

Pembroke Jetty, Pembroke, West Wales



When Alstom invited BAUER Technologies to tender for a project to install 20 piles on a 50 year-old jetty within a Site of Special Scientific Interest (SSSI) with four piles located off the end of the jetty into the tidal reaches of the Milton Haven estuary, their first thought was, *"Thanks, but no thanks!"* says BAUER Project Manager, Carl Dunsire. The health and safety risk, the environmental risk and the overall business risk seemed unacceptably high, but not wanting to harm the good relationship built up with Alstom during the main power station piling works, BAUER committed to the project.

BAUER had successfully completed the main works piling for RWE Npower's combined cycle gas turbine power station at Pembroke several months earlier (GE Oct 2009) and as the turbine halls started to take shape the focus turned to the delivery and off-loading of the five 400-tonne turbines and the hundreds of smaller items of mechanical plant arriving by ship from Europe. With the first of a long procession of ships booked for March, the pressure was on to deliver

a foundations solution capable of supporting the Liebherr LGD 1750 and its 400-tonne superlift.

The jetty was built in the 1960's and is constructed of an irregular sheet piled box held together by interlaced tie bars. These mild steel bars have borne the brunt of 50 years of wild Welsh weather and the jetty was in

no condition to support a 100-tonne BAUER piling rig. Tony Gee and Partners were engaged to develop a strengthening scheme that involved replacing the upper tie bars; an automated monitoring system, supplied by CMCS, constantly monitored the critical sheet pile wall for movement.



The ground conditions were highly variable; saturated silts and sands turning to dense gravels, cobbles and layers of boulders overlying weak boulder clay. This suited the BAUER rotary system, using thick walled casing with tungsten carbide cutting teeth rotated to toe using BAUER's powerful BG28 rig. For the marine piles, 1220mm diameter permanent casings, 19mm thick, were fitted with BAUER spec cutting teeth to ensure penetration through the boulders. A 2.5 tonne bespoke piling frame was fabricated to control positional tolerances and provide manned access to the marine piles during construction and due to the large tidal swing the works were planned around three hour windows during low tides.

"Everything on this project was big, except for the working space" says Carl, *"If we got it wrong, we could have a 1.2 million euro piling rig in the sea, and our rigs don't float!"* The risks were not confined to failure of the jetty structure, although had they inadvertently cut through the uncharted lower tie rods, a possibility with such powerful piling equipment, there was a real likelihood of catastrophic jetty collapse. The embankments either side of the jetty causeway were steep and one displayed evidence of an earlier slip. The BAUER rig movements and piling locations had to be pre-planned weeks ahead, the tracks located on large crane mats embedded into the piling platform. Two safety boats patrolled the icy waters around the jetty, in hourly contact with the Coast Guard. And the whole jetty was bunded to prevent an accidental discharge into the protected environment.

Due to the criticality of the works programme, BAUER worked 24 hours a day, 7 days a week to complete the piling before the first ships departed port in Rotterdam.



All the hard work has paid off as the 1700 tonne crane is now being erected in time for the first of the 200 plus heavy lifts required to build Europe's biggest gas fired power station.

Client:	RWE Npower
EPC Contractor:	Alstom Power Ltd
Piling Contractor:	BAUER Technologies Ltd
Contract Period:	Mid January to mid February 2010 - 24/7 working
Scope of Works:	<ul style="list-style-type: none"> - Construction of a bespoke steel guide frame and access platform for the marine piles - 14no. 880mm diameter reinforced rotary piles - 2no. 915mm diameter permanently cased reinforced piles - 4no. 1220mm diameter permanently cased reinforced marine piles - Working load tests - Pile attendances including 2 safety boats
Turnover:	£800,000
Equipment:	1no. BG28 piling rig