



**GAS CONDENSATE
TECHNOKONTROL REFINERY**



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National Fire Protection Association

The authority on fire, electrical, and building safety

Typical application and allocation of Gas Condensate Technokontrol Refinery (TK-CGMR)



Technokontrol Refinery Construction & Management

Application and allocation of Gas Condensate Technokontrol Refinery (TK-GCMR)

Gas condensate is a typical by-product of both, gas- and oil production. In the gas field it is generated in the gas drying process. In the oil field it forms a part of the associated gas and such is mostly flared.

Instead of being flared, gas condensate could be used to produce valuable refinery products by feeding them to TK-GCMR. The attached block diagrams demonstrate how TK-GCMR could typically be integrated into gas field facilities (ATT01) or oil field facilities (ATT02).

Features of the TK-GCMR

TK-GCMR is a refinery supplied in pre-erected and pre-tested packages and designed to process 25.000 BPD of gas condensate per single stream.

It is designed to optimise the output of mainly gasoline, jet fuel, diesel and fuel oil in high quality. The design is based on industrially proven technology and is in accordance with internationally accepted rules, codes and standard as well as European environmental regulations.

TK-GCMR is equipped with modern and up-to-date integrated refinery information system for monitoring & control of process and performance of the plant.

TK-GCMR is a rather comprehensive refinery which therefore includes various process units like atmospheric distillation, refiner and reformer. (Therefore, it is important to distinguish

the skid-mounted TK-GCMR from e.g. simple topping plants which typically run on crude oil are often skid-mounted and called mini refineries too).

The scope of the TK-GCMR includes besides the process units also off-sites and utilities according to requirements on site. However, TK-GCMR could be designed as almost self-sufficient with regard to utilities requiring water as only imported utility.

The TK-GCMR is offered on a LSTK basis or “Keys in hands” option. This means, that the required EPC work (engineering, procurement and construction) will be realised by a general contractor with single responsibility towards the client or a full package as required by the client.

Key Arguments for TK-GCMR

The key arguments for the TK-GCMR concept are as follows:

- (1) Its high level of self-sufficiency makes TK-GCMR an almost independent source of gasoline, jet fuel, diesel, fuel oil and even electricity for small, remote and under-developed markets or oil- and gasproduction fields.
- (2) The pre-assembled and pre-tested modules of the TK-GCMR result in short transport, erection and commissioning times and eventually smaller related cost compared to conventional refineries.
- (3) Due to modularised package concept, TK-GCMR could be easily removed to alternative product markets or feedstock sources, if need be. For the same reason it is also easy in operation and very well suited as pilot plant for testing and/or training purposes.

(4) The integrated refinery information system helps to optimise operational efficiency of the plant and to maximise the business margin.



(5) Because of the favourable feedstock – gas condensate instead of crude oil –TK- GCMR provides cost-effective high quality products which exceed European as well as US-American quality standards .

(6) This and the fact that 100% of the feed is converted into products results in a considerably shorter pay-back period than comparable crude oil refinery projects of similar product output.

Technokontrol exclusive safety technology will allow the refinery to benefit from a anti-explosive, anti-bleve technology by introducing in all of the possible areas our technology to prevent any types of accidents, especially, gas explosion s, fires, bleves, sabotage, etc.

(7) We also strive to reduce all possible contamination by using our exclusive TK-Chimney Contamination Filtering Technology.

(8) Technokontrol products and safety technology surpasses many International safety requirements including the guidelines of the US NFPA-United States National Fire & Prevention Association guidelines regarding the prevention of Explosions US NFPA-69-2008 Guidelines.

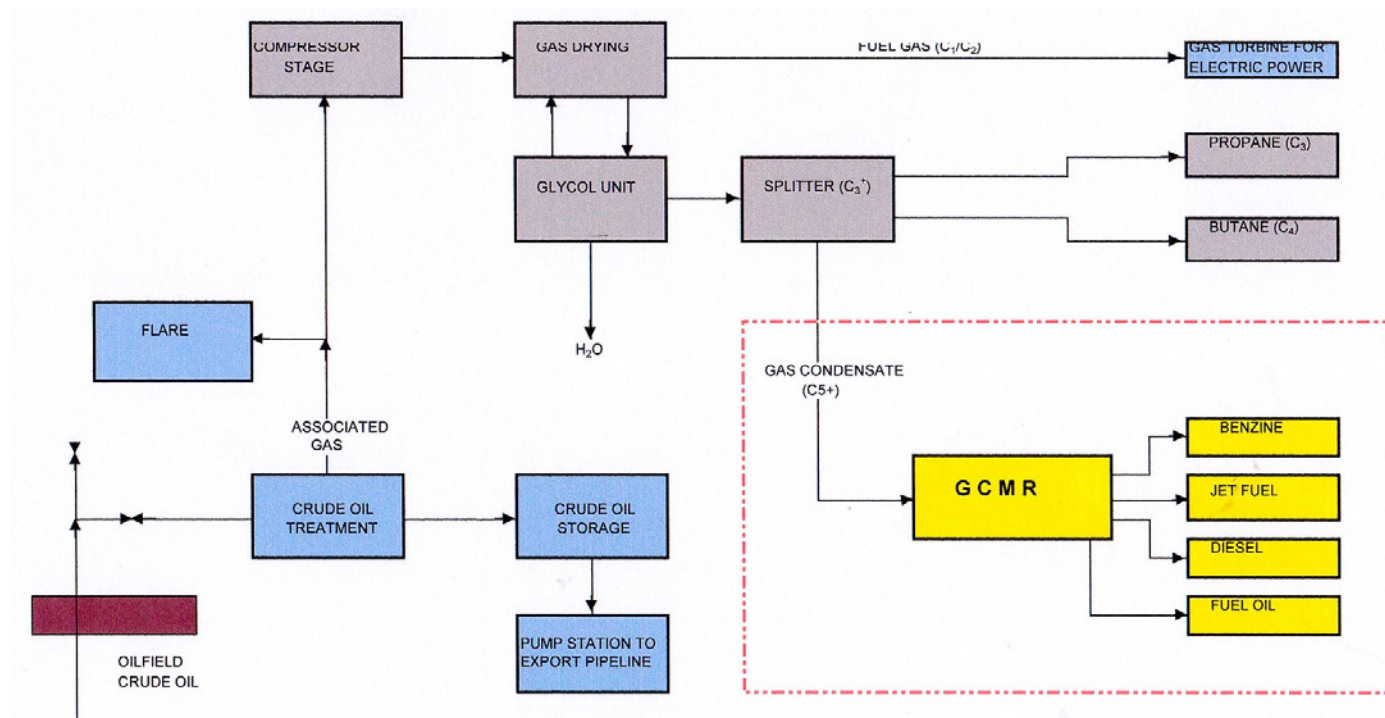
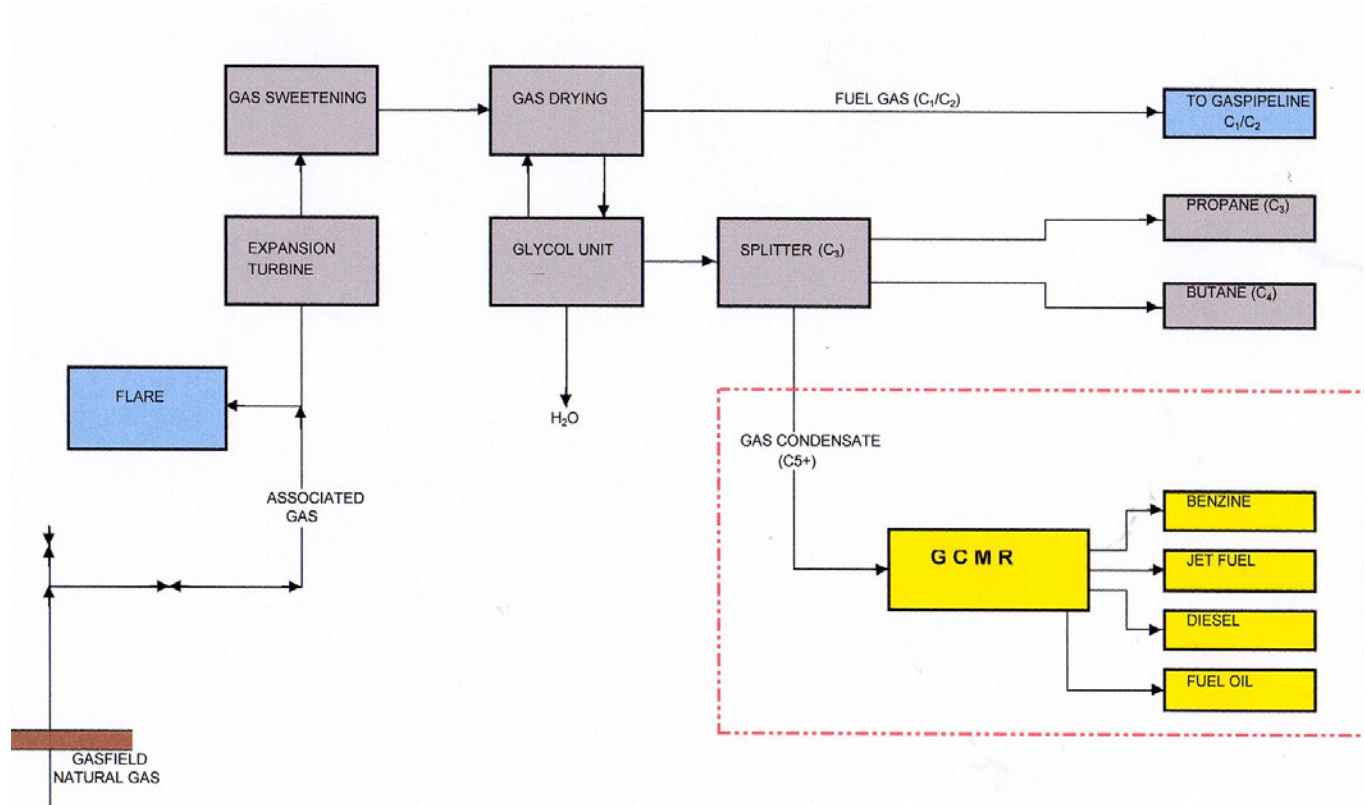
(9) Technokontrol manufactures its safety products in the EU under full CE safety requirements

and follows full quality & safety guidelines from internationally recognized auditors as the ISO Organization.

(10) Technokontrol prides itself in having quality certificates as the ISO9000-ISO14000-ISO18000-ISO23000 and is a member of the US NFPA.

(11) Technokontrol Safety Technology is used ,recommended or obligatory from the UK Health & Safety Authorities, the Australian Fire Authorities, The International MotorBike Racing Authority(FIM), to the World Professional Powerboat Association.(WPPA),etc.





The Process and the TK-Plant

2.1 Capacity of the Plant

The refinery is designed for an annual capacity of

Max. 937.500 t/a = 25.000 BPD Gascondensate

The operation time of the refinery is **8.000 hours per year**.

Following our process technology per example the following endproducts can be achieved. The exact endproducts depend on the real gas analysis.

Gas condensate	LPG t/y	Benzine t/y	Kerosene t/y	Diesel t/y	Fuel Oil t/y
100 %	28.125	487.500	121.875	225.000	62.500

t/y = tons per year

The above figures are based on a throughput of 937.500 t/y respective 25.000 BPD.

Additionally 7.500 tons/year (7.500.000 m³/year) of gas are produced, which will be used for the own energy supply and therefore is no need to use additional gas from outside.

The plant is following international standards. The plant can go in operation after signing of contract and clarification of all technical and commercial points in less than 2 years.

2.2 Main Equipment

The plant is supplied with all required units and the so-called off-sites, so it can go on stream with this equipment. A Lay-out of the plant is attached. The required area for the plant is around 43.000m².

The equipment is as follows:

TK-tankfarm for the gascondensate (reserve for 7 days)

The desalination unit

The atmospheric distillation

The disulphurisation of benzine

The benzine splitter

The reformer unit

TK-tankfarm for endproducts (reserve for 3 days)

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Off-sites

Water processing plant

Steam producing unit

Control- and pressure air

Slope system

Flare unit

Electr.power supply

TK-tankfarm for intermediate products (reserve 3 days)

Repair workshops

Spare parts package

Piping and instrumentation

Laboratory

Process control room

Administration and personnel's dayroom

Fire fighting equipment

TK-Safety Technology

2.3 Installation and Putting in Operation

The units are supplied skid mounted and in part units. Therefore the total installation time will only be 4-8 months, depending on local conditions.

Putting in Operation takes place in two steps:

- First will be training of personnel and dry run
- The second step will be going on stream.

The Process Control Room will be supplied in containers, full functioning, so the training of the operation personnel can already start parallel to the installation. The Putting in Operation therefore will be only 3 months.



2.4 Products produced and Quality

Benzene	Normal benzene	A - 76
	Super benzene	A - 93

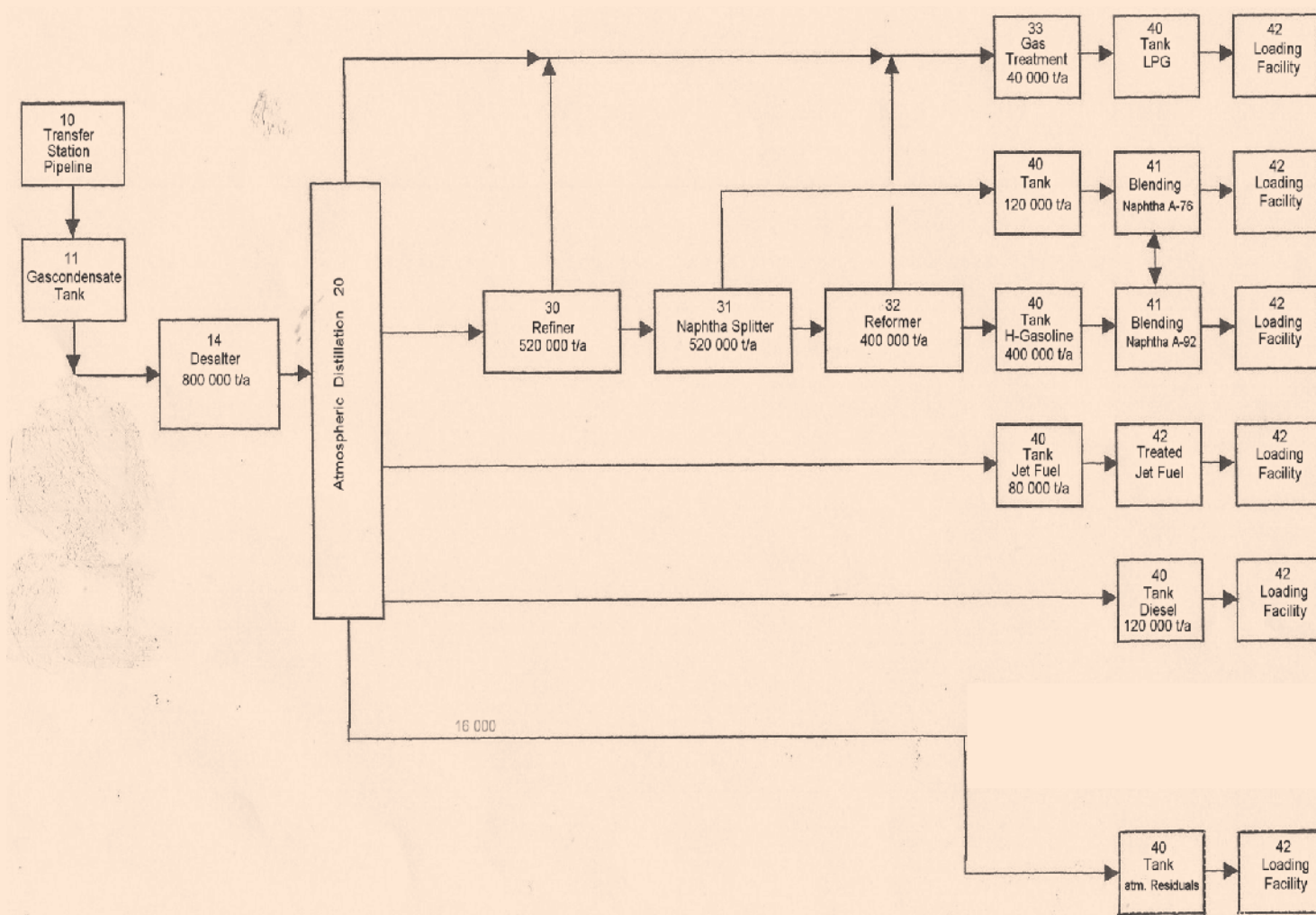
Kerosene	Sulphur content	< 0,2 % (Mass.)
	H ₂ S-content	Not tracable
	Free water	no
	Spec. gravity (20°C)	< 820 kg/m ³
	Ignition point	> 40°C
	poor point	< -35°C
	Cloud point	< -25°C
	Mech. impurities	none

Diesel	General characteristics	Sulphur content	< 0,2 % (Mass.)
		H ₂ S-content	Not evident
		Free water	none
		Mech. impurities	none
Following ASTM-D86	95 % of the boiling analysis	< 340°C	
Marketing characteristics	Summer diesel	Winter diesel	
Density (20°C)	< 850 kg/m ³	< 840 kg/m ³	
Ignition point	< 40°C	< 40°C	
Poor point	< -10°C	< -35°C	
Cloud point	< -5°C	< -25°C	

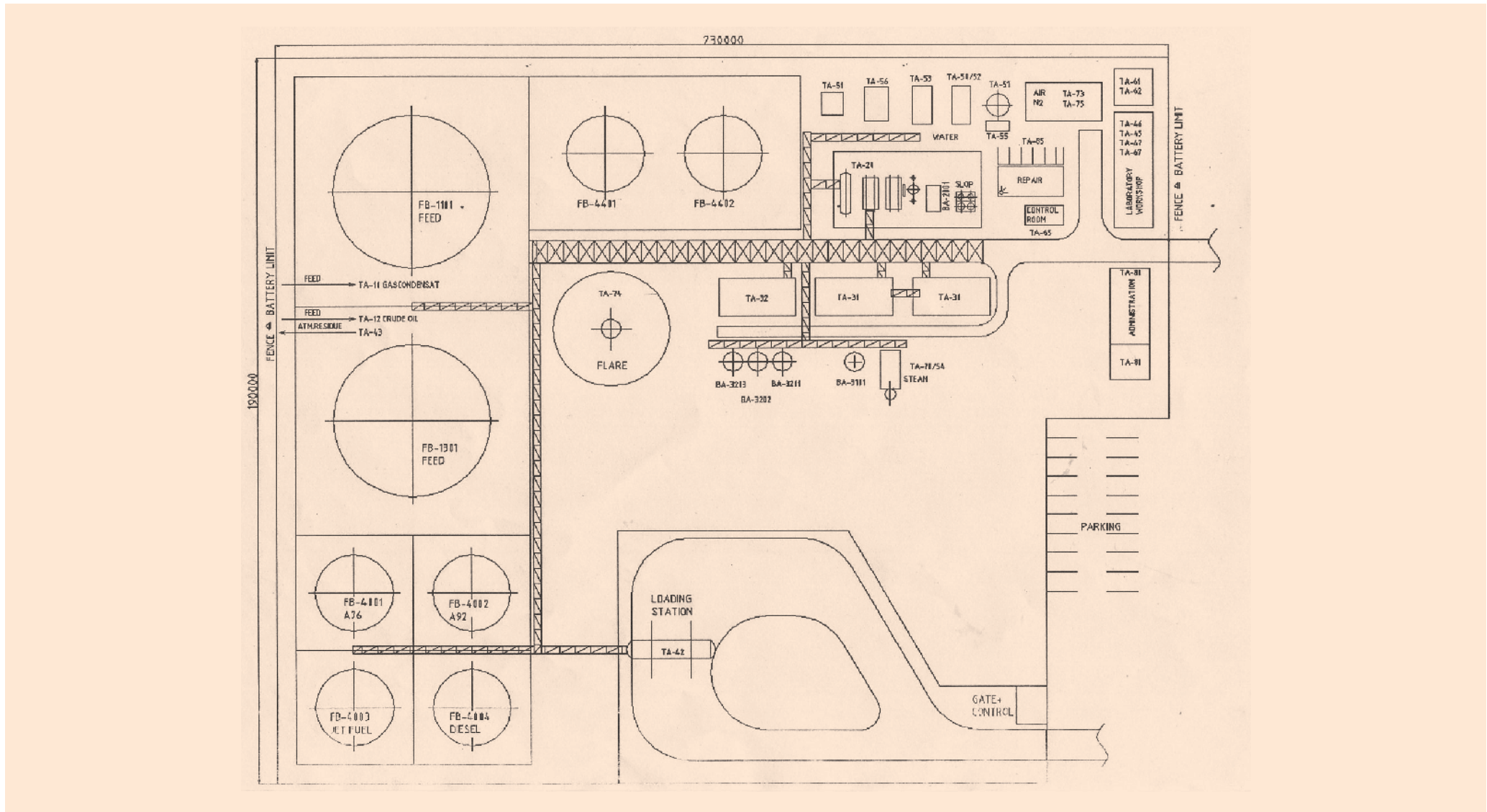
This quality datas are experienced values which can be slightly changed by the feed characteristic of the gascondensate.

2.5 Plant Description

2.5.1 Process Diagram / Refiner – Reformer



2.5.2 Lay Out



2.6 Emissions and Effluents

2.6.1 Waste Water

The waste water will be treated in the waste water treatment. This are 3 (three) basins made from concrete. After the basins the water will be fed into a draining basin.

The content in the water is:

Oil < 10 mg/l

Salt < 10 ppm

Sludge from the basins cleaning 1 x / year.

Fuel Gas

The process furnaces are fired with refinery waste gas. The burners are designed this way, that the emission levels as listed hereunder will be achieved.

g/m³ flue gas

CO content < 170

NOx < 250

SO2 content < 200

Dust < 50

TK-Refinery Consulting Services

3. Design, fabrication and installation of the plant



Putting in operation, test run, training of local personnel and support of operation for a certain period.

Based on a concluded supply contract a first class german general contractor will, based on the process of TK- CONSULTING, design, fabricate, purchase, deliver and install the plant on the site of the client, turn-key ready for operation.

Within this supply contract a supervision team will take over training of local personnel, putting in operation of the plant and will help operation of the plant for a period to be agreed.

Certificates & Associations



Additional Certificates Due in 2016-17

Certificados adicionales en 2016-17

Certificats supplémentaires en 2016-17





TechnoKontrol™
WHERE YOUR SAFETY IS OUR PRIORITY

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