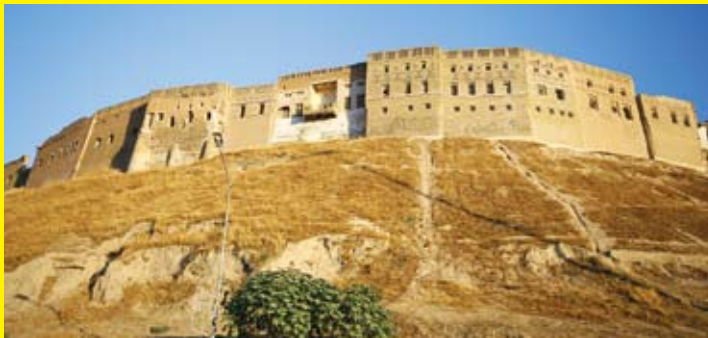




Crescent Petroleum



**Projects in
Kurdistan Region, Iraq**
Benefiting the People



Crescent Petroleum in the Kurdistan Region of Iraq

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Overview of The Kurdistan Region

Geography

The Kurdistan Region is a mountainous area with many rivers and fertile slopes located in northern Iraq where its border meets Iran from the east, Turkey from the north, and Syria from the west.





Politics

Iraq's Kurdistan Region is a constitutionally autonomous region with its own distinct local government (Kurdistan Regional Government - KRG) and parliament; both seated in the capital city of Erbil, one of the world's longest continuously inhabited cities.





People

Kurdistan is a Latin word that means the land of Kurds. Kurds form the majority of the population, with Arabs, Armenians, Assyrians, Azeris, Persians and Turks representation in the Region. The predominant religion is Islam, however Christians and Jews are also found in the Region. Approximately 4 million people currently constitute the population of the Region.



Economy

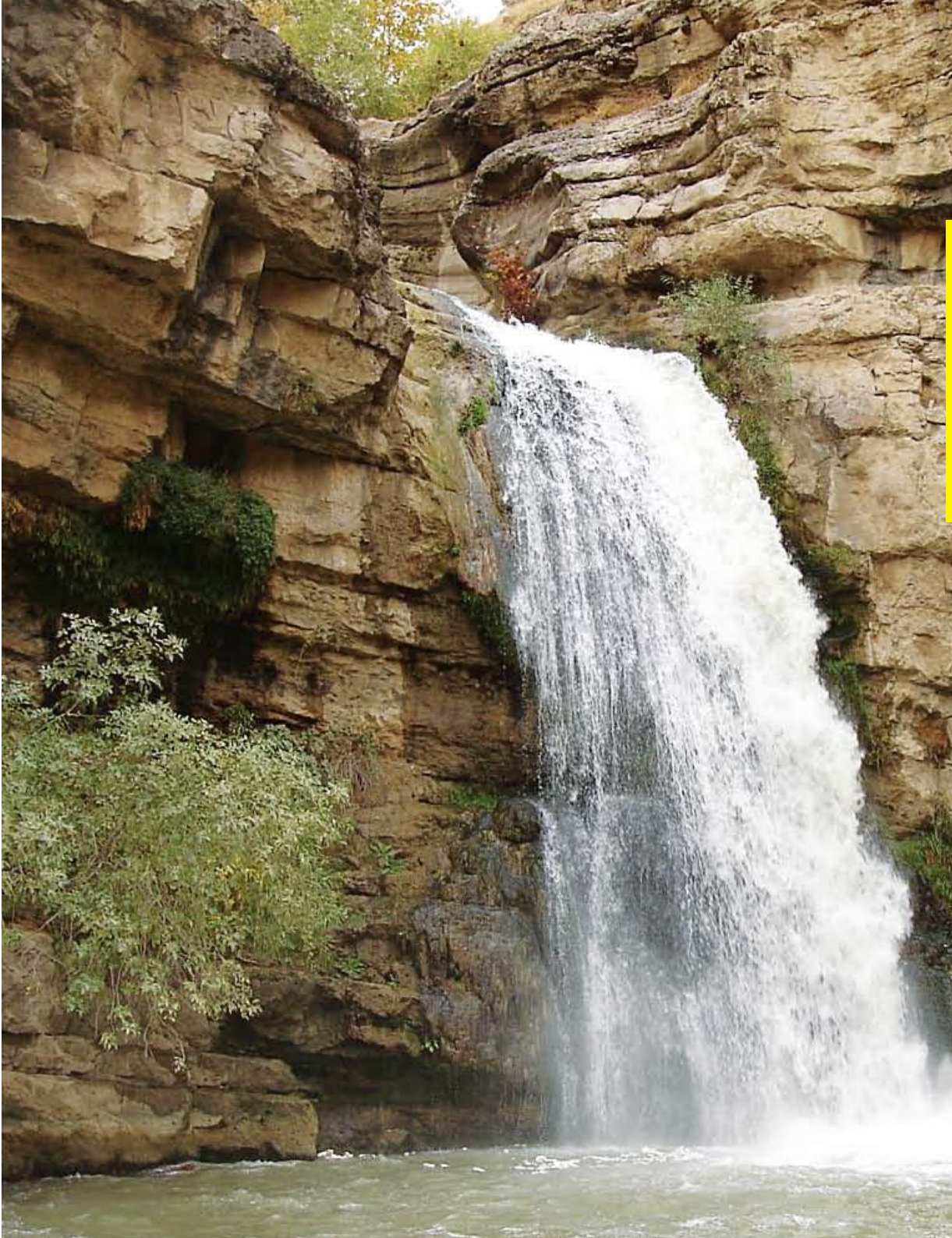
The local economy was traditionally dominated by animal husbandry and small agriculture projects, while the recent political stability has yielded an increase in cross-border trading, especially building materials, consumables and petroleum products, resulting in rapid economic growth in the whole Region, especially near the border areas. Furthermore, the presence of Crescent Petroleum and its affiliate Dana Gas, as well as around 40 other international oil companies now operating in the Region, has made the oil and gas industry a major driving force in Kurdistan Region's economy.





Climate

The Kurdistan Region has a continental climate where extremes of hot, dry summers and very cold winters prevail in many areas. Despite these temperature variations, the Region abounds in fertile land and has traditionally been an exporter of grain and livestock to other cities across Iraq.



Resources

Whilst to date largely undeveloped, the Kurdistan Region is very rich in oil, gas and mineral resources. With an estimated potential of 45 billion barrels of oil reserves in the KRG administered Region alone, and gas reserves of about 250 trillion cubic feet. Beyond oil and gas, the Region is rich in minerals such as copper, iron, zinc and limestone.



Crescent Petroleum

Partner of Choice

Crescent Petroleum is an established regional upstream oil and gas company operating in the Middle East and North Africa for over forty years. Founded in the early 1970's, the company was the first regional, independent, privately-owned Middle Eastern petroleum company to engage in the acquisition, exploration and development of petroleum concessions and the production and sale of crude oil, natural gas and other petroleum products. Headquartered in Sharjah, in the United Arab Emirates, Crescent Petroleum has an extensive global presence across 4 continents.

Crescent Petroleum has been present in Iraq for over 20 years, with active offices in Baghdad, Erbil and Basra, all fully staffed by qualified and experienced Iraqis. The company has been actively engaged with the Iraqi Ministry of Oil since the late eighties, carrying out studies and training for the Ministry's personnel and completing a full field development plan for the Ratawi oil field in The Basra province. More recently, in 2005 Crescent Petroleum signed a Memorandum of Understanding with the Oil Exploration Company (OEC) of Iraq, a division of the Iraqi Ministry of Oil. This MOU covers technical co-operation and training, and includes an exploration and appraisal study on an area in southern Iraq assigned to Crescent Petroleum by OEC.







Crescent Petroleum in the Kurdistan Region

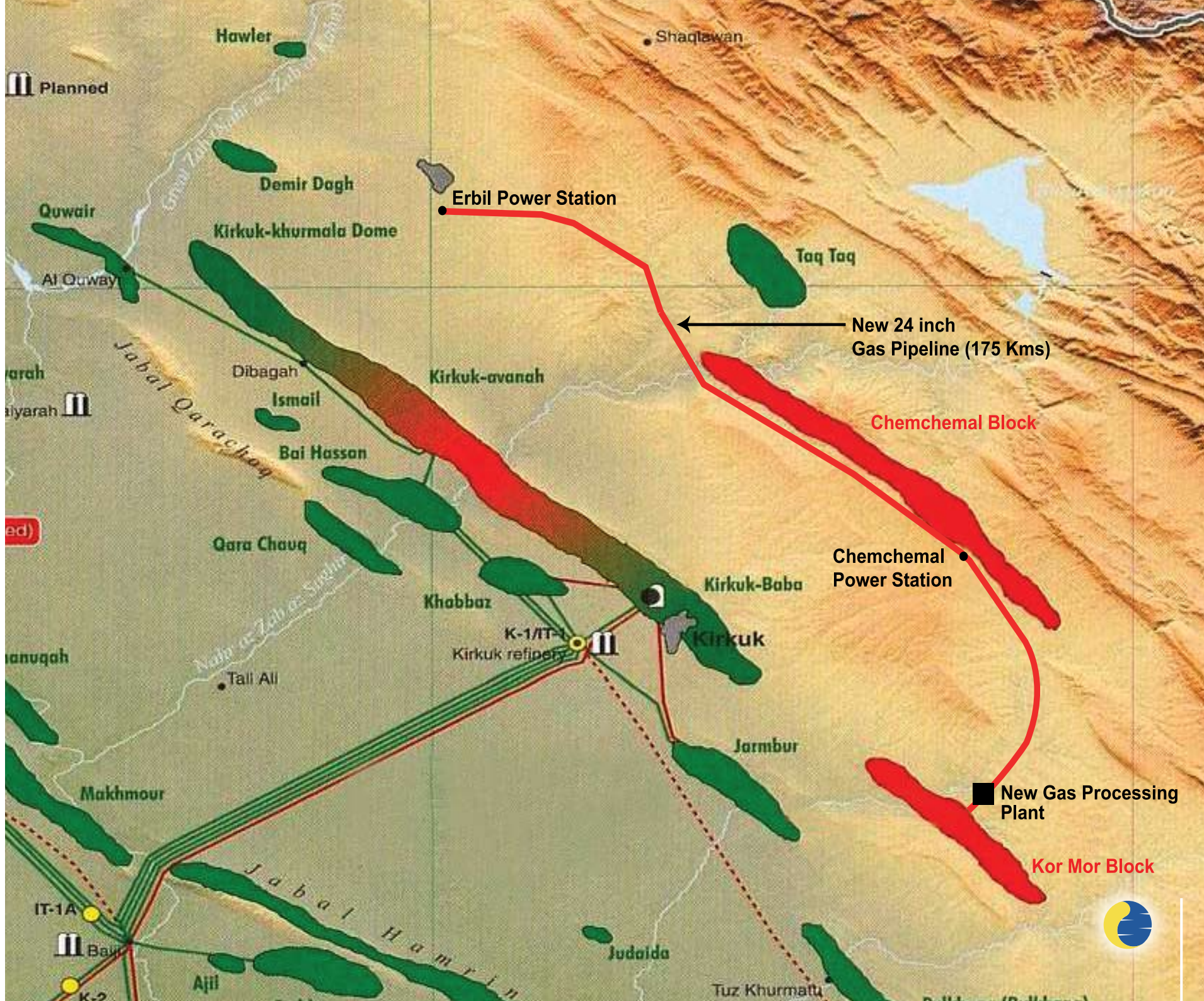
In April 2007, Crescent Petroleum and its affiliate, Dana Gas entered into agreements with the Kurdistan Regional Government (KRG) for the development of substantial gas resources.

Under the terms of the agreement, the KRG awarded Dana Gas and Crescent Petroleum title to and the exclusive right to develop, produce and sell petroleum from the Kor Mor and the Chemchemical areas within the Region, including natural gas for urgently needed power generation, domestic industry in Iraq and subsequently for potential export.

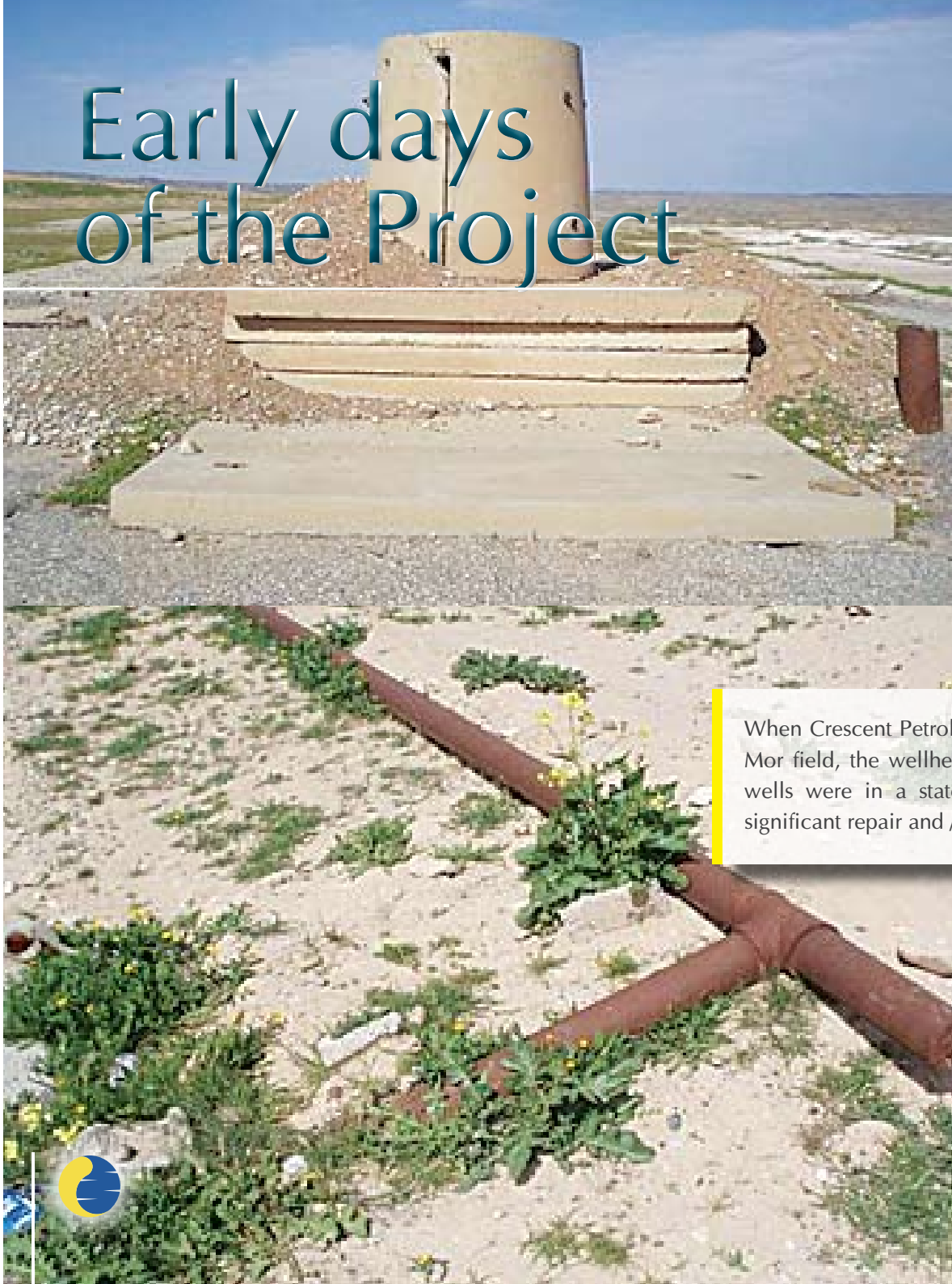
Additionally, under the terms of a second agreement, the Strategic Alliance Protocol, the KRG, Crescent Petroleum and Dana Gas, agreed to jointly review and develop a strategic plan for the natural gas resources in the Region with a view to optimization, development, and utilization of the substantial gas resources available.

The Strategic Alliance Protocol initiative also involved the launch of an ambitious and ground-breaking project, Kurdistan Gas City which is a major new gas-utilization industrial complex designed to promote private sector investment in a variety of gas-related industries and to benefit the Region's population through massive job creation, training and the promotion of significant economic activity. This initiative was developed by Crescent Petroleum's affiliate, Gas Cities LLC.





Early days of the Project



When Crescent Petroleum assumed operations with Dana Gas on the Kor Mor field, the wellhead facilities, in-field pipelines, and long-abandoned wells were in a state of complete neglect and inoperability, requiring significant repair and / or replacement at considerable expense.

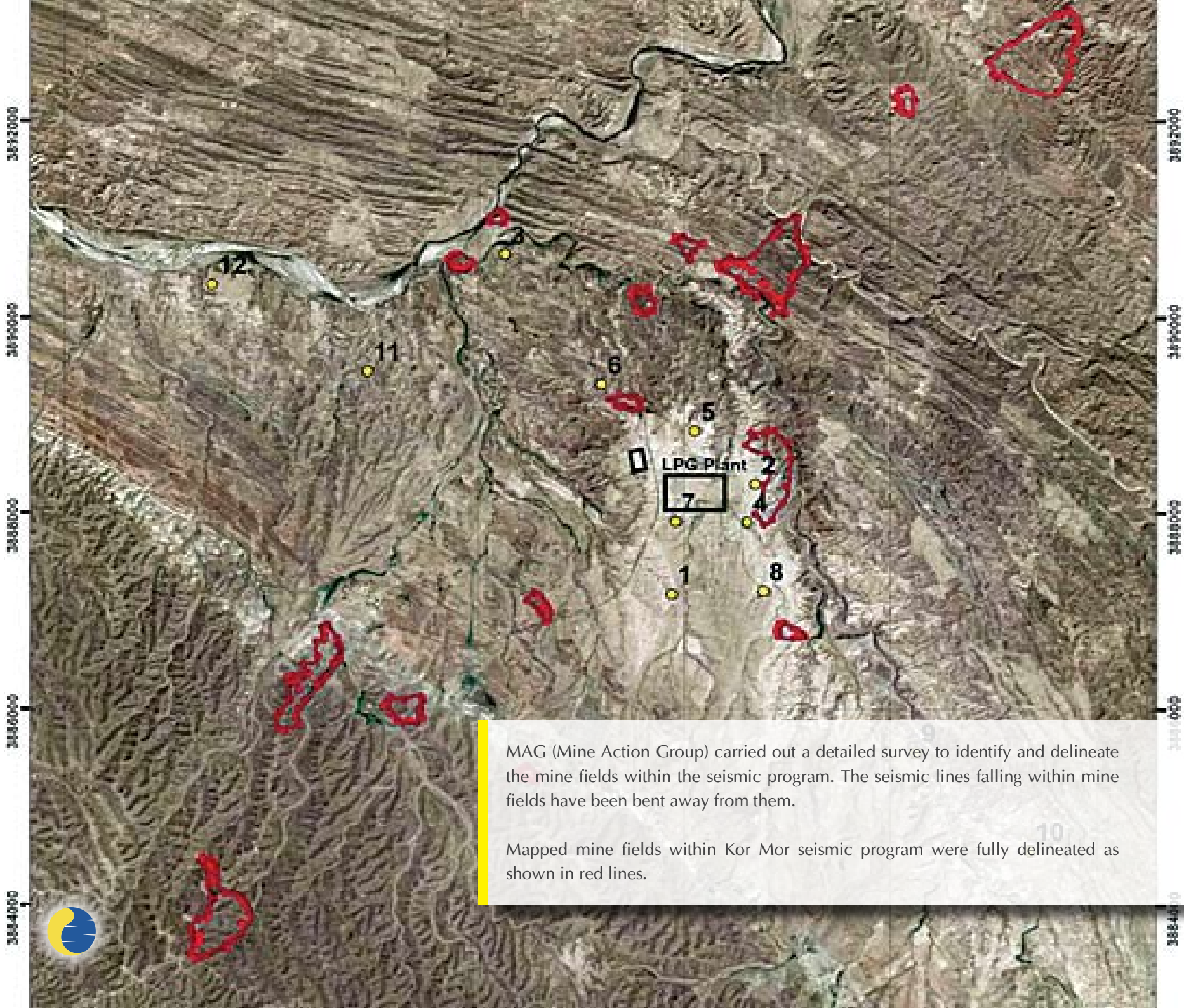




De-mining

Before any work could start at the Kor Mor field, the site had to be cleared of extensive mines and of all unexploded ordinances. Crescent Petroleum teamed up with the non-profit organization Mine Action Group (MAG), to secure the site before the work crew could safely begin any seismic data acquisition. Similar detailed work had to be performed before the start up of the seismic acquisition of the Chemchemical areas. Similarly, the selected site for the gas processing plant near the village of Qader Karam (the site of a previous battle field) had to be cleared of mines and unexploded ordinances. Several diversions were also required during the survey of the 180 kilometers pipeline route between Qader Karam and Erbil Power Station in order to avoid old mine fields. All in all several hundreds of mines and unexploded ordinances had to be removed.





MAG (Mine Action Group) carried out a detailed survey to identify and delineate the mine fields within the seismic program. The seismic lines falling within mine fields have been bent away from them.

Mapped mine fields within Kor Mor seismic program were fully delineated as shown in red lines.



Seismic at Khor Mor

As part of the initial appraisal and development of Kor Mor field, a 2D seismic acquisition program was carried out between July 2007 and June 2008. The seismic program consisted of 32 SW-NE dip lines perpendicular to the surface structure and 3 NW-SE strike lines sub-parallel to the axis of the surface structure. The size of the program was 451 Kilometers. The average line spacing was about 870 metres in the center and NW parts of the block for appraisal /development and about 2,400 metres in the remaining SE part of the block.





Due to the rough terrain in the Kor Mor area, explosive seismic acquisition was used as the source of energy throughout the block. Before the start of the seismic data acquisition, an extensive Shot Point testing program was conducted to determine the optimum field parameters.

The optimal pattern of the Shot Point array, based on both data quality and cost, was found to be 4 inline holes 1.5 metres deep, each loaded with 750 grams of explosives and separated from each other by a distance of 5 metres providing an overall array length of 15 metres.

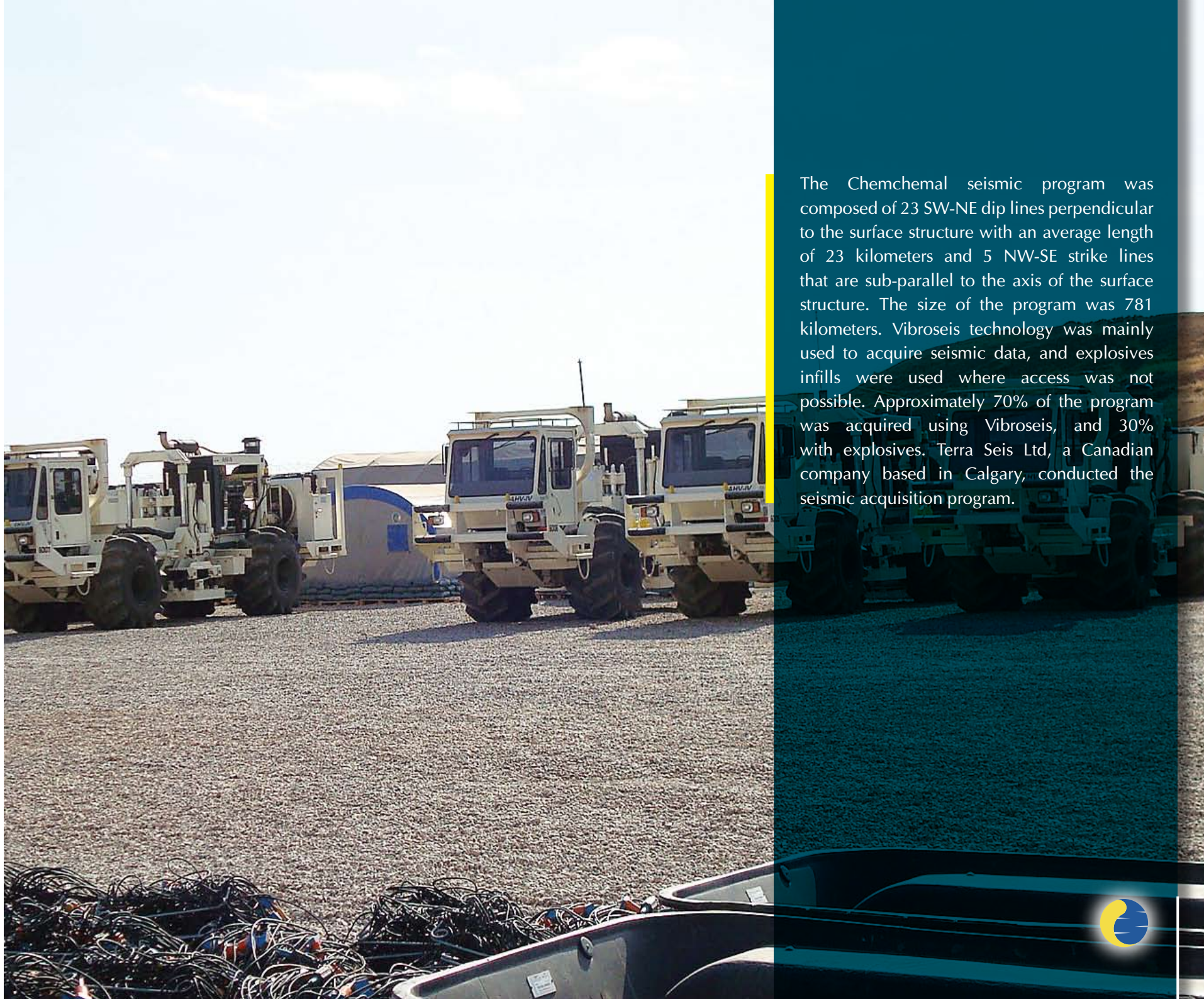




Seismic at Chemchemical

For an efficient assessment of the Chemchemical block, a 2D seismic program with an average line spacing of 3,000 metres was carefully designed. Two survey crews began acquiring data on 22 December 2007 and the survey was completed on 15 October 2008.





The Chemchemical seismic program was composed of 23 SW-NE dip lines perpendicular to the surface structure with an average length of 23 kilometers and 5 NW-SE strike lines that are sub-parallel to the axis of the surface structure. The size of the program was 781 kilometers. Vibroseis technology was mainly used to acquire seismic data, and explosives infills were used where access was not possible. Approximately 70% of the program was acquired using Vibroseis, and 30% with explosives. Terra Seis Ltd, a Canadian company based in Calgary, conducted the seismic acquisition program.





The seismic data for both Kor Mor and Chemchemal has been processed by Kelman Technologies in Calgary, Canada and interpreted in-house. Various exploration/appraisal drilling locations were selected on this basis. One well has already been successfully drilled to Cretaceous in Kor Mor with very encouraging results.





Setting up Camps

Crescent Petroleum undertook the construction of a camp to accommodate all personnel working at the Kor Mor site. The newly built camp houses up to 500 project people, and has the capacity to serve meals through five purpose-built dining halls. It also features other extensive amenities and facilities based on the work-live-play concept.





Kor Mor Wellheads
before Project start-up

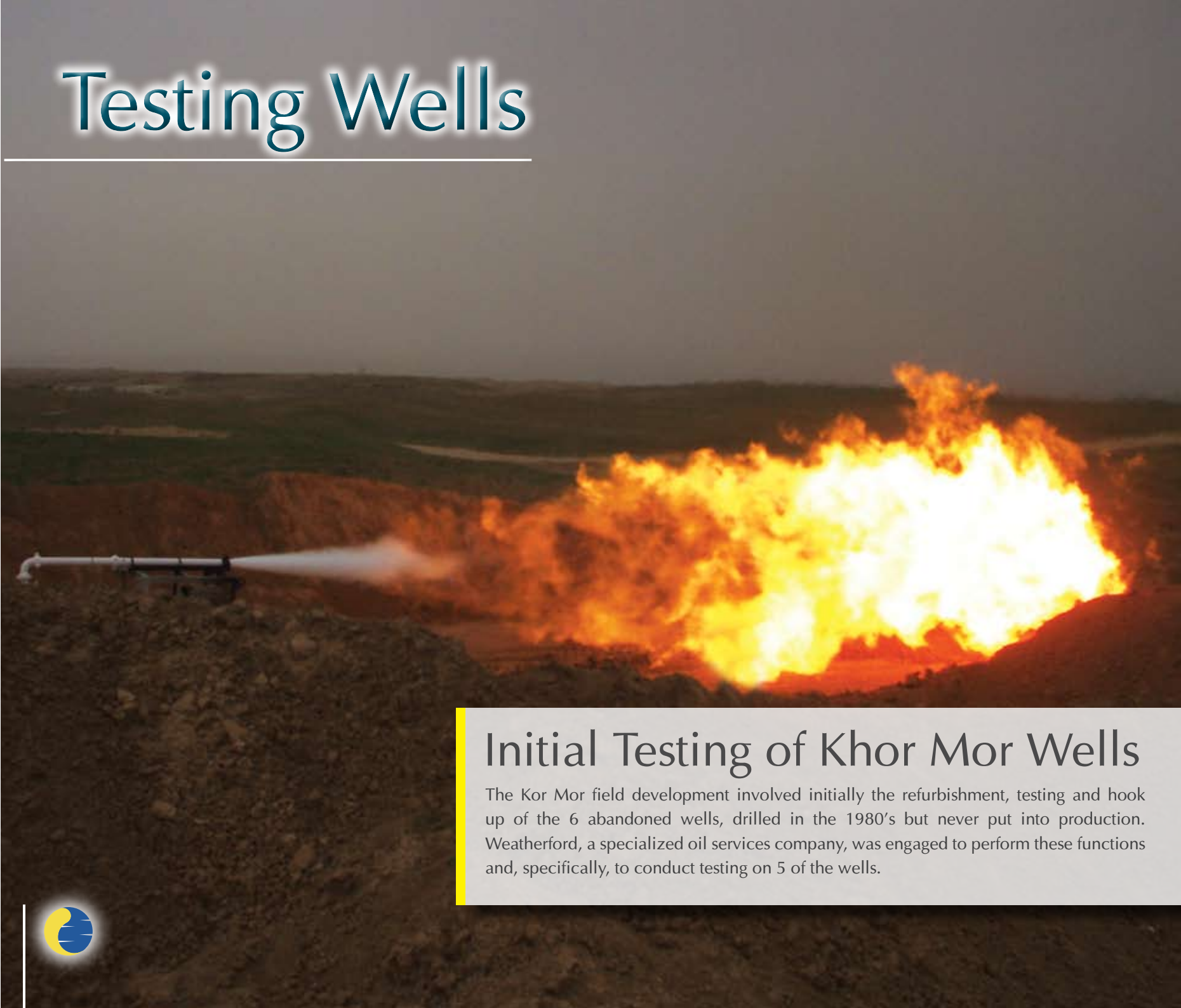




Kor Mor
Wellheads after
repair and
production
start-up



Testing Wells



Initial Testing of Khor Mor Wells

The Kor Mor field development involved initially the refurbishment, testing and hook up of the 6 abandoned wells, drilled in the 1980's but never put into production. Weatherford, a specialized oil services company, was engaged to perform these functions and, specifically, to conduct testing on 5 of the wells.



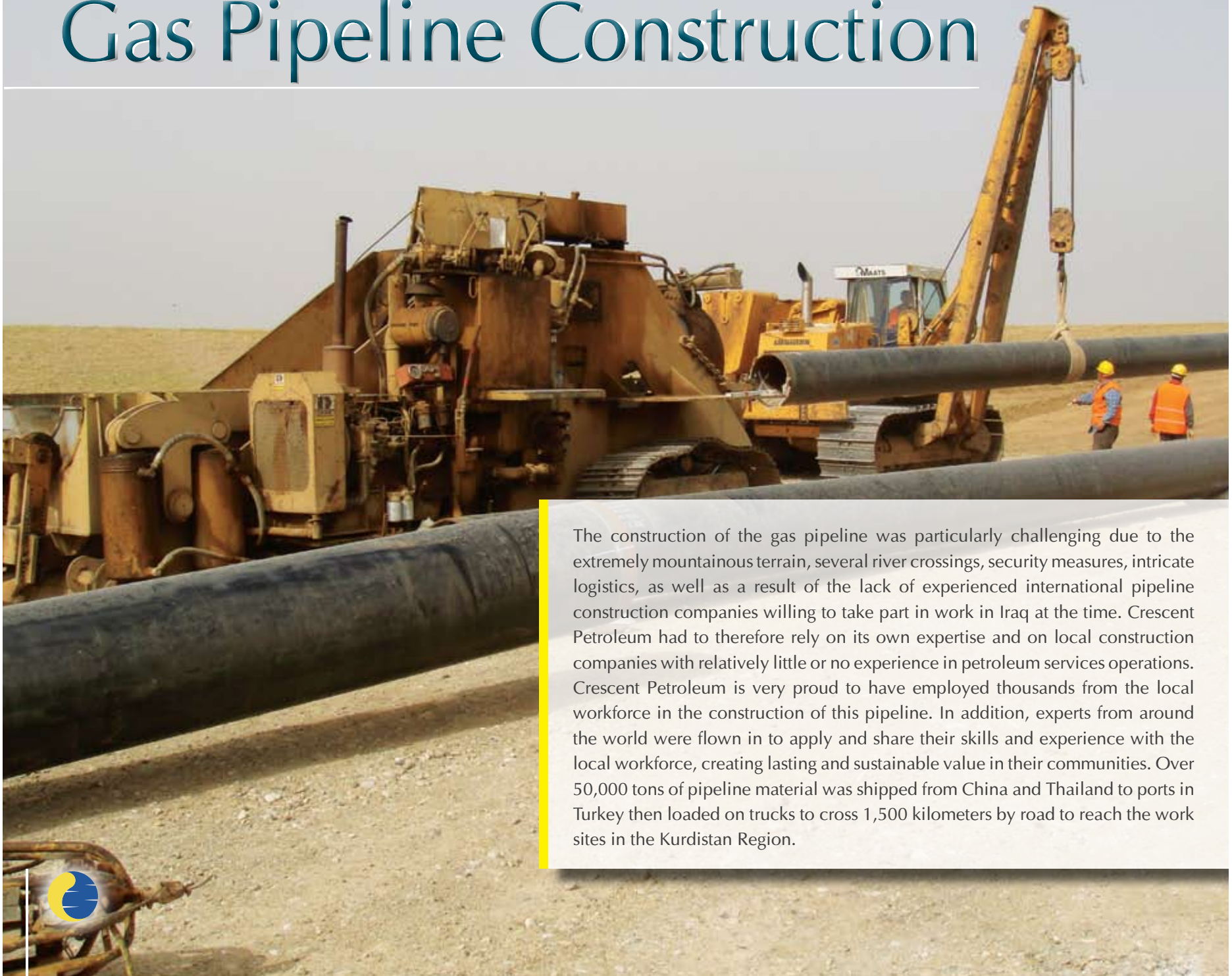
Drilling New Wells

Well Work over, Recompletion and Drilling New Wells

The development program of Kor Mor field included the work over and recompletion of 6 natural gas wells, appraisal of the reservoir, and the drilling of an exploration well and 2 additional gas development wells. A 1500HP drilling rig "Romfor Rig #24" was mobilized to the site from Egypt for this purpose. These functions were performed by a joint team from Crescent Petroleum and its affiliate Dana Gas.



Gas Pipeline Construction



The construction of the gas pipeline was particularly challenging due to the extremely mountainous terrain, several river crossings, security measures, intricate logistics, as well as a result of the lack of experienced international pipeline construction companies willing to take part in work in Iraq at the time. Crescent Petroleum had to therefore rely on its own expertise and on local construction companies with relatively little or no experience in petroleum services operations. Crescent Petroleum is very proud to have employed thousands from the local workforce in the construction of this pipeline. In addition, experts from around the world were flown in to apply and share their skills and experience with the local workforce, creating lasting and sustainable value in their communities. Over 50,000 tons of pipeline material was shipped from China and Thailand to ports in Turkey then loaded on trucks to cross 1,500 kilometers by road to reach the work sites in the Kurdistan Region.











Mechanical completion of the pipeline from Kor Mor to Erbil was achieved in late September 2008 when the pipeline was put into operation to deliver gas from Kor Mor field to the two power stations at Chemchemical and at Erbil. The 24 inch, high pressure pipeline extended over a distance of 175 kilometers. The completion of the pipeline construction in such a short period of time (9 months), despite all the challenges is widely considered to be a record achievement by industry standards.



Initial Gas Production



The Kurdistan Regional Government (KRG) requested Crescent Petroleum and Dana Gas to begin production of gas on a fast-track basis to provide fuel for the two power stations being built at Chemchemical and Erbil. In order to allow for this and for the treatment of the natural gas, Crescent Petroleum purchased, transported (from the USA) and installed the Early Production Facility (EPF) at Kor Mor in less than four months. Gas deliveries to the Erbil Power Station began on 10 October 2008 via the 175 kilometer pipeline. Upon commencement of first gas, the EPF began producing 80 million standard cubic feet of gas per day and 3,600 barrels of condensate per day.



Constructing a World-Class Gas Processing Facility



During the Project's construction phase, work opportunities were provided for over 2,000 Iraqi workers drawn from all ethnic and religious groups, supported by limited expatriate workers from over 20 nationalities. In total over 15,000 tons of gas processing equipment, including a brand new state-of-the-art gas processing plant imported from the USA, were delivered into the Kurdistan Region, first shipped to ports in Turkey and then trucked to the plant site at Qader Karam.







Construction of the gas processing plant at Kor Mor began in January 2008. The plant is a two-train facility with a total design capacity of 300 million standard cubic feet of processed gas per day, 14,000 barrels of condensate per day, and circa 1,000 metric tons of LPGs per day.

In October 2008, gas production started by using the EPF. By May 2010, the inlet facilities of the main plant were completed, and by October 2010 the first cryogenic train came online. The second cryogenic train came online in January 2011.





HSE Matters

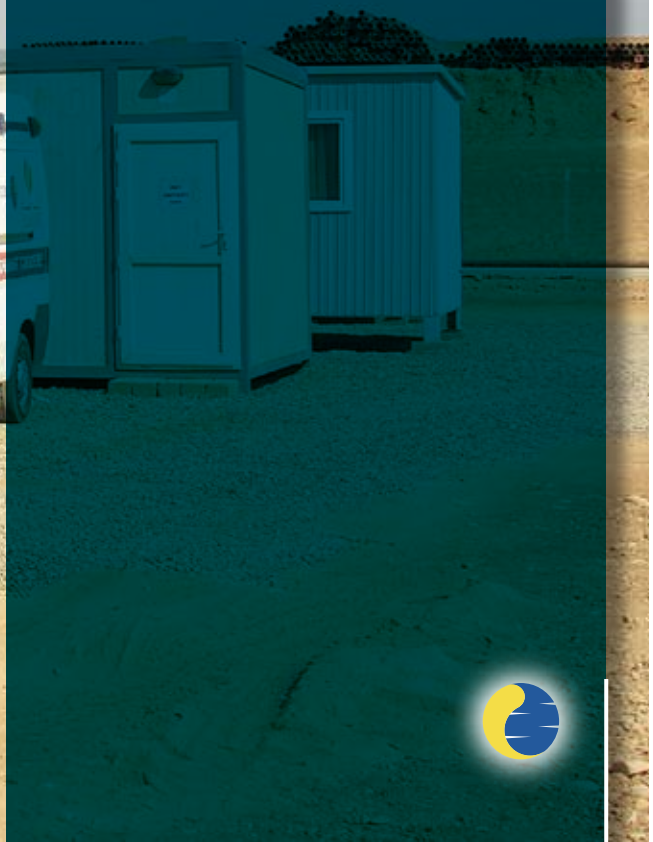


The Kor Mor plant is proud to take Health, Safety, and Environment matters very seriously. The safety culture that Crescent Petroleum instills in the local employees requires dedication and hard work from Crescent Petroleum's HSE Management in cooperation with the local workforce. Crescent Petroleum's training program created a paradigm shift in working habits on the ground. Crescent Petroleum has installed its own dedicated medical and fire fighting emergency response team. Over the past year, with almost 3 million man hours worked, the HSE records showed less than 25 minor safety incidents, and no environmental incidents.





Crescent Petroleum's HSE team is also actively engaging the broader community with training sessions to transfer safety knowledge and know-how to the local population.





Environmental Impact Assessment

In January 2008, Crescent Petroleum completed a successful environmental and socio-economic assessment of the Project area. This assessment was carried out by the highly reputed international engineering firm Worley Parsons, and included surveys of ecology, water resources and socio-economic resources.





Benefiting the People



The power plants close to Erbil and at Chemchemical are now running on natural gas supplied via the pipeline from Kor Mor. This has dramatically lowered the cost of electricity generation for the KRG, which was previously dependent on expensive diesel fuel. The cost saving is estimated conservatively at \$2.5 billion annually.





Beyond this, the power projects facilitated by the Project generate approximately 22 hours a day of electricity supply in the cities of the Kurdistan Region, compared to the previous norm of 2-3 hours per day before the start of gas supply by Crescent Petroleum and Dana Gas. Furthermore, in addition to the obvious huge financial benefits, replacing diesel with natural gas in power generation has yielded huge environmental Benefits: with 35% reduction in nitrogen oxide based pollutants, 30% reduction of carbon emissions and elimination of sulphur oxides emissions. The impact on the Region's environment is extremely significant and positive.



Crescent Petroleum's Commitment to the Community



Crescent Petroleum's work and investment in the Region has brought both significant measurable economic benefits as well as considerable positive environmental impact: The gas produced has resulted in major fuel cost savings, increased reliability of electricity supply to the local economy, job creation, and training of the local workforce. Additionally, the use of natural gas to replace diesel has resulted in a vast reduction in emissions and a more sustainable environment.

Beyond the direct positive impact of the gas projects on the quality of life of the people of the Kurdistan Region, Crescent Petroleum has implemented several projects tailored to support local villages in the vicinity of the Project facilities. These included: several water storage tanks and related facilities for the local villages, providing local schools with educational materials, building football pitches for local youth, building mosques, providing power generators and many other similar community support projects.





 شركة البترول
Crescent Petroleum

 دانه غاز
DANAGAS

ياريگای ريزان

به خشين كرا له لايان كۆمپانيای كريستنت پتروليوم - دانه غاز
تم البناء من قبل شركة كريستنت بتروليوم - دانه غاز

Donated By Crescent Petroleum and Dana Gas



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