

United Utilities - sludge pathogen removal

15 multi-site projects in AMP3 programme

by
John Klunder CEng, MICE, MCIWEM
Shanthi Rasaratnam CEng, MICE, MCIWEM

In January 2001, responding to the Water Industry's commitment to the British Retail Consortium (BRC), United Utilities (UU) committed to 15 multi-site construction projects all aimed at ensuring compliance with anticipated revisions to the Sludge Use in Agriculture (SUA) Regulations by 31st December 2001. The regulations introduce (inter alia) bacterial standards for treated sewage sludge recycled to land, similar to those already in force in the USA and anticipating forthcoming European legislation. The Ribble & Warrington AMP3 Sludge Pathogen Removal Project is typical of the works undertaken to a very tight programme requiring extensive cooperation between UU, its engineering services provider, MWH and the selected contractor Birse Construction Ltd (BCL). The works covered 3 sites at Leyland, Burnley and Warrington and included the construction of sludge screening facilities and 11 secondary digesters within a 9 month period.



Completed secondary digestion tanks at Warrington (courtesy MWH & United Utilities PLC)

Design development

The design was based on the principles developed during the Options investigation completed in November 2000. This investigated the performance of over 30 sludge treatment plants within the UU area and identified the features required for compliance with the SUA Regulations, together with those desirable for reliable and efficient operation of the plant. These key features were summarised in the idealised Process Train (IPT)¹. Each site in turn was then compared to the IPT and a site specific programme of improvements was identified. Typically, this included the following items:

- * screening of all sludge to 6mm in two directions;

- * two day buffer storage;
- * mesophilic anaerobic digestion (MAD) with 16 days average retention;
- * secondary digestion with 14 days batch retention;
- * automatic control and data logging to demonstrate compliance.

Project management

The programme required could just be achieved within the normal framework for UU AMP3 work, including competitive tendering and the various UU financial approvals, but with very little 'float'. After considering the alternatives it was decided that this route should be followed, and it was clear that this would require careful management if the end date was to be achieved.

The procedures set up by UU and MWH to manage the AMP3 Programme include a number of Value Management workshops for each project, timed to coincide with the key decision making stages of the project. This is designed to achieve clarity of information and consensus on decisions between various parties including the UU and MWH Project Managers; the designers (from both MWH and the Contractor); works operators, maintenance staff, and any others who have an input. Key aims are:

- * common understanding of project objectives, scope and programme;
- * jointly addressing problem areas and agreeing a mutually acceptable solution;
- * identifying risks and putting in place mechanisms to manage them.

The sludge projects were amongst the first to be subjected to these procedures and were a significant test of their performance. Whilst there were some upsets along the way, the project met or exceeded expectations in all key target areas.

Design management

The work included many items common to several sites, for example sludge screens; buffer tanks; secondary digesters and sludge mixing systems. Signature designs were developed for these items based on the first projects to be executed which saved considerable time on later projects. These, together with the IPT, have subsequently formed the basis for UU's revised Asset Standards.

Other items were very much site specific, including many interfaces with the existing plant. The plant is generally over 20 years old and its original design and current condition required considerable research. Further, since the work was to be carried out on live plant the construction sequence required careful consideration and, in some cases, temporary measures were

required to maintain the existing sludge treatment during construction. These matters were investigated and developed by liaison between the designers and operators, employing the procedures developed by MWH and UU for the AMP3 programme. Where firm solutions could not be identified within the time available, the key risks were identified and methods of managing them were put in place.

Construction management & commissioning

After contract award the focus has shifted to the Contractor's programme of work, the interfaces between his work and the normal operation of the treatment plant and management of design and contractual issues as they arise.

The work was awarded to *Birse Construction Limited (BCL)* on a GC Works (Design and Construction) contract, with design by *George Hutchinson Associates* and *Livingstone Gunn Projects*. A close liaison was established early in the contract between the designers from MWH and BCL, allowing design issues to be discussed in a timely manner consistent with the construction programme. This, together with the good working relations and pragmatic approach exhibited by all parties enabled the inevitable setbacks to be handled without undue impact on programme or budget.

Summary

The Biosolids Compliance Projects have all achieved the critical compliance date of 31st December 2001. On the Ribble and Warrington Sludge Project, work continues on completion of ancillary items with final completion expected end May 2002. ■

References

1. Le M S, Mayhew M.E, Ratcliffe R.W.2000. Enzymic Hydrolysis as a means for pathogen control in sludge treatment. Proc of the Joint CIWEM Aqua Enviro 5th European Biosolids and Organic Residuals Conference. Nov 2000, West Yorkshire.

Note on the authors: *John Klunder is Project Manager, MWH; Shranthi Rasaratnam, Biosolids Programme Manager, UUPLC.*



Birse site team during construction at Burnley (courtesy MWH & United Utilities PLC).