



ANHAM INDUSTRIES LTD.

UNIT 1, MANOR FARM

WICK LANE

STINCHCOMBE

DURSLEY

GLOS.

GL11 6BG, UK

TEL: +44 (0) 7814 577095

Email: sales@anhamindustries.com

A UK Incorporated Company, registration no. 8112168

**WATER TREATMENT TECHNOLOGY
DESIGN AND APPLICATION
CONSULTANCY CAPABILITIES**

MAY 2014



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1 INTRODUCTION TO ANHAM INDUSTRIES LIMITED

Anham Industries Limited (Anham) provides specialist water treatment technology design and application service to the Oil and Gas Industry. The key services provided include:

- Conceptual designs and reviews leading to technology selection
- Front End Engineering Design Studies
- Detailed equipment design and definition documentation
- Process equipment optimisation and value engineering studies
- Operational troubleshooting and performance improvement
- Maintenance and refurbishment recommendations
- Project Management and Project Engineering services

These services are provided by experienced process and project engineers with a wide knowledge and long history of water treatment projects in the field of oil and gas production.

Anham engineers have considerable experience of water treatment projects in Africa, the North Sea, the Middle East, FSU, Asia, North and South America encompassing offshore and onshore water injection projects and water injection systems using seawater, aquifer water, river water and produced water treatment and re-injection. These activities include:

- injection water quality specifications
- process design
- HAZID and HAZOP participation
- System design review
- equipment design and specification
- fabrication and supply chain management
- assembly and test
- installation and commissioning supervision services.



2 SERVICES OFFERED BY ANHAM

2.1 Water Treatment Technologies

The range of services offered as part of a comprehensive water treatment technology portfolio can be described under the following headings:

- Review of existing water qualities and treatment objectives
- Identify appropriate treatment technologies and limits of effectiveness
- Selection of equipment design and orientation
- Equipment sizing and specialist component definition

2.1.1 Data quality Assessment

The importance of obtaining reliable good quality data cannot be over-emphasised as the results will be the basis for all subsequent process design.

Anham recommends that the following list of parameters should be obtained:

- Oil droplet and particle size distribution analysis
- Total suspended solids
- Suspended solids identification
- Membrane filtration tests
- Turbidity
- Full ionic analysis
- pH, temperature, specific gravity, viscosity and conductivity
- Dissolved gases (oxygen, carbon dioxide and hydrogen sulphide)
- Bacterial analyses
- Bacterial nutrients
- Chlorine demand
- Oil-in-water, free and dissolved
- Chemical and microscopic analysis of suspended solids
- Gas composition
- Oil characterisation

This list contains the most commonly required parameters, other parameters can be included if required.

2.1.2 Specialist Component Definition

At the heart of any effective process equipment is the correct selection and specification of the design or component that provides the environment in which the treatment effect can occur. This requires a clear understanding of the principles on which the treatment is based and a sound design basis to provide the correct sizing and application.

Anham engineers have a long experience of detailed involvement in water treatment for the Oil and Gas Industry, including:

- Review of client expectations and requirements
- Optimisation of design requirements to meet actual needs

- Identifying appropriate treatment technologies
- Understanding limits of effectiveness
- Mitigation of process risks
- Selection of equipment design and orientation
- Equipment sizing and specialist component definition

2.1.3 Equipment Fabrication

- Fabrication and equipment assembly
- Package design and skid unit assembly
- Management of the supply chain and logistics
- Inspection and test
- Supervision of Installation and Commissioning

2.1.4 System Process Design and Engineering

The effective application of treatment technologies relies on the overall system to provide the optimum conditions under which they can successfully operate. Anham engineers provide advice and guidance to the overall system parameters that will enhance the treatment effectiveness. This can extend to full FEED and detailed design as appropriate to the project, including:

- Review and definition of upstream conditions
- Process risk and sensitivity analysis
- Optimisation of upstream process conditions
- Analysis of discharge conditions, limits and objectives
- Environmental impacts and compliance with legislation
- Equipment optimisation and customisation

2.2 Process Technologies

Anham engineers have a wide range of oil and gas industry experience and in-depth understanding of the operation and application of many types of water treatment technologies for the effective filtration of solids and separation of free oil. These include:

- Autobackwashable Coarse Strainers
- Solid / liquid hydrocyclones
- Liquid / liquid hydrocyclones
- Dual media filters
- Nutshell filters
- Cartridge filters
- Vacuum Deaerators
- Chemical dosing systems
- Membrane technologies
- Absorbent media
- System design and operation including pumps and tank storage