

# METITO

*Commitment to a  
Cleaner Environment*

## BOO DESALINATION PROJECT FOR MAXUS OIL CO. AT PABELOKAN ISLAND IN SUMATRA SEA - INDONESIA

### *A Case Study*

At a time of expanding infrastructure requirements in developed and developing nations, governments and public organizations are increasingly receptive to the ideas of funding water and wastewater treatment projects via public and private partnerships. From its beginning, METITO's drive was towards making pure water available and affordable to each and every person on this planet. It was thus natural for METITO to have adopted the BOO and

BOT approaches as tools for achieving its goals.

METITO's reputation for professional excellence, coupled with its expertise in the field of project finance, culminated in the successful award of a landmark BOO project in Indonesia. The YPF Maxus South East Sumatra B.V. corporation, which operates in partnership with the Government of Indonesia, provided METITO with an opportunity to supply a 2x520 m<sup>3</sup>/d Reverse Osmosis

desalination plant for drinking purposes, on a Build, Own and Operate basis, for its oil exploration venture on Pabelokan Island in the Sumatra Sea.

METITO's participation in the development and operation of water projects, such as the Maxus one, is both attractive and beneficial for end users for a number of reasons:

- Eliminating plant performance and operation risk factor.
- Expediting provision of vital services such as water and safe environment.
- The utilization of conventional financing ( through the private sector ) in lieu of sovereign financing.
- Long term commitment of the contractor through equity, technical and operating support.
- The option of project transfer at the end of the term of the contract, allows the end user to be the ultimate owner and in charge of his vital resources.

The multi-million US Dollar contract undertaken for Maxus, the second largest oil company operating in Indonesia, is a vital part of the service systems required to keep the oilrigs operational in an area which is 90 km away from the island of Java.



MAXUS SERVICE CENTRE AT THE PABELOKAN ISLAND



**TUG BOAT FILLING FRESH WATER AT THE ISLAND JETTY**

To solve the problem of fresh water supply needs, Metito constructed a sea water desalination plant on the tiny Pabelokan Island that is located in the heart of the oil rich Sumatra Sea. The Pabelokan Island operates as a service centre for eight major offshore oil drilling platforms with a work force exceeding 2000. Seawater is desalinated by Metito's plant on the island before being transferred by small water tanker ships to the individual exploration platforms.

The feed to the desalination plant is

extracted from the Pabelokan Sea. The total dissolved solids in the feed source were found to be 38000 mg/l, and the reverse osmosis plant was required to reduce the dissolved solids content to 300 mg/l. The remote location of the site, scarcity of skilled labour and a compressed delivery schedule required that the site activities viz.: piping, installation and cabling be restricted to a minimum, and that the plant be skid mounted to the maximum possible extent. The plant was required to be delivered in a staggering 4 months time!

The multi-million dollar contract was awarded to METITO in partnership with BRE, considered amongst the most reputable oil field contractors in Indonesia, with impeccable references. This was done in the face of intense competitive local bidding. METITO with its global expertise and local presence made a seemingly impossible task an extraordinarily easy affair by commissioning the plant in a record 4 months time.

**Scope of Contract:**

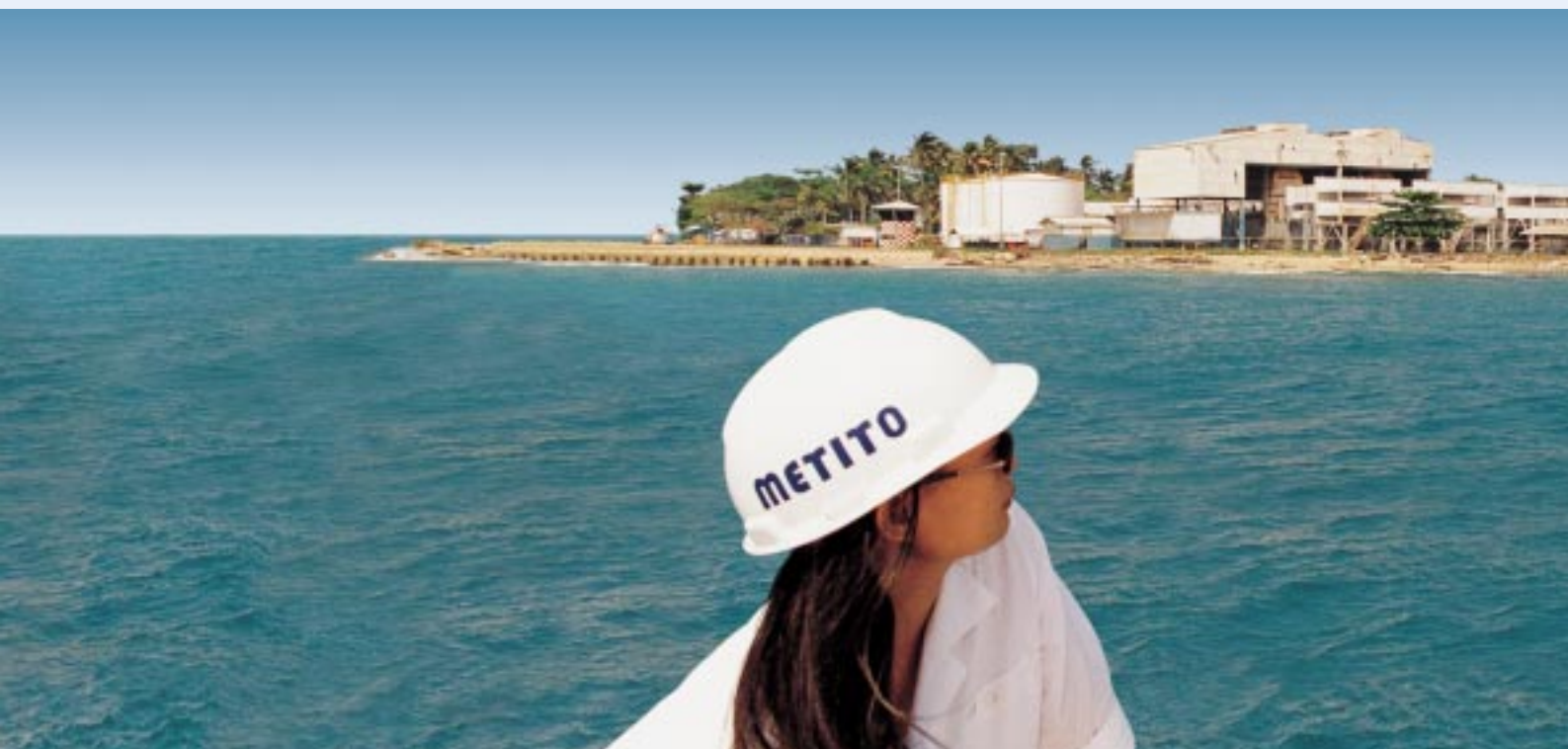
This included the complete design, engineering, manufacture, inspection, testing, delivery, installation, commissioning and operation of the plant.

**General Information:**

Water produced at the Maxus desalination plant meets the approved World Health Organization standards for drinking water, and is sufficient to supply the daily requirements for the 2000 plus people operating the rigs as well as the necessary process water for various needs. The plant is fully automated and features high reliability for continuous uninterrupted performance.

**Scope of Work:**

- Sea water intake including pumps, piping and all civil works.



**OVERALL VIEW OF PABELOKAN ISLAND WITH ALL ELECTROMECHANICAL WORKS**

- Pretreatment system consisting of dual media filters and 5 micron cartridge filters.
- Two Reverse Osmosis Plants.
- CLX cabling system for interconnecting cables.
- TEFC, Class I, Div.2, Group D motors for all the pumping units.
- Three steel storage tanks of 50 ton, 200 ton and 1600 ton capacities, API 650 design.
- Refurbishment of the existing RO plant with a capacity of 400 m<sup>3</sup>/day.
- Operation and maintenance of both, existing and Metito's new RO Plants.
- Pumping station and 1.2 kms piping to jetty for boat filling.

**Plant Technical Characteristics:**

The design influent water characteristics are as follows:

Parameter	Average Value (mg/l)
Calcium	320
Magnesium	1020
Sulphates	2755
Bicarbonates	135.5
Total Silica SiO <sub>2</sub>	0.1
Total iron Fe	0.1
Total Mn Mn	0.1
Conductivity µs/cm	66670
pH	8.1
TDS	33331
Temperature	30



**SEA WATER INTAKE FILTERS FOR POWER PLANT COOLING WATER**

**Reverse Osmosis Plant:**

- The Pretreatment System consists of two dual media filters 3.2 m diameter each, followed by cartridge filters.
- The Chemical Dosing System includes Sodium Hypochlorite dosing for protection against organic matter, Polymer dosing to help coagulation and flocculation of turbidity and suspended solids, Sodium Meta-bisulphite for dechlorination, Antiscalant to prevent sulphate scaling, Sulphuric acid to prevent

Calcium Carbonate scaling, and finally a caustic dosing system for adjusting the pH of the permeate.

- Each Reverse Osmosis train is assembled on a skid, and has 6 pressure vessels with 6 membranes in each vessel. The skid includes SS316L piping, control panels with instruments and control valves.

Treatment starts when seawater is pumped by the intake pumps into the dual media filtration system. The filtration units, consisting of dual media filter vessels, remove all



suspended matter from the seawater. Polymer dosing in the feed line helps in faster coagulation and flocculation of the turbidity and suspended solids.

The filtered water, collected in a GRP storage tank, is pumped into the 5-micron cartridge filters, which remove the colloidal particles present in the water. The treated water at the outlet of the cartridge filters passes through the high pressure pumps where the pressure is boosted to a high of 65 bar g, generating the required osmotic pressure necessary for reverse osmosis.

The permeate ( product ) water is stored in a product water tank, and is used for drinking purposes. To ensure constant production and supply of fresh water to the oilrigs,



OVERALL VIEW OF THE DESALINATION PLANT

every vital component installed has a standby in case of failure. The plant was engineered using state

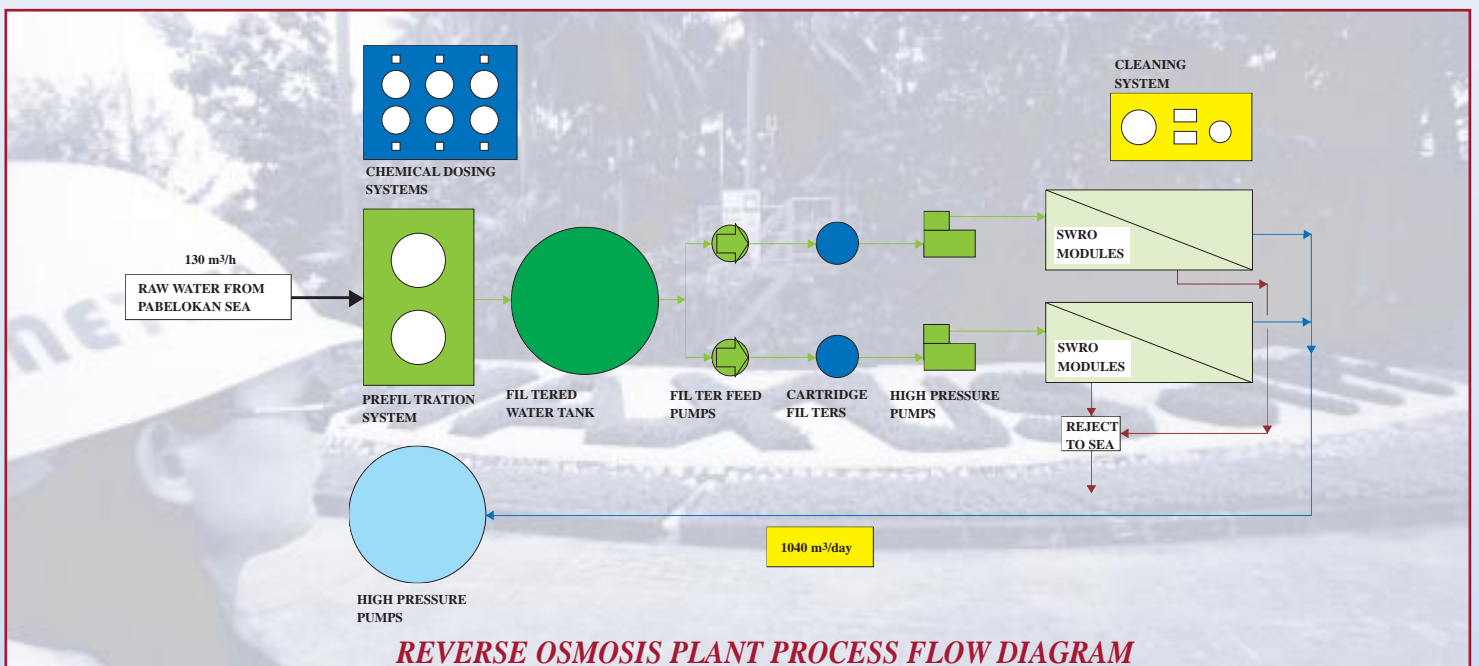
of the art software, like CAD P&ID and CAD PIPE, which resulted in professional quality designs.

The entire plant was fabricated, assembled and tested in modules under vigilant in house quality control procedures and resources, to the full satisfaction of both the client and consultant.

ENGINEERING, using state of the art procedures, followed by an expeditious PROCUREMENT activity and an outstanding QUALITY CONTROL oriented CONSTRUCTION phase, culminated with the SEAWATER REVERSE OSMOSIS PLANT being commissioned on time and to the highest possible standards.



QUICKEST ACCESS TO THE ISLAND IS BY HELICOPTER



REVERSE OSMOSIS PLANT PROCESS FLOW DIAGRAM

Local presence, global know how

www.metito.com