

CHAPTER I



INTRODUCTION

1.1 Fundamental Concepts of Environmental Geology

There exist many wide-spread usage of terms that have fallen to be familiar among geologists and scientists since last decade. Those terms include environmental geology, integrated survey or multidisciplinary survey, urban geology, land planning, resources planning and management, natural resources and their development, geoscience and the potential of the natural environment, and etc. All imply their close relations to the development of natural resources and their environments in such aspects of information collecting, planning and management for the purpose of balancing them to the development of social environment. General speaking, most of the activities concentrate on the improvement of peoples' standard of living.

The great problem, regarding natural resources and environments, is persistent which primarily due to the ever-increasing population and concurrently the ever-increasing consumption of limited resources. Inevitably, world-wide deficiency of some resources occur, for instance, mineral fuels presently tend to become one of the significant crisis. Petroleum crisis have led peoples' stimulation through the recognition on the scarcity of the resources. On account of the OPEC, the greatest

group of petroleum producers of the world, declared to increase petroleum price while decrease its export resulted in worsely change of the world economics. This is basically due to the rising of energy cost. The OPEC claimed that people should acknowledge the value of petroleum which is non-renewable resource and it exists with limited amount. Consequently, in order to sustain and save this kind of natural resource it is expected that scientists should awake and attempt to search for substitutional materials and or any sophisticated technology to remedy this problem.

Geology includes investigation of earth materials, earth processes, and landforms that result from the interaction of natural materials and natural processes. Geological investigation also goes beyond surficial phenomena to include subsurface phenomena. The geologists should therefore be well equipped to contribute much toward the solution of a variety of problem concerning the physical environment. They are experientied in evaluating the earth's capacity for providing water, mineral resources, building sites, structural anormalies, and other special circumstances of geological origin such as earthquake, landslide, flooding, land subsidence, etc. For these reasons, geologists should play an important role by using their knowledge to make the planners more understanding the physical environment, certainly, before dicision of land and its resources planning is made.

The development of new branch of geology is begun for the purpose of making a more harmongous relationship between man and his environment.

It is commonly called "environmental geology". The first use of this term is credited to Jame E. Hackett (1967) to identify a new orientation for the study and use of geology in a coordinated and integrated manners. It was applied to programs conducted by the Illinois Geological Survey, beginning in 1962. After that, many geologists write their own definitions. They applied geological principles to improve man's environment through the wise use of natural resources. They are making a new discipline -environmental geology-function in metropolitan areas, the suburbs, rural areas, and the wilderness.

Moser commented in 1969 that "Environmental geology uses the principles of geology, hydrology, engineering geology, geophysics and associated sciences and disciplines to determine how the resources of an area may be developed for the maximum benefit of man. It is a science that studied the environment in relation to man and its reports are helpful not just to the scientist but to all concerned with the growth of an area".

Flawn et al. (1970) summarize more extensively and explicitly that "Environmental geology deals with the entire spectrum of man's use of the earth, both in city and in rural and primitive regions. It includes the location and exploitation of natural resources, the disposal of wastes, the effect of both mass movement and tectonic movements on structures and the effect of subtle variations in the composition of earth materials on health. It involves the oceans and atmospheres as well as the solid earth - the effect on the earth of the

great columns of heat and smoke produced by massive concentration of people and industry fall within its domain. The key word in environmental geology is "application".

Accordingly, Moser and Hyde (1974) expressed that environmental geology studies apply the principles of geology in conjunction with those of related sciences to provide for wise, effective and orderly development of our natural resources. Such studies aid in planning urban and industrial complexes, water resource development, construction projects, waste disposal facilities and other projects involving man and his environment.

Environmental geology involves having a thorough knowledge of our natural resources, and realizing their capabilities and limitations for orderly development to stimulate effective urban and industrial growth and to maintain a healthy living environment.

However, there appears to be numerous problems confronting geologists of the present day on the application of geology to the human affairs. First, geologists must have ability to talk to engineers and other specialists in their own languages and from the non-geological point of view to learn what those disciplines need that can be supplied from the geological side of the technical fence. Second, if one geologist points out that it is necessary to increase the engagement of geoscience in planning he often is answered by his colleagues that planning is in no case the geologist's task. Rather, he should act as a scientist, compiling his scientific knowledge into the form of maps and reports

and give them to the planners and politicians. But so far these geological works are, most of them, not understandable and useable by others.

The scope of this study, attempts have been made at least to solve the problems previously mentioned by means of producing the geological outputs in a more systematic and understandable manners applicable to other professions. Environmental geology studies in this context emphasize on producing aid in planning and formulating guidelines for the development programme.

1.2 Objectives of the Present Investigation

Basically, the investigation aims at compiling, analysing data and information regarding the physical environment and geological resources of the area in order to provide useful baseline which will allow an accurate assessment of environmental geological conditions. Subsequently, the recommendations concerning guidelines to assist the planning and development are prepared with the emphasis on the potential of geological resources and environment.

The physical environment primarily embraces the geographical and geological settings including the land use and land cover, whereas the geological resources cover the minerals and water resources, soil in particular. Besides, the social and economic conditions of the area including proposed development programmes have been harmoniously considered.

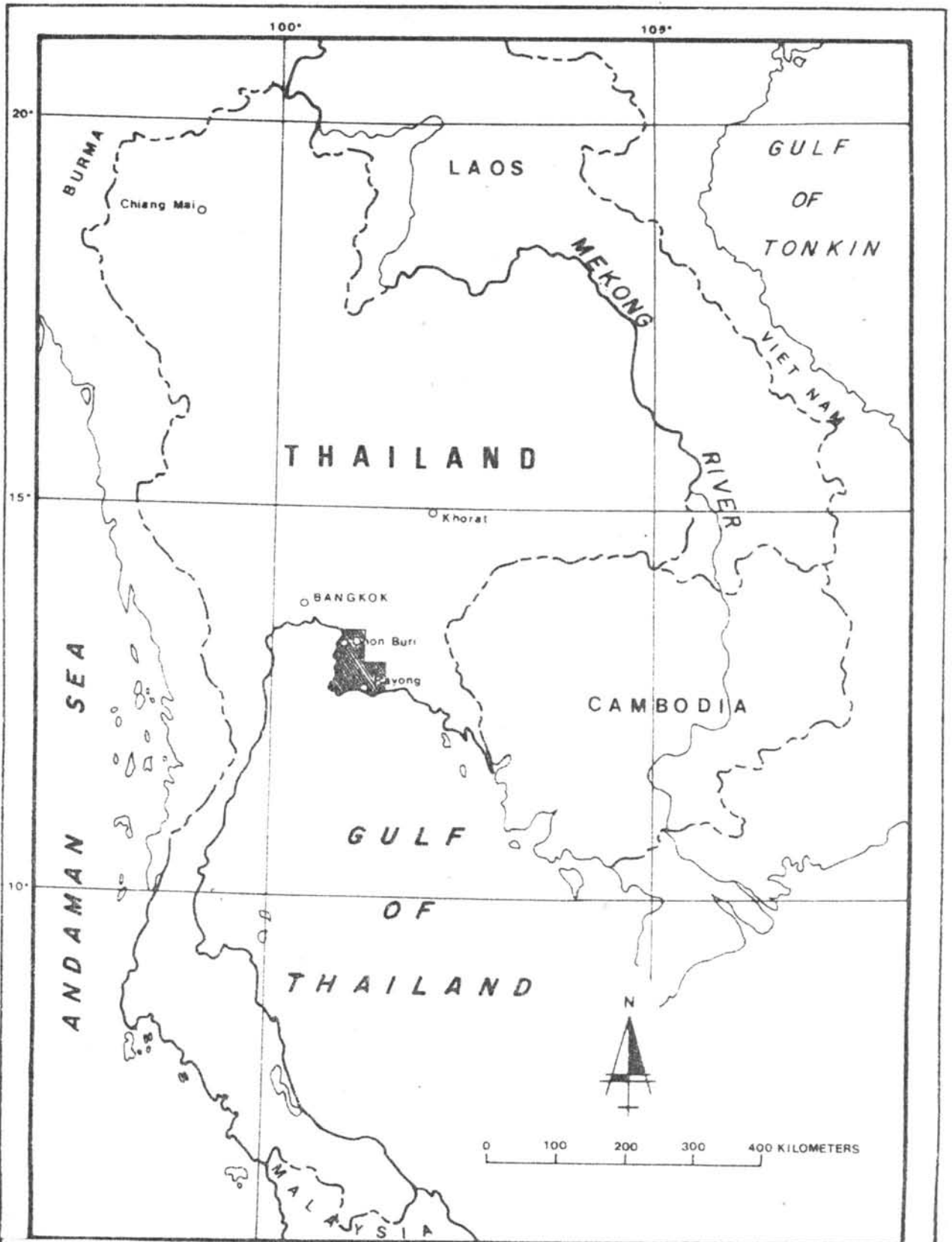
1.3 Location of the Studied Area

The studied area is a part of the so-called eastern coast of the Upper Gulf of Thailand and covers approximately 4,500 square kilometers. It lies between the latitudes 12° 30' 00" N - 13° 27' 30" N and the longitude 100° 50' 00" E - 101° 30' 00" E. It is bound on the north by the central plain of the country; on the west and south by the Gulf of Thailand; and on the east by Chanthaburi physiographic province. The area covers half of the administrative provinces of Chon Buri and Rayong (Figure 1.3).

As far as the development planning is concerned, the studied area lies essentially in the so-called Thailand's Eastern Seaboard Area where numerous development projects have been planned and some have already been materialized.

1.4 Previous Investigations

Generally, the area of eastern part of Thailand particularly Chon Buri and Rayong has been an active area for various development projects for quite a considerable long time. However, the trend of development in this area continues to be very promising in the future for both government and private sectors. Despite the fact that the area has been rapidly developed and has a high potential for future development, notably, industries, natural resources, infrastructures, agricultures, etc. However, very little has been done regarding the complete baseline studies for comprehensive planning. Most of the studies were mainly carried out on a piece-meal basis.



Location of the Studied Area

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FIG. 1.3

In 1971, NEDECO carried out the surveys, investigations and designs of the deep-seaport of Laem Chabang area in the Upper Gulf of Thailand for the Port Authority of Thailand. The studies covered many aspects concerning the deep-seaport development of Laem Chabang and areas in the neighbourhood. Later on, Pungrasmi and Wasuwanich (1972) reported the potential geological resources with emphasis on raw materials for ceramic industry in the eastern part of Thailand. While the Committee for the Development of the Easternpart part of Thailand, NESDB, had prepared a resume' on the development status of the area from 1964-1970. Besides, the Department of Mineral Resources (DMR) published the report of investigation for mineral resources in the easternpart of Thailand. In 1976, Bhotiwihok had been assigned by the Subcommittee on Water Resources Planning, NESDB, to carry out the feasibility study of water resources in Pattaya - Bang Lamung areas. This study embraces various aspects and proved to be a comprehensive and admirable one for the area concerned. Later on, NEDECO (1978) reviewed the final report on the deep-seaport of Laem Chabang while Chivakul (1978) presented the outstanding study on the physical environment and socio-economics of the eastempart of Thailand. This report is an excellent overview baseline data and information of the whole eastern part of Thailand with appropriate recommendation for suitable development programme. In the same year, Chantrakul and others (1978), Department of Business Economics, conducted a survey on the economics of the easternpart of Thailand. The survey report covers the economic structure, economic problems including remedial measures for economic development.

In 1979, the Committee for Heavy Industry Development prepared the preliminary study report on the heavy industry and Sattahip deep-seaport. With regard to the development of natural gas resource in the Gulf of Thailand, the Petroleum Authority of Thailand (PTT) had authorized the Floor Ocean International, Inc. to conduct the environmental impact studies for the natural gas development project in 1979. The study emphasizes on the environmental impact of the production of natural gas in the Gulf of Thailand including the environmental impact of off-shore and on-shore gas pipelines in Rayong and Chon Buri. Besides, the Electricity Generating Authority of Thailand (EGAT) has long conducted a continuous feasibility study of the nuclear power project's first unit (600 MWe) located at Ban Ao Phai, Chon Buri. Various feasibility reports have been completed and many others are expected to be completed in the near future. Furthermore, Japan International Cooperation Agency (JICA) presented the feasibility study report on the integrated flat steel plant in the Kingdom of Thailand in 1979 to the Thai Government.

In 1979, the Research Institute of Applied Science of Thailand conducted an ambitious feasibility study on the reclamation of the sea in Chon Buri Municipal Area for the NESDB while the Environmental Research Institute of Chulalongkorn University had carried out the reconnaissance survey on various baseline conditions of Rayong, Chanthaburi and Trat for the development of tourism in 1980. The report was subsequently submitted to the Tourism Authority of Thailand (TAT).

In 1980, Mounsell Consultants Limited has conducted a final report on the study of Sattahip commercial port submitting to the Ministry of

Communications while USS Engineering and Consultants, Inc. presented the study report on site selection for iron, steel and fertilizer complex submitting to the Ministry of Industry (MOI). The USS report covers a study of various pertinent aspects of three sites, considered by the MOI as potentially suitable for installation of a heavy industry complex, consisting of facilities for the production of sponge iron, steel mill products, and fertilizer. After completion the study, the report provided the results, conclusions and recommendations for a site selection of the industrial complex. In late 1980, the Office of National Environmental Board (NEB) prepared an initial environmental impact assessment of the soda ash and rock salt project. The study concentrates on the Laem Chabang area with recommendation on the alternative site for the project.

Finally, the Secretariat Office of Sub-Committee on the study of Primary Industry along the Eastern Coast of Thailand (1981) has carried out the most comprehensive final report on the study of primary industries and deep-seaport development, along the eastern coast of Thailand.