



Center for Strategic and International Studies

Arleigh A. Burke Chair in Strategy

1800 K Street, N.W. • Suite 400 • Washington, DC 20006

Phone: 1 (202) 775-7324 • Fax: 1 (202) 457-8746

Web: www.csis.org/burke

The Impact of the Abqaiq Attack on Saudi Energy Security

Khalid R. Al-Rodhan

Visiting Fellow

kalrodhan@csis.org

Revised: February 27, 2006

The author is grateful to many people for their comments, suggestions, and corrections to an earlier draft of this article. Special thanks go to Nawaf Obaid, Patrick Ryan, and Nikos Tsafos.

Background

It is too early to know the full details of what actually took place at the Abqaiq oil facility in eastern Saudi Arabia, but early reports indicate that an attempted attack was foiled by Saudi security forces on February 24, 2006. The news caused oil prices to jump more than \$2 a barrel.

The reaction of the oil market—that is all too aware of geopolitical, security, and economic risks—is expected. The attack comes amidst continuing instability in Iraq, the uncertainty regarding the Iranian nuclear issue, and the ongoing violence and supply disruption in Nigeria.

Saudi Arabia is the world's largest oil producer and exporter. It holds 25% of the world's proven oil reserves (261 billion barrels), produces 12.5% of the world's oil production (9.0-9.5 million barrels a day), and exports 16% of world's total exports (7.5 million barrels a day). Furthermore, the Kingdom has the largest surplus oil production capacity (approximately 1.1-1.8 million barrels a day.¹)

The stability of the global oil market depends not only on the Kingdom's capacity to meet shortages in oil supply, but also in its ability to reassure the market. In the past, Saudi Arabia has played the role of "swing producer" to meet shortages in supply. Now, the attention is focused on the Kingdom's ability to meet global oil demand and protect its key oil facilities.

In the case of Abqaiq, even if some of the facilities were destroyed, Saudi Aramco has claimed that it has backup and redundant facilities to produce at near capacity.² The same fears about Saudi energy security arose after the May 2004 attack in Yanbu. During that incident, the Saudi security forces were also able to suppress the attack. The terrorists were quickly killed and the facilities in Yanbu were not in danger. That, however, did not stop speculation about Saudi energy security.

The Importance of Abqaiq

The importance of Abqaiq is twofold: contains one of the largest oil fields in the world and its facilities are the main oil processing centers for Arabian Extra Light and Arabian Light crude oils, with a capacity of more than 7.0 million barrels a day. The facilities include pumping stations, gas-oil separator plants, and pipelines. This makes Abqaiq pivotal to Saudi and global energy production and export capacity.

In terms of the field, it contains 17 billion barrels of proven reserves. The proven reserves in the Abqaiq field alone are larger than the reserves of some major oil exporting countries: Mexico's total oil reserves are 14.8 billion barrels and Canada's conventional oil reserves are only 16.8 billion barrels.³ (This obviously does not include Canada's reserves of tar sands, which are estimated at about 175 billion barrels.)

Abqaiq produces 4% of Saudi Arabia's total oil production.⁴ Currently, Abqaiq has a production capacity of approximately 0.43 million barrels a day, and it is estimated to reach 0.44 million barrels a day in 2010. The International Energy Agency (IEA) forecasts Abqaiq's production capacity to decrease to approximately 0.36 million barrels by 2030.⁵ This is largely due to natural depletion; Abqaiq has the largest depletion rate of all the Saudi oil fields. In 2004, Aramco estimated that 73% of Abqaiq's total reserves have been depleted, which would leave the field with approximately 5 billion barrels of proven oil reserves.

Abqaiq's importance is compounded by the fact that it mostly produces Arab Extra Light crude, which requires little refining compared to other heavier crudes (for example the crude produced

from Munifa).⁶ Abqaiq is also the most important processing facility in Saudi and the world. At Abqaiq, crude is stabilized by controlling the levels of dissolved gas, natural gas liquids (NGLs) and hydrogen sulfide. Once this is done, the crude can be transported. Nearly two thirds of Saudi Arabia's crude oil is exported via Abqaiq, nearly 5.0 million barrels a day.

Oil from Abqaiq goes to export terminals in Ras Tanura (with a 6.0 million barrels a day export capacity), Ras al-Juaymah (3.0 million barrels a day export capacity), and many other terminals in the Gulf.⁷ In addition, Abqaiq contains ten cylindrical towers within which hydro-desulphurization occurs (the process of making crude oil "sweeter"). Abqaiq is also connected to the Shaybah oil field (with estimated reserves of 15 billion barrels and production of 0.5 million barrels a day) via a 395-mile pipeline, and to an export terminal in Yanbu on the Red Sea via a natural gas liquid pipeline with an estimated capacity of 0.3 million barrels a day.⁸

Saudi Petroleum Security Apparatus

The Kingdom has taken precautions in securing pipelines, oil fields, and other energy terminals. The Saudi security budget for 2005 was \$10 billion, including \$1.5 billion on energy security (in 2004, the total security budget was estimated to be \$8 billion, including \$1.2 billion for energy security). Surveillance from helicopters and F15 patrols operate around the clock, as do heavily equipped National Guard battalions on the perimeter.⁹ Oil fields and processing plants, however, are large area targets and redundant facilities ensure that an attack on one would not cause a serious disruption in the entire production system.

At any given time, there are an estimated 25,000 to 30,000 troops protecting the Kingdom's infrastructure. Each terminal and platform has its own specialized security unit, comprised of 5,000 Saudi Aramco security forces, and an unknown number of specialized units of the National Guard and Ministry of Interior. The Coast Guard and components of the Navy protect the installations from the sea.¹⁰

Ministry of Interior security units guarding Saudi energy infrastructure include: representatives from the Special Security Forces, Special Emergency Forces, the General Security Service (domestic intelligence), regular forces of the Public Security Administration (police and fire fighters), the Petroleum Installation Security Force (PISF), and specialized brigades of the Saudi Arabian National Guard (SANG), Saudi Royal Navy, and the Coast Guard.

Saudi Aramco also has built advanced communication centers to manage emergency and supply disruptions in its pipelines and processing hubs. For example, in November 2002, Aramco inaugurated a new Abqaiq Area Emergency Control Center (ECC). According to Aramco, the ECC houses 14 workstations, which control radio and telephone communication systems as well as link this to the Shaybah field, export stations, and pipeline control hubs.¹¹

Asymmetric Threat to Energy Security

Terrorists present a new kind of threat in terms of their willingness to suddenly change strategies and tactics to attack energy facilities. This threat not only presents a threat to the physical security of key oil facilities, but it also adds to the "security premium" in the global oil market.

Until recently, extremist groups had generally avoided energy targets, or had not made them critical priorities. This changed dramatically when the insurgency became serious in Iraq; since then, key al-Qaeda leaders such as Bin Laden have threatened attacks on oil facilities. In a tape that was posted on an extremist website, Bin Laden asserted that, "Targeting America in Iraq in

terms of economy and loss of life is a golden and unique opportunity... Be active and prevent them from reaching the oil, and mount your operations accordingly, particularly in Iraq and the Gulf.”¹² Bin Laden’s deputy, Ayman Al-Zawahiri, also urged similar attacks. On December 7, 2005, a statement attributed to Al-Zawahiri called on the “mujahideen to concentrate their attacks on Muslims’ stolen oil, from which most of the revenues go to the enemies of Islam while most of what they leave is seized by the thieves who rule our countries.”¹³

Abu Muzab Al-Zarqawi, the leader of al-Qaeda in Iraq, made similar statements urging attacks against energy facilities in the Gulf and Iraq. Insurgents in Iraq have made oil facilities one of their targets. The Institute for the Analysis of Global Security estimates that there have been 299 attacks on Iraqi oil infrastructure and personnel between June 2003 and February 12, 2006.¹⁴ These attacks continue to constitute a threat and some of them have caused a complete shutdown of oil exports from Iraq.

Rebel groups in Nigeria have also attacked energy installations and disrupted oil exports. Four days before the attack on Abqaiq, the Movement for the Emancipation of the Niger Delta (MEND) claimed responsibility for attacking an oil facility and a naval vessel, and for kidnapping oil workers. This caused Shell to shut its operations and production of a fifth of Nigerian oil output, approximately 0.45 million barrels a day. Interestingly, rebel leaders used rhetoric similar to that of al-Qaeda. MEND claimed that they were fighting a “total war” to control the oil wealth of the Niger Delta.¹⁵

Attempts against Saudi oil facilities continue to worry the global energy market and the Saudi leadership. Following a siege and a raid against extremists in Dammam, Saudi security forces discovered more than 60 hand grenades and pipe bombs, pistols, machine guns, RPGs, two barrels full of explosives, and video equipment. The Saudi Minister of Interior, Prince Nayef al-Saud, was quoted as saying that the al-Qaeda cell had planned to attack Saudi oil and gas infrastructure, but Prince Nayef added, “There isn’t a place that they could reach that they didn’t think about,” and insisted that al-Qaeda’s ultimate goal has been to cripple the global economy.¹⁶

Shortly after the attacks against Abqaiq, al-Qaeda claimed responsibility. In a statement posted on its website, al-Qaeda in the Arab Peninsula said that the attack was “part of a series of operations that al-Qaeda is carrying out against the crusaders and the Jews to stop their plundering of Muslim wealth.” Al-Qaeda dubbed the attack “Operation Bin Laden Conquest,” and claimed that the attackers managed to storm the compound.¹⁷

U.S. and Saudi officials, however, confirmed that the attackers were stopped from entering the compound and praised the Saudi security forces for foiling the attack. The U.S. ambassador in Riyadh James C. Oberwetter said in a statement that, “The Saudi government and Saudi Aramco deserve considerable credit for what they have done in recent years to enhance the security of oil facilities throughout the kingdom...I know firsthand the robust security systems that are in place there. When they were needed, those systems worked, and the facility at Abqaiq was fully protected.”¹⁸

Assessing the Saudi Security Forces Performance at Abqaiq

While early reports are often unreliable, the Saudi counterterrorism and petroleum security forces seem to have largely contained the attack against the facilities at Abqaiq and minimized the damage. Tactically, the operation and the Saudi response had a number of characteristics and lessons:

- Two suicide bombers tried to drive two cars packed with explosives into the Abqaiq compound on Friday February 24, 2006 at 3:10 pm Saudi time. The time is significant given that most of al-Qaeda attacks in the Kingdom have happened during the night to keep an element of surprise, prevent detection, and delay the response by Saudi forces.
- The tactic of using vehicle-borne suicide bombers is also significant. It has certainly been used by al-Qaeda in the past to attack targets in the Kingdom. For example, the attack against three compounds on May 12, 2003 demonstrated similar tactics. The attackers used four cars that were packed with explosives and had heavy assault rifles. After spraying gunfire and killing the guards at the gates, they drove an explosive rigged car inside the compound where it was detonated.
- In the case of Abqaiq, the facility was far more protected than the residential compounds in Riyadh were. Abqaiq reportedly had at least three layers of security. The goal of such frontal assaults is to weaken the first layer of defenses, penetrate it, and get closer to the center of the area. The Saudi security forces engaged the two approaching cars when they approached the first gate. The first car, reportedly, slammed into the gates, exploding, and injuring the guards, who eventually died in the hospital.
- The second car used the hole in the fence to enter the compound. It was then engaged by Saudi forces at the second tier of the security perimeter, approximately 1.0 mile away from the closest facility. This was probably done through firing directly at the cars with large caliber machine guns mounted on the armored personal carriers of the Saudi Arabian National Guard (SANG) unit at the gate or by an elite counterterrorism squad from the Special Emergency Forces. The explosives in the cars detonated and caused damage to facilities near the gate, but the damage was largely outside and impacted only pumping and processing stations at an adjacent the pipeline. This may have been prevented by strengthening the first layer of the security perimeter to prevent the breach, but Abqaiq covers approximately 1.0 square mile. This would have meant that the second layer of security was very close to the first and that even the first perimeter was breached, the damage to the facility would be limited given the distance from the center of Abqaiq.
- Press reports have claimed that the attackers wore Saudi Aramco uniforms and used cars painted in the company's colors. This does not, however, imply that the cars were actually those of Aramco. Al-Qaeda previously used cars in attacks similar in appearance to those used by Saudi internal security forces. Subsequent investigations have shown that the cars were painted by the terrorists in order to breach security checkpoints.
- The terrorists were killed before they could get out of the cars and cause further damage. It is unclear if the Saudi security forces directly killed the assailants or the explosions of the cars actually killed them. Regardless, the important fact is that the attackers were stopped from using automatic weapons, grenades, or suicide belts to kill workers or attack facilities inside the compounds. While such assaults may have little lasting damage to the facilities it could have caused far more to the "security premium" in the global oil market than a \$2 per barrel jump in the oil price, if the attackers were successful at breaching the security at Abqaiq.
- The attempted attack most likely happened after surveillance by the attackers. One of the hallmarks of al-Qaeda is its surveillance capabilities. In addition, early reporting from the Kingdom indicated that the Saudi security forces were expecting an attack in the Eastern province, which may have come from Saudi counterintelligence monitoring of al-Qaeda. Preparation, enhanced by warning, also explains the success of Saudi forces in foiling the attack.
- As noted earlier, most large attacks by al-Qaeda took place during the night. The fact that the attack against Abqaiq happened on a Friday afternoon (the Muslim day of prayer) may signal that al-Qaeda was changing tactics, but it also shows that the Saudi security forces were on alert, adapted to this shift, and responded accordingly.
- Saudi Arabia issued two most-wanted lists. In December 2003, it published a list of 26 wanted terrorists, of which the Kingdom killed or captured all but one. The second list was issued in June 2005 of 15 wanted terrorists. The al-Qaeda statement following the attempted attack against Abqaiq identified the attackers as Mohammed Saleh al-Ghaith and Abdullah Abdulaziz al-Tweijri. This was subsequently confirmed by DNA

tests by the Saudi authorities. This shows that the Saudi authorities have been successful at both identifying the most dangerous elements of al-Qaeda, and at tracking them, but it also shows that these two could have been far more dangerous if they were successful at storming the compound. In addition, while the success rate of capturing or killing those who are on the most wanted lists is impressive, the death of the two attackers at Abqaiq leaves six terrorists from both most-wanted-lists at large.

- According to the Saudi Ministry of Interior (MoI), the cars carried two tons of ammonium nitrate (one ton in each car) as well as unspecified quantities of high explosives including RDX, PITN, and Nitro Glycerin. These are large quantities of explosives were most likely smuggled into the Kingdom either through the Saudi-Yemeni (906 miles) or the Saudi-Iraqi (506 miles) border. This highlights the importance of border security. Saudi Arabia has spent billion of dollars on securing its border with Iraq and Yemen with thermal imaging, border guards, 20-foot tall berms, and barbed wires. These precautions, however, cannot stop every infiltrator. Cooperation between Saudi Arabia with the Iraqi and Yemeni authorities, however, can limit penetration of terrorists, explosives, and weapons.
- If the attackers were not stopped and managed to storm the gate, they could have reached major facilities and the damage may have been more severe. The extent of the damage is not yet fully known. The MoI claimed that the damage was “limited to a small fire which was brought under control.” Other reports have claimed that the explosion set fire to a segment of the pipeline, but that it was easily restored and returned to operation shortly thereafter.
- Another equally important lesson is that while oil fields are large areas, they are hard targets and the damage from a car or a suicide bomb is limited to the vicinity of the attack, particularly given that there is much redundant infrastructure. While fires can be set in many areas of a working field, including at oil wells, fires do not produce critical or lasting damage. Unless wells are attacked with explosives deep enough in the wellhead to result in permanent damage to the well, most facilities can be repaired rapidly.

It is important, however, to distinguish between attacking the Abqaiq oil field and the Abqaiq facilities. The attackers did not reach the Abqaiq oil field, and were not successful at attacking key processing facilities. They were, however, successful at adding more uncertainty and risk to an already volatile global oil market.

The Significance of the Attack

It is equally important to note that the attack against Abqaiq should not be seen as a turning point in either Saudi stability or the global energy market. Rather, it is evidence that al-Qaeda and other extremists groups will stop at nothing to disturb the global economy and international peace. It also signals that al-Qaeda is changing tactics to attack an area that will garner most attention and inflict most damage on the Saudi leadership, the U.S., and the international community.

Some have claimed that the attack on Abqaiq was an act of “desperation” by al-Qaeda, while others questioned the Saudi ability to protect its energy infrastructure. It is, however, all too clear that the Saudi counterterrorism strategy, intelligence, and internal security forces are getting progressively more effective. The Saudi response to the attempted attack against Abqaiq was a victory for the Saudi counterterrorism forces. They were successful in both limiting the damage and containing the impact of the attack.

This, however, is one battle in the war against al-Qaeda. Since May 12, 2003, attacks in Saudi Arabia by the terrorist organization have caused the death of 144 Saudi nationals and foreign residents and 120 militants.¹⁹ The attempted attack on Abqaiq, however, is the first major terrorist assault in the Kingdom since December 29, 2004—more than a year ago, which is seen by many as evidence to the fact that Saudi counterterrorism efforts have been steadily improving. Others see the delay as al-Qaeda waiting for more “spectacular” targets. Like all security efforts,

the Saudi counterterrorism forces have made improvements in many areas. But the enemy is adapting their tactics and so must the Saudis adapt the strategy against them.

While “al-Qaeda in the Arab Peninsula” may well be on the defensive, the asymmetric and terrorist threat to the Kingdom and its energy facilities is certainly not over. The al-Qaeda statement that claimed responsibility for the attack against Abqaiq also threatened more attacks against other Saudi oil facilities. The Saudis are taking these threats seriously, and, reportedly, the Saudi forces have been put on a higher state of alert in the Eastern Province. On Monday February 27, 2006, Saudi security forces shot five militants and arrested one in a shootout with members of al-Qaeda who were suspected of being involved in the Abqaiq attack.

Many analysts, however, are concerned about what may come next. Some have argued that given the failure of al-Qaeda to destabilize Saudi Arabia, they may turn their attention to “softer targets,” not necessarily in the Kingdom, but against oil installations of neighboring Gulf States. While a lot is known about the Saudi petroleum infrastructure security apparatus, there is little known how countries such as Kuwait, Qatar, and the UAE actually protect their energy facilities. It is equally unclear if the Gulf countries’ internal security and intelligence capabilities can withstand the type of assaults and intensity level that the Kingdom has experienced since May 2003.

Conclusion

There are no “bullet proof” security systems for energy facilities. Perhaps the weakest link in the Kingdom’s energy infrastructure is its estimated 11,092 miles of pipeline. It is impossible to protect all of this area, but as noted earlier, short of a large attack that damages these pipelines at multiple points, the resulting damage can be repaired relatively quickly. In addition, the building of redundant facilities may not be economically viable in the short-run, but given this asymmetric threat, it adds one layer of indirect security to vital energy structures.

Incidents like the attack on Abqaiq will happen, and the global energy market will react accordingly. The challenge for the Kingdom and all energy producing nations is to limit the physical damage to the facilities and the psychological impact on the global energy market. With the tightness of the current energy market and world energy consumption estimated to increase by more than 50% by 2025, the security of Saudi energy exports will play an increasingly more central role in the world’s economy.

The geostrategic and security risks facing the global energy market are all too clear. Stability in petroleum exporting regions is tenuous at best. Algeria, Iran, and Iraq all present immediate security problems, but recent experience has shown that exporting countries in Africa, the Caspian Sea, and South America are no more stable than their counterparts in Middle East. There has been pipeline sabotage in Nigeria, political posturing in Venezuela, alleged corruption in Russia, and civil unrest in Uzbekistan and other former Soviet Union countries.

Finally, energy security must also be understood in a broader context. In the near future, energy supply and transportation routes may be challenged by transnational terrorism and proliferation. It is equally possible that recent surges in the demand for oil, supply disruptions by hurricanes, the US refining capacity bottleneck, and the limited spare production capacity will continue to test the energy market in the mid to long-term.

About the Author

Khalid R. Al-Rodhan is a visiting fellow at the Center for Strategic and International Studies (CSIS) in Washington DC. He and Dr. Anthony H. Cordesman have written *The Global Oil Market: Risks and Uncertainties* (CSIS, 2006); *The Changing Dynamics of Energy Security in the Middle East* (forthcoming Praeger, Summer 2006); and *The Gulf Military Forces in the Era of Asymmetric Warfare* (forthcoming Praeger, Fall 2006).

¹ Estimates of Saudi spare capacity range from 1.1-1.8 million barrels a day. Nawaf Obaid of the Saudi National Security Net Assessment Project estimates that it is between 1.5-1.8, and the EIA estimates that it is between 1.1-1.6 million barrels a day

² EIA, "Saudi Arabia," Country Analysis Briefs, August 2005, available at: <http://www.eia.doe.gov/emeu/cabs/saudi.html>

³ BP, Statistical Review of World Energy, June 2005.

⁴ Nawaf Obaid, Saudi National Security Net Assessment Project.

⁵ IEA, World Energy Outlook 2005, November 15, 2005.

⁶ Ibid.

⁷ It is important to note that Saudi export capacity is larger than its production capacity. Saudi export capacity is nearly 14.0 million barrels a day, compared to its production capacity of 10.5-11.3 million barrels a day.

⁸ EIA, "Saudi Arabia," Country Analysis Briefs, August 2005, available at: <http://www.eia.doe.gov/emeu/cabs/saudi.html>

⁹ Anthony H. Cordesman and Nawaf Obaid, "Saudi Petroleum Security: Challenges and Responses," CSIS, November 30, 2004.

¹⁰ Ibid.

¹¹ Aramco, "Abqaiq Emergency Center Upgraded," November 28, 2002.

¹² "Bin Laden Tape Urges Oil Attack," BBC News, December 16, 2004, available at: http://news.bbc.co.uk/1/hi/world/middle_east/4101021.stm

¹³ Paul Marriott, "Oil Back Above \$60," Reuters, December 7, 2005.

¹⁴ "Iraqi Pipeline Watch," February 25, 2006, available at: <http://www.iags.org/iraqpipelinewatch.htm>

¹⁵ "Nigerian militants claim attacks," BBC News, February 20, 2006, available at: <http://news.bbc.co.uk/2/hi/africa/4730754.stm>

¹⁶ Christopher Dickey, Saudi Storms," Newsweek, October 3, 2005.

¹⁷ Donna Abu Nasr, "Al-Qaeda Threatens More Saudi Attacks," Associated Press, February 25, 2006.

¹⁸ Souhail Karam, "Al-Qaeda vows more attacks after Saudi oil raid," Reuters, February 25, 2006

¹⁹ Ibid.