Reusing Refuse

Bid to augment Nagpur's water supply through treated sewage

The city of Nagpur in Maharashtra has been witnessing rapid economic development due to its renewed role as the industrial and investment hub of the state. The city's population and urbanisation level have also grown rapidly due to rising migrant inflows. As a result, resource availability, especially that of water, has come under increasing stress. One of the foremost concerns in Nagpur today is the unrestricted use of potable water for various non-potable purposes.

To combat these issues, wastewater reuse facilities are being developed in the city. At present, a wastewater treatment project, which involves the reuse of 200 million litres per day (mld) of treated sewage, is under execution in Nagpur. The project aims to supply the treated sewage to nearby thermal power plants (TPPs) for non-potable use. This would make additional potable water, previously used by the power plants, available for meeting the city's drinking water requirements. It is estimated that this fresh water could serve at least an additional 1.5 million people.

Once completed, Nagpur's experience is likely to provide valuable insights, lessons and best practices to other cities looking to explore the treated wastewater segment. Further, this would also help civic agencies meet the growing water requirements for domestic, industrial and commercial purposes.

Background and project scope

At present, the city of Nagpur generates about 525 million litres of sewage per day. In 2014, the Nagpur Municipal Corporation (NMC) awarded Vishvaraj Infrastructure Limited (VIL) the contract for expanding the capacity of the Bhandewadi sewage treatment plant (STP) from 100 mld to 200 mld. The project scope also involves the construction of two 75 mld pumping stations at Pioli and Pohra and the laying of a 17 km rising main pipeline for conveying sewage from the two pumping stations to the STP. Construction work on the plant began in November 2015.

The project is being implemented on a design-build-finance-operate-transfer basis. As per the concession agreement, the concession period of the project is 32 years, which comprises two years for construction and a 30-year period for operation and maintenance (O&M). During the initial two years of construction, VIL will also operate and maintain the existing 100 mld plant.

Further, O&M activities at the STP will be carried out through a supervisory control and data acquisition (SCADA) system. Along with chambers and treatment units, flow regulation and valves of the plant will also be controlled through SCADA. Therefore, the plant will require minimal manual intervention.

Use of treated sewage and other by-products

As per the arrangement between VIL and NMC, the former has the right to sell the secondary or tertiary treated wastewater to any non-potable user. VIL is planning to sell the treated sewage from the STP to TPPs in the Nagpur area. These plants require low-end industrial standard water for ash handling and cooling towers. Treated sewage can thus act as a good substitute for freshwater for these requirements.

At present, VIL is in advanced stages of discussions with NTPC Limited for selling the majority of the treated sewage generated by the STP. The treated sewage will be used by NTPC's TPP at Mouda in Nagpur. A tariff rate of about Rs 10 to Rs 25 per cubic metre of treated sewage is being considered by the two parties.

Further, VIL is also planning to reuse the biogas and sludge generated as by-products during the treatment process. The biogas can further be converted into compressed natural gas (CNG). In fact, VIL is in talks with Swedish company SCANIA AB, which is planning to use