## *Berlin: A winding road doesn't put bends in our pipes*

Along the river Havel, close to the Olympic stadium and to the south of the Heerstrasse, are the lakes which serve as reservoirs for the Tiefwerder waterworks in Berlin's Spandau Stadtforst or city forest. Some 1100 metres of pipes of DN 500 and 600 nominal sizes carrying untreated water needed to be replaced along a route following a narrow, rather winding, lakeside road. In the fine, sandy soil, the trench therefore had to be lined at the advancing end. Access was restricted so the pipes could not be laid out and stored along the side of the route. As a result the pipes and accessories were delivered straight to the grounds of the waterworks and unloaded there. In view of the cost of cranage, three tractor-trailer units per delivery had to be on the spot ready to be unloaded at hourly intervals. Not an easy task, but Buderus's in-house staff, together with their Berlin haulage and logistics partner HZ, dealt with it brilliantly. There was no downtime whatsoever and the six metre long Buderus DIN EN 545 pipes could be quickly and easily installed and securely and reliably connected. Once again, there was convincing evidence of how well even curved routes can be tackled with Buderus's restrained joints. After connection, the joints could be deflected through an angle of 2°, i.e. each pipe could be laid in a position up to 20 centimeters off the axis of the previous pipe. In this way, there were no problems in getting the pipeline for untreated water to follow the slight curves in the road through the forest and it goes without saying that this reduced the number of fittings installed. Incoming connections were made via fittings at a hydraulically beneficial angle of 45°. The entire pipeline is restrained against thrust loads to the standards of the Berlin water-supply companies and is also protected against extreme loads from traffic, for example from heavy forestry vehicles which can get bogged down in the soft soil of the forest.