Serious environmental considerations should be given to the project due to its closeness to the Caspian Sea

Table 3
Turkmenistan and Kazakhstan crude oil specifications
(selected fields)

Table 3 Turkmenistan and Kazakhstan crude oil specifications (selected fields)

Crude	Density (kg/m3)	API Gravity	Sulfur (weight %)	Pour point (Deg.C)
Burun	0.852	34.5	0.20	+ 6
Cheleken	0.841	36.75	0.13	- 3
Okarem	0.879	29.5	0.29	+ 30
Keimir	0.856	34	0.22	+22
Kotur Tepe	0.857	34	0.24	+2
NGDU Blend	0.846	35.5	0.18	- 1
Tengiz	0.801	45.15	0.59	- 49
Kalamkas	0.908	24.35	1.49	- 49
Iranian Light	0.855	34	1.35	- 29
Iranian Heavy	0.871	31	1.65	- 21

the capital city of Golestan province and 35 Km east of Gomishan coastal town facing the Caspian Sea, is Available and can be allocated for construction of the proposed refinery. The land is not suitable for agriculture and is owned by government.

Infra-structure

The infra-structure in the city of Gorgan and the surrounding cities is an important consideration in the feasibility study of this project.

Water is available from the reservoir located 25 Km away from the proposed refinery site.

Natural gas can be transported from the existing Korpedje-Kordkuy natural gas pipeline.

The existing pipeline network currently transporting oil products from Tehran Refinery to the north and north eastern provinces can be utilized for transfer of Golestan Refinery products to these provinces, thereby reducing cost of pumping products from Tehran Refinery.

A crude oil unloading jetty must be constructed off shore of coastal town of Gomishan near the project site.

To guarantee the continuous, uninterrupted flow of oil to the refinery, a consortium comprising Iran and oil producing companies in the region willing to invest in this project, can be established and comprehensive feasibility study for the project can be performed.

The lifting of American sanctions against Iran will clear the way for providing the required capital for this sensible and economically viable project by the international financial institutions.

It is only a matter of time and before long the American sanctions against Iran will be lifted. In fact, indications are that already the American Administration, under the immense pressure of influential local and international oil companies has started to reconsider these sanctions.

Environmental Considerations

The project being closely linked with the Caspian Sea, Serious considerations must be given to the environmental aspects of the project. The effects on the eco system of the Caspian Sea and variety of flora and fauna, of which over 400 species are unique to the Caspian, must be carefully studied.

The WHO standards and the World Bank guidelines must be adhered to with respect to the oil spill from the unloading facilities, air emission criteria and effluent discharge from the refinery. ■

Table 2

Tehran refinery crude distillation yields

Table 2 Tehran Refinery crude distillation yields

	LPG	LSRG	HSRG	Blending Naphta	Keros.	Light Diesel	Heavy Diesel	Waxy Distillate	Lub Cut	Residue
L. V%	3	4	11.6	4.1	14.3	15	4.5	15	7	19.5

metal content.

The Product specifications of the new refinery should be similar to the specifications proposed by the world engines and automobile manufacturers (WWFC2000) specifications) and those of the EU.

The project viability is supported by a number of advantages and key elements. These are briefly explained below:

Market availability for the refinery products

Table 1 shows consumption recordand demand projection of the major oil products in the projects area (Khorasan, Golestan and Mazandaran provinces).

The demand for major oil products in the project area will increase to a level of 173,000 bbls/day by 2015 (medium projection) and to 200,000 bbls/day for high projection.

The effect of conversion to natural gas is taken into account in the above demand projections. Gasoline not receiving the effect of conversion to natural gas, steadily increases its demand in future, while demand for fuel oil, being strongly affected by conversion to natural gas, will decrease.

If the fuel oil consumption in northern Iran can be substituted by gas, the low sulfur fuel oil from Golestan refinery can be utilized as feedstock for a metallurgical coke manufacturing unit. Iran is currently importing most of the coke required for its industries.

Therefore the market demand in the north of Iran is sufficiently high to absorb the products of the proposed refinery.

To meet the demand of these northern provinces, oil products are currently being pumped from Tehran Refinery and the balance is provied by import from the CIS countries.

Tehran Refinery is currently processing Ahwaz crude. The yields of crude distillation units are shown in Table 2.

Crude characteristics of a few oil fields in Turkmenistan, and those of Tengiz and Kalamkas in Kazakhstan are shown in Table 3.

Characteristics of Iranian Light and Heavy crudes are also included for comparison.

Land Availability

An important factor often causing delay in refinery projects is land acquisition.

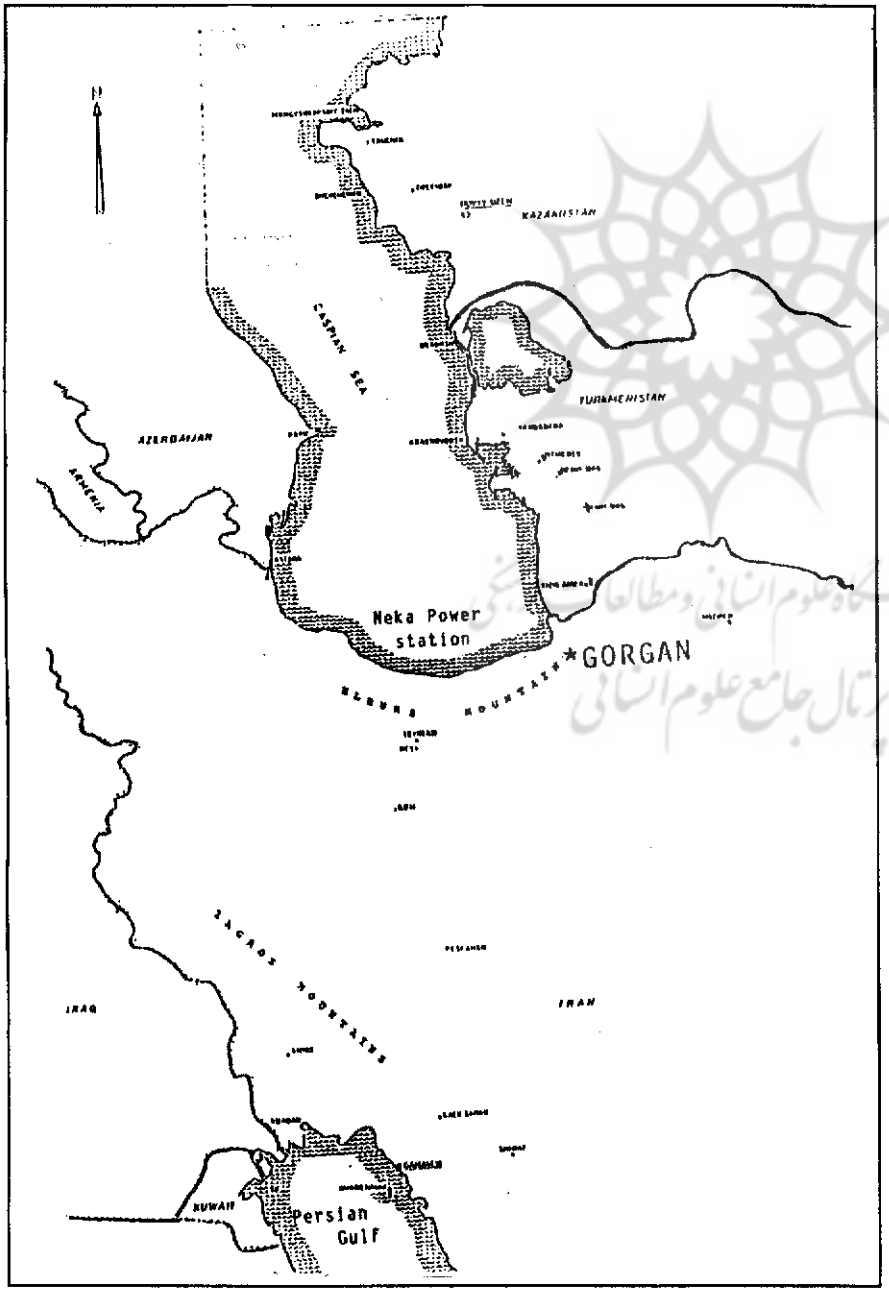
A large uncultivated area at Agh Ghala, some 40 Km north of Gorgan,

Table 1

Consumption record and demand projection of major oil products in the project area

Table 1 Consumption Record and Demand Projection of Major Oil Products in the Project Area barrels/day

	Gasoline	Kerosene	Gas Oil	Fuel Oil	Total
1995	28466	33463	59394	31394	152718
1996	29964	37082	64841	35893	167830
1997	31808	34997	63238	38304	168348
1998	38786	37753	69992	27362	173896
1999	36789	33326	59463	26811	156389
Demand Projection for the Period 2000-2015 (Medium Projection)					
2000	37709	33305	59426	26107	156547
2005	43715	33784	60279	22699	160477
2010	50677	34269	61145	19736	165828
2015	58749	34761	62024	17159	172693



In the area of refining too, Iran can offer regional solutions. Although Iran has ample refining capacity (over 1.4 million barrels per day installed and operating capacity) yet in the north and particularly north east of the country there are no oil refining facilities.

These northern and northeastern provinces have large population and high demand for energy. (Table 1)

Currently the energy demand of these provinces is met by gas and refinery products transferred from refineries in the center of the country through the existing product pipeline network.

Oil swap agreement between Iran and Kazakhstan was signed and for a limited period some Kazakh crude was transported to Tehran refinery using the existing Neka-Sary-Tehran pipeline. However, due to the high mercaptan content of the crude, the agreement was suspended. The crude was a blend from Tengiz and Kalamkas fields.

Installation of a new refinery in the north of Iran somewhere near Gorgan(south-east of the Caspian) with a capacity of 200,000 barrels per day can be a viable project for transfer of this amount of oil from these republics to the northern Iran market.

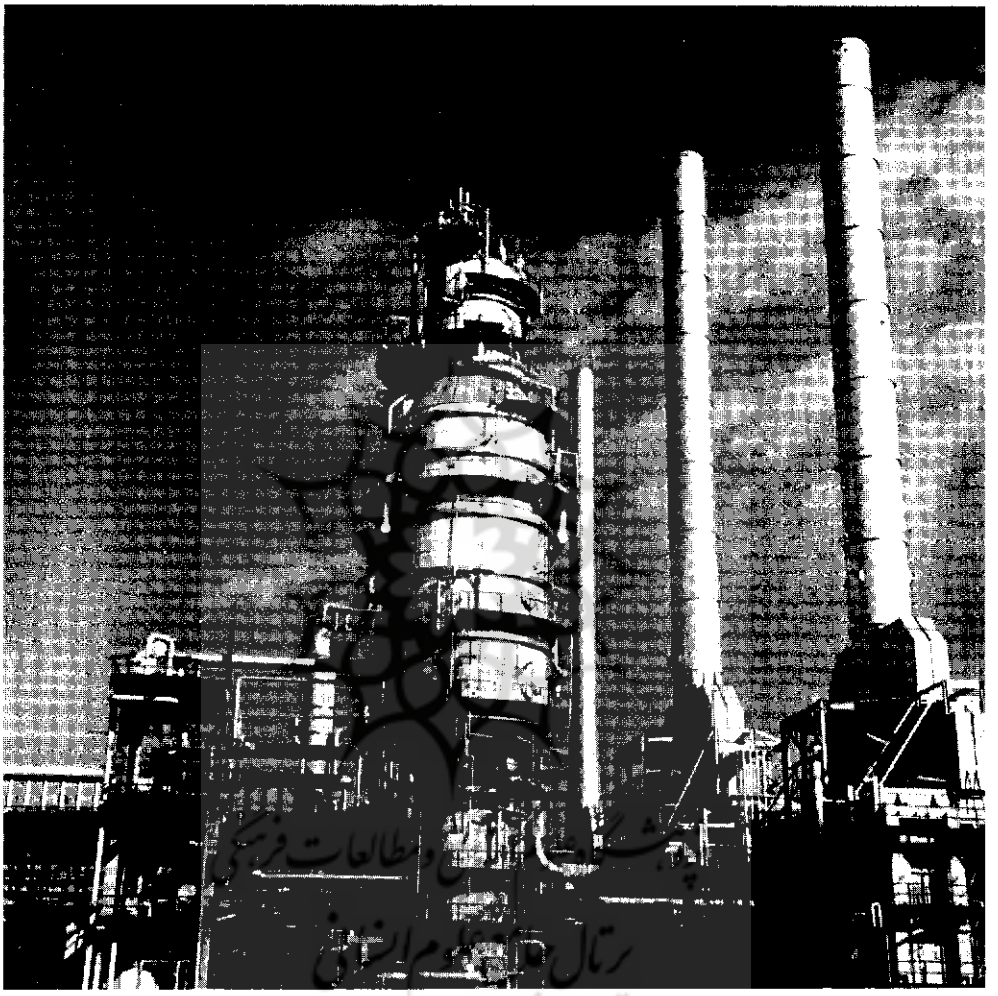
This oil can be imported by direct purchasing or through oil swap arrangements with oil producing companies in the region or by agreements at governmental levels.

The Golestan refinery can be designed for crude oil mix from Kazakhstan (50%) and a blend of Turkmenistan and Azerbaijan crudes for the remaingn 50 percent.

Kazakh crude can be a blend of Tengiz crude (super light with API Gravity of around 47, similar to condensate) and Kalamkas crude (super heavy) with an appropriate ratio.

Azerbaijan and Turkmenistan crudes are light crudes with low sulfur and

Construction of a Refinery in The North of Iran Using CIS Crude Oil as Feedstock



Dr. M. Nematollahi

The newly independent states of the Former Soviet Union are seeking ways to move their landlocked oil into worldmarkets.

The hesitation of the international institutions to invest in large, capital intensive projects such as oil transit pipelines to suitable locations for getting access to the world market and the urgent need for hard currency in these republics, calls for regional solutions.

Iran, with its unique geographical location, linked to these republics directly or through the Caspian Sea and having Persian Gulf extending along its entire border in the South, can offer quite a few regional solutions.

The gas pipeline from Turkmenistan to north of Iran inaugurated in December 1997 proved to be a successful example. Oil swap with Azerbaijan, Kazakhstan and Turkmenistan or providing transit corridors for oil and gas pipelines of these republics for exports to the world markets are other possibilities.