Ola Wam (ola.wam2000@gmail.com) 05/10/2019

Special Report: The Houthi Threat to the Saudi Oil Industry

REVISED VERSION FOR OLA'S ARTICLE

A Houthi Borkan-2H. Found at *"180502-D-DB155-067" by DoD News Photos is licensed under CC BY 2.0*

There has been widespread skepticism about the Yemeni Houthis being behind the attacks on Saudi Arabia's Abqaiq and Khurais oil processing plants. The fact remains the Houthi's increasing missile, drone, and naval capabilities make the Saudi oil industry vulnerable to attack.

The Houthi rebel group in Yemen was the first to claim responsibility for what they described as a drone attack on Khurais and Abqaiq in eastern Saudi Arabia. However, fingers were quick to point to Iran's missile capabilities. Substantial evidence has yet to emerge, and speculations are rampant.

Yet one thing is certain; the Kingdom was struck at at its most important asset. The attack damaged processing trains and storage tanks at the Abqaiq stabilisation plant, the world's largest of its sort. It also disrupted Saudi production by about 5 million barrels per day (b/d), nearly half the Kingdom's output.

Nonetheless, this was not the first attack on Saudi oil infrastructure. In May, Houthi drones attacked a major pipeline, disrupting oil flows. In August, their drones targeted

the Shaybah oil fields in Saudi's southeast, sparking fires. In previous years they have also attacked oil tankers and other Saudi oil production infrastructure. How vulnerable is the Saudi oil industry to attacks from the Yemeni Houthis?

A vulnerable industry

Saudi Arabia is one of the world's largest oil-producing countries, second only to the United States, producing an average of 10.3 in 2018 and 9.9 million b/d in 2019. It has the world's largest proven oil reserves distributed among 85 fields containing more than 1,000 production-wells and 60 gas-oil separation plants over a vast geographical area.

Most Saudi oil is "sour" and must pass through a stabilisation plant that removes hydrogen sulfide. There are several such plants, including at Jubail, Qatif, and Ras Tanura. The largest one in Abqaiq stabilizes 6-7 million b/d of crude with up to 7 million b/d of additional capacity. The other nine operational plants refine only 2.8 million b/d.

Linking the oil infrastructure is nearly 20,000 km of pipelines. Running from oil fields in the east to refineries and ports in the west is the East-West Pipeline. It pumps around 1.9 million b/d but has a spare capacity of 2.9 million b/d at full throttle. Saudi Arabia exports around 7.4 million b/d of crude oil and 1.9 million b/d of refined products. It ships about four-fifths from the east coast through the Ras Tanura and Ras al-Juaymah export terminals. Most of the rest from Yanbu, on the west coast. There is also 45.5 million barrels in storage capacity in Ras Tanura and Yanbu.

The largest importers are the U.S. followed by Japan, China, Korea, and India. Crude oil and refined products must, therefore, be shipped in oil tankers. Saudi shipping companies operate 88 Very Large Crude carriers with an individual capacity of 1.9 - 2.2 million barrels of crude oil, in addition to 82 smaller tankers carrying oil products and petrochemicals. Over 1 million b/d of Saudi oil must pass through the Bab el-Mandeb Strait, where tankers are confined to a 3 kilometer wide shipping lane.

Credit: https://www.voanews.com/middle-east/iran-threatens-war-oil-prices-spike

A rising threat

From oil fields to export terminals, these attacks demonstrate the vulnerability of Saudi oil infrastructure. But to what extent are the Houthis able to target them?

The sophistication, precision, and range (Abqaiq being 1,150 kilometres north of Yemen) of the September 14 attacks far exceed anything the Houthis have done before. Iran, however, is known to have been supplying and training the Houthis in using and managing drones. The Houthis operate primarily the Qasef-1 attack drone, which is identical to the Iranian Ababil-2/T, and is able to deliver a 45kg warhead up to 150 kilometers.

Analysts have counted 58 Houthi drone strikes on Saudi Arabia, of which most targeted airports in nearby Abha, Najran and Jizan. But drone strikes on an airport in Abu Dhabi in July 2018 and on the East-West pipeline in May 2019 (over 800 kilometres away) show an upgrade in sophistication and range. In late 2018, the UN found the use of a new drone they named 'UAV-X' (which may be what the Houthis refer to as 'Samad-2/3'), conceivably able to carry an 18 kg warhead with shrapnel up to 1,500 kilometres.

Saudi officials have also reported 200 ballistic missile attacks, but the true number is likely to be significantly higher. The Houthis are provided with key components from Iran to build missiles, according to a UN report. Iran also provide advisers that give assistance on construction and tactics.

The UN report found the Houthis to have a range of different ballistic missiles in their arsenal, including the Qaher-2M (with a 400-kilometre range) and various scuds (with 600-kilometre range). The Borkan-2H (picture) is a modified Iranian Qiam-1, which the

Houthis have extended the range of 800 kilometres by reducing the warhead. And in August, the Houthis announced the arrival of the Borkan-3. Analysts have also speculated that they have the Quds-1 cruise missile, which is a modified Iranian Soumar with a range of less than 1,350.

Houthi threat from north Yemen

Most Houthi missile attacks have been launched from Yemen's north, predominantly hitting targets in Saudi Arabia's Jizan, Asir, and Najran districts with Qaher-2Ms and scuds. But with the extended-range Borkan-2H, the Houthis have hit targets as far off as Yanbu and Riyadh, over 900 kilometres north. On November 4, 2017, they hit a destination north of Riyadh some 1,043 kilometers away. Though denied by Saudi and Emirati officials, the Houthis have also claimed attacks on Dammam (1,100 kilometers away) with a Borkan-3, and Abu Dhabi (1,200 kilometres away) with cruise missiles.

Saudi Arabia relies on the Patriot system (PAC-2/3) for their ballistic missile defense, and the US is scheduled to deploy another four radar systems, a battery of Patriot missiles and 200 support personnel to Saudi Arabia soon. But analysts have even cast doubt over the system's ability to intercept the Borkan-2H missile. Saudi claims of having caught a Borkan-2H attack on Riyadh's airport in 2017, were later dismissed by a team of missile experts who found the missile probably evaded the Patriot system before missing target.

Patriot systems are expensive (in the region of $1 billion each) and defend only a relatively small area. They also struggle to intercept cruise missiles and drones, which can fly at very low altitudes. Pentagon recently announced that it would also deploy a Terminal High Altitude Area Defense system (THAAD). But THAAD is even more expensive and also optimized against high-altitude targets.

Naval capabilities

The Houthis also have specific naval capabilities, with analysts documenting 40 Houthi naval attacks in the Bab el-Mandeb and off Yemen's western coast. In most of the attacks C-802 anti-ship missiles, with a range of 120-190 km while carrying a 165 kg warhead, were used against military and commercial ships. The Houthis have received training and advice on this weapon from Lebanese Hezbollah.

They also have also deployed suicide-drone boats, such as the Shark-33 and the Blow Fish. In September 2018, a Saudi warship was targeted by a Shark-33 at the port in Jizan. They have also utilised water borne improvised explosive devices and sea mines. Such attacks have been tapering off, probably due to a loss of coastal territory, but in July 2018 Saudi Arabia saw no other choice but to suspend oil exports through the Bab el-Mandeb after attacks on their oil tankers.

More to come

Since 2015, drone and missile attacks have reached further into Saudi Arabia, indicating a development in Houthi missile capabilities. And since 2018, they have increasingly targeted oil infrastructure. As they continue to develop such capabilities, they will likely continue targeting oil infrastructure with more accuracy and range. Saudi's oil infrastructure covers large areas and is difficult to protect from missiles and drones. Even with American reinforcements, Saudi Arabia's Patriot missile defense system seem somewhat unreliable. Although naval attacks have tapered off, this is highly likely to change should the Houthis regain coastal territories. Passing oil tanker are sitting ducks when bottlenecked at the Bab el-Mandeb.

Most vulnerable to attack is the Jizan export terminal and refinery less than 150 kilometers away, and well within the range of Qaher-2M and Qasef-1. Six of Saudi's nine refineries, the Yanbu export terminal, the East-West pipeline, and oil fields south of Riyadh are all 650 – 900 kilometres away and within the proven reach of Borkan-2H and some scuds. Little is known about the UAV-X drone and the Quds-1 cruise missile, 8but with ranges of about 1,300 kilometers, they could in theory target oil infrastructure at Khurais, Abqaiq, Ras Tanura, and Ras al-Juaymah.

In Conclusion

Revenues from the Saudi oil industry accounts for 87% of budget revenues, 42% of GDP, and 90% of export earnings - this puts into perspective how sensitive Saudi Arabia is to disruptions in oil flows. A fact not lost on the Houthis. High-impact attacks, like the ones on Abqaiq and Khurais, are highly unlikely to become a regular event. But it is highly likely that the Houthis will increasingly execute low-impact attacks on critical Saudi oil infrastructure. Saudi Arabia can compensate for disruption in flows as it holds a lot of oil in store, and has a lot of spare capacity in pipelines and stabilisation plants. But a large number of low-impact attacks would cause significant damage over the medium to long-term as cost of repairs and defences accumulate. It would also challenge Saudi Arabia's credibility as a reliable oil supplier, and its role as a swing producer.