

**AGREEMENT ON COOPERATIVE PROJECT OF JOINT
ENVIRONMENTAL GEOLOGICAL SURVEY AND COMPILATION OF
RELATED MAPS BETWEEN
THE CHINA GEOLOGICAL SURVEY
MINISTRY OF NATURAL RESOURCES
THE PEOPLE'S REPUBLIC OF CHINA
AND
THE DEPARTMENT OF MINERAL RESOURCES
MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT
THE KINGDOM OF THAILAND**

According to the "Memorandum of Understanding on Geosciences cooperation between the Department of Mineral Resources (DMR), Ministry of Natural Resources and Environment of Thailand and the China Geological Survey (CGS), Ministry of Land and Resources of the People's Republic of China", signed in Chengdu City, Sichuan Province, China on June 29, 2016, both parties agree to conduct activities in the fields of geosciences to carry out the cooperative project entitled "**Joint Environmental Geological Survey and compilation of related maps**" (hereinafter as the Project) and reach the following agreement on mutual interest.

ARTICLE 1 PARTIES OF THE AGREEMENT

- 1.1 The China Geological Survey, Ministry of Natural Resources of the People's Republic of China
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- 1.2 The Department of Mineral Resources, Ministry of Natural Resources and Environment of the Kingdom of Thailand.
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ARTICLE 2 PURPOSE AND CONTENTS OF THE COOPERATION

2.1 Cooperation Purpose

- 2.1.1 To carry out joint environmental geological survey and compilation of related maps in Kaeng Khoi-Nakhon Ratchasima section (1:50,000 for normal area, and 1:10,000 for key area), both parties aim to get a thorough understanding of regional environmental geological conditions, major environmental geohazards (e.g. collapse, landslide, debris flow and collapse etc.); study the mutual influence between environmental geohazards and the construction and operation of the railway; evaluate geohazards risks of this region; and propose the countermeasures for mitigating the geohazards in this region.
- 2.1.2 To carry out joint environmental geological survey and compilation of related maps in Bangkok-Kaeng Khoi section (1:50,000 for normal area, and 1:10,000 for key area), both parties aim to get a thorough understanding of regional environmental geological conditions, major geohazards (e.g. land subsidence and land fissures etc.); study the mutual influence between geohazards and the construction and operation of the railway; evaluate geohazards risks of this region; and propose the countermeasures for mitigating the geohazards in this region.
- 2.1.3 To foster the exchange and cooperation of environmental geologists between China and Thailand, and enhance the capacity for environmental geological survey of both sides.

2.2 Project Area

Buffer zone with the semi-diameter as 5 km of Bangkok-Kaeng Khoi-Nakhon Ratchasima section.

2.3 Cooperation Contents

2.3.1 Capacity Building

Dispatch staff to participate in related work and jointly organize regular work meeting so as to strengthen staff's communication between both parties; meanwhile, carry out joint trainings on relevant techniques to enhance related technical level.

2.3.2 Main Tasks

- 2.3.2.1 Conduct remote sensing investigation and field investigation including geotechnical engineering to get a thorough understanding of geo-environmental problems and geohazards development, including: collapse, landslide, debris flow, land fracture, land subsidence, land collapse etc., so as to find out their distribution rules and formation.
- 2.3.2.2 Evaluate the geohazards developing intensity, as well as the impacts and damages caused by environmental geological problems in different regions, and to predict the possible trend. Also, establish the geohazards risk assessment model of key areas. On this basis, determine key areas for geohazards

prevention with consideration of natural environment and socioeconomic development planning including population, urban areas, economic construction-projects construction etc.

- 2.3.2.3 Study and propose countermeasures to mitigate geohazards and protect geo-environment, including conduct further survey and evaluation, monitoring and prediction as well as countermeasures for control etc. Those locations with higher risk or the problems with serious impacts should be reported to the administrators as early as possible, so as to take preventative measures and reduce the loss and damages as much as possible.
- 2.3.2.4 Establish a database for environmental geology of Bangkok-Nakhon Ratchasima section, and compile a serial maps and reports on environmental geology and results report for these areas.

ARTICLE 3 PROJECT DURATION AND ARRANGEMENT

3.1 Duration of Cooperation Project

The duration of this cooperation project is 4 years, from 2019 to 2022

3.2 Planning and preparing stage (1st year)

Collect related data and materials for the project including social, economic, geographic, geological, meteorological, environmental and remote sensing data and materials, and compile the project implementation design, as well as preparation of working brochure and organize training for all the participants. Moreover, the remote sensing interpretation of Bangkok-Nakhon Ratchasima section will also be conducted.

3.3 Field work stage (2nd – 3rd year)

2020 Both parties shall conduct following work of Kaeng Khoi-Nakhon Ratchasima section, including field survey, samples analysis, and database construction etc.

2021 Both parties shall conduct following work of Bangkok -Kaeng Khoi section, including field survey, samples analysis, and database construction etc.

3.4 Conclusion and Making Final Report (4th year)

Both parties shall generate the maps and reports on environmental geology. The final achievements shall be submitted to the governments of both parties by the end of 2022.

ARTICLE 4 OBLIGATIONS OF BOTH PARTIES

4.1 Obligations of CGS

4.1.1 To organize and coordinate the CGS team to take part in the project work, the Institute of Karst Geology (the International Research Center on Karst (IRCK) of UNESCO), the China Aero-geophysical and Remote Sensing Center for Land

and Resources (ARGS) and the Institute of Hydrogeology and Environmental Geology (IHEG) of CGS are authorized to organize and implement the Project from CGS side.

- 4.1.2 To be responsible for project design and planning, sustainable operation of technology and labor on the basis of mutual agreement of both Parties.
- 4.1.3 To organize the technical trainings of both Parties.
- 4.1.4 To be responsible for indoor interpretation of remote sensing, maps and reports generation.
- 4.1.5 To analyze samples which are beyond the ability of DMR.
- 4.1. To provide DMR's team with project information as needed, such as remote sensing data, as per the required of this project.

4.2 Obligations of DMR

- 4.2.1 To organize and coordinate the DMR's team to take part in the project work.
- 4.2.2 To be responsible for field work of environmental geological survey, verification of remote sensing results in the field and the construction of database.
- 4.2.3 To be responsible for samples (rock, soil, and water) collection and analysis which are under the ability of DMR with guidebook provided by CGS.
- 4.2.4 To provide available data and information to CGS, including topographical map, geological map, remote sensing data and monitoring data etc.
- 4.2.5 To coordinate with CGS, especially delivering samples and passing the custom etc., so as to ensure the smooth implementation of the Project.
- 4.2.6 To make publications and videos for scientific popularization.

4.3 Mutual Obligations

- 4.3.1 Jointly conduct the survey, research and comprehensive analysis, exchange related scientists and technicians, provide necessary information and share data.
- 4.3.2 Jointly organize the training themed on "Environmental Geological Survey and Methodology of Bangkok-Nakhon Ratchasima section"
- 4.3.3 Cooperate with each other to conduct remote sensing investigation, database construction, compilation of maps and completion of results report.
- 4.3.4 Irregularly organize necessary working group meetings during the implementation of the project to discuss the related problems and make a further plan for future work.
- 4.3.5 Provide necessary assistance for ensuring the smooth implementation of the project.

ARTICLE 5 FINANCIAL ARRANGEMENTS

5.1 Financial arrangement of DMR

- 5.1.1 Provide the fund for flight and accommodation expense of the DMR participants working in China.
- 5.1.2 Provide the fund for related cost of field investigation on environmental geology in Thailand, including vehicle expense, material purchase, print, samples analysis, geophysical and geochemical survey and mailing etc.
- 5.1.3 Provide the necessary salary, bonus and other emoluments for Thai personnel involved in the project.

5.2 Financial arrangement of CGS

- 5.2.1 Provide the fund for flight and accommodation expense of the CGS participants working in Thailand.
- 5.2.2 Provide the fund for related cost of training held in China, including training materials, travel expenses and salary of lecturers.
- 5.2.3 Provide the necessary salary, bonus and other emoluments for Chinese personnel involved in the project.

ARTICLE 6 ACHIEVEMENTS

- 6.1 Environmental geological database for Bangkok-Nakhon Ratchasima section.
- 6.2 Serial maps of environmental geology (scale 1:50,000 and 1:10,000) for Bangkok-Nakhon Ratchasima section.
- 6.3 Some countermeasures for geohazards prevention and geological environment protection of Bangkok-Nakhon Ratchasima section.
- 6.4 Brochures and videos for scientific popularization on geo-hazards prevention and geological environment protection of Bangkok-Nakhon Ratchasima section.
- 6.5 Joint workshop/seminar, or meeting's presentation, to demonstrate the progress of the project.
- 6.6 Provide summarizations of the activities.

ARTICLE 7 WORKING LANGUAGE

- 7.1 The working language of the project is English as well as training, meeting, resolutions, summaries of the meetings, exchanged information, annual and final reports, etc.

ARTICLE 8 SHARING AND PROTECTION

- 8.1 The protection and allocation rules of Intellectual Property involved in this agreement shall abide by relevant Intellectual Property laws of China and Thailand or bilateral treaty.
- 8.2 Maps and data shall be released in one year after the project completed.
- 8.3 Maps and data of the project shall be jointly used by both parties, not be

disclosed to the others if any party does not agree.

ARTICLE 9 DUTIES OF NON-COMMITMENT AND TERMINATION OF THE AGREEMENT

- 9.1 Both parties shall be free from any responsibilities concerning such factors as war, turmoil, earthquake, devastating disaster or any other natural disaster which is out of the government's control or the factors which are out of both parties' control.
- 9.2 The termination date of the project refers to finish time of the work or specified date in the agreement, whichever comes first. However, under the circumstances which are agreed upon by both parties, the publication of the work achievement reports may be extended beyond the expiration of this agreement.

ARTICLE 10 PROJECT COORDINATOR

- 10.1 Both parties shall establish a working group, formulate a road map of the project, and discuss specific cooperation details.
- 10.2 Both parties shall designate one person as a project coordinator for daily contact, exchanging documents, and organizing domestic experts to work on the project as per the confirmed plan on behalf of the country.

10.3 CGS Coordinator

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China Geological Survey

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10.4 DMR Coordinator

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ARTICLE 11 DISPUTE RESOLUTION

11.1 Any dispute arising from the performance of duties committed by both Parties in this agreement shall be settled through friendly negotiation.

ARTICLE 12 MISCELLANEOUS

12.1 Resolutions and summaries convened by both Parties are significant supplements to this agreement and are equally binding to both Parties.

12.2 This agreement is signed in English on March 23, 2019 in Beijing, China. The agreement will be signed in two copies, each copy of the agreement is equally valid, and each Party shall hold one copy respectively.

12.3 This agreement becomes effective since the date on which representatives of both Parties approve and sign this agreement.



China Geological Survey
Ministry of Natural Resources
The People's Republic of China



Department of Mineral Resources,
Ministry of Natural Resources and Environment
The Kingdom of Thailand