been implemented by the investor, 01 project has stopped construction since 2022 and has not continued construction yet.



Photo: Checking the construction progress of the Dong Ri coal mine exploration project in October 2023



Photo: Checking the construction progress of the Bao Dai coal mine exploration project in October 2023

The Department has guided, monitored and transferred the results of monitoring exploration projects to the Office of the National Mineral Reserve Evaluation Council as a basis for appraisal and approval of reserves.

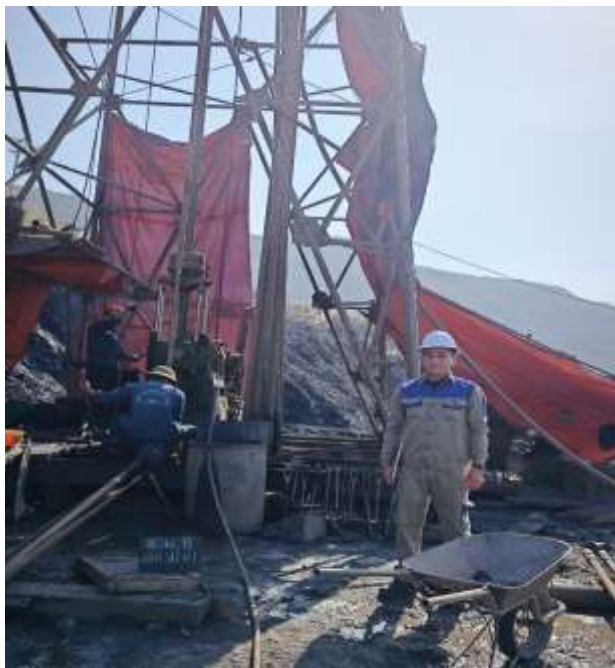


Photo: Construction supervision of the Khe Cham II - IV coal mine exploration project (Geological Analysis and Verification Center)



Photo: Monitoring drill hole Karota measurement of Dong Ri coal mine exploration project (Geological Analysis and Verification Center)