



# Case study

## ATEX Compliance for Offshore Power Generation

### POWER SOURCES OFFSHORE

The considerable power demands of offshore production and processing platforms are usually met by the use of gas turbine power generators. Encased within acoustic enclosures, these units provide reliable and cheap energy. However, the combination of hot surfaces and natural gas combine to create a well known explosion hazard.

### EUROPEAN REGULATION

From the middle of 2006, the design of these enclosures will be governed by the pan-European ATEX legislation. Under these rules, detailed analysis is required to demonstrate that the largest undetectable gas leak will not lead to an uncontained explosion. Working with the HSE under a JIP, Frazer-Nash developed a process a number of years ago that will provide this assurance.

### COMPLEX NUMERICAL MODELS

Using this technique, a detailed Computational Fluid Dynamics (CFD) model of the turbine and its enclosure is constructed. The model must contain fine detail, to capture areas where escaped gas can pool, and must also accurately simulate the ventilating air flow through the enclosure.

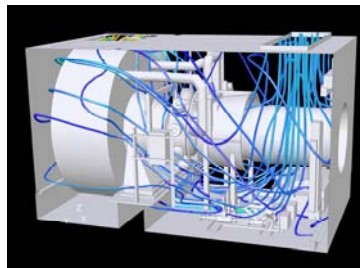
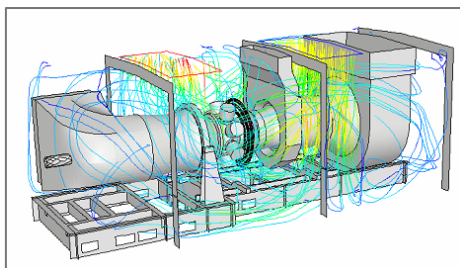
A series of possible leak locations are then identified and a gas leak introduced into the model. A limiting gas cloud size and mixture is defined within the ATEX standard, and the aim of the analysis is to establish whether a cloud of sufficient size could be created without tripping the gas detectors at the exit of the enclosure.

### IMPROVED DESIGN

Should the design initially fail the assessment – and 75% of designs do – we are able to use the numerical model to propose modifications. These can take a number of forms:

- ▶ Using plating to control the ventilation flow and remove dead zones
- ▶ Modifying the ventilation flow volume
- ▶ Modifying the number, location, and setpoints of gas detectors.

Naturally, there are advantages and disadvantages with each of these methods and the final design must be carefully balanced. We are able to use our extensive experience to help our clients achieve approval.



#### Client

Various

#### Business need

To verify the safety and conformance to regulations of gas turbine enclosures on offshore platforms

#### Why Frazer-Nash?

Frazer-Nash has an extensive expertise in detailed Computational Fluid Dynamics within its Fluids & Thermal teams.