

## Canal Automation

The Sardar Sarovar Project canal system comprises 458 km long Narmada Main Canal (NMC) and a vast delivery network consisting of branch canals, distributaries, minors/sub minors channels and control structures viz., cross regulators, escapes, etc. NMC has design discharge capacity of 1134 cumecs (cubic meter per second). World Bank, experts suggested to operate the canal conveyance system by Control Volume Concept (CVC) of operation with an aim to improve the response time of the system, particularly keeping in view the distance of farthest delivery point from the sources (about 700 kms). CVC in turn calls for simultaneous operation of all the control structures, which is not practicable to be implemented manually and hence Remote Monitoring and Control System is inevitable for operation of the canal conveyance system. Irrigation water in the command area of SSP would be delivered to farmer's group (cooperatives or other forms) and not to the individual farmers as per the requirement of water. In order to distribute water equally in the command area irrespective of head / tail reach in the entire command area, and to minimize the wastage of water RMCS is necessary. Actually, main objective of SCADA based RMCS is to make system more efficient, responsive, flexible and safe. In order to deliver water at the distant points in the region of Kachchh, North Gujarat & Saurashtra Region, it is important to evaluate the actual demand of water. Normally, in order to distribute water, as per variations in demand, it takes days and days to reach in command area. However, in SSP these variations in demands of water will be known in advance. This needs advanced planning and designing of hardware as well as software of specific requirement, which is in progress.

Commonly it is observed that, there is overuse of water by initial command blocks (near the dam), and leaving less supplies to the areas down the canal. Canal Automation will eliminate this discrepancies and equal benefits of irrigation will be available to entire command area. It is planned that entire canal network, upto 300 cusecs (8.5 cumecs) discharge, shall be operated by a SCADA based Remote Monitoring and Control System. RMCS will ensure that required quantity of water will reach to farms. Nowhere, in the world Remote Monitoring and Controlled System for open channel network on such a large scale has been implemented. Even the project envisaged for SSP Canal conveyance network (600 km length) is larger than the existing canal automation projects elsewhere in this world.

Right from the study of functional requirements of SSP canal network to the selection of appropriate technology options, this unique project had no off the shelf available solution. Designing a customized system to meet the requirement and preparation of bid document following the norms of tendering of SSNNL were challenging and hence time taking. These advance actions were in-fact mandatory to bring the study to an implementable stage and thus the deliverable received from the consultants as per the contract are today ready with SSNNL as an asset. This decade long exercises has provided very useful insight into this relatively unexplored area and has also helped in in-house capacity building.

As the CAD works as well as Gate works of Branch Canal, Distributaries', Minors and Sub-Minors for pilot project Phase – I, are completed, it is now decided to go for implementation of Pilot Project for the Canal Automation on Main Control Center (MCC) at Gandhinagar and Divisional Operation Center (DOC) Vadodara, which will include Narmada Main Canal (0 to 458 km), Vadodara Branch Canal (with Jambusar and Kundhela Branch Canals) and Sakarda Branch Canal Systems. Telecommunication Consultants India Limited (TCIL, Government of India undertaking), New Delhi has been asked for Reviewing Detailed Design & Bid Documents for Canal Automation Pilot Project (earlier prepared by SCP-GERSAR in Year 2005), in light of the technological advancements, which has been completed. Tendering process for Revised Bid document for Canal Automation Project Phase – I is in progress.

Canal Automation is a inter – disciplinary subject with new technology, implementation of which needs technical expertise and co-ordination between the various engineering disciplines viz. Civil, Mechanical, Electrical, Electronics, Instrumentation, Control & Communication. Time Span scheduled for Canal Automation Project Phase – I, including Narmada Main Canal (0 to 458 km), Vadodara Branch Canal (with Jambusar and Kundhela Branch Canals) and Sakarda Branch Canal Systems is eight years. Out of eight years, First two years will be for implementation, one year will be for trial run, and remaining five years will be for Operation and Maintenance of entire canal network. This RMCS project will include laying of about 700 km of Optical Fibre, installation of 49 Remote Monitoring Units (RMUs), 135 Remote Control and Monitoring Units (RCMUs) and will provide the information for Water Level at 196 locations, Gate Position at 669 locations and Flow at 33 locations etc. At 135 locations of control structures gates will be automatically operated as per the requirement of water.

Estimated cost of the proposed project is about Rupees 306 crores.

