

Implementation of Carbon Dioxide Gas Injection Method for Gas Recovery at Rashidpur Gas Field, Bangladesh

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Abstract- Natural gas plays an important role for the economic development of Bangladesh. It is the primary options to satisfy the environmentally clean energy, whereas coal is a dirty energy source and oil creates an unhealthy environment. Bangladesh is the seventh-largest producer of natural gas in Asia. Gas supplies meet 56% of domestic energy demand. The proven natural gas reserve in Bangladesh is only 19.73 Tcf. The Rashidpur Gas Field (RGF) is located in the Sylhet Basin, Northeast Bangladesh. It is 35 km long and 7 km anticlinal structure and asymmetric in nature with steeper eastern flank (22° to 25°) and gentler western flank (8° to 12°). There are two gas zones in depth between 1380m to 2787m below surface. Sandstone reservoirs of Miocene-Pliocene age and are considered to have been originated shallow marine depositional environment. The reservoir porosity-permeability values are very good, with estimated gas initially in place (GIIP) of the RGF was 2.242 Tcf with 58% recovery, thus recording an initial gas reserve is 1.309 Tcf. Five gas producing wells (RP-1, 3, 4, 6 and 7) in the RGF are producing 50 MMscf gas per day. Due to the demand of natural gas with decreasing production rate, this enhanced natural gas plays a vital role in the national economy of the country. This research depicts the development of the daily production of the RGF from 50 MMscfd to 99 MMscfd using software from the existing production wells. Thus the natural gas in the RGF would be enhanced/recovered using carbon dioxide (CO₂) gas injection by Enhanced Gas Recovery (EGR) method from the RGF reservoir. Applying this method would play a vital role to increase the daily production rate of the RGF.

Index Terms- Rashidpur gas field, enhanced gas recovery, carbon dioxide gas injection, trillion cubic feet.

I. INTRODUCTION

The Rashidpur gas field (RGF) is situated in the south central part of the Sylhet trough under Bahubal Upazila of Habiganj District (Figure 1). The Rashidpur gas field is located in the Sylhet Basin, known as the Surma Basin, is a sub Basin of the Bengal Basin, which is in the north eastern part of Bangladesh about 84 miles north east of Dhaka and 44 miles south east from Sylhet. Stratigraphically, the Tertiary Sylhet succession is subdivided into Jaintia, Barial, Surma, Tipam and Dupitila groups in ascending order (Table 1). Bangladesh is the one of the largest gas producer in Asia, and now it has proven to be only 19.73 Tcf natural gas reserves [2]. A total of 26 gas fields were discovered in Bangladesh and some more fields yet to be declared [3]. This existing reserve 16.74 Tcf is set to be exhausted within next one decade, and the gas production rate will be decreased steadily from 2017 [4]. Currently the country produces daily 2500 MMscf gas per day from 19 producing gas fields, and it is not sufficient, as its major source of primary energy used as gas [2]. If this continues, it is assume that, Bangladesh will face a major setback in industrialization, and against the demand for gas 2700-3000 Bcf per day instead of 2.28 Bcf makes the country one day to be dry up. Coal has been used since the industrial revolution and became the major source of energy [5]. And by the middle of the twentieth century oil indeed dominated the economics and politics of the world. As the contribution of the greenhouse gases to the atmosphere by burning coal and oil became more alarming, natural gas was preferred as cleaner and environmentally friendly. Natural gas contains virtually no sulphur or sulphur compounds, coal and oil accounted for approximately 99% of fossil fuel emissions of sulphur dioxide which is harmful for the environment [6]. In Bangladesh, sector use of natural gas during year 2003-04, is power generation plants use about 51%, fertilizer industry 21% and remaining 30% gas used in industrial,