

CASE STUDY

IEC 61511 Compliant Proof Testing Procedures

Following a review of safety instrumented system (SIS) proof test procedures, as part of a maintenance audit, BG Group decided to overhaul the methodology used in compiling the procedures to ensure compliance with IEC 61511. BG Group commissioned Genesis Oil & Gas Consultants to undertake the work and tasked them with developing an approach to meet the requirements of IEC 61511 whilst ensuring consistency in the structure and content of future procedures together with Regulatory compliance.

The Challenge

At the beginning of the project, Genesis sat down with BG Group Engineers to discuss concerns with the current situation and what the BG Group goals and objectives were to achieve a satisfactory outcome. It was clear from the discussion that the overall goal was to have a SIS proof testing regime that met the requirements of IEC 61511 (Functional safety - Safety instrumented systems for the process industry sector) and in doing so satisfied the expectations of the Regulator (the Health and Safety Executive - HSE).

The HSE regard IEC 61511 as 'Current Best Practice' for the design and management of safety instrumented systems in the process industries and so the design of any proof testing regime should take account of this fact.

The maintenance audit conducted by BG Group highlighted the fact that many of the existing procedures were generic and did not reflect the level of risk protected by each SIS. The procedures also varied in content and structure which presented problems for the Technical Authors in deciding what level of detail and instructions to include. In many cases,

KEY BENEFITS

- A CONSISTENT METHODOLOGY FOR TEST PROCEDURE DEVELOPMENT
- MORE CONSISTENT HIGH QUALITY TEST DATA
- IMPROVED SYSTEM DESIGN
- OPPORTUNITIES FOR REDUCED OPERATING AND MAINTENANCE COSTS

the content of the procedures fell short of the requirements of IEC 61511.

With these observations in mind, BG Group defined the objectives for achieving the overall goal as:

- Ensure SIS proof test procedures meet the requirements of IEC 61511 and hence, the HSE.
- Design a methodology and template to facilitate a consistent approach to developing compliant procedures.
- Closely involve offshore maintenance personnel involved in testing activities to ensure practical considerations are taken into account

The Solution

Genesis undertook a review of the existing SIS proof testing procedures with the BG Group Technical Authors to gain an understanding of their structure and content.

The next step was to see how the BG Group offshore maintenance team used the procedures and to view a sample of completed test sheets to evaluate the quality of information received and to understand the onshore processing regime.

Genesis then conducted a Gap Analysis of the existing procedures against the stated requirements in IEC 61511-part 1 to establish the extent of compliance.

At this stage, Genesis reported back to BG Group with their IEC 61511 compliance findings and recommendations for achieving BG Groups' stated goals and objectives. The main recommendation centred on developing a methodology and template SIS proof testing procedure based on each element of the criteria specified in the relevant section of IEC 61511.

Genesis tested the methodology by using the new template to create a proof test procedure for the most complex SIS in the BG Group SIS database. Having successfully completed this, an edited version of the template was then available for use in less complex systems.

The final part of the development involved trials offshore to get the input from the maintenance personnel and to check the quality and consistency of recorded test data fed back to onshore personnel.

Results / Benefits

After extensive testing activities offshore, Genesis and BG Group Engineers met with offshore maintenance personnel to get an overview of the outcome.

In general the feedback was extremely encouraging. The offshore maintenance personnel were keen to be involved in the process and appreciated the training they received on the maintenance aspects of IEC 61511. They now felt they had a better understanding of the risk mitigation provided by individual SIS and were able to apply this to putting appropriate operational risk reduction measures in place when the SIS was out of normal service.

The improvement in the consistency and quality of test data is a key outcome in the introduction of the new format test procedures. Onshore and offshore maintenance personnel now understand the importance of this data and how it contributes to the continuing safe operation of the SIS and how it leads to improved designs of future systems.

Apart from radically improving the proof testing of SIS, BG Group commented that Genesis involvement in the project has served to emphasise the fact that effective functional safety management is not the responsibility of one person but is one which requires a multi-disciplined input.

Ultimately, having a better understanding about the condition of your offshore plant gives rise to opportunities for cost savings and more effective maintenance management.

About Genesis

Genesis is a wholly owned Technip company operating on a global stage providing clients with leading edge



Engineering solutions in the oil & gas market sector.

Genesis has more than 1000 employees operating from 15 locations around the world. Its aim is to add value to Client projects by applying world class expertise to each assignment.

About BG Group

BG Group plc was a British multi-national oil & gas company operating in 25 countries around the world, producing around 680,000 barrels of oil equivalent per day. It was acquired by Royal Dutch Shell in February 2016.

 Published by Write Projects Limited