

**MAGNETOTELLURIC INVESTIGATIONS IN  
TATTAPANI GEOTHERMAL REGION,  
SURGUJA DISTRICT, MADHYA PRADESH, INDIA**

PROJECT SUPPORTED BY  
MINISTRY OF NONCONVENTIONAL ENERGY SOURCES  
GOVERNMENT OF INDIA, NEW DELHI



**NATIONAL GEOPHYSICAL RESEARCH INSTITUTE  
HYDERABAD - 500 007  
INDIA  
2000**

**MAGNETOTELLURIC INVESTIGATIONS IN  
TATTAPANI GEOTHERMAL REGION,  
SURGUJA DISTRICT, MADHYA PRADESH, INDIA**

PROJECT SUPPORTED BY  
MINISTRY OF NON-CONVENTIONAL ENERGY SOURCES  
GOVERNMENT OF INDIA, NEWDELHI.

**NATIONAL GEOPHYSICAL RESEARCH INSTITUTE  
HYDERABAD - 500 007, INDIA.**

**2000**

## PARTICIPANTS

T.Harinarayana  
M.Someswara Rao  
M.V.C. Sarma

Data acquisition, Processing,  
modeling, interpretation,  
and report preparation

K. Veeraswamy  
A. Lingaiah

Data acquisition.

S. Prabhakar E. Rao

Modeling.

G.Virupakshi  
D.N. Murthy

Instrumentation,  
software development.

S.V.S. Sarma

Project leader, coordination, report  
Preparation.

- (h) The high conductivity zone detected from the present study of both 1D and 2D modeling of the data seem to be related to high temperature indicating the presence of geothermal reservoir of Tattapani hot spring zone. The results obtained at different stations near the hot spring zone are compiled and plotted as a 3-D plot and presented in Fig.41. Figure shows the depth to the top of the high conductive zone. It may be seen from these figures 38 and 41 that the depth to the high conductive zone and the depth to the low resistivity (5 Ohm.m) contour values have similar shapes indicating that the boundary shown is indicative of the existence of a major Geothermal reservoir.

## **CONCLUSIONS AND RECOMMENDATIONS**

- The Tattapani hot spring area is underlain by a highly conductive subsurface section related to a major geothermal reservoir oriented in an EW direction.
- The estimated temperature at deeper levels (3 km) is about 260° C corresponding to decrease in the resistivity of 5 Ohm.m. The eastward limit of the reservoir is located near Tattapani village and possibly controlled by a NE-SW trending fault structure.
- The thickness of the high resistive crust in the region is about 6 to 8 km towards southern side of the study area and is about 10 km towards north. Regionally, the conductive Tattapani hot spring zone falls between these two upper crustal blocks of varying thickness.

- From the well known tectonic activity of NSL zone and also due to the presence of high conductive zone extending from shallow level of 2-3 km to great depths extending to tens of kilometers, it can be conjectured that the region of NSL zone must have reactivated many times during the geological episodes resulting in the collision and development of fractured zone and also intrusion of magmatic material at deep crustal depths.
- A deep exploration bore well to a depth of 3 to 3.5 km in the Tattapani hot spring zone towards west of Tattapani village between the sites 2 and 40 to tie up the results obtained in the present study would greatly enhance retrieving more refined models and also to quantify the geothermal potential of the region for power generation.