KOC has made huge strides in driving down gas flaring in their operations over the last 6 years from 17% to 1.2% of gas production and is on track to meeting its target of <1% by 2012/2013. Although this phenomenal achievement was initially driven by environmental concerns, it soon became apparent that millions of KD in cost savings could be accessed. The reduction in flaring let to a gain of KD780 million ($2.75 bn). These results were driven by the dedicated and well-coordinated efforts of many departments across KOC with a clear agenda, a common goal and total commitment from the troops to the Senior Leadership team.

**KOC BACKGROUND:**

*Kuwait Oil Company Ltd.* (KOC), a national oil and gas company is a subsidiary of the *Kuwait Petroleum Corporation* (KPC) that was established to bring all state owned oil companies (including KOC) under one entity to consolidate activities relating to petroleum and hydrocarbon industries both in Kuwait and abroad.

The KOC activities include exploration, appraisal, field development, operations, transportation and export of Oil and Gas opportunities in Kuwait.

Oil was found in commercial quantities in the Burgan Field of Kuwait in 1938 and first crude export was made in June 1946.

Associated gas, after dehydration and compression process is transported to LPG Plants where valuable higher hydrocarbon products are extracted and the resulted lean gas is utilized for power generation and as fuel in process plants.

Non-associated gas was discovered in 2006 in the deep Jurassic reservoirs at Rahiya, Mutriba, Um Niga and other fields.

**GAS FLARING REDUCTION IN KOC:**

An essential part of producing oil and gas is the need to flare gas. Gas flaring is the controlled disposal (usually by burning) of gas that cannot be handled / processed or traded due to economic reasons or technical requirement for the safety of hydrocarbon handling or processing plants. Flaring cannot be sustained at zero levels though it can be brought-down to significantly low volumes.

In KOC, flaring reduction is driven by concern for the environment and economic paybacks. Being National Oil & Gas Company, KOC is committed in reducing the Gas Flaring and therefore reducing Greenhouse gas emission in order to create a healthier and safer environment; and as an active partner of the
Global community work towards creating a better future for next generations. After having discussions with representatives of World Bank-led Global Gas Flaring Reduction partnership (GGFR) in 2005, KOC set a corporate mission of achieving gas flaring of < 1% of its production by the end of company’s fiscal year 2012-13 (KOC joined GGFR partnership in 2011).

In efforts to increase availability and reliability of facilities and equipment towards also reducing Gas Flaring, KOC has completed approximately KD 1.1 Billion (US$ 4 Billion) projects since 2005 and another KD 1.25 Billion (US$ 4.5 Billion) projects are on track.

KOC began an extensive program in 2005 which led to the reduction in Gas Flaring from 17% in 2005 to 1.18% in 2011 (as of October 2011).

Gas Flaring Awareness:
- Extensive Gas Flaring Reduction Campaigns are run regularly at all levels to create awareness about flaring.

Top Management Commitment and Gas Flare Monitoring:
- Yearly flaring targets are set and monitored through company Balance Score Card; and is also included in all higher and mid management executives’ KPIs.
- Daily gas reports of flaring are circulated to higher management for review.
- Gas Flaring report and Gas flaring related projects status is presented monthly to the Chairman and other higher management for review and support in case of any concern.
- KOC maintains close coordination with upstream and downstream functions in order to keep gas flowing without any interruption; and communicate any shutdowns well in advance to avoid any operational upsets and excessive gas flaring.
- Customer surveys are conducted regularly by the KOC Gas Management Group which is registered to ISO 9001:2008 Standards, to continuously improve KOC services to the customers.

New Gas Handling Facilities and Equipment:
- New Booster Stations (BS-160, BS-132 & BS-171) are being built that will significantly increase Gas processing capacity therefore reduce gas flaring.
- Eleven new Condensate Recovery Units have been commissioned.
KOC MISSION OF GAS FLARING REDUCTION

- A Gas Sweetening Unit was commissioned in August 2010 to handle the high H\textsubscript{2}S content in the West Kuwait export gas.
- A Gas & Condensate Telemetry Project was completed in late 2010. This led to efficient & optimal utilization of both – the networks & the compressors. Under this project, flare-gas flow-meters were installed wherever not available, to provide accurate values of the flared quantities.
- Under the Gas Management Group of KOC, a team has been created for monitoring and ensuring possible enhancement in reliability/ availability of KOC Gas facilities.

Adequate Pipeline Network:

Following actions are being taken that will increase gas handling capacity therefore, reduce flaring.

- New rich gas & condensate export pipelines and new large diameter fuel pipelines are in the process of being built.
- Old non-pigable pipelines are being converted to pigable (if possible) as part of Pipeline Integrity Management System.
- All major HP export gas lines (≥ 25 years of service) are being replaced by the new ones or revamped under various projects. The HP rich gas network is also being upgraded in sectors identified as bottle-necks.

Flare Stacks / Tips:

- Obsolete flares are being replaced with efficient air-assisted flares to increase availability and reliability of surface facilities which helps in reducing Gas Flaring.

In an increased effort to achieve the corporate mission of < 1% Gas Flaring, KOC in coordination with GGFR experts is in a process of conducting a study to define ALARP (as low as reasonably possible) Gas Flaring Technical limit and accordingly develop new action plans for the new limits.

GAS FLARING REDUCTION BENEFITS:

Environmental benefit:

Gas flaring reduction has decreased greenhouse gas emission to the environment. Following graph illustrates yearly carbon emission volumes represented by number of Wimbledon stadium fields with 1 foot thick carbon layer; reduction in carbon emission since 2005 is significant. Compared with 2005, KOC has stopped 1180 Wimbledon stadium fields filled with 1 foot thick layer of carbon emission.

Monetary Gain:

The gas flaring reduction is translated into increased gas production and in turn increased company revenue. The lost revenue due to flaring has decreased since 2006 from KD 177 Million (US$ 625 Million) in 2005 to KD 20 Million (US$ 70 Million) in 2010; and it is expected to further reduce in 2005. Since 2005, KOC has saved KD 780 Million (US$ 2.75 Billion).

"With strong commitment towards creating a cleaner environment, we have reduced KOC gas flaring from 17% in 2005 to 1.2% in 2011; and we are committed to further reduce it to the lowest possible limit", said KOC Chairman and Managing Director Mr. Sami Fahed Al-Rushaid. "I firmly believe that it was only possible by mind change of employees towards better understanding of the consequence of gas flaring to the environment and future generations."

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