High-tech for Failaka

An adventure in the Arabian Gulf

Matthias Bertram was living and working in Kuwait in 1976 during the construction of the Water Supply System to Failaka Island. This article is a short version of article translated into English from the German original written by Matthias Bertram. Original article link is www.http://ahr.eifel-rhein.de/seiten/reisen/1976_Failaka_Island_Water_Supply.pdf

This is the first part in a series of articles on Water Supply System to Failaka Island.

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Background and history

Just a few years after the oil crisis of 1973: The revenues of the countries that had joined together in the OPEC — the Organization of Petroleum Exporting Countries — had increased significantly. The exploration of oil was promoted worldwide; further sources were discovered and developed. In Europe, projects of exploration of oil and gas in the North Sea were conducted in order to reduce the dependency to the OPEC countries. Kuwait, one of the Emirates in the Arabian Gulf region, benefited from this and used a part of the revenues to develop its infrastructure and water supply. About one million people were living in this country; approximately half of them were foreign guest workers. The costs of living were low, fuel was about 5 Eurocent per liter, using the phone in the country was free; but getting a phone connection to Europe was very difficult, it took hours to get a connection.

The water supply was partly fed by the few wells, but its water had a high degree of salinity. Furthermore there was a desalination plant that made it possible to connect even remoted areas of the small Emirate to a drinking water network. It was therefore planned to connect the Island of Failaka which is located 25 kilometers northeast to Kuwait, close to the Shat Al-Arab, to the drinking water network of the Mainland.

The Island of Failaka belonged to the Dilmun civilization (ca. 3.000 to 2.000 BC), a civilization of mariners; with its center in Bahrain, it may be regarded as one of the important civilizations of the old orient, in addition to Sumer, Egypt, Babylon and the Indus Valley. Archaeological excavations on the island confirm this fact as well as the presence of Greek mariners in the fourth century BC. Niarchos, the admiral of Alexander the Great, was stationed with a garrison on the island.

At the time of the Ptolemaic Empire there was a city with the Greek name Ikaros, a kind of a Greek colony. Coins that were found during the excavations show that the island was an important place of trade that was connected to Iraq, Persia, the Mediterranean, the Levant and the Indus valley. After the Persians had colonized the island, and after its islamization, the island came into the area of influence of the Caliphs of Damascus and Bagdad as well as the Persians, until the Portuguese colonized the island in the early modern age in order to build a commercial settlement.

During the immigration of Bedouin tribes from the Arabian Peninsula, the Al-Sabah family came in the middle of the 18th century to Kuwait. Until today the ruler of Kuwait originates from the Al-Sabah family. After the rule of the Ottoman Empire and Great Britain, Kuwait and the Island of Failaka became independent in 1961 as a hereditary emirate. Nevertheless, British troops remained in the country in order to secure its borders, particularly with regard to the border disputes with Iraq. In 1973, for example, Iraq occupied areas close to the border; during the following shooting people were killed.

Failaka: Early national planning targets

Only a short time after Kuwait's independence, the Kuwaiti government issued a study regarding the urban development of Kuwait and many ideas about the development of the island were discussed.

According to a local newspaper dated 29/12/1961 a so called tourism expert had already said to the responsible authorities:

"You have this wonderful sun; why don't you sell it to Europe?"

The persons in charge dreamed of turning the island into an international tourism destination, for tourists escaping from the cold weather in European winter. The first conceptions of this development were:

"… the beaches and the beach sweeps of Failaka are so beautiful and clean that they are comparable very easily to the most famous beaches of the world. The remoteness and the isolation of the island and yet its proximity to Kuwait make it an enviable place of serious contemplation as well as an international winter resort, rest and recreation area. Access to Failaka can be guaranteed by reliable helicopter and ferryboat services …"

Top and above: Placing moored surfaced marker buoys, a side scan sonar.

Several years later the government of Kuwait decided to connect the Island of Failaka via an offshore pipeline with the water network of the mainland. The island is flat; it is 14 kilometer long and between three and eight kilometers wide. The island had its own fresh water resources, but there are plans to turn the island into a holiday destination, as it was mentioned in the development plan of 1965. Until this time, almost 2.000 people lived there securing their existence through fishing, trade and agriculture for their own needs. Pearl diving was another source of income until the near past. The coasts of Kuwait, Iraq and Iran are not far away.

New settlements in the south of the island, a high-power supply via an offshore cable and a sufficient water supply via a pipeline were planned. But the required pipeline and submarine cable had to cross the shipping channel between the mainland and the island. Kuwait's port Shuwaik is located northwest to Kuwait city. In an international tender, the German Joint Venture "Northern Offshore" won the competition for the pipeline. Japanese companies got the contract to lay the submarine cable; Korean companies were assigned to build 2.000 housing units.

Northern Offshore

"Northern Offshore", a consortium of the German companies Philipp Holzmann, Preussag AG, Ludwig Freytag and Bohlen & Doyen, tendered for the project after these companies had successfully built the pipeline shore approach of the Ekofisk gas pipeline (36 inch) for Norwegian Statoil; this pipeline connected the German Island of Juist with the mainland crossing the tideland. After this, the head office based in the German city of Oldenburg wanted to promote this offshore knowhow worldwide. The Failaka project was the first follow-up order. Preussag AG assumed the technical responsibility for this project.

After finishing his studies at the technical university of the German city Aachen, Matthias Bertram, a young construction engineer, started to work for Preussag in the German city of Hanover. At first, he took part in an-one-year project that was financed by the Federal Ministry of Research which was conducted in cooperation with Blohm & Voss, AEG and Mannesmann in order to study procedures of laying pipelines in deep water. At 1976 it was hardly possible to lay large diameter pipelines in depths of more than 100 meters. The research project had the goal to develop techniques (laying, welding, coating, insulating) that make it possible to lay a pipeline safely up to a depth of 1.000 meters. With his theoretical knowledge Mr. Bertram was asked to take part in the Failaka project for four months as an assistant to the Project Manager with the special task to control and supervise the construction of the offshore-part of the route. He agreed immediately and was ready to go for this challenging project.

One of his first impressions of Kuwait were the uncountable fires that he saw during the landing procedure at night. The gas that emerged from the oil production wells was flared; there was no commercial use for it at that time. Leaving the plane he was surprised by the high humidity, the heat and mugginess that he was confronted with at the arrival at Kuwait airport. Rainer, the commercial manager of the project who had lived for several years in Jiddah /Saudi Arabia picked him up with an American Buick auto car.

They went to the "Villa", a house in the Abdullah Al-Salem district close to the second ring road that was rented for the period of the project. The house was called "Villa" after the board of directors of the Joint Venture in Germany had heard about the rental price: 2.000 Kuwaiti dinars per month, an exorbitant price at that time. The project was planned to be finished within four to six months, so the rental price was accepted. The majority of the team lived in the "Villa", where two Indian boys were employed to cook and to keep the house in order.

Life in Kuwait

The construction works started with some delays, so there was enough time at the beginning of the project to visit the city and the whole country on weekends. The old, narrow souk was worth seeing, with its fruit merchants and coolies who carried several things for their Kuwaiti masters in a huge basket or bag on their back.

Additionally to that, the old shipyard, where the traditional Dhows were built, modern mosques and houses under construction were worth seeing.

Fishermen sold huge fresh shrimps directly at the beach; In local supermarkets in old clay ovens freshly baked traditional flat bread was offered to the customers. Apart from the souk, the water towers and the Emir's palace, there were only few places of interest in the city.

During some of the many extremely hot days the engineers went swimming in the area of Mina Saud close to the border with Saudi Arabia and in the former neutral zone between Saudi Arabia and Kuwait. In this region the beach was clean, whereas the beach in the area of Mina Al-Ahmadi, a few kilometers in the north close to an oil shipping point, was partly covered with oil clumps. Al-Ahmadi was the center of Kuwait's oil industry; the headquarters of the oil companies were located here.

Trips into the desert were very appealing and charming, especially at the end of November when the first rain came down and the desert turned for a few moments into a green gleam. The annual amount of rain adds up only to 100 mm in some regions. Grains carried by the wind began to germinate fast, but after a short period of time it withered, were burned by the heat and covered by sand. Sometimes, heavy sandstorms moved across the country and limited the view to a few meters. It was the time during that many rich Kuwaitis left the city and went to the desert where they pitched their traditional Bedouin tents and lived there for a short period of time with their families. They arrived by an off-road vehicle instead of camels that they had used in the past.

It was interesting to visit the area around Shatt Al-Arab and Bubiyan Island, with its nice landscape and people. These trips were a little bit dangerous because this area close to Iraq was under strict military control of both countries. In the month of December 1976, Matthias, Rainer and his girlfriend Sandy — who had come from Jeddah for a visit — toured through this area. At a branch of the Shatt Al-Arab, opposite the Island of Bubiyan, they met some fishermen with whom they began to talk. They were invited to eat with them the grilled fish; they talked in a friendly atmosphere about this and that: about the project for which they were in the country. Later, one of the Kuwaitis presented himself as a member of the secret service; he wanted to know — in a very detailed way — what they do in this region of the country and why they had entered the prohibited zone. The friendly atmosphere had finished; Matthias, Rainer and Sandy were happy that they were allowed to leave this region without big problems.

Another nice activity was a trip with the speedboat, equipped with a Johnson outboard motor. The boat was bought for getting quickly to the lay barge; it was especially reserved for the client and the Lloyds inspector, but on weekends it was possible to use the boat for small tours or for taking a diving tour.

One of these trips almost ended with an empty tank, in the border area between Iraq and Iran. Jim Noon the Lloyds inspector, Kurt the welding expert of Northern Offshore and Matthias went from the port Ras Al Arad in Salmiyah to the Lay Barge "Baas Kobus" that laid at anchor close to the landing point of Failaka Island. One of the seamen from the barge navigated the boat. The visibility conditions were extremely poor; hence, it was very difficult to see the crossing ships in the highly frequented shipping channel. Therefore, it was important to go precisely by compass. Matthias who knew the area and the conditions best told the steerman to go on the 35 degree position, but more than once he realized that he went on the 30 degree position. On the first glance, this is not a big difference, but after driving 25 kilometers under bad weather conditions this is no trifle. So after the expected journey time they came neither to the island nor to the barge. They continued the travel hoping to see the island soon. Now, Matthias was steering on his own, trying to compensate the deviation. But no chance; during the dense sandstorm it was not possible to see anything. The tank was half empty; hence, they decided to begin the return trip. For safety reasons they asked the crew of a Dhow that crossed the way about the direction to Kuwait. After some time, an uninhabited island appeared in the middle of the sandstorm. It seemed to be the island Mishan that is located few kilometers in the north of Failaka. That was an essential landmark and therefore they reached the barge soon. The crew on the barge had already contacted the office on the mainland announcing the missing of this boat and its crew. What had happened? Because they drove under poor visibility conditions into the given direction, the boat deviated from its destination, coming into the open sea, turning into the direction of the peninsula Al- Fao/Iraq without seeing Failaka.

Inhabitants of Failaka are waiting in Ras Al-Arad for a ferry boat bringing them to the island.

A diver controls the 'Tie-In' after the final abandoning of the pipeline.

Aligning of the ends of the two pipestrings before welding the 'Tie-In' weld.

Lowering one end of the pipestring by means of a stringer.

Surveying the offshore-part of the route

While the arrival of the lay barge to Kuwait delayed, there was enough time to examine the route that was specified by the client. Before that, a Japanese consultant had conducted a study about the selection of a possible sea route. Based on that study the length of the pipes was determined, and pipes were ordered and shipped. During the signing of the contract, the client, the MEW, Ministry of Electricity and Water, was assured that the executing company would review the study. The recommended offshore part of the route, approximately 25 kilometer long, connected Salmiyah, a southern suburb of Kuwait City with the northwest of the Island. From a geological perspective the route consisted of two parts:

Beginning in Salmiyah, the pipeline crossed the area of the beach, running through the dead coral reefs and the shipping channel with its depth of about 30 meters. In the second half of the route, the coral reefs were covered by a thick layer of mud. The water level sometimes differed two meters between low tide and high tide.

Close to the landing point in Salmiyah groove like depressions in the coral reef were found. Therefore, the Japanese partners had planned an alternative route in this area. The examination of the area by Northern Offshore showed that also the alternative route couldn't guarantee the security of the pipeline. So it was necessary to find a more secure alternative, because the warranty period was 30 years; not a short time.

Apart from these problems with the pipeline routing the team realized that there were other things, which could endanger the safety: High current velocity at the sea ground of up to 0.8 m/sec. could lead to significant drag and lift forces. So, it was absolutely not sufficient to examine the critical points of the route with an echo sounder. The team needed a complete surveying program with side scan sonar, echo sounder, measurements of the flow rates and the examination of underground conditions at least at some points of the route.

Preussag Meerestechnik, a subdivision of Preussag AG, conducted this task for the Joint Venture, using a special trisponder measuring system with points of reference in Salmiyah, the island and the measuring boat, NO 21, and later on the Lay Barge.

To be continued

Pull-in procedure offshore Failaka Island.