

OTC 19110

Execution of a Major Gas Development in the Landlocked Caspian Sea

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This paper was prepared for presentation at the 2007 Offshore Technology Conference held in Houston, Texas, U.S.A., 30 April–3 May 2007.

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Abstract

The Shah Deniz high-pressure gas platform development in the Azerbaijan sector of the landlocked Caspian Sea required a unique execution plan, the key components being:

- Selection of a production jack-up for a continuous operational life of up to 30 years
- Fabrication of major components outside of the Caspian
- Transport of major components as self floating ‘strips’ towed through a canal network into the Caspian Sea
- Assembly in Azerbaijan
- Reactivation of a largely abandoned construction yard
- The use of the world’s largest ‘skirted spud cans’ with their associated challenges of fabrication, transportation and connection using a unique ‘assisted pendulum’ methodology
- Installation of foundation utilizing a novel ‘controlled punch-through’ technique

This paper describes the overall execution plan and the key technical challenges that the project team successfully overcame.

Introduction

At the start of the development planning for the Shah Deniz gas production platform, all available installation facilities (crane vessels and transport barges) in the Caspian, along with construction yards in Azerbaijan, were fully committed to a series of offshore oil production platforms. Consequently, the design brief for the Shah Deniz platform included the requirement that it should not have any impact on those facilities. The result was the selection of a self-installing jack-up production facility with an execution plan based on maximizing the out-of-country construction coupled with transportation of large self-floating ‘strips’ into the landlocked Caspian via a canal network for final assembly in-country. It

also included re-activating a largely abandoned in-country construction yard (Zykh).

The selected platform concept is a TPG 500 which totalled 32,500 tonne (t) (36,000 short tons) dry weight in its final configuration during the sail-away to site and was successfully installed in April 2006 (Fig. 1).



Fig. 1: Shah Deniz platform – installed April 2006

This paper presents the project’s unique execution plan and outlines the major technical challenges associated with it. Key steps in the project execution were:

- 1 Out-of-country (Singapore) fabrication of the hull strips incorporating topside process, utility and ancillary facilities including the living quarters
- 2 Transportation from Singapore to Baku (Fig. 2):
 - Loading of the initial 4 strips onto the Mighty Servant 3 (MS3)
 - Offloading of strips at Kerch
 - Tow of the strips through the canal network to the Caspian and on to Baku
 - Separate shipping of the last strip (strip 0 - wellbay & manifolds)
- 3 In-country (Baku) assembly and completion:
 - Hull strips mating in a floating dry dock
 - Skidding of the drilling equipment set (DES) onto the platform and its integration
 - Mating of the last strip sections (strip 0)
- 4 Spud cans – the largest ever – in-country fabrication and transportation to the connection site