Proceedings World Geothermal Congress 2000
Kyushu - Tohoku, Japan, May 28 - June 10, 2000

THE STATUS OF STUDYING GEOTHERMAL FIELDS IN VIETNAM

Hoang Huu Quy

Research Institute of Geology and Mineral Resources
of Vietnam (RIGMR), Thanhxuan, Hanoi, Vietnam

Abstract: *Vietnam's territory is situated along the geothermal west Pacific Rim and has more than 300 natural hot springs. In the past, Vietnamese people considered these hot mineral waters a valuable natural resource serving human life. Thus, in the past decades many Vietnamese and French geologists have done valuable research on these hot springs and geothermal fields. Most studies were conducted after the August Revolution in 1945 by the Vietnamese. Geothermal research has become a specialized field of study since the 1980s with the assistance and cooperation of international organizations such as UNDP and USESCO.*

From 1990 to the present, geothermal studies in Vietnam have resulted in significant achievements, and some of the most valuable geothermal research has been done by the Research Institute of Geology and Mineral Resources (RIGMR) of Vietnam since 1995. These include assessments of geothermal potential of South central Vietnam, north central Vietnam, and other geothermal regions nationwide. Many international organizations and geothermal companies are interested in the development of geothermal resources of Vietnam, especially in the prospective areas of South central, North central, and northwest parts of Vietnam.

The Vietnam territory is situated at the west side of the Pacific Rim from latitude N 8^0 15' to N 23^0 30'.

For a long time the Vietnamese people have used natural geothermal occurrences for balneology, treating diseases, bottled mineral water, and other uses.

The study of natural hot mineral water at the surface and in boreholes has a long history. It was recorded in a monograph titled "Phu bien tap luc" written by a famous ancient Vietnamese scientist Le Quy Don in 1776. He described and assessed the features of some hot mineral water sources in the Binh Dinh and Phu Yen provinces of central Vietnam.

About 100 years ago, the French described physical and chemical characteristics of hot springs in the Quang Nam and Da Nang provinces (Madrole, 1895). Sallet in 1928 listed statistics of an addition 56 hot springs in Vietnam, and in 1941 M. Autret added 13 more hot springs to the growing list in Vietnam.

After liberation of the country following the August Revolution in 1945, the Vietnam

government established a geological organization with the function to investigate, explore and exploit mineral resources. This favorable situation continues to allow for the study of geothermal resources in Vietnam with the following remarkable works:

- Mineral Water - Hot Water Map of Northern Vietnam, at the scale of 1:1,000,000, compiled by Chau Van Quynh in 1976.
- Mineral Water - Hot Water Map of Vietnam, at the scale of 1:3,000,000, compiled by Cao The Dung in 1980 (it belongs to national ATLAT program).
- Mineral Water - Hot Water Map of Vietnam, at the scale of 1:1,000,000, compiled by Tran Hong Phu in 1983.
- Monograph for Mineral Water of S.R Vietnam, by Cao The Dung in 1986 (it belongs to national program 4404).

In the 1980s, geologists of Vietnam carried out exploration at about 30 prospective geothermal areas. Fourteen of these in South central Vietnam were assessed for flowrate in the following categories: A + B = 944 m^3/day ; C_1 = 7,284 m^3/day ; C_2 = 10,310 m^3/day. At that time, some international organizations such as UNDP and BRGM of France began to pay attention to these fields in Vietnam. The Geological Branch of Vietnam promoted special geothermal studies of which the following are typical:

- Geothermal Sources - Exploration and Exploitation in Vietnam, by J. Koenig in 1981. Project Document VIE 80/025.
- Evaluation du Potentiel Geothermique de le RS du Vietnam, by A. Gadalia in 1982, BRGM, Orleans France.
- Geothermal Resources Assessment Serving as Basis for Design, Exploitation and Pilot Utilization for Energy Purpose, by Vo Cong Nghiep et al. in 1987.

On the basis of these studies, pilot drying stations for agricultural and forestry products were installed in Tuyen Quang (North Vietnam) and Binh Dinh (central Vietnam) provinces.

In the 1990s, the Research Institute of Geology and Mineral Resources (RIGMR), with the assistance and cooperation of international organizations such as UNESCO, International Geothermal Institute Pisa - Italy (CNR), KRTA (Newzealand), Geological Nuclear Institute of Newzealand, has carried out and are continuing to carry out important geothermal research. Typical examples of this research are:

- Geothermal Potential Assessment for a Territory from Quang Nam – Da Nang to Baria-Vung Tau (from latitude N 100 to N 160) by Hoang Huu Quy in 1995, which defined 12 prospective geothermal areas (six of which are licensed to ORMAT (USA) to explore and develop).
- Recently, RIGMR completed a geothermal potential assessment for North central Vietnam by Eng. Cao Duy Giang. This work also outlines some prospective geothermal areas.

On the basis of geothermal research done by RIGMR, many international organizations and companies either are or intend to be involved in this field of geological science. At present, ORMAT International Inc. of Nevada, USA had been licensed by the Vietnam Government to explore six prospective geothermal areas in central Vietnam. On August 22, 1998, ORMAT was licensed to invest in and build geothermal power plants in six of the twelve prospective geothermal

areas.

In the territory of Vietnam, more than 300 natural geothermal sources have been recorded, and six geothermal regions have been defined (northwest, northeast, Bac Bo plan, North central part, South central part, and Southern plain) (Hoang Huu Quy, 1996: General Evaluation of Geothermal Potential in the Tectonic Setting of Vietnam. GRC bulletin, Vol. 25, No. 2, February 1996, California, USA).

The results of our research show that Vietnam territory has a remarkable potential for geothermal resources. Especially, Northwestern Vietnam is the most prospective region for geothermal exploration and development. Many ethnic minorities live there under very difficult transportation conditions. However, Vietnamese authorities are doing their best to encourage and expand the development of geothermal resources for socio-economic benefit. Recently, the Vietnam government and especially the Ministry of Industry are supporting the goals of RIGMR to encourage and develop geothermal research all over the country. We are sure that with the assistance and cooperation of international organizations, the geothermal communities and geothermal companies, geothermal research in Vietnam will make important contributions to the modernization and industrialization of our country.

FIG. 1. MAP OF VIETNAMESE TERRITORY SHOWING LOCATION OF GEOTHERMAL SPRINGS AND FAULTS