Certificate

Rene Heijenberg

has successfully attended and completed the M269P course

SIF – Safety Instrumented Function (with Facilitation)

15 – 19 November 2004

Course Director

Jan Willem Montagne

Shell Global Solutions

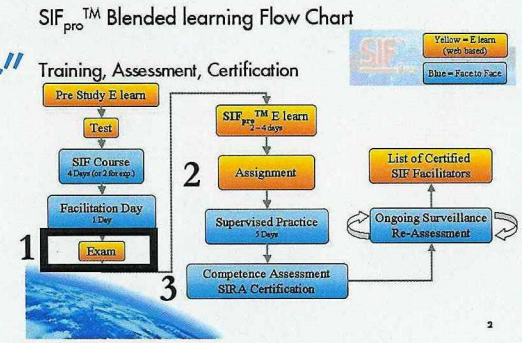
Certificate

Rene Heijenberg

Passed the Final Exam EM269E (step 1 of 3)

To become "Certified SIF Facilitator"

Date: 2 November 2005



Course Director

Jan Willem Montagne

Safety Instrumented Functions (SIF)

Shell Global Solutions

The M269E (SIF Final Exam) proved that this person has the following competences:

- Understand the IEC 61511/ 61508 requirements
- Know existence and relation of SIF to other International standards (US OSHA PSM, EC Seveso2, ISA84.01, etc)
- Understand the Risk Concept, ALARP, Tolerable, Acceptable Risk
- Understand and apply the LOPA concept (Layers of protection)
- Know the definition of the Safety Lifecycle concept
- Be able to use the SIF Terminology, Abbreviations
- Know what Documentation is needed, why HAZOP precedes SIF
- Be able to identify SIF's in PEFS, Tag's, symbols
- Be able to define SIF's (Primary, Half, Collateral, Demand reducing, success criteria)
- Understand the different Failure modes of equipment, The effect of Common mode failure (Beta factor)
- Be able to do Consequence assessment
- Be able to do Likelyhood analysis (demand rate, ruduction on demand rate)
- Be able to determine SIL selection using Risk Matrix
- Be able to carry out Safe Fault tolerance justification calculations
- Understand and know the SIF Implementation details (IEC minimum requirements)
- Be able to do simple Probablity of Failure on demand (PFD) calculations
- Be able to calculate Test Interval Calculations, using Test coverage and different Layers of testing
- Know what Reports are required to complete the study
- Understand the advantage using the SIFproTM software tool (demonstration)

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