

# PROTECTION & CONNECTION

## BAC'S NEW REMOTE MONITORING SYSTEM IS CAPITAL-FREE AND SIMPLICITY ITSELF



**A** new remote monitoring scheme for corrosion protection systems that makes use of GSM mobile telephone technology to transmit readings back to a control room rather than expensive bespoke equipment and software has been introduced by BAC Corrosion Control. As well as removing a need to incur capital expenditure, customers no longer need to concern themselves about regular software and technology upgrades.

CCOL, Cathodic Control On-Line, which in partnership with Tecnosystem of Italy, BAC rents to customers allows for various levels of data monitoring, logging, graphing and alarm warnings and uses the cellular network short messaging system (SMS) and the internet for display, monitoring and data manipulation. The hire charge also includes the data collection units with

field installation a simple operation. Limited damage insurance plus telephone and internet service costs are also included. Each data collection unit (SATcell) comprises a data logger with 2 channels, one for current and one for potential; a GSM transmitter and terminal board.



Data is accessed through a unique website where information can be viewed and graphed. Maps and documents can be uploaded to the relevant SATcell on the website whilst readings and graphs can be downloaded to a local PC for later viewing and analysis. Alarms for the potential channel can be set and if triggered can be sent to the user either through the SMS system (mobile phone text message) or via an e-mail.

Data is retained on the website for four years and each year's historical data is sent to the customer on a CD. Replacement equipment in case of failure and battery replacement is included in the rental cost. As the system is for rental only, there are no capital costs and the system is updated regularly in line with developments in technology. There is also a sister service to monitor pipeline pressure.

# 450KM PIPELINE AUDIT FORMED BASIS OF BAC'S NWL CP CONTRACT

**BAC CORROSION CONTROL** is now well into the final phase of its Northumbrian Water Limited (NWL) cathodic protection contract comprising minor civil works, testing, commissioning, interference testing and completion of technical manuals. The contract is part of an investment by NWL to help it achieve leakage targets and maintain the integrity of its strategic network of potable and raw water trunk mains.

Back in the late seventies and early eighties BAC worked with what were then smaller separate water undertakings that were later incorporated into what is now NWL, to apply corrosion protection to steel mains for raw and treated water. Subsequently, BAC also undertook annual surveys of the system. More recently the company has been involved in upgrading these earlier systems to bring them into line with modern technology.

The BAC/NWL relationship is such that about 4 years ago when NWL, along with other water undertakings throughout the UK, was being pressed by OFWAT to reduce distribution leaks, discussions began between the two companies into the economics of applying cathodic protection (CP) to other steel mains in the NWL region. As the pipelines that were already protected by BAC systems had remained leak-free, the question was being asked internally as to which other steel mains would benefit from the installation of CP systems.

## *Pipeline Audit*

As a result, BAC was awarded a contract to carry out a pipeline audit, refurbishment/upgrading and a cathodic protection programme for all NWL's large diameter steel trunk mains. The pipeline audit comprised a desktop study of buried steel water mains from the Scottish border down to the River Tees in County Cleveland. Working closely with NWL asset Managers and Utility survey teams, buried steel mains were identified and assessed for refurbishment.



*Transformer rectifier installation*

The mains were prioritised utilising a custom made criticality matrix, the major factors of which were the main's age, its coating specification and carrying capacity together with its strategic importance. Time and repair costs were also considered as was soil corrosivity and of course third party interaction. Also of importance were Sites of Special Scientific Interest (SSSI), leak histories, alternative routes to ensure supply continuity, access difficulties and finally, expenditure. Steel mains ranging from 200 mm to 1200 mm diameter with a combined length 450 km were identified and cathodic protection (CP) requirements re-assessed, designed and implemented.

From the criticality matrix a formula was devised and a table of about 20 pipelines were identified requiring protection by location, diameter and length and priority of installing CP as funds were made available. To date, the ten pipelines most in need have been refurbished and fitted with corrosion protection.

## *ICCP and Hybrid Systems*

Impressed current (ICCP), galvanic anode and hybrid systems using both ICCP and sacrificial anodes have been used to provide protection to the steel conduits, dependent upon factors pertinent to the specific main.

The ICCP systems used for Northumbrian Water employ shallow

horizontal groundbeds and the sacrificial systems, installed where ICCP is not practical due to possible interference with other buried structures – utility pipelines and AC power lines – use distributed magnesium anodes. These tend to be installed in pairs either close to – 3 metres – or remotely – up to 20 metres distant.

BAC is now well into the commissioning phase, the straight forward direct from A to B pipelines in the Wearside and Tyneside area having been completed. Those serving the industrial Teesside area are more complex in that they form more of a matrix and therefore take longer to commission. However, to date about 50% of the total NWL area has been commissioned.

## *Interaction With Others*

Interaction with other facilities in the area has been put to the test. Railtrack's fears of electrical interference with signalling systems were alleviated after a full and detailed testing programme indicated that no adverse affects would occur to the train signalling systems at maximum CP system outputs. TRANSCO has a vast array of HP gas mains in the industrial area along the River Tees and to ensure inter-company harmony BAC has maintained close contact throughout the construction phases.

The final test for interference is with Huntsman Petrochemicals and BP on the TSEP Ethylene pipeline. Based on the early co-operation between NWL/BAC and BP then the same successful outcome is expected.

## *CCOL System*

To maintain integrity of the overall system a Cathodic Control On-Line system (*see front page*) has been installed on a trial basis. Initial results from the trial are very encouraging.

## *Metro Extension*

The Tyne and Wear Metro has been extended to Sunderland and any interaction with NWL pipeline PC systems and other utilities along the route has been considered. To determine and set up a controlled system of test and monitoring facilities for utilities crossing, or in close proximity to the track a corrosion working party has been established. BAC Corrosion Control, representing NWL, is a member of this working party.

## Documentation

Before the contract is complete BAC will finalise all documentary records and hold a number of seminars for the operational and engineering staff to encourage best practice when working on pipelines. This will ensure that no adverse effects to either the pipes or the CP systems are created.

Operational manuals and codes of practice for the protection of pipelines are also being produced to enable NWL engineers to operate the systems correctly and carry out on-going maintenance functions on the CP installation thus ensuring system longevity once BAC move away from the site.

There are some very old sections of the network where cast iron pipes have been used and, as they are not electrically continuous due to the type of jointing system, protection is not economically practical. To apply sacrificial anodes would involve an anode every 6 metres along the lines to be effective. Instead, BAC's legacy for these pipes is that when repairs are necessary, a sacrificial anode is applied whilst the pipe is exposed, even if only a repair collar is fitted. As the majority of the cost of repair is digging the hole and the labour, the cost of an anode – about £40.00 – is insignificant but it will provide future protection the pipe 5 metres either side of the repair.

With continued monitoring and maintenance, the investment made over the last 3 years is likely to be paid back many times with diminishing costly leaks due to corrosion.

# Bright-Bond's New 'Smart' Pin Brazing Units Produce Greatly Improved Joints

**P**in brazing has come a long way since it was developed over fifty years ago to ensure electrical continuity on rails and connections for all types of track-bound transportation. As well as track applications the process is now common in the pipeline industry to make electrical connects for CP systems.



Both the battery operated BB2 and its bigger sister, the BB3 now have digital control systems instead of analogue to improve reliability. Electrical current quality to the brazing head is better resulting in a greatly improved braze. If the software within the control unit detects a problem when an operator begins the brazing sequence, it will stop the process immediately. The pin in the



*The 'smart' digital control system on Bright-Bond's new BB2(right) and BB3(left) pin brazing units can tell if optimum conditions exist and then produce perfect brazes every time.*

Bright-Bond's latest equipment makes the process even simpler using as it does a 'smart' digital control system that can tell whether optimum conditions exist for a pin brazing. The new BB2 and BB3 units from Bright-Bond, a division of BAC Corrosion Control ensure perfect connections virtually every time. Because the smart controller assesses the set-up conditions, brazing pins are not wasted by being partially brazed before the power cuts out.

gun can be used again as soon as the controller has assessed the conditions and indicated what needs resetting to provide optimum conditions.

The Bright-Bond BB3 unit is designed with wheels and can travel on a rail track. It has a large capacity battery and is suitable for all types of installation and maintenance programmes. The pin-brazing process is digitally controlled for consistency of the brazing action and is pre-programmed with three settings, F, B and G that coincides with the type of pin being used. When the correct setting is selected on the control panel, the brazing process is timed to provide an optimum brazed connection every time. The battery capacity is sufficient for approximately 100 brazes with the smallest brazing pin type and is recharged from a mains supply.

By connecting the BB3 to an engine-driven generator unit, the completely sealed batteries can be charged continuously and with this combination the set is suitable for bigger works, typically new construction.

The portable, lightweight BB2 pin-brazing unit is for smaller maintenance jobs or installations. The equipment functions in a similar manner to the BB3 but with a braze capacity of 40 brazes per charge cycle. However, batteries can be recharged using the Bright-Bond in car recharge system whilst transferring a BB2 from one site to another.

## The BAC Management says.....

*Welcome to the Winter 2002 edition of our "Protection and Connection" Newsletter where we are especially pleased to feature the new CCOL Remote Monitoring System which takes advantage of Internet and GSM mobile phone technology. Another important launch for us is the new Mk10 Global Surveyor Close Interval Survey Equipment which is being launched in conjunction with new Windows Data Management Software.*

*For further information or to arrange demonstrations on any of our Products or Services please feel free to call or email us.*

*We look forward to continued business together in 2004*

**Tony Gerrard**  
General Manager

# BAC LAUNCHES NEW WINDOWS COMPATIBLE MARK 10 GLOBAL SURVEYOR SYSTEM

**BAC CORROSION CONTROL has introduced a new Windows compatible version of its highly reputable Surveyor System which enables a complete pipe to soil potential profiles over an entire pipeline length by recording data every one to two metres for high accuracy.**

The new Mark 10 Global Surveyor system has simple-to-use MS Windows® based, printer friendly data management software. The latest chips, processors and oscillator have been incorporated into the Mark 10 which has a new ergonomic enclosure. Battery life has been increased by 30% and input impedance has been improved to eliminate all "noise". The new software is compatible with the full range of Global Surveyor equipment and although included in the price of the Mark 10 System, it is available separately for use with earlier systems. The system has 750Kb of

memory and a full QWERTY keyboard is included.

The software has been specially designed to enable downloading, editing, saving and printing of data collected from close interval (CIP) and DC voltage gradient (DCVG) surveys. It is compatible with MS Windows® 95, 98, NT 2000 and XP operating systems and requires a minimum computer specification of 300MHz processor with 32MB of RAM. Being MS Windows® based the software will print directly to any suitable printer (colour or mono) negating the need for costly dedicated plotters.

BAC's Global Surveyor System has been purpose built by cathodic protection engineers who understand the requirements for effective field work and cathodic protection data accuracy. The Surveyor System forms a complete package and comprises a data logger synchronised to the current interrupter, synchronised switchers to



*The new Mark 10 Global Surveyor has simple-to-use MS Windows based, printer friendly data management software.*

an accuracy of  $\pm 4$  milliseconds a day, a cable dispenser with automatic distance incrementing and special high insulation re-usable lightweight cable.

Together with its specialist data handling software the Surveyor data logger has the very highest specification available for field instruments. Input impedance is switchable between 10 and 1000 megohms and the common mode rejection is better than  $\pm 1$ mV for any DC input (operating range) and better than 100dB at 50-60 Hz for 10V AC output. Normal mode rejection is better than 60dB at 50-60 Hz for 10V AC output and the voltage accuracy is 0.1% FS.

## PIN BRAZING - Positive Track Bonding and Electricity Pylon Earthing

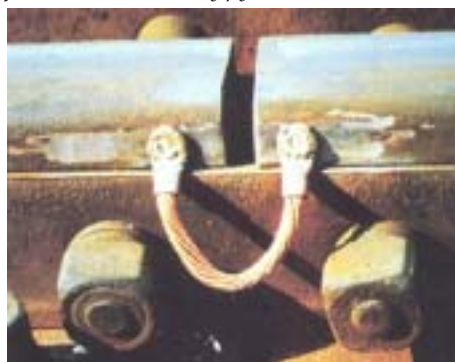
**Pin brazing is a fully proven technique that produces positive electrical connections. Its ability to withstand the elements enables the process to be performed worldwide, from the sub-zero temperatures in arctic Europe and North America to the tropical humidity in Africa and the Far East.**

As well as track bonding for signaling purposes the technique is used extensively for the connection of heater strips. Earth connections may also be attached to pylons carrying overhead electricity lines for railway locomotives and tramway systems. Pin brazing has also been a great success in the Cathodic Protection sector, bonding cables to pipelines carrying oil, natural gas and water throughout the world.

In practice, a specially designed

brazing pin is inserted into a brazing gun and a ceramic ferrule is placed over it. The gun is applied to a cable lug and after a few simple adjustments the trigger is depressed. A full bonding operation for brazing two cable lugs takes less than a minute, a saving of nearly twenty minutes per bond when compared

*As well as track bonding Bright-Bond is ideal for overhead electricity pylon earth connections.*



to the more conventional methods of track bonding. Tests have shown the bonding to still be intact after more than 5 million wheels have passed over it.

Bright-Bond has two main types of pin brazing unit, the popular BB3 with the capacity to produce approximately 100 connections per charge, for long stretches of rails or pylons and the portable BB2 unit, for service and maintenance operations, giving approximately 40 connections per charge. Both units can be tailored manually to suit user's specific needs. A wide range of ancillary equipment is also available including several types of brazing gun, specially designed bonds and cables, batteries and accessories. Bright-Bond units and equipment are available for sale, lease or hire.

The Bright-Bond technique is safe, fast, durable and all weather. Due to its high mechanical strength, Bright-Bond Pin Brazing is an extremely effective and efficient form of electrical bonding.

**BAC CORROSION CONTROL LTD Stafford Park 11 Telford TF3 3AY United Kingdom**  
Tel: +44 (0)1952 290321 Fax: +44 (0)1952 290325 Email: [bac@bacgroup.com](mailto:bac@bacgroup.com) Website: [www.bacgroup.com](http://www.bacgroup.com)  
**BRIGHT-BOND** Tel: +44 (0)1952 208524 Email: [brightbond@bacgroup.com](mailto:brightbond@bacgroup.com) Website: [www.brightbond.com](http://www.brightbond.com)

