

## A Case Study

# Surface Water Treatment Plant for Sousa – Tunisia

## Introduction

Sousa is a tourist city located on the south Mediterranean coast. It is home to several resort beaches that are flocked by thousands of tourists every year. The city constitutes one of the major income areas for the Tunisian government.

In order to increase the national income and develop the tourist services, the Tunisian government decided to implement a new water treatment plant with a capacity of 26,000 m<sup>3</sup>/day for potable use.

## The Project

The client, SONEDE (Societe Nationale d'Exploitation et de Distribution des Eaux), had an urgent requirement for a water supply project to cater for the anticipated demand expected during summer of 2004. Metito was entrusted by SONEDE to execute and deliver the plant within 4 months from date of award. The contract scope encompassed the complete design, manufacturing, installation and commissioning of the plant, followed by a two months performance reliability test. Classroom and field training of client personnel were also a part of the services rendered under this contract.



The overall project was a challenge for Metito due to the short milestone schedule and the amount of detailed engineering and manufacturing work required. The plant equipment was manufactured at Metito's facility in Egypt then shipped overland to Tunis passing through Libyan territory. The project demanded extreme effort, cooperation and team work from all departments within Metito, and having secured that, was executed in a timely manner whilst meeting the project high specifications and the client's dead line.



## General Information

The Surface Water Treatment plant consists of three streams each with a capacity of 8600 m<sup>3</sup>/day. Each stream includes an intake structure where coagulation and flocculation occur, and two tube settler type clarifiers. The clarified water is pumped through three multi-cell dual media filters prior to final storage and distribution.

## Technical Characteristics

Influent water is withdrawn from several dams that collect water during the rainy season. This water has a turbidity of 150-400 NTU, while the produced water after treatment has a turbidity of less than 2 NTU.

## Pre-chlorination system

Raw water is introduced by gravity from the dam. It is then

disinfected using sodium hypochlorite, which is an important step in the treatment to destroy harmful micro-organisms and prevent algal growth inside the process tanks.





## Coagulation and flocculation system

The chlorinated water flows to the flash mixing tank by gravity. Here, coagulant is dosed and mixed by means of high speed electrical agitators. Water is then directed to the flocculation tank where a flocculant is dosed and mixed by low speed agitators to insure good mixing. This process helps to reduce the suspended solids and organic matter.

## Clarification system

The influent continues its way to the tube settler clarifiers where solids settle and clear water overflows to the break tank prior to filtration. Each tube settler is designed to allow maximum efficiency removal of suspended solids. Sludge settles at the bottom of the clarifier and is periodically drained and transported outside the site for further treatment or disposal.

## Filtration system

Two filter feed pumps transfer the water from the break tank to the automatic dual media filters, where fine suspended solids are removed. The dual media filter is divided into three compartments each capable of treating 50% of the plant capacity. Filtered water is then collected from the three streams and stored in the treated water tank, where it meets a dose of hypochlorite to maintain sufficient residual chlorine concentration.

The dual media filter operation is automatic, and the backwash sequence is controlled based on time or high differential pressure across the filter bed. During backwash, two cells are in service while the third is in backwash mode. The use of filtered water from the duty cells eliminates the necessity of dedicated backwash recovery tanks and separate backwash pumps.



## Controls

The overall control of the plant is achieved through a state-of-the-art Programmable Logic Controller (PLC) integrated with a Man-Machine-Interface (operator panel). This provides an easy way to visualize graphic display for monitoring and controlling each component of the plant. Furthermore, various instruments installed in the process lines such as flow meters, pH meters and turbidity analyzers, provide the operator with the ability to properly maintain the plant operation in a reliable and safe mode.

The automation system has a manual mode feature to enable the plant operator to trouble shoot different equipments during maintenance and in emergency operation.

## Conclusion

As a result of Merito's efforts and commitment to the project milestones, the client was able to meet the water demand in time for the tourist season, an action that contributed to the Tunisian national economy and helped in raising the standard of living in the city of Sousa.

