Journal of Science and Technology
1 (1), 2007, 26-34

Oil Supply Diversification Needs for the Gulf Region: By-pass pipelines to the Strait of Hormuz

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ABSTRACT

Comprising 65% to 70% of the world's oil reserves, the Gulf States (Saudi Arabia, Iran, Iraq, Kuwait, UAE and Qatar) are a key region in solutions to energy supply matters. The Gulf States producers accounted for 24.7 % of the world oil supply at the moment, and this share of supply will grow to 51,8 % in 2030. However, the Gulf region has a multitude of oil supply problems closely interlinked to each other, originating wars, conflicts and terrorist attacks. Therefore, alternative transport routes and diversification of the supply are required. These are possible with two new pipeline systems connected with each other and operative for both northward and southward directions. One of them should be construction of Gulf–Ceyhan Pipelines for transporting the Gulf oil to the Mediterranean. Other should be construction of by-pass pipelines to the Strait of Hormuz for transporting the Gulf oil to Indian Ocean.

Keyword: *The Gulf oil; Oil Supply, The Strait of Hormuz; By-pass Pipelines*

ÖZET

Dünya petrol rezervlerinin %65-70'i Orta Doğudaki Körfez ülkelerinde (Suudi Arabistan, İran, Irak, Kuveyt, BAE ve Katar) yoğunlaşmıştır Körfez ülkeleri 2005 yılında dünya petrol üretiminin %24.7'sini sağlarken, 2030 yılında %51.8'ini sağlayacağı beklenmektedir. Bununla birlikte, Orta Doğu'da çok sayıda petrol sağlama güvenliği problemleri bulunmakta olup, petrol taşımacılığının alternative yollarla desteklenmesi gereklidir. Bu makalede Körfez petrollerini Akdeniz'e taşıyacak Körfez-Ceyhan Petrol Boru Hattının ve Hürmüz Boğazını py-pass ederek Hint Okyanusu'na taşıyacak Trans-Arabistan ve Trans-İran Petrol Boru Hatlarının yapılması önerilmektedir.

1. INTRODUCTION

Oil supply is a major concern in the world, as the oil dependence of the US, Europe, Asia-Pacific increases in line with energy utilization projections. The Global oil demand will rise from 84 million barrels per day (mbd) in these

days to 121.3 mbd in 2030 [1]. North America will import 75 % of total oil in 2020 [2], EU will import 90% of total oil in 2030 [3,4], and Asia-Pacific oil dependence will also rise to 78% in 2020 [5]. The world's oil reserves are concentrated in the Gulf States (Saudi Arabia, Iran, Iraq, Kuwait, UAE and Qatar). This region has up to 677 billion barrel proven-undiscovered oil reserve (70 % of world reserve) according to a 30 years technology progress [6]. According to OPEC, there is 656.2 billion barrel proven oil reserve (65% of the world reserve) in the region [7]. The Gulf States producers accounted for 25.9 % or 21.85 mbd of the world oil supply in current time and it is an important to note that Gulf producers are expected to provide 51,8 % or 62.8 mbd of world production in 2030 [1,8]. The Gulf region is the world's leading exporter of oil. Total crude oil export from the region was 18.64 million barrels per day in 2005 [9]. Therefore, oil from the Gulf States is very important to USA, European Union and Asia-Pacific. However, the Gulf region has a multitude of oil supply problems closely interlinked to each other and originating Arab-Israel wars and conflicts, Iran-Arab, Arab-Arab wars and conflicts, US-Gulf wars and conflicts and terrorist acts. Therefore, alternative transport routes and diversification of the supply are required. The aim of this paper is to identify the oil supply problems in the Gulf region and to suggest alternative transport routes for diversification of the oil supply.

2. OIL SUPPLY FROM THE GULF SATES TO WORLD

Gulf oil is mainly exported to USA, Europe and Asia-Pacific via oil tankers. However several pipeline systems are also in operation (Figure 1). Oil from Iran, Kuwait, Qatar, UAE, and some amounts from Saudi Arabia and Iraq are transported via oil tankers from various Gulf localities. Total amounts of oil transported by oil tankers via the Gulf were 15.5 mbd in 2004. Part of the oil from Iraq has also been transported by four oil pipelines (a small portion by trucks via Turkey and Jordan) [10, 11].

a) Kirkuk-Yumurtalık oil pipeline: Running from Kirkuk (in Northern Iraq) to Yumurtalık (a Mediterranean port in Turkey), the two parallel pipelines have an optimal capacity of 1.5-1.6 mbd.

b) Iraq-Syria oil pipeline: From Kirkuk to Mediterranean port of Banias (Tripoli, Lebanon) pipeline has a capacity of 200,000 bd.

c) IPSA oil pipeline: Iraq - Saudi Arabia (the Red Sea port of Mu'ajiz, north of Yanbu) pipeline has a capacity of 1.65 mbd, but it was closed after Iraq's invasion of Kuwait in August 1990.

d) Mossul-Haifa pipeline: Mossul (in Northern Iraq) - Haifa (Israel) pipeline has 100,000 bd capacity. The line was built in the 1930s, but has been closed since Israel's establishment in 1948.

Saudi Arabian oil has been carried by Petroline Oil Pipeline with a 5 mbd transport capacity from the Gulf to the Red Sea, and 1.65 mbd by the

Trans-Arabian Pipeline (Tapline) from the Gulf to the Mediterranean. But, Petroline don't operate full capacity. Tapline was constructed to serve to export Saudi Arabia oil to Haifa in 1940's. The establishment of Israel resulted in diversion of Tapline's terminus from Haifa to Sidon, Lebonan, but Tapline has been closed since the Beirut (Israel-Arabian) war in 1983 [12, 11, 13].

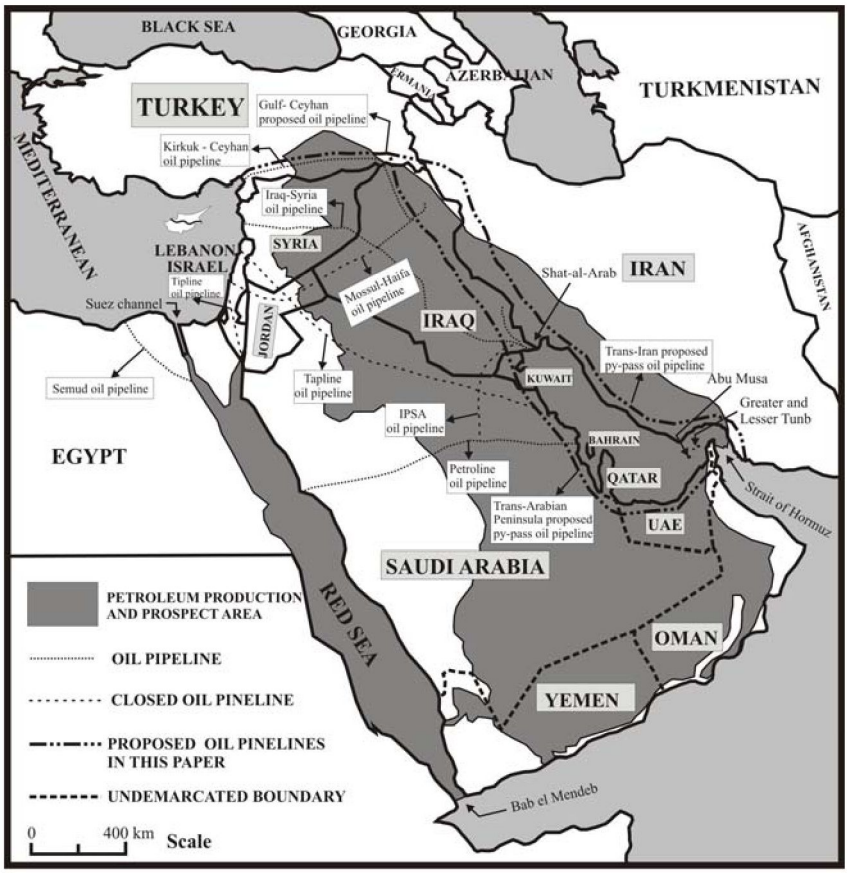

Figure 1. Oil prospect area and oil pipelines of the Gulf region (from [6,12,18,11,13]).

Portions of the Gulf oil exports have been transferred via the Suez Channel while others used Semud (Fig. 1) pipeline. In 2002, oil transport via the Suez Channel was 1.3 mbd capacity and by the Semud pipeline was 2.5 mbd capacity [11].

Moreover, another pipeline known as the Tipline, running from the Red Sea to Haifa (Israel), has a capacity of 1.2 mbd and was operational in

both directions. This pipeline was used to transport Iran oil to Israel during the time of the Shah. Recently, it has been suggested that this pipeline may also be used to ship oil from Russia to the Asian market [13].

3. PROBLEMS OF THE OIL SUPPLY IN THE GULF REGION

There are several elements affecting the continuous flow of oil from the Gulf region:

a) Arap - Israel wars and conflicts

Establishment of the Israeli state after World War II caused many wars between Israel and the Arabic world. These wars seriously affected energy supply from Gulf region. First, establishment of Israel led to the shut down of Mossul (in Northern Iraq) - Haifa oil pipeline in 1948. Camal Abdul Nassir, president of the Egypt closed the Suez Channel after Israel-Arabian war in 1957. When Arabian oil producers put into practice an oil embargo against USA and Europe after the Israel-Arabian war in 1973, the first oil shock was felt. The Israeli–Arabian Beirut war led to the close of Tapline (Transit Arabian Oil Pipeline) in 1983, which is used to transport oil from the Gulf to the Mediterranean.

The Arab-Israeli wars, along with numerous lesser crises highlight the centrality of the conventional attack and defense of territory in regional conflict including the sharing of holy city, Jerusalem Some of the terrorist attacks in the Middle East are also related to Israel-Arabian conflicts [14, 15, 16].

b) Iran –Arab and Arab-Arab wars and conflicts

The Iraq-Iran war has caused a decline in oil production and serious fluctuations in oil market beginning in the 1980s due to many reciprocal attacks on oil fields, oil infrastructures and oil tankers. Shatt-ul-Arab water way was one of several reasons for Iraq-Iran war. Abu Musa, Greater Tunb and Lesser Tunb Islands created many of the problems between Iran and the UEA. Warba, Bubian Islands and Rumalia oil field problems was led to the invasion of Kuwait by Saddam in August 1990. Saudi Arabia has not yet reached an agreement with neighbors over the exact location of key interior boundaries (Figure 1). The establishment of exclusive economic zones in accordance with UN Convention on the Law of the Sea has also produced disagreement over the location of offshore boundaries of the Gulf [17, 18, 14, 15,16].

c) US- Gulf wars and conflicts

Invasion of Kuwait by Saddam in August 1990, which had triggered the first Gulf War in 1991, resulted in the serious destruction of the oil fields and oil supply infrastructures in Kuwait and Iraq. The Iraq-Saudi Arabia oil

pipeline (IPSA) was closed in the first Gulf War. Starting from April 2003; the Iraqi oil supply infrastructure has continued to be damaged throughout the second Gulf War, whose effects are still being seen. The current levels of oil production and exports from Iraq are lower than pre-war era which contributed to current new oil shock [19]. The second Gulf War ended within a short time and was followed by the collapse of Saddam's dictatorship regime. Unfortunately, after the war, reconstruction of the country and restoration of the law and order in Iraq could not be achieved because the security challenges in the country were not overcome.

After the revolution in 1980, Iran began a fight with Iraq which continued until 1988. During this period, Iran-USA relation changed to enmity due to US support to Iraq. The present status of the Iran-US relations is strained as a result of situations such as nuclear weapons and Iran's supposed terrorist actions. US-Israel and Iran relations have stressed since the nuclear program has been restarted by President Mahmod Ahmedinecad. Thus, oil prices have soared up with the expectation of a possible war risk and oil supply shortage.

d) Terrorist acts

Although they have temporary effects, terrorist attacks are problems for energy supply. For example explosion of a French oil super tanker offshore Yemen in 2002 or terrorist attacks in Saudi Arabia targeting foreign oil workers and oil fields after second Gulf War is no great effects on oil supply except high oil price. The 9/11 terrorist attacks proved that Al-Qaeda type terrorist organizations could play a serious negative role in energy supply, if oil fields, oil tankers (especially in Strait of Hormuz and Bab el Mandeb) or oil pipelines are targeted [18]. However, such attacks are bound to cause only temporary effects due to fast repair efforts and security measures [15,16]. On the other hand, as an aftermath of the second Gulf War, the oil production and supply from Iraq has not developed fast enough due to sporadic fighting (pre-war oil production was 3.00 mbd and oil production in July 2005 was only 1.84 mbd, [8]). However, sporadic fighting is related to civil war rather than terrorist acts, because suicide bombings targets to Iraqi people rather than Coalition Forces.

4. DIVERSIFICATION OF THE OIL SUPPLY WITH ALTERNATIVE TRANSPORT ROUTES

Large amounts of oil (15.5 mbd) from the Gulf region are exported by oil tankers along the Strait of Hormuz, only six miles wide in its narrowest point (Figure 1). Iran and UEA have border dispute near the Strait of Hormuz (Abu Musa, Greater Lesser Tunb). Any conflict or war in the region especially between the US and Iran or Iran and the Arabs, or even any crisis between US-

China over Taiwan [20] may affect free oil flow from this most important oil chokepoint of the world. Therefore, oil flows from the Strait of Hormuz must be reduced using alternative methods [18,1].

Similarly, an Israel-Arabian conflict may affect Suez channel-Semud pipeline (3.8 mbd) and Iraq- Syria oil pipeline (0.2 mbd) as in the past (Figure 1). According to [13], control of Iraq and economic cooperation between Israel and Iran-Arab states with energy transfer may provide an opportunity to achieve a comprehensive peace in the region. However, the re-opening and widening of former pipelines (Tapline and Mossul-Haifa) and turning Haifa into the "Rotterdam of the Middle East" are not suitable owing to its sudden transition. Whereas, oil transfer between Israel and the Gulf states should be constructed step by step with peace process.

Therefore, alternative transport routes and diversification of the supply are required. These are possible with two new pipeline systems connected with each other and operative to both north and south directions. One of them is to construct Gulf–Ceyhan Pipelines (GCP) for transporting the Gulf oil from Arabian Peninsula and Iran to the Mediterranean. Others are by-pass pipelines to Strait of Hormuz such as Trans-Arabian Peninsula Pipeline and Trans-Iran pipeline (Figure 1).

4.1. The Gulf-Ceyhan Oil Pipelines

The GCP will provide an important challenge for oil supply from the Gulf region for many reasons;

1) The GCP will directly transport the Gulf oil to the Mediterranean.

2) The GCP is already in operation both between Kirkuk and Ceyhan and Kirkuk- Southern Iraq. If it is extended and widened, this line will provide the transportation of oil from Iran, Iraq, Kuwait and Saudi Arabia.

3) The GCP is not directly affected by the current Iran-Arab war and conflicts, Arabian- Israel war and conflicts and Iran-US war and conflicts. The Kirkuk-Ceyhan Pipeline has been operated full capacity before the second Gulf War. But this line has been sabotaged tens of times during civil war in the Iraq. Therefore, if the civil war is stopped by united and integrated democratic country represented by democratically elected representatives from all groups, the GCP will again operate safely.

4) For economic considerations, the GCP may be interrelated with newly constructed pipelines. The BTC and the CPC pipelines constructed for the Caspian oil transportation, which are good examples due to their nearness to the Gulf region.

The Baku-Tbilisi-Ceyhan (BTC) pipeline will be able to transport up to one million barrels of crude oil per day from the Caspian Sea to the Ceyhan, the city on Mediterranean. This pipeline was constructed by a consortium led by international oil companies (SOCAR, BP, Unocol, Statoil, TPAO, Itachu, Ramco and Delta-Hess). Line fill of the BTC pipeline began in Azerbaijan on 10 May 2005 and the first export of oil from the Ceyhan marine terminal in

Turkey commenced on May 2006. The BTC pipeline that is 1774 km long is constructed with $3 billion investment [21].

The CPC was formed to build a pipeline system to transport oil from western Kazakhstan to the Black Sea near Novorossiysk in Russia. The governments of Russia, Kazakhstan, and Oman developed the CPC project together with a consortium of international oil companies such as ChevronTexaco, LUKARCO, ExxonMobil, Rosneft-Shell, Eni, BG Group, KazMunaiGaz/BP and Shell. The CPC pipeline is 1,510 km long. Initial capacity of the CPC pipeline is 560,000 bbl/d, and the consortium has plans to increase the pipeline's capacity to 1.34 million bbl/d by 2008. Eleven companies from six countries were involved in the construction of the $ 2.6 bn pipeline [22].

The GCP can be constructed as two lines; A) Iran-Ceyhan Pipeline and B) Saudi Arabia-Ceyhan Pipeline. A) The Iran-Ceyhan Pipeline (ICP) will be 1700 km long. B) Saudi Arabia-Ceyhan Pipeline (SCP) will be 1750 km long. Therefore, the GCP will be more economical from the BTC and, only little more expensive coming from the CPC.

4.2. By-pass pipelines to the Strait of Hormuz

Klera (2001) discussed Trans-Arabian Peninsula pipeline from Saudi Arabia to Indian Ocean. However, Saudi Arabia has not reached an agreement with southern neighbours over the exact location of key interior boundaries. Saudi Arabia also has some conflict with Oman (Figure 1). Thus, the Trans-Arabian Peninsula by-pass Pipelines from Iraq to UAE are more suitable for the decrease of oil transportation from the Strait of Hormuz. The Trans-Arabian Peninsula by-pass Pipeline will not be directly affected by any Arabian-Israel war conflicts or Iran-US war and conflicts. The pipeline will be 1200 km long from Iraq to the Indian Ocean. In addition to this, by-pass of the Strait Hormuz require another by-pass pipeline to Iran side. The Trans-Iran by-pass Pipeline will be 900 km long from north of the Gulf to Indian Ocean and it will not be directly affected by any Arab-Israel war and conflicts or Arab-US war and conflicts. The by-pass pipelines will especially enhance oil supply for Asia-Pacific region. Both by-pass pipelines will also be more economical correlated with the BTC and the CPC.

5. CONCLUSIONS

Gulf oil is the key to world oil supply. The Gulf region has a multitude of oil supply problems such as wars, conflicts and terrorist attacks. Transportation of the Gulf oil requires alternative routes, because current routes are not sufficient and not secure. Oil flow from the Strait of Hormuz must be reduced using alternative routes because the large amounts of oil (15.5 mbd) exported from the Gulf region by oil tankers through the Strait of

Hormuz.

Transportation of the Gulf oil (Saudi Arabia, Iraq, Iran and, Kuwait) to western markets via Turkey will increase secure oil supply as this proposed route will not be interfered by any war and conflicts if also makes direct transportation of Gulf oil to western markets possible. Constructing of by-pass pipelines to the Strait of Hormuz will especially enhance Asia-Pacific oil supply matter for they will not be directly affected by any war and conflicts.

ACKNOWLEDGEMENT

We would like to express our thanks and gratitude to Dr. Deniz Kutluk (University of Ankara, Turkey), Dr. Tuncay Babalı (University of Houston, USA), Prof. Dr. Şener Üşümezsoy, Prof. Dr. İsmail Boz and Prof. Dr. Ömer Alptekin (University of Istanbul, Turkey), Dr. Remzi Aksu (Turkish Petroleum Company), Amy Coren (University of Texas, USA), Kensuke Kanekiyo (The Institute of Energy Economics, Japan) and Janusz Bielecki and Gürbüz Gönül (Energy Charter Secretariat, Belgium) for their critical reviews.

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