

RADIUS



Integrated Utility Services
client newsletter
Summer 2004

Animal instinct

How we reorganised the
electrical infrastructure
at Flamingo Land



Glass act

Asset replacement
in practice

Right on track

Upgrading power supplies
for Network Rail

Safe pair of hands

Meet the team who see high voltage
as a vital emergency service

Welcome to RADIUS, the first edition of a new business magazine from Integrated Utility Services (IUS).

It aims to give you helpful information, particularly using case studies, about how our people help their clients.

If you have any comments about RADIUS, if you would like to see your own business featured in it or if you would like to know more about what IUS could do for you, please contact Cath Pattison on 01642 258042 or Rachel Peacock on 01642 258044.



Rollercoaster

of an assignment at Flamingo Land

“Never work with children and animals,” may be sound advice for most of show business – but not if your show happens to be the Flamingo Land Theme Park and Zoo at Kirby Misperton, North Yorkshire.

Every year, Flamingo Land welcomes children by the million to take a walk on the wild side and marvel at more than 1000 animals from tigers and giant zebras to those rather more cuddly and ever-inquisitive meerkats.

If they’ve still got a thirst for adventure (and which child hasn’t?) then there are more white-knuckle roller-coaster rides than anywhere else in Europe to keep the little darlings screaming happily all day long.

If they want to do it all again the next day, then there’s an en-suite holiday village and caravan park.

It was with electrical safety in mind that Flamingo Land commissioned IUS to undertake a comprehensive survey and upgrade of the existing electrical infrastructure across its 375-acre site during the closed season last year.

The project also included the installation of a number of additional distribution substations to

support ambitious plans for expansion which saw the addition of a number of new attractions for the 2004 season, such as a self-drive car ride and the daunting Lost River Ride.

Often working under difficult ground conditions during the winter which hampered access to some of the more remote substations, the IUS team replaced time-expired switchgear with the latest units designed to provide a much safer environment.

A new high voltage cable was laid and additional substations installed to bring power to the new rides and enable the zoo to house more animals in new enclosures.

Andrew Scott, chief electrical engineer at Flamingo Land, commented: “The

IUS team were very professional and worked all through the night on one occasion when they were preparing to bring a new substation on line.”

As a result, Flamingo Land was able to reopen in March for a 2004 season not only with even more attractions for its multitude of visitors, but also with an electrical infrastructure that is entirely in keeping with the park’s reputation for combining the best of fun with the best in electrical safety.



IUS wins Network Rail contract

In March 2003 IUS tendered and successfully won a prestigious contract with Network Rail to assist in the Southern Region Power Supply Upgrade (PSU) project in the South East of England. The project is in the order of £600 million.

The project came about because all of the old "slam door" trains in the region are being replaced with more modern rolling stock by April next year. The project is a major investment into the existing electrical infrastructure, and is the largest project ever undertaken on UK rail-based electrical assets. The necessity for the electrification upgrade is due to the new trains and carriages using more power because of automatic doors, air conditioning, heating and electronic passenger information.

The trains connect to the electrical system using a carbon "shoe" which floats on top of a live 750V DC conductor rail, also known as the "third rail". The third rail runs parallel to the running rails that the train wheels sit on, and is only used in the South East within the UK so IUS had to use all its experience in the industry to deliver the appropriate technical solution to Network Rail. The work



Getting connected:
IUS contract win adds an exciting new dimension to its already diverse portfolio

involves building new 33kV substations, and replacing existing ones, that transform and rectify the output to DC that is then connected to the third rail.

The 33kV system, which is privately owned by Network Rail, is located at the side of the tracks

and is connected through various grid supply intake points from the local distribution network operator. However, the DC technology and connectivity is relatively new to IUS and considerable innovation has been made by the company to

adapt to this alternative technology, thus adding an exciting new dimension to its already diverse portfolio.

IUS began work on this £20 million contract in April 2003 and it expects to finish this December.

Four-year framework with Central Networks



Cable management in action

IUS is providing a full range of power distribution services to Central Networks in the East Midlands. An extensive tendering process during 2002 was successfully negotiated by IUS, culminating in the award of a four-year framework agreement with Central Networks, formerly East Midlands Electricity.

IUS is delivering across the maintenance, investment projects and business connections platforms in the east area of Central Networks, and is one of five strategic external service providers in this large geographical area which includes Derbyshire,

Nottinghamshire and Lincolnshire.

The work ranges from low voltage up to 132kV, covering overhead line and substation inspections, overhead line refurbishment, underground cable reinforcement, automation scheme installations, substation maintenance, tree management, service replacements, protection replacement schemes, large diversion schemes, connection installations up to 3MVA and primary substation construction.

In addition, IUS has worked closely with Central Networks to develop a contractual model that reimburses actual costs incurred with a fixed

management fee paid to IUS for its services. An incentive mechanism drives IUS to monitor costs continually in order to receive extra fees for cost savings that are passed on to Central Networks.

Two years into the framework agreement, IUS has delivered a multi-million pound contract of services to Central Networks.

DID YOU KNOW?

■ IUS has offices in Dublin, Ballymena, Croydon and Hucknall as well as in Middlesbrough, Hull, Hellaby and Dewsbury

HIGH VOLTAGE

Why the High Voltage Customer Service team is similar to the nerve centre at one of the emergency services...

Day and night, around the clock and throughout the year, it's the silent unseen power that enables products to be made, goods to be sold and services to be delivered.

Treat it right, and high voltage electrical apparatus will continue to perform these vital roles without interruption. Neglect it, and the results can be catastrophic – in both financial and safety terms.

That's why every organisation using high voltage switchgear and transformers is required by law to provide management systems that will ensure safe operation and minimise the risk of injury. And those requirements are both strict and comprehensive:

- Accurate records must be kept of all switchgear in service, with diagrams showing the interconnections between switches and the plant they serve;
- An asset register must be prepared and kept up to date;
- Policies and procedures must be developed to cover the installation, commissioning, operation, maintenance and removal of the equipment;
- Responsibilities must be defined, and training provided for people dealing with high voltage equipment; and
- An auditing regime must be developed to monitor and maintain the effectiveness of procedures.

It is for all these reasons and more that 1,400 organisations now put their high voltage equipment into the safe hands



Safety first: an IUS electrical fitter takes a transformer oil sample for condition monitoring analysis

View from the HSE

"In general, switchgear has a proven record of reliability and performance. Failures are rare but, where they occur, the results may be catastrophic. Tanks may rupture and, with oil-filled switchgear, this can result in burning oil and gas clouds, causing death or serious injury and major damage to plant and buildings in the vicinity. Failures of switchgear can also result in serious financial losses.

"The use of modern switchgear containing sulphur hexafluoride gas and/or vacuum has removed the hazard of burning oil but inevitably has introduced other risks that need to be managed. Accident experience has shown that failure usually occurs at, or shortly after, operation of equipment. How switchgear is operated, its condition and the circumstances existing in the electrical network at the time of operations, can affect its ability to perform safely."

Extract from "Electrical switchgear and safety" by the Health and Safety Executive.

High voltage

What the law says

Owners and operators of high voltage equipment have a legal responsibility for their apparatus in accordance with:

- The Health and Safety at Work Act 1974;
- The Management of Health and Safety at Work Requirements 1999; and
- The Electricity at Work Regulations 1989.

of IUS. Members of the specialist High Voltage Customer Service (HVCS) team provide the professional support needed to install, commission, maintain and, where necessary, repair and replace high voltage switchgear, cabling and transformers not only in accordance with the law but also in line with the financial and operational requirements of those clients.

"While we cannot take away the legal responsibility from the owner of the equipment, we can provide the peace of mind that

comes from knowing that their high voltage equipment is installed, maintained and operated by people who have the specialised training and accreditation to do so," explained HVCS commercial manager, Tony Askins.

The new HVCS team was formed two years ago through the amalgamation of the former Northern Electric and Yorkshire Electricity high voltage service organisations. The move saw the establishment of a new central control and administration base

in Middlesbrough, which is where each client's maintenance records are kept up to date and from where teams of locally-based specialists are despatched to clients' premises.

There is a smaller satellite office in Hull where two experienced engineers prepare quotations. The team also includes two sales engineers who can advise prospective and existing clients on the most suitable maintenance regime for their equipment.



Meet the HVCS team: back row from left Neil Mole, Ian Musgrave, Rachel Peacock, Cath Pattison, Tony Askins. Front row from left Susan Spencer, Ian Gowland and Samantha Appleton

Cath Pattison, a business process manager at Middlesbrough, described the operation as “similar to the nerve centre of one of the emergency services, where we respond to each client’s requirements by pulling together a team of suitably qualified specialists for each task.

“We also maintain up to date equipment inspection records

to spot potential faults before they can develop into serious problems.

Operations manager Neil Mole can call on hundreds of people throughout the IUS organisation with appropriate skills as project managers, senior authorised engineers, fitters, jointers and linesmen. They are all certified for competence and operate to the company’s

“There’s a great feeling of satisfaction in knowing that I’ve helped to keep a client’s business running smoothly by leaving their high voltage equipment in better condition than I found it.”

Current clients range from major organisations such as Northumbrian Water, which alone has more than 30 separate maintenance agreements with

always remain with the owner, HVCS can take away all those day-to-day worries about the condition of switchgear, cabling and substations. It’s high voltage power in safe hands.

Qualified and accredited

The IUS High Voltage Customer Service organisation holds all these accreditations:

- ISO 9001:2000 for quality systems and management, updated and audited regularly by Lloyds Register;
- ISO 14001:1996 for environmental management, audited annually;
- Link UP, UVDB and Supply Line – recognised as approved contractor status for high voltage work; and
- Current Contractors Assurance Case – allows IUS to carry out HV work for Network Rail.

in safe hands

for each client, and store them on a database.”

As well as maintenance, project work, such as the installation of new equipment, is also handled from the Middlesbrough centre, where, via appropriate training, dedicated team members keep their skills constantly up to date as new types of equipment come into service.

This is also where samples of transformer oil are logged as part of a condition-based maintenance service designed

approved Safe Systems of Working and comply with the Distribution Safety Rules and Operational Practice Manuals.

It is a challenging – and rewarding – role for those at the sharp end.

“One day could see me carrying out a routine annual inspection on a transformer, and the next could find me responding to an urgent call to restore power after an unexpected failure,” said Mike Bonning a senior authorised operational engineer.

IUS covering its assets in the North East, to much smaller companies with just a single transformer.

Recent work has included an extensive programme of 66kV maintenance and battery replacement for BOC, as well as a range of substation services and inspections to meet the statutory requirements of the rail industry.

Although the law says that the final responsibility for the safe maintenance and operation of high voltage equipment must

DID YOU KNOW?

■ We have more than 1,300 maintenance agreements in place and we inspect more than 1,800 substations each year.



Step inside: the main entrance to Leeds University

A major centre of learning

The University of Leeds is acclaimed world-wide for the quality of its teaching and research. It is the most popular among students applying for undergraduate courses, and an emphasis on innovative research and investment in high quality facilities and first-rate infrastructure means that no fewer than 35 departments are rated internationally or nationally as 'excellent.'

Leeds has more undergraduates studying languages and physical sciences than another UK institution and has also developed distinctive areas of specialist expertise in rarer subjects such as colour chemistry and fire science.

With 7,450 staff and 31,500 students (plus another 52,000 on short courses) the university is a significant community in its own right. As well as 2.7 million books, the university houses 9,000 PCs, 150 Sun computers and servers, eight Sun high-performance servers and 250 supercomputers.

Principal contractor

IUS is carrying out the principal contractor role for the upgrade of the electrical infrastructure at the University of Leeds with responsibility for design, site delivery, co-ordination of the specialist sub-contractors, testing and commissioning.

This prestigious contract involves the installation of a power logic control system, replacement of HV apparatus, extensive LV modifications and associated power factor correction equipment.

Degree of success

Electricity provides the power for learning, for living and for research at the University of Leeds – now celebrating its centenary as one of the UK's premier educational establishments.

IUS is helping to bring the university's electrical infrastructure up to modern standards, and to provide capacity for further expansion, under a major £2 million project that includes replacing all the 11kV switchgear and upgrading 15 substations across the 1,230-acre campus.

As overall project managers, IUS is also co-ordinating the modification of the low voltage network as well as the installation of power factor correction equipment and a 'fly

by wire' power logic system that will enable the university's estates manager, Stuart Allam, to monitor every substation and control all the HV and LV circuit breakers from a PC.

Adding to the scale and complexity of the two-year project is the fact that the university requires power all year round, meaning that all the work involved in providing a safe and robust electrical infrastructure has to be carried out with minimal disruption.

While the campus hums with more than 31,500 students during each academic term, the vacation periods are far from quiet: "We had to ensure that power was maintained for the Aikido World Championships, which were held at the university

last summer, while this Easter saw our work move to a substation serving the dental teaching hospital on site where it was equally vital for power to be maintained," explained IUS project manager, Chris Parkes.

"Beyond that, many experiments – some of which need to be kept running over protracted periods – rely on electrical power, as do the many fridges and freezers which are used to store important samples or perishable material.

"The whole exercise calls for very detailed planning to make sure that no essential supplies are interrupted, and we've achieved that through a combination of reconfiguring the HV or LV circuits and providing back feeds. Without exception,

our work on each substation has required some form of temporary power supply to maintain essential usage."

Transformers converting 11kV power to 415V have been replaced in three substations, and every substation has seen an upgrade of the incoming circuit breakers for the low voltage switchgear.

The work is being carried out by a small core team of specialists, with additional resources being brought in to suit each phase of the project.

With the project now two-thirds complete – and remaining both on time and within budget – IUS will be maintaining its links with the university by providing an operation and maintenance service into the future.

Lotta bottle

Every time you pick up a pinta from your front doorstep, the chances are that milk bottle came from Rockware's giant glass packaging factory at Wheatley in Doncaster.

As well as producing 60% of Britain's milk bottles, the Wheatley plant also makes clear glass bottles and jars for some of the best-known brands in the business, from pickles, soft drinks and sauces to peanut butter and jam.

With an annual output of more than one billion glass bottles and jars, the Wheatley site is not only the biggest in the UK, but also among the best with a string of awards to its credit including a share in the Queen's Award for Sustainable Development won by Rockware for its role in recycling glass containers. That record for

quality and efficiency has just been enhanced with the installation of a new high voltage electrical distribution system which IUS is undertaking in two phases.

The first phase has already seen the replacement of the site's two HV substations, where obsolete oil-filled equipment has been stripped out and modern vacuum-insulated units installed. At the same time, an automated control and monitoring system has been provided to make future operation not only simpler, but also safer.

"The older equipment was manually operated, which meant somebody had to physically stand in front of equipment to turn it on and off, which was a potential safety hazard," explained Bob King, the site's engineering manager.

"The oil-filled units were also heavy on maintenance, requiring regular checks for the presence of contaminants such as hazardous PCBs, but the new switches are now much more user-friendly with remote control and monitoring facilities available from a PC."

Electrical power is a vital component throughout the

manufacturing process at Wheatley, with some of the HV circuits being dual-feed to ensure a constant supply to mission-critical equipment such as the furnace cooling system.

During the design phase for the project, IUS worked closely with the Rockware team at Wheatley to ensure that the new system met the company's requirement for lower maintenance, enhanced safety and improved operational capacity.

'The new switches are now much more user-friendly...'

Installation was phased to minimise disruption to production, which continues round the clock every day of the year. There will be a similar requirement for the second phase of the project, which could see IUS use directional drilling techniques to enable production to continue without disruption during the installation of replacement cables throughout the operational areas of the site.

Putting the power behind Polypipe's plans

As one of Europe's fastest growing and most successful manufacturers of plastic products for the building, construction and leisure markets, Polypipe has impressive expansion plans for its production facilities in Doncaster.

And IUS has been putting the power behind those plans with a comprehensive programme of new and replacement high voltage (HV) and low voltage (LV) distribution systems designed to keep Polypipe ahead of the game.

Based on the wealth of experience built up through supporting clients with similar needs, IUS designed the

replacement of obsolete oil-filled switchgear with a new, non-oil high voltage distribution board to maintain the existing connection with the transformer, and to serve two new transformer positions.

IUS also supplied and installed new low voltage cables and an LV distribution board, carefully routing the cables to suit site conditions and using inverted cable boxes to allow easy access for further inspection and maintenance without the need for significant civil engineering work.

As the existing source supply equipment did not suit Polypipe's future expansion plans, IUS

recommended the replacement of the existing HV circuit protectors with fully-reconditioned circuit breakers, current transformers and relay protection as the most cost-effective way forward.

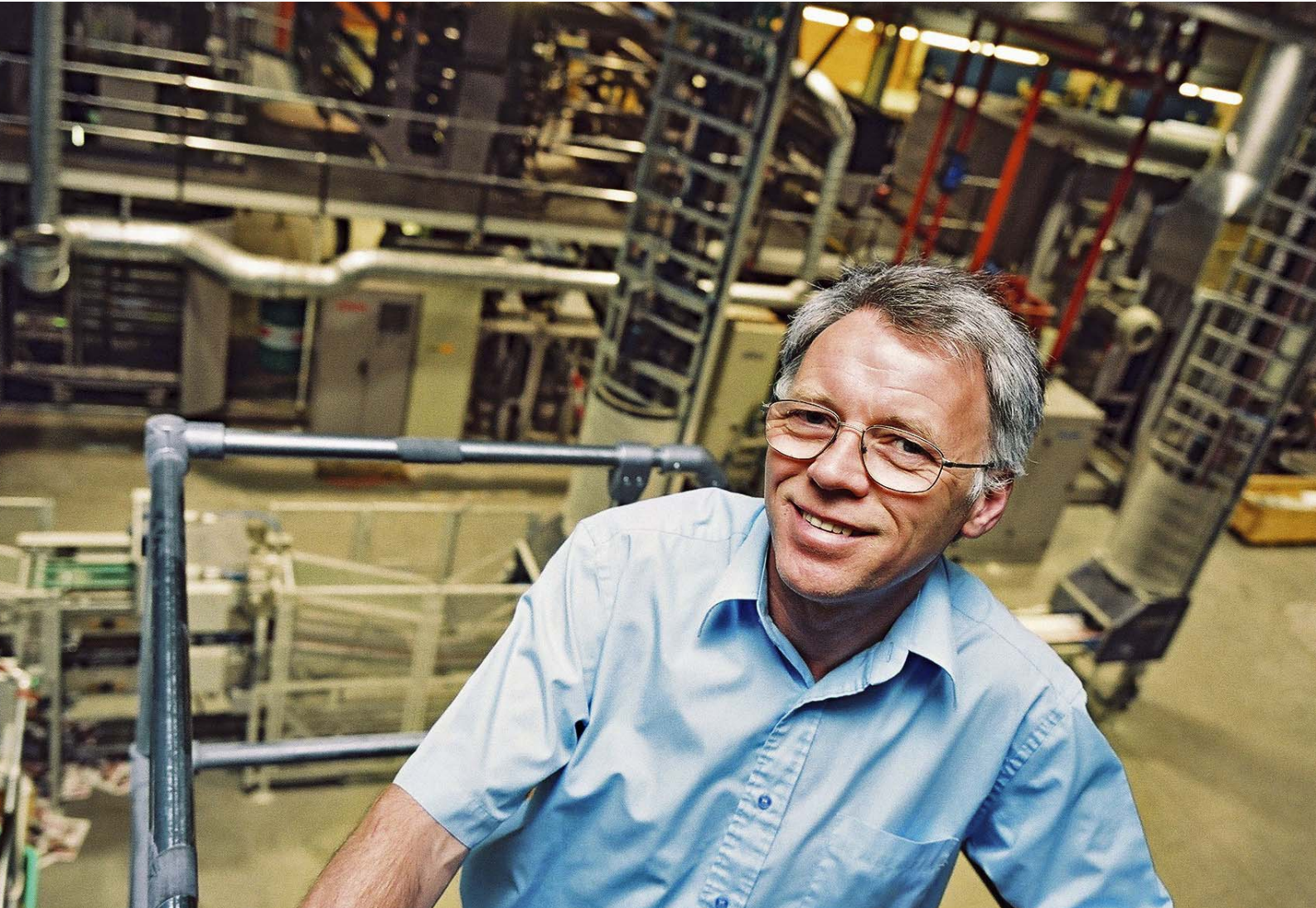
As a result, Polypipe now has modern HV distribution equipment designed to integrate practically with existing site designs and equipment – as well as to serve future distribution points that will cater for further development.

Although this type of work on an active site can present a number of challenges, not least of which is the need to keep

production running, IUS's experience with HV and LV distribution can prove vital in maintaining the confidence of the client that everything will be handled safely and competently.

DID YOU KNOW?

■ IUS is part of the CE Electric UK group of companies. IUS's mission statement is: 'To be an industry leading provider of utility services.'



Power of the press: Polestar Petty's engineering director Les Fenton at the Leeds plant

Hot off the press

There's no 'stop press' for this time-critical client.

With more than six million copies of some of Britain's most popular magazines to produce every day, they can't afford to stop the presses at Polestar Petty – the UK's leading printer of time-critical publications.

And just as readers can't wait to get their hands on the latest

issues of magazines like 'Now' and 'Radio Times,' so Polestar Petty couldn't switch off the power for a second longer than necessary while IUS installed a complex scheme on 11kV switchboards, transformers, LV switchboards and both HV and LV cables – to make way for even greater output from the Leeds-based plant.

The critical factor in the project was the arrival of a new four-unit Heidelberg Sunday 4000 press – the second to be installed in just six months – along with new drum-stitching equipment and two four-unit double width magazine presses.

The IUS team worked closely with Polestar Petty to define and amend the electrical scheme, which not only catered for the new equipment, but

also upgraded the supply to existing units.

"By combining a number of small projects into a single programme of work, we gave Polestar Petty the flexibility it needed while the new equipment was installed, as well as the security of power supply it depended on to keep the presses rolling," said Des Baird, tendering & estimating engineer.

While time was one critical factor, space was another. IUS had to design and install special high-level gantries to accommodate some of the transformers and switchgear, and as each new piece of printing equipment arrived, solutions had to be found for supplying power from different areas of the plant.

With the project still ongoing, Polestar Petty's engineering director, Les Fenton, is happy with the way IUS is performing.

"They're very good," he said. "Our production hasn't been slowed down at all – we cannot afford to let it do so – and when we've had to shut down, it has always been for the absolute minimum time."

As part of the programme, IUS has also designed and installed power factor correction equipment to keep the maximum capacity within agreed limits.

Polestar Petty was the world's first company ever to insert Post-It Notes into magazines online, and has since applied more than 20 million such notes to make it the UK's leader in this type of application.

DID YOU KNOW?

■ IUS's range of services include:
HV/LV Contractor
Operation and maintenance
Rail
Consultancy
Multi-Utility
Public Lighting
Connections