Safety & Risk Management Services

Safety Case and Compliance Consultancy

Germanischer Lloyd – Service/Product Description
Safety Case and Compliance Consultancy

Service Title: Safety & Risk Management Services
Lead Practice: GL Safety and Risk (UK)

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Service Description and Values Generated:

The purpose of a Safety Case is to demonstrate that the facilities in question are designed, constructed, commissioned, operated and maintained such that risks to personnel are reduced to as low as reasonably practicable (ALARP).

Safety Cases as offered by Germanischer Lloyd (GL) are pertinent to all operational facilities which have the potential to cause a major accident due to storage, process or handling of hazardous or toxic materials. The standard and step by step methodology used in the production of a Safety Case allows the major hazards to be identified and managed to reduce the hazard to an acceptable level.

The production of a Safety Case is a legislative requirement in some countries and is also considered best practice by major oil and gas operators.
The production of a safety case includes the following tasks which are summarised in the chart below:

- Identify and document major accident hazards, using tools such as Bow-tie diagrams
- Analyse impact of major accident hazards
- Assess risks and compare with criteria, Quantitative Risk Assessment
- Identify risk reduction measures to satisfy ALARP
- Identify safety critical elements in place to manage major accident hazards
- Generate performance standards for each safety critical element
- Write and maintain the asset safety case

The production of a Safety Case is generally based on these identified tasks and each of the individual tasks has its own methodology. The individual tasks are detailed in separate Joint Service Descriptions as follows:

- Hazard Identification Studies
- SIL Studies (Safety Integrity Level)
- RAM Studies (Reliability, Availability, Maintainability)
- Consequence Evaluation (Fire, Release, Explosion, Dispersion)
- EER Analysis (Escape, Evacuation, Rescue)
- Quantitative Risk Analysis
- Risk Based Layout Studies
- Performance Standards
a. Offshore Safety Case for BG

Date: 1999/2000
Customer: BG
Savings: Improved Safety

Issue:

In the UK, there is a requirement to produce a formal Safety Case for offshore facilities. GL updated the Safety Case for a BG installation, with the aim of including more accurate hazard consequence modelling and making the document easier to read.

Methodology & Results:

The existing Safety Case was updated to reflect the changes that had taken place on the installation, the changes to the management structure and progress that has been made in hazard assessment modelling techniques. Apart from the ease of reading that a rewrite gave, formal HAZOPs, explosion and other studies showed a small number of serious safety deficits on the platform that were corrected as part of the Safety Case submission.

Benefits:

Safety improvements were realised by studies performed during the update work. Also, as ARAMAS™ (GL consequence and risk assessment package for offshore facilities) was used for the risk assessment, it will be far easier to update the risk assessment part of the safety case when it is next required to do so. This is particularly important as the regulatory authorities only permit operations in the UK if an up to date safety case has been approved.
b. Safety Cases

Date: 2007  
Customer: GlobalSantaFe  
Savings: Improved Safety and Regulatory Compliance

Issue:

To comply with the UK requirement to produce a formal Safety Case for offshore facilities. GL has written many Safety Cases, all characterised by the aim of including more accurate hazard consequence modelling and making the document easier to understand. Specifically for this project, GL updated all of GSF’s Safety Cases to include combined operations.

Methodology & Results:

GL has updated many UKCS Safety Cases, either to reflect major modifications, change of ownership, or to make the document easier to understand. In some cases, only parts of the Safety Case have required updating, but in others a complete rewrite has been required. As part of the process, in some instances, safety issues were identified that led to improvements in safety on the platform.

For the GSF Safety Cases, GL developed in consultation with GSF a standard combined operations section of the Safety Case this acted as a guide for the information and assessments required for ComOps and how GSF would interact with other parties during the combined operation.

Benefits:

GL created a streamlined process for GSF to manage safety during ComOps and also updated the Safety Cases in a timely manner.

c. Transmission Pipeline Risk Assessment

Date: 2007  
Customer: International Collaboration  
Savings: Improved Risk Management

Issue:

GL has developed a natural gas transmission pipeline risk assessment software package PIPESAFE, for collaboration of international gas companies. PIPESAFE uses a series of linked mathematical models, which allows all aspects of a pipeline failure to be assessed. The models, which have been validated against large and full scale experimental studies and also pipeline incident data, allow an assessment of failure frequency, ignition probability, fire characteristics and risk to surrounding population and buildings for specific pipelines.

Methodology & Results:

The PIPESAFE package is not licensed to third parties, but is used by GL pipeline risk assessment engineers who have extensive experience of applying the package to perform pipeline quantified risk assessments (QRAs) for both UK and international gas pipeline operators.

Benefits:

In the UK quantified pipeline risk assessment is used to assess the risks associated with situations where sections of a pipeline no longer meets the requirements of the code of practice to which it was originally designed and operated (IGE/TD/1). The results of the risk assessment are used to demonstrate whether the risk levels are “as low as reasonably practicable” (ALARP) or whether there is a requirement for additional risk mitigation measures, such as impact protection, to be employed. This methodology allows transmission pipeline operators to demonstrate that they are managing the risks arising from their pipeline systems responsibly and enables them to focus spending on risk reduction measures only in situations where it is required.
d. COMAH Safety Case and Risk Assessments

Date: 2006
Customer: Talisman
Savings: Safety and Regulatory Compliance

**Issue:**

UK sites that exceed a defined level of hazardous chemicals are required to have a COMAH Safety Case. Following the Buncefield incident, the HSE has asked Operators to assess the safety of oil storage depots.

**Methodology and Results:**

GL compiled the Flotta COMAH Case creating a document that was well-received on site and by the HSE. The COMAH case included:

- Revision of the Safety Management System to HSG65
- Recalculation of the frequencies, consequences and risk from major accident hazard
- Assessment of jetty operations to HSG 186
- ALARP assessment of the control rooms
- Environmental and Human factors assessments
- Revision of site plans and hazard contours
- Post-Buncefield risk assessment of the tank farm
- Tank farm failures including Smoke Modelling, Bund overtopping, Hazard ranges

**Benefits:**

A well-constructed COMAH Safety case leads to a quicker and more straightforward HSE assessment easing regulatory compliance. A quality assessment also highlights any areas on site where safety can be improved. GL's risk assessment led to safety improvements and assurance that an acceptable level of safety had been reached.
Safety & Risk Management Services

- Safety Case and Compliance Consultancy
  - Hazard Identification Studies (HAZID)
  - Hazard Operability Studies (HAZOP)
  - SIL Studies (Safety Integrity Level)
  - Consequence Evaluation (Fire, Release, Explosion, Dispersion), Including CFD
  - EER Analysis (Escape, Evacuation, Rescue) (GL-Aeneas)
  - Quantitative Risk Analysis (QRA)
  - Decision Support (Risk Based Layout Studies)
  - Performance Standards
  - Large Scale Hazards Testing (Spadeadam)
  - Incident Investigation

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