European Waste Incineration Directive

Yorkshire Water to upgrade 4 sites by December 2005

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The European Waste Incineration Directive issued in 2000, became part of English law in December 2002. It encompasses gaseous, liquid and solid emissions from all waste incinerators and requires Yorkshire Water to upgrade treatment at its four sewage sludge incinerators in the county so as to comply with the Regulations by December 28th 2005. The four incinerators, located at the main centres of population in Yorkshire are: Esholt. at Bradford; Blackburn Meadows, Sheffield; Calder Valley, Huddersfield; and Knostrop, Leeds.

Knostrop Incineration Plant *(courtesy Arup)*

Following an initial feasibility study, Yorkshire Water competitively tendered the consultancy services for the development and administration of this project in 2002. TEAM[1]were successful in their bid for this work and were appointed by Yorkshire Water in May 2002.

Current incineration facilities

Esholt was commissioned in December 1988 with a design capacity of 18,000 tds of sludge per annum. **Blackburn Meadows** was commissioned in February 1990 with a design capacity of 15,000 tds of sludge per annum. **Calder Valley** was commissioned in November 1992 with a design capacity of 24,000 tds of sludge per annum.

These three incinerators were designed to the German TA Luft 1986 standards that were current during the design stages of their construction. Knostrop was commissioned in April 1997 with a design capacity of 26, 400 tds of sludge per annum and was designed to 17th Bimsch V standards that were introduced in 1990.

The 17th Bimsch V Standard is similar in requirements for gaseous emissions to the new WID standard and, therefore, Knostrop complies with many of the WID gaseous requirements. As a result, retrofit requirements for Knostrop are substantially less than those for the older incinerators.

The three older incinerators are of a similar design:

* sludge is dewatered and fed by conveyor to the incinerator;
* at Blackburn Meadows and Calder Valley, sludge passes through a pre-dryer before reaching the incinerator to enable autothermal operation;
* sludge is burnt in the fluidised bed incinerator at temperatures of 850 degrees C;
* flue gas and ash passes through an indirect waste heat recovery phase before -
* an electro static precipitator removes ash particles;
* flue gases are washed in a wet scrubber;
* flue gas is then reheated to prevent visible plume prior to discharge via a high level stack.

Knostrop Incineration plant showing incinerator stack with Ash hopper to left *(courtesy Arup)*

Knostrop has a similar process except that the changed legislation (17th Bimsch V) required that the flue gas treatment stream was enhanced. This translated into a design where the single stage electro-static precipitator and single pass wet scrubber are replaced by a two-stage electro-static precipitator, two stage wet scrubber, heater (to suppress plume formation) and a tertiary fixed bed adsorber for final gas polishing.

Project approach

A risk study was held between YWS and TEAM in the early stages of the project.

Key risks identified included:

* selection of technology;
* planning and permitting constraints;
* commercial effects of pressure upon the specialist market;
* availability of only one plant at a time for shutdown/upgrading;
* sludge management;
* design responsibility;
* overall programme to compliance date.

Many of the risks indicated the desirability of achieving the earliest possible involvement of appropriate design and construction expertise and to the reduction of company interfaces between design, construction management and construction.

The challenge facing Yorkshire Water and TEAM, therefore, was to define the required process alterations for the incinerators in sufficient detail to be able to obtain Integrated Pollution Control variation and Planning Regulation approvals for the design and also leave sufficient time to allow competitive tendering of the works.

Procurement solution

It was recognised that the market place was competitive and that demand would be high for specialist process companies able to undertake the retrofit work required, as all sewage sludge incinerators in Europe are covered by the new legislation.

Together, YWS and TEAM defined a development approach where an NEC Professional Services Contract (PSC) would be awarded to a YWS framework contractor for development of an outline design and tender document that could be competitively tendered. A PSC contract approach allows YWS to influence the selection of suppliers, thereby managing elements of procurement risk and to obtain design information quickly for submission of the necessary documentation for planning and permitting.

PSC tenders were assessed by YWS and TEAM against a number of criteria that included the ceiling price and rates; fee for the ECC Contract; the level of partnering with YWS in the selection of subcontractors and team/project experience. The contractor appointed for the PSC had experience of YWS incinerators and would be able to quickly identify suitable specialist designers to develop the required technical solutions.

The project team consisting of YWS, TEAM and the Contractor and specialist sub-contractor have worked together in development of the outline design and tender documents. The tender has been divided into 5 sections to cover Flue Gas Treatment; Scrubber Effluent Treatment; De-NOx; Refurbishment and Dewatering Improvements.

It is proposed that the main NEC ECC Contract will be based upon a target cost with a pain/gain share mechanism. The Contractor would be encouraged to cascade this incentivisation down the supply chain to encourage a more participatory approach. This approach allows YWS flexibility in the installation of the equipment. This is essential as operational reliance on the incinerators means that YWS may need to be able to alter the programme of works without excessive charges being incurred. A target cost mechanism with pain and gain share encourages efficiencies and cost savings within the project.

The project is now at the stage where IPC variations have been submitted for the Flue Gas Treatment element at three of the sites and the initial design and tender documents have been produced.

Work is continuing to finalise the contract strategy and full scope of the works. YWS are anticipating awarding a contract mid 2003 to undertake final design, construction and commissioning. ■

Notes: (1) T*EAM is the name of one of Yorkshire Water's Framework Consulting Partners and comprises MWH, Arup and EC Harris.*

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