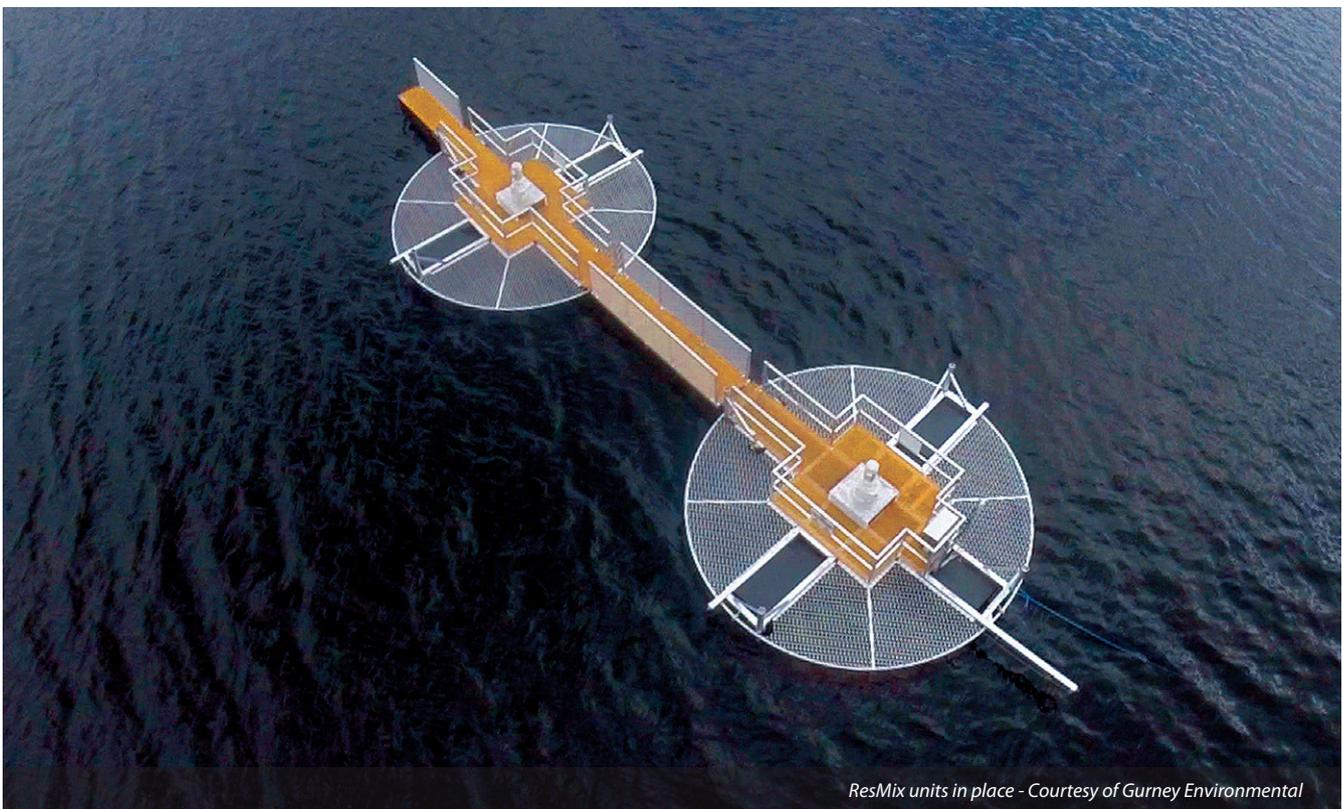


Pontsticill Reservoir

installation of ResMix 'Source Management' system to prevent taste and odour issues at water treatment works

Located in the Brecon Beacons on the outskirts of Merthyr Tydfil, Pontsticill Reservoir and treatment works date from 1927. The Reservoir holds approximately 13.6 gigalitres of water and is a key element in the supply of drinking water to 106,000 customers in this region of South Wales. In recent times Dŵr Cymru Welsh Water has sought solutions to overcome periodic problems with MIB and Geosmin, compounds causing taste and odour issues. Welsh Water began looking at ways to tackle the issues including the option to install a GAC plant (granular activated carbon) system, which comes with high CAPEX and OPEX costs. The option to construct a GAC plant was also complex due to lack of space at the treatment works. In addition the cost of installing such a system would be substantial.



ResMix units in place - Courtesy of Gurney Environmental

Evaluating options

Solutions management at Welsh Water took the decision to evaluate options that tackled the issue at source and commissioned a report from consultants Black & Veatch. The two main options that were available were a compressed air system, which attempts to move water from the bottom of the reservoir up to the surface or the ResMix 'Source Management' system which uses impellers to create a top down full column mix driving oxygenated water from the surface to the bottom of the reservoir.

ResMix 'Source Management' system

The ResMix 'Source Management' system was designed and developed in Australia by WEARS Australia 20 years ago and the system was first used in the UK by Scottish Water in 2009. The ResMix system was eventually recommended to Welsh Water as the preferred choice.

The limited options available until recently were compressed air systems which are high energy systems and so are only typically switched on once a problem occurs or to rid the reservoir of an

existing problem. The ResMix 'Source Management' system uses about 1/20th of the energy of the compressed air system and are typically run 24/7 for 365 days per year. Now, for the first time, water utilities can cost effectively and sustainably manage the water in their reservoirs with the benefit that downstream treatment costs can be reduced.

Specification

Based on the volume and depth of Pontsticill Reservoir, WEARS Australia specified the largest system available in the ResMix range being the ResMix 5000cc. This would be the first application of the 5000cc in the Northern Hemisphere.

The ResMix 5000cc, which comprises of 2 (No.) 5000 units each driven by 5kw electric motors, was specified to ensure uniform conditions and improved dissolved oxygen levels were established and maintained throughout the reservoir. The 5000cc uses impellers that are each 5m in diameter and is capable of moving 20 tonnes of water from the top down to the bottom of the reservoir every second.



Aerial view of WTW - Courtesy of Gurney Environmental



Air-lifting ResMix unit - Courtesy of Gurney Environmental



ResMix units in place - Courtesy of Gurney Environmental



ResMix units in place - Courtesy of Gurney Environmental

Procurement

The system was ordered at the beginning of June and Welsh Water asked for the process to be fast tracked for an installation in August 2014. WEARS Australia, Gurney Environmental and Welsh Water worked closely to streamline the procurement and delivery process so this could be achieved.

The ResMix 'Source Management' system specified for the project was shipped from Australia and installed by Gurney Environmental, who are based in East Anglia. Experience had shown that the preferred method of installation into the reservoir was by helicopter mainly due to complexity of getting access to the edge of the reservoirs by large cranes.

Early experience had shown that often reservoirs are located in remote areas with poor road access often making it difficult for cranes to reach them. In addition even if access was available and if you could get a crane to the site they often do not have the reach needed to launch the ResMix system due to the constantly varying water level which is a feature of reservoirs.

Delivery and installation

Delivery by helicopter is the simplest, safest and quickest method of installation into the reservoir. Gurney Environmental has worked with the same helicopter operator on a number of projects and has developed a tried and tested system for installation.

The team from Gurney Environmental worked alongside Tema Engineering who were assigned by Welsh Water to manage the operation and provide on-site services.

Due to its size the ResMix 5000cc was delivered to a specially prepared site adjacent to the reservoir. The ResMix 5000cc was assembled on the site in the space of a week ready for installation by helicopter. Installation is very quick with both units of the ResMix system in the reservoir within about half an hour.

Locating the system in the reservoir was the subject of analysis of the reservoir using a bathymetric survey to establish the deepest part. The deepest part of the reservoir is the most efficient for it to operate successfully; in addition consideration was given to other users of the lake for recreation, fishing and water sports. The 5000cc is anchored in position using a carefully measured and positioned cable and anchoring arrangement.

Commissioning and handover of the system took place at the completion of the project and initially the system was operated at low capacity using as little as 10% of its power over a few days as operators expressed concern that the introduction of such a system may cause issues at the water treatment works. Concerns were quickly dispelled and the system was gradually powered up to the correct operating capacity.

Conclusion

The introduction of the ResMix 'Source Management' system to the reservoir is a solution which has sought to treat the root cause of the problem. Since installation The ResMix 'Source Management' system has effectively de-stratified the reservoir which has seen an increase in DO levels in its body and as a result has seen oxidation of Manganese making the source water easier to treat at the water treatment works.

In the Spring of 2016 Welsh Water ordered another ResMix 5000cc 'Source Management' system for Llangdedfeyd Reservoir near Pontypool.

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