**ABSTRACT**

Shell designed, is building, and will operate Mars B Project Olympus Tensioned Leg Platform (TLP) with Drilling and Completion Platform Rig to produce 100 MBOPD oil and 100MMSCFD gas. Protecting people and environment is the top priority for Shell. Initial design assumptions for Passive Fire Protection (PFP) application and blast design to protect people could result in the need for significantly high weight allowances. Therefore, there is a need to find a comprehensive and structured approach to optimize PFP and blast mitigation to deliver reasonable weight allowances.

This paper demonstrates how, through the use of practical safety assessments, weight allowances for PFP application and blast design can be optimized. It describes how the Mars B Project was able to demonstrate As Low as Reasonably Practicable (ALARP) risks for the design of critical systems for Major Hazards on the Olympus TLP. Major Hazards such as blowout fires, large wellbay explosions, and process releases are addressed. Optimization of PFP requirements and blast mitigation is demonstrated for critical systems such as the Temporary Refuge (TR), Drill rig, Flare Boom, Primary Structures, Process Vessels, Occupied Buildings, and Crane. In the case of the Drill Rig, fire and blast assessment is aligned with a key recommendation from the United States Coast Guard Deepwater Horizon investigation report.

Credible Design Scenarios are identified for Major Accident Hazards (MAHs) and used to assess the inherent strength of the proposed design through Fire Degradation, Blast Structural Assessment, and TR Impairment studies. When necessary design improvements were identified, further work was undertaken to optimize PFP application and blast resistance while delivering an ALARP design. In the process, full consideration was given to minimizing design changes, saving weight, and reducing maintenance problems during the life of the facility. In some instances this produced a superior result relative to initial engineering assumptions about PFP application and blast design.