

Prescot Water Treatment Works

£9.1m scheme for increased output & reduced compliance risk

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This £9.1 million project to address Prescot Water Treatment Works' Cryptosporidium compliance and increase output is on target for completion despite significant constraints and challenges to the whole team from design through to delivery not least of which were the requirement to maintain the operational status of the existing works, and the compact nature of the site. The purpose of this flagship scheme is to reduce the risk of cryptosporidium break through and increase the works output capacity to 120MI/d.



Prescot WTW: Overall view of compact site

courtesy: KMI Water

The project has two phases:

- * **phase 1: Cryptosporidium compliance up to a capacity of 50MI/d by week 55;**
- * **phase 2: Cryptosporidium compliance up to a capacity of 120MI/d by week 74.**

The plant's operational requirement will be between 20MI/d and 50MI/d, the maximum output of 120MI/d will be used to provide back-up in the event of a pollution incident in the River Dee (Deepol) to cover the loss of production from WTW's which use this as a raw water source.

The complete project comprises a raw water inlet pumping station, two microflocculators, two rapid gravity filters and a filtered water transfer pumping station, along with a clean backwash system and dirty backwash treatment plant. Further refurbishment of the existing plant processes also form part of the contract.

In the initial phase KMI Water's design team worked closely with

United Utilities (UU) and (MWH) to value engineer the whole project. As a result, four complex below ground structures were incorporated into two compact process plants with much improved constructability and programme certainty.

To put this in perspective, the main contract works is sited on what can only be described as something akin to the size of a 5-a-side football pitch with all structures and buried pipelines (up to 1600 mm dia) interconnected. Detailed planning highlighted that a significant amount of phase 2 works had to be constructed ahead of schedule, due to constructability issues within the very tight footprint. A risk was also identified to the operation of the filtered water transfer pumping station sump. Designers *Entec* undertook computer fluid dynamic (CFD) modelling to provide a solution to the issue in the most cost effective and time efficient manner.

Mechanical and Electrical Installation works commenced on programme, working alongside the main civils subcontractor to achieve timely completion in order to maintain/secure the intensive programme for the Ph1 and Ph2 Commissioning Phases.



Prescot WTW: New filtered water PS with new pumps, pipework, valves & access steelwork

courtesy: KMI Water

All structures are now complete including the Raw Water Pump Station, Microfloculator and Dirty Backwash Treatment Plant, existing 6 Duplex Filter refurbishment works, construction of 2 new Duplex Filters and the new Filtered Water Transfer Pumps Station. All interconnecting pipe work and valving, ranging from 350mm to 1600mm, are fully installed, tested and now in use.

Significant modifications have been undertaken within the existing UU buildings to house the following new equipment which is now fully installed and operational following a series of carefully planned and managed ‘plant outages’ coordinated with United Utilities Operations on site:-

- * extensive modifications to existing Chlorine Contact Tank gallery to house a new 900mm diameter transfer main inlet manifold which now resides in the location of the existing Hi-Lift pumps which were de-commissioned and removed from the building. A new Service Water System has also been installed in the lower basement area within the Contact Tank Gallery;
- * a new SO₂ Drum Storage and Dosing Facility has recently been completed and installed alongside the existing Chlorine Drum Store. Again, this work involved very detailed and careful planning with UU Safety Representatives working alongside MWH and KMI Site Management. A strict code of site supervision was undertaken where contractors worked beside the “Live” Chlorine facility to ensure all hazards were being controlled and contractors worked in strict accordance to the agreed Method Statements in place. Suitable screens were erected whilst the building underwent structural modifications to allow a 2T crane to be installed to serve the new SO₂ drums;

Due to the programme constraints and the proposed 2 sectional completion dates, commissioning activities commenced a quarter

way through the project, primarily handling the new media fines washing in the existing 6 duplex filters, moving onto disinfection and sampling prior to putting the refurbished filters back into service. To ensure this transition went smoothly the commissioning team was formed early enough to become well established and integrated into the construction team. This ensured timely co-ordination of items of process plant being brought on line as the team was always planning ahead for Commissioning.

On 3 December 2004, Phase 1 (DWI compliance) sectional completion was achieved on programme, which was a massive milestone for the whole team. At the time of writing, the works are now substantially complete with Completion Testing well underway moving towards Forecast Completion by the end of August 2005. The plant is currently producing water into supply up to 60MI/d and is soon to be tested up to 120MI/d. Completion documentation is well advanced with final O & M Manuals and ‘as built’ drawings logged with the client.

Without doubt the success to date of this complex and challenging project is the close working relationship of all parties. *KMI Water* integrated the main civils subcontractor, *Heyrods*, into the team by appointing a Civils Agent who is employed by *Heyrod* but reports to and is part of, the Prescot site management team. Both parties have worked extremely closely with MWH and UU, in particular the on site UU operations team at Prescot, to ensure minimal disruption to live plant operations and the timely resolution of any issues or difficulties..

From commencement of the project in November 2003 to date, the site team has achieved more than 185,000 man-hours worked without a single accident. ■

Note: The author, Paul Brabazon, is Site Project Manager, *KMI Water*



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