> **We are now in a position where we can retrieve and modify drawings efficiently with the added benefit that all drawing data is now in a format compatible with the majority of other company's CAD systems.**

NORWEB

Customer Focus

Organisation: Norweb Distribution

The project: Document Conversion

Cad-Capture was required to implement its expertise in:

1) Document management

2) Large format scanning

3) Small format scanning

4) Document conversion services

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PROJECT: Norweb switches on to Document Conversion

Norweb is an electricity and gas supply distribution company. A subsiduary of United Utilities, the business includes Norweb Energi, Norweb Telecom and Norweb Distribution.

Norweb Distribution maintains a distribution network of around 14,000 kilometres of overhead lines, 45,000 kilometres of underground cables and 32,000 substations to supply electricity from power stations and the National Grid. Norweb Distribution is responsible for delivering 23,800 GWh of electricity annually to 2.2 million customer premises in the North West of England.

Headed by Alan Jones, the Grid & Primary Systems department is responsible for all 132kV and 33kV asset replacement project work within the North West of England. The department is divided into three functional sections; Major Asset Development, Major Asset Construction and Network Management. The work of the department involves system planning and design, the management of electrical and civil construction projects and the management of maintenance works on the system.

At the beginning of 1999, Bruce Taylor, Major Asset Development Team Leader based at Norweb's Hathersage Road site in Manchester was facing a problem. All the drawings and records detailing Norweb installations throughout the area were stored in a number of electronic formats based around various out of date and unsupported legacy CAD systems as well as some in AutoCAD R12. Many of the drawings were difficult to use and there was no assurance that the Unix based CAD systems used to produce the drawings would be Y2K compliant. Norweb had no effective drawing management system in place and used a Sybase database as a drawing register. Added to this, they also had a considerable number of large format paper drawings and 70mm microfilms that were required to be in electronic format if they were to be a useful resource.

Norweb took the decision to implement a comprehensive document management system throughout the Grid and Primary Systems department. The solution sought, involved the installation of a Motiva document management system to be supplied by EDC Photonic with all CAD stations operating AutoCAD14 and GTX rasterCAD. The project would also involve the installation of new hardware systems to replace the existing ageing equipment and the conversion of all the existing drawings regardless of their format to be compatible with the new system. The conversion of their existing drawing archive would enable them to progress from their present situation of having to use a variety of legacy systems for storage, retrieval and viewing of documents to a standard system for finding and viewing all documents.

Norweb turned to Cad-Capture for document conversion services in order to achieve their aim of compatibility for their existing drawings.

Cad-Capture was established in 1987 as the UK's first large format scanning bureau. Specialists in the Industrial sector, Cad-Capture offered a wealth of experience in the provision of document conversion services and the supply of document management solutions to industry.

Bruce Taylor attended the official opening of the new Cad-Capture building at the Greenfield Rd site in Blackburn. The gala event was attended by Jack Straw

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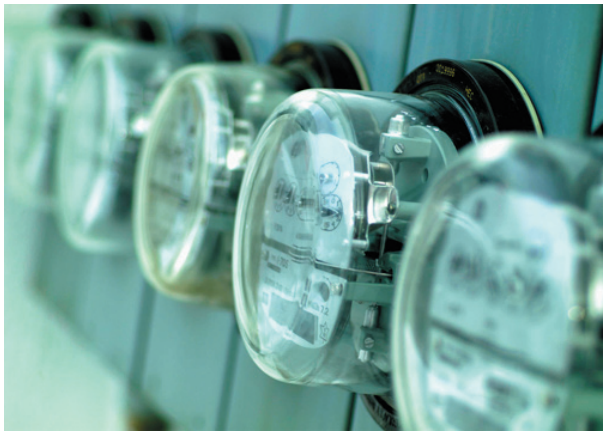
the Home Secretary and MP for Blackburn, and Mr Tayor was invited as Norweb were a valued existing Cad-Capture customer. Cad-Capture had previously carried out successful document scanning contracts for Norweb who had been more than satisfied with the quality of the services provided.

During the visit all guests were treated to a tour of the new site as well as demonstrations of the capabilities of Cad-Capture's drawing conversion facilities. Mr Taylor was very impressed by the visit and in particular by the company's expertise in CAD based solutions.

Cad Capture was invited to visit Norweb for an initial discussion of Norweb's document conversion requirements in May 1999 and to assess Cad-Capture's ability to provide a suitable



solution. Cad-Capture were subsequently awarded a two part contract which included the conversion of all existing electronic files on the Norweb systems and the scanning of over 1000 large format drawings and almost 2400 70mm microfilm documents. Cad-Capture would then supply Norweb with AutoCAD R14 compatible drawing files.

Norweb had a varied electronic drawing archive. There were around 3000 drawings created using the Proscan Unix based CAD system. The Proscan files were built using a series of directories to store layers within the CAD drawing and presented a particular problem for conversion.

Approximately 1600 of the drawings were in AlperTIFF format, created using the Alper CAD system on Unix based Sun Workstations.

There were almost 4000 large format drawings in uncompressed TIF format that had been previously provided by Cad-Capture as part of an earlier project. At the time Norweb's CAD systems were unable to view a complete large format drawing due to the file size, so the drawings had been split into sections to accommodate their requirements.

Other drawings included a number of A4 and A3 sized drawings in HowardTIFF format and around 7000 AutoCAD R12 drawings, 500 of which included associated raster files linked via GTX raster CAD.

The solution proposed involved the upgrading of all the AutoCAD R12 to AutoCAD R14 and the conversion of all the remaining drawings in to TIFF group 4 format. A new AutoCAD14 drawing would then be created for each drawing. The converted document would reside as a raster layer within the AutoCAD drawing.

As with many legacy systems, problems with the previous management of drawings meant that there was no record of the number of duplicates, redundant or out of date drawings or of empty drawing files that had been created within the various Norweb systems. Conversion work on the drawing files could not begin until this had been resolved and so Cad-Capture set about developing procedures that could quickly manage this process and extract only valid drawings for conversion.

The validity of drawings was determined using the file size and name to determine if a drawing was empty or invalid. Where it was impossible to assess the files using this method, the drawings were visually examined, and a decision made based on the details within the document.

The existing Norweb systems varied greatly. As a consequence of this there was no consistent drawing name or numbering convention. Norweb wanted to ensure that a new logical drawing numbering sequence was used in the new Motiva system and as a result, the archive documents needed to be renumbered to accordingly.

Routines were developed for automatically numbering the TiFF4 files as they were converted and a suitable indexing specification drawn up to meet Norweb's document management requirements. The generated drawing numbers reflected the site that the drawing referred to and the number of the drawing at that site.

Work on the conversion of the documents began in the middle of October 1999 after a considerable amount of time and effort had been dedicated to ensuring that the files were valid before conversion.

Norweb required Cad-Capture to submit procedures for approval prior to commencing work and the implementation of a pilot conversion to determine the effectiveness of the solution.

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Due to their structure it was not possible to simply export the Proscan drawings. However Cad-Capture devised a solution that captured a raster compilation of the file from the Unix system by intercepting the files as they were sent to print from the Proscan software. This process could only take place at the Norweb offices and a Cad-Capture engineer worked on site until all the Proscan files were captured.

The AutoCAD R12 drawings were converted to AutoCAD R14 and renumbered using the automatic numbering routine.

The previously converted uncompressed TIFF files would have presented a particular problem due to the fact that they had been split in to 2 or 3 A1 sized files. This had been done originally to accommodate the fact that Norweb's Alper CAD system could only read files up to A1 in size. Converting the files to single file drawings would have meant stitching several files together to form a single drawing file. Fortunately, Cad-Capture's quality system ensures that an archive copy of all the drawings is kept

unless the customer requests deletion. The existing Norweb files were discarded where appropriate and Cad-Capture supplied Norweb with complete copies of the original files.

The remaining Unix based CAD and TIF files were converted to TIFF4 format and renumbered accordingly.

All the converted tiff files were indexed according to Norweb's requirements. The Index specification consisted of a number of mandatory fields including revision number, the previous drawing title, the drawing number and grid references.

Once the documents were converted to TIFF 4 the batch process of creating AutoCAD .DWG files could be carried out during which the converted documents were attached to the AutoCAD drawings. The final stage in the process involved the adding of an extended attribute to the AutoCAD drawing into which the drawing number would be automatically loaded when the drawing was opened within the Motiva system.

All the document conversion work for stage 1 of the contract was successfully completed by mid January. The last of the stage 1 drawings were delivered to Norweb ready for integration with the new document management system over the holiday period.

Work on stage 2 of the contract, which involved the scanning of Norweb's hard copy drawing archive, was completed at the beginning of February 2000.

Cad-Capture scanned the large documents using conventional large format scanning techniques to provide high quality TIFF 4 images. These were subsequently numbered and indexed to the Norweb specification in the same way as the electronic document archive.

The 70mm microfilms were converted using a unique scanning process developed by Cad-Capture. The conversion-process provided Norweb with a high quality greyscale image; the converted files being supplied in JPEG format.

The JPEG format drawings were integrated by attaching them to the AutoCAD .DWG files in the same way as the TIFF files.

Norweb are already benefiting from their use of an effective document management system in which all their documents are controlled, relevant and accessible. The conversion contract has enabled them to maximise their existing resources without losing any of their drawings and allowed them to implement an effective solution in the shortest possible time.

"Cad-Capture has provided the Grid & Primary Systems department with a quality service both on and off site, adopting both a friendly and professional approach to what was a seemingly impossible task. They have converted around 16,000 drawings into a compatible format so that we can access them within our new document management system. We are now in a position where we can retrieve and modify drawings efficiently with the added benefit that all drawing data is now in a format compatible with the majority of other company's CAD systems."

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