Industrial effluent treatment - the total solution

The pressure to improve the quality of our river and coastal waters has been steadily increasing over recent years. Furthermore, pressure is now coming from a number of different sources. Regulatory requirements, for example, are becoming more stringent, as is the checking procedure which ensures that businesses are complying with their trade effluent discharge consents. Influential groups such as customers, shareholders, employees and lobby groups also voice their feelings and concerns. Such pressure can result in companies which do not appear to be doing enough to protect their local environment not only being pilloried in the media but possibly suffering financial loss if business is taken elsewhere.

Capability statement

Entec

Entec is one of the UK's largest environmental and engineering consultancies. Our technical and business skills are dedicated to delivering strategic, technical and engineering solutions which bring commercial benefit to customers at home and overseas. This know-how is based on over 60 years' consulting experience in the public and private sectors.

Certificate No. FS 13881

Certificate No. EMS 69090

Entec operates a Quality Management System in accordance with the latest requirements of the international standard BS EN ISO 9001 and an Environmental Management System compliant with BS EN ISO 14001. Both are audited by BSI Management Systems.

Creating the environment for business

Compliance and costs - the pressure is on

In industry today, environmental protection and industrial effluent treatment are inseparably linked. The potential risks and costs involved in not facing up to effluent problems and dealing with them in the most appropriate and cost-effective way are too great for companies to ignore.

Not only are costs affected but so is staffing. This is because businesses will require a comprehensive and detailed knowledge of both how their effluent is produced and the methods available for its control and treatment. This impacts on in-house resources and requires levels of expertise, which may simply not be available.

The indirect financial impact on industrial businesses is also increasing. Over the past few years the EC has issued a number of legally-binding Directives concerning the quality standards of river and coastal waters throughout Europe. For many industrial companies this has resulted in a dramatic increase in both their water and trade effluent charges. This increase has considerable financial implications for these businesses.

The pressure has become greater with the introduction of the Integrated Pollution Prevention and Control (IPPC) Directive in October 1999 and the application of Direct Toxicity Assessment (DTA) which will require businesses to reduce the contamination caused by the discharge of their industrial effluents.

IPPC applies to a wider range of industry sectors than those affected by the current UK Integrated Pollution Control requirements. It is planned that DTA will be carried out on any industrial effluent discharge that could potentially have a toxic effect on the environment. This will mean that many more companies than at present will find themselves in the uncomfortable position of being brought under still tighter control whilst at the same time having to comply with consents that will be even more difficult to achieve.

Make pressure work for you

Although the picture may at first appear depressing, it is one which can - and indeed, should - be turned to a company's advantage.

Industrial companies often realise that they either lack or cannot spare the technical resources to resolve their effluent treatment and disposal problems themselves. Carrying out studies, checking up on ever-changing regulations or designing treatment plants is simply not what they are in business to do. They realise that they need professional, knowledgeable and skilled help from people who provide exactly this expertise as part of their core business - expertise which we have at Entec.

By using and trusting Entec's specialist knowledge, companies find that what had initially been a major problem - and potentially a major expense - can turn into significant cost savings once the solution we develop has been implemented. The problem is solved and your bottom line may well be improved.

Turn our experience to your advantage

We have extensive experience of working with a wide range of industrial companies, in different industry sectors, identifying and implementing the most cost-effective solutions for their effluent treatment and disposal problems.

More and more industrial companies are benefiting from the advantages of turning to Entec for help, advice and assistance in solving their trade effluent and disposal problems. Three of the most crucial advantages to consider in terms of the benefits we bring are:

- *Our ability to work for companies in any industrial sector - we put this wide range of experience to work for you*
- *A complete range of skills and services is available within one organisation - there is no need to find different specialists to solve different parts of the problem*

How much can we do for you?

Our process skills are based around a highly trained and experienced team of chemical and environmental engineers, chemists and biologists. Our expertise in civil, mechanical and electrical engineering as well as in instrumentation, control and automation (ICA) allows us not only to undertake projects of any size or complexity but also in any industry sector. This means we are not limited by knowledge of only one or a few particular types of industry or manufacturing processes, but we can offer a full range of services tailored specifically to your needs.

Add to this our proven project and construction management skills and we are capable of providing complete support throughout the entire life of a project, from the initial quantifying of the problem, right through to design work, supervising any construction necessary and commissioning the finished plant.

We also provide an unrivalled range of complementary services to enhance the total package available. These include waste usage auditing, waste minimisation studies, bench-and pilot-scale effluent treatability and environmental impact assessments.

Entec's approach to providing solutions for industrial effluent treatment.

Scoping phase

Review and evaluation of historical data to agree definition of the project, including treatment options worthy of further investigation.

Treatability phase

Laboratory analysis and bench scale trials to investigate treatability.

Feasibility phase

Selection of the most feasible treatment options through production and comparison of preliminary lifetime cost estimates.

Design phase

Pilot scale trial, conceptual and detailed engineering design of selected treatment option, including, where required, competitive tendering and contractor selection.

Construction phase

Supervision of chosen contractor to ensure that the treatment plant is constructed to the required specification standards.

Commissioning phase

Operation and optimisation of the constructed treatment plant to enable consistent compliance with the required consent standards.

Case studies

The following pages demonstrate Entec's capabilities in the area of industrial effluent treatment, using case study examples

Effluent management strategy ensures regulatory compliance

Client: Chemical fragrance Manufacturer

A chemical fragrance manufacturer had a consent to discharge effluent directly to the public sewer but it was not achieving the required consent quality on a consistent basis. Entec staff assessed the risks on site and, working with the customer's own operational and project team, proposed a strategy for future effluent management. The project was split into three phases.

- *Phase 1 was to ensure legislative compliance and involved the design and construction of new pH control and buffer storage prior to discharge to the sewer*
- *Phase 2 was to remove the potential environmental risks. This involved containment, bunding and improvements to the site drainage system to better control effluent disposal and eliminate potential contaminations*
- *Phase 3 was to minimise the effluent treatment and disposal costs and included an assessment of the treatability of the various effluents. Many of those previously tankered off site have now been found to be treatable. A combined on site plant to treat all effluents prior to discharge to sewer will achieve significant cost savings.*

Entec also prepared a front end design and capital estimate which was used to obtain financial approval. We also provided a full, detailed design, again in partnership with the client who used his own procurement and site management resources.

Industrial companies help to clean up the River Tees

Clients: Northumbrian Water; Teesside Industrial Businesses

Northumbrian Water Limited needed to construct a large wastewater treatment facility and sludge treatment centre within very tight time scales in order to meet its responsibilities under European legislation. Known as the TEES project (Tees Estuary Environmental Scheme), it presents an exciting vision for a cleaner River Tees.

The new plant, which was designed by Entec, treats industrial and domestic effluent and sludges. It is located at Bran Sands on Teesside (North East England) in the heart of a massive chemical and petrochemical complex.

By joining the scheme, local industrial companies (including ICI, DuPont and British Steel) gained the security of knowing that their trade effluent is being treated by experts. They also gain from the financial and technical benefits of scale and, where appropriate, are able to rely upon the stability and robustness of co-treatment with other industrial flows or even with municipal sewage. This provides them with increased confidence that they are acting responsibly in respect of their effluent treatment and discharge requirements.

The new effluent treatment works is based upon the activated sludge process and is designed to treat more than 300,000 m³/day of municipal sewage and industrial effluents with a total long term BOD (Biochemical Oxygen Demand) in excess of 150 tonnes/day. The site also incorporates a large regional sludge treatment centre to deal with the municipal and industrial sludges created by the treatment process at Bran Sands and by other plants within the Northumbrian region.

All the design work and supervision of the construction were provided by Entec. The scope of services we provided included:

- *Environmental impact assessments*
- *IPC process authorisation assistance*
- *Contaminated land investigation and design*
- *Pilot plant studies*
- *Waste characterisation*
- *Technical advice during regulatory negotiations.*

Similarly, advice was given to the Northumbrian Water commercial team. This included conceptual and detailed engineering design, project management, engineer to contract, construction management and commissioning of the treatment works.

Effluent treatability trials identify best options

Client: Pharmaceutical company

A major producer of penicillin needed to be prepared in case its consent requirements were ever tightened. To start this preparation, the company wanted to gauge the cost involved in installing an effluent treatment works at its site.

Entec was asked to perform trials in order to find the most appropriate treatment scheme for the effluent produced by the company's processes.

Initially, a series of bench scale trials were carried out. This allowed various physical and biological options to be considered. The results of these trials led to a pilot scale study taking place at the company's site.

The study selected and demonstrated a suitable process for the treatment of effluent and, in line with the client's request, allowed an estimate to be made of the capital and revenue costs involved.

Treatment feasibility study identifies cost effective solution

Client: Synthetic protein manufacturer

A manufacturer of a household brand of synthetic protein products was investigating the feasibility of expanding production at its site in Teesside. A treatment facility was already in operation at the site, treating the effluent from the existing production plant. Entec were asked to undertake a feasibility study to determine the most cost-effective solution for treatment of the additional effluent which would result from the proposed expansion.

Five different treatment options were identified and conceptual designs were produced for each. Budget cost estimates were also prepared for each option. Taking the expected life span of the facility into account, these were then compared to find the most cost-effective treatment solution. This will enable the expansion of production to occur at optimum profit levels.

Disposal route investigation helps evaluate best treatment method

Client: Chemical Manufacturer

An international chemicals manufacturer treated its effluent to control the pH and to remove suspended solids. The effluent contains low levels of toxic pollutants. The company has a consent to discharge the effluent directly to the local river but asked Entec to investigate alternative options for treatment prior to disposal.

Bench scale trials were conducted to simulate treatment of the effluent at the local sewage works as well as through a proposed dedicated on-site facility. Maximum expected levels of the contaminants were fed into each of the treatment systems to assess their effects.

The results were used as part of a feasibility study to compare cost estimates for each of the various treatment options. The information provided has put the business in a confident position to face the implementation of new environmental legislation.

From pilot study to the design and construction of a treatment plant

Client: Pharmaceutical company

A major pharmaceuticals company, producing a range of consumer products, discharges its effluent to the public sewer. Reductions in organic load were sought by the effluent receiver, since the local sewage works was overloaded. The company appointed Entec to design and construct a treatment facility to handle the company's combined effluent discharge.

After initial pilot plant treatability trials it was concluded that an oxygen-based aerobic biological system would be most appropriate for treatment of the effluent.

Entec produced the engineering design, project managed the construction of the plant and commissioned it on completion.

The company is now looking to expand its operation and Entec has been asked to develop the effluent treatment facility which will cope with the eventual additional load.

Sample client list

Alexander Drew

British Steel

Bush Boake Allen

DuPont

Elton Cop

Fine Organics

Hayes Chemicals

ICI

Nelson of Aintree

Nestlé

Premier Brands

Phillips Components

Rohm & Haas

Scottish Courage

SmithKline Beecham

Synpac

Thomas Swan

Union Camp

Zeneca

Entec

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