

## **Basal Ghazij Sand (BGS) - A Unique Exploration Play in Eastern Part of Pakistan**

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A sandstone unit 5-6m thick underlying the Ghazij Shale of Eocene age was named as Basal Ghazij Sand (BGS) by Tullow Pakistan (Developments) Ltd in 1994 after their first gas discovery at Sara-1. Subsequently, appraisal and exploration in the area proved BGS a unique and discrete sand reservoir with a limited areal extent restricted only in small area in eastern part of Pakistan. BGS has so far only been penetrated in wells of Sara gas field in Pakistan and Dandewala Gas Field in India while it is missing in rest of the wells drilled in the region. The Basal Ghazij Sand (BGS) exhibits excellent reservoir quality with 19-30% porosity & > 2 Darcy permeability. Sara-1 tested 17.75 MMscfd with a max. flow of 42 MMscfd at depth of 982m - 988m. Sandstone seems to onlap against Sui Main Limestone in east and shaleout towards west. This paper is an attempt to understand distribution and extent of the sand in sequence stratigraphic framework.

A proper understanding of source, distribution and control on reservoir quality of BGS has been a major challenge during appraisal and further exploration in the area. Lack of sufficient and relevant data remained one of the major constraints. However, an attempt was made to integrate a well based sequence stratigraphy with seismic data to understand the genetic relationship and distribution of BGS. BGS was deposited during regression associated with a late stage of HST and an early stage of LST. The Sequence Boundary underlying BGS appears to downcut slightly into underlying HST (Sui Main Limestone) in Sara area resulting in relatively thick sand in a localized area. The siliciclastic shoreline moved from west towards eastward and appears to have established itself in the region of Sara wells. The LST varies across the area and is characterized by glauconitic, sideritic and bioclastic sandstone in Sara wells. The sandy character of LST gives way to basinal facies and northwards becoming dominated by sandy limestone, limestone and shale with either no reservoir quality as in Suri wells or poor reservoir quality as in Khan-1. Overall low reservoir quality wells appear to be in a moderately restricted facies possibly indicating some sort of lagoon environment. Based on sequence stratigraphic work, BGS fairway appear to follow shoreline along an interpreted NW-SE direction. Regional seismic data at BGS level suggest progradational reflection geometry and brightening at places in some areas in the Central Indus Basin. A proper understanding of BGS system would help extending and tracking Sara gas play in the eastern parts of the Middle and Lower Indus Basins of Pakistan.