

## CHAPTER I

### INTRODUCTION

#### Background

One of the present problems facing the public in the Bangkok metropolitan area is an insufficient supply of potable water.

The present population of the metropolitan area is about 5 millions and is anticipated to rise to 10 millions by the year 2453.

Faced with such problems, the Metropolitan Water Works Authority (M.W.W.A.) selected the Camp Dresser & Mc Kee of Boston, Massachusetts as a consultant to produce a master plan for water supply in the metropolitan area.

The master plan, produced in February 2513 recommended a gradual phasing out of ground water as a gradual phasing out of ground water as a source of supply in favour of increased use of Chao Phya river and greatly expanded treatment facilities, the work to be carried out in several stages over a twenty years period.

Having the requisite financial arrangements, the Metropolitan Water Works Authority (M.W.W.A.) commissioned the detailed design of the facilities to be constructed according to the master plan.

Metcalf & Eddy Ltd. of Boston, Massachusetts was appointed consulting engineers to the M.W.W.A. in 2517 to undertake supervision of the construction of the first stage contracts.

The first stage works include the construction of a completely new water treatment plant with an initial design capacity of 1200 megalitres per day, two transmission pumping stations, related reservoirs and approximately 25 kilometers of water transmission tunnel.

The new water treatment plant is located at Bang Khen about 17 km. from the centre of Bangkok. Treated water will be distributed to the distribution pump stations of the water transmission tunnel system.

The tunnels in the stage system vary in finished internal diameter from 3.4 meters to 2.0 meters, and the work is split into six contracts including a river crossing.

The make up of the individual contract units are as follows:

G-TN-1A length 1770 m., finished diameter 3.0 m.

G-TN-2 length 8460 m., finished diameter 3.4 m.

G-TN-3-R length 7500 m., finished diameter 2.8 m.

G-TN-4A-R length 720 m., finished diameter 2.0 m.

G-TN-4B-R length 3650 m., finished diameter 2.0 m.

G-TN-5A-R length 3020 m., finished diameter 2.0 m.

The tunnels are designed to lie, in layer of firm to stiff clay at a depth of approximately 17 m. from the surface. This layer is

overlain by soft clay and overlays a water bearing sand.

Except the under river section, the works in any portion is carried out under low compressed air condition (less than 1 bar above atmospheric pressure).

#### Purpose and Scope of Study

The project reported here-in is conducted to study the water transmission tunnelling construction method, the new technology for Thailand.

In this study the major construction equipments, the construction process, the facing problem during construction and also the remedial measures will be described. The discussion will be made as to the advantages and disadvantages of each step of construction method.

It is expected that the investigation will provide some valuable information for practical engineers.

#### Sources of Data

Data were gathered from the final report of Metcalf & Eddy consultant engineers, Nishimutsu construction Co., Ltd. and Ohbayashi Gumì construction Co., Ltd. in water transmission tunnel construction.