## High-level Water Quality Monitoring with Remote Data Transmission in the Mpumalanga Province in South Africa

OTT ecoLog 800 and Hydrolab DS5X

Background

Situated in the Mpumalanga province of South Africa Xstrata Coal South Africa (XCSA) runs several open cut and underground mining operations producing thermal coal.
For environmental **management purposes** they **have to collect and monitor water quality data**. **OTT Southern Africa was approached to supply** and install a remote monitoring solution.
Especially the installation of a multiparameter probe in the Olifants River for which 25 m of protection pipe along steep rocks had to be fixed was a challenge!
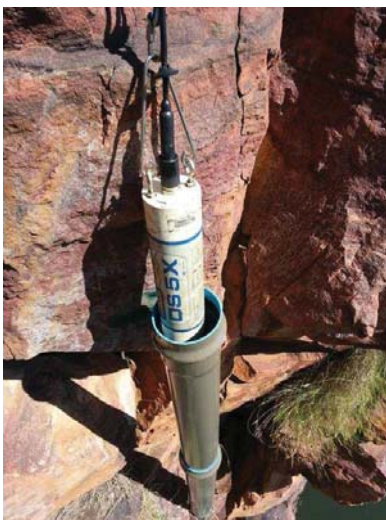
Task

"Long-term monitoring of selected streams and boreholes for environmental management"

The mining company wanted to record stream flow data for water license reports, water quality parameters for environmental reports and of course system performance data. An existing defunct remote monitor system had to be replaced and a new database for remote monitors had to be established.

The technical needs were high-level:

- Technology designed specifically for environmental monitoring applications
- Robust in construction for long-term deployment
- Long-life internal power source
- Small installation footprint
- Easy to install and maintain
- Remote data transmission capabilities; GSM or satellite
- Software system that is compatible with customer's IT infrastructure
- Flexible data management and data handling.

Monitoring Solution

The remote monitoring system was designed with the following **hardware components and functions**:

- 6 OTT ecoLog 800 units were deployed at 5 stream measuring points and 1 borehole site.

- Parameters are recorded hourly and reported daily via GSM/GPRS using FTP transfer to a secure server hosted by OTT.
- The Ecolog800 units are housed in structures designed and manufactured by XCSA as per OTT recommendations

The following parameters were selected:

- Water Level / depth (for boreholes)
- Conductivity (with Salinity and TDS derived)
- Water Temperature
- Internal Battery Voltage (configurable option)
- GSM Signal Strength (configurable option)

The remote monitoring system was designed with the following **software components and functions:**

- OTT Hydras3 + RX software was installed on a local PC at the Environmental Management offices.
- Data is retrieved via an internet connection and the database is populated automatically.
- Hydras3 software provides graphical interface and data export functions into other formats (text, Excel).

The Kanongat water quality monitoring system:

In addition to the XCSA remote monitor system, integrated into this project was the implementation of a **remote station** to **monitor water quality parameters**, located on the banks of the Olifants River at Kanongat inside the Loskop Nature Reserve.

This system is quite different from the OTT ecoLog 800 but still allows the data to be presented on the same OTT platform and managed by XCSA for reporting purposes to the forum.

The system contains the following **components**:

- Hydrolab DS5X Sonde with: pH, EC, Temp, Depth & DO
- OTT NetDL1000 IP Datalogger
- Hughes 9502 M2M BGAN Satellite Modem
- Solar power supply and secure enclosure

Data is logged hourly and transmitted 4x daily via IP satellite connection to the OTT FTP host server as with the Ecolog800 system

Summary/Outlook

For a successful implementation of this project the customer XCSA and OTT South Africa cooperated in the way that after the project scope was determined by the customer, **OTT was approached to select and supply the suitable products**. After XCSA had prepared and installed the sites, OTT supplied the following services:

- Commissioning
- Database and configuration
- Training and support

OTT will further support the customer with the database management and (on contract) carry out the system maintenance.

Thanks to the OTT Hydras3 +RX software the post process data handling will be comfortable for the customer

Technology

6 OTT ecoLog800 with integrated GSM modem

OTT HYDRAS3 + RX software suite with FTP/HTTP data retrieval

Mulitparameter probe **Hydrolab DS5**

IP Datalogger **OTT netDL 1000**

…and there is further potential to the project…

The customer has expressed the following needs for further developments and expansion of the system:

- Development of the system to allow for direct integration of the remote data into the GIS system. This can be achieved by implementing the HTTP/XML feature of OTT host server bypassing the need for the local Hydras3 software (in development phase).
- Re-conditioning of the stream flow measuring stations (external consultants and contractors).
- Addition of 10 new borehole monitoring stations.
- Inclusion of weather parameter monitoring

aqualab
scientific

t   +61 2 9894 4511
e   sales@aqualab.com.au
w   www.aqualab.com.au