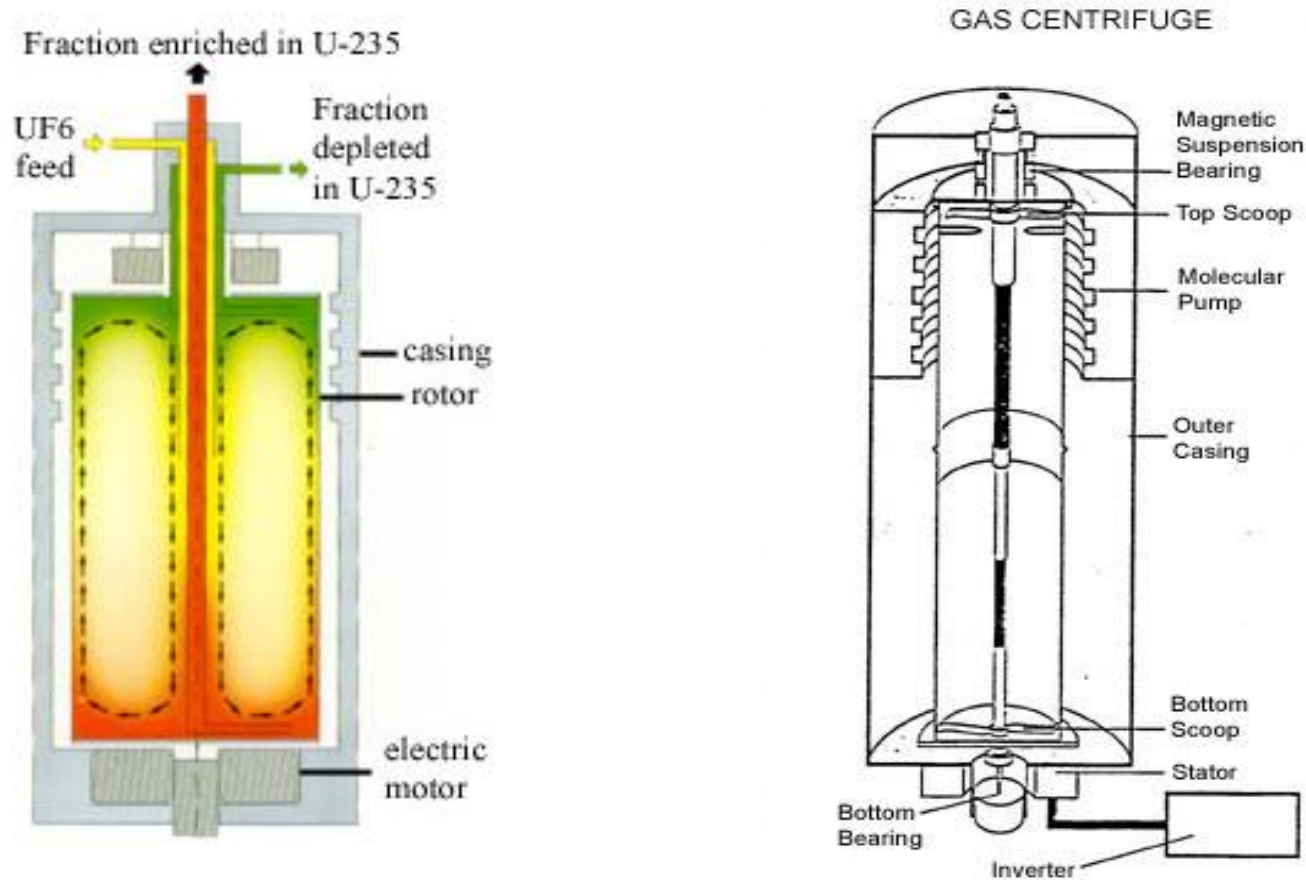


Khan Case

ISIS Course

December 4, 2014

Generic drawing of an early URENCO-type gas centrifuge.



Source: David Albright Drawing: Jandos Rothstein

Iranian P1 Centrifuge Cascades



Centrifuge Cascade



P2 Centrifuge Assembly

- *A P2 centrifuge rotor assembly, showing a bellows in the middle of the tube and the pin of the bottom bearing, provided to Libya by the Khan network and subsequently sent to the United States. North Korea likely received several such assemblies and is now producing them.*



**IRAQ-A FAILED ATTEMPT IN
1990**

Copy of
original

PROJECT A.B.

Pakistan had to spend a period of 10 years and an amount of 300 million U.S. dollars to get it. Now with the practical experience and the world-wide contacts Pakistan has already developed, you can have ^{A.B} it in about three years time and by spending about 150 million U.S. dollars.

1. We will provide the detailed design and actual blue print of A.B. This will cost five (5) million U.S. dollars.
2. We undertake to procure all the vital components on your behalf and these will be supplied through our Dubai office. Ten (10)% commission will be charged on such procurements. No commission will be charged on purchases to be made direct by you.
3. All technological assistance will be provided by us through our Dubai office. This will be free advice.
4. Meetings between the two top persons can be arranged after every 3/4 months to review the project. There will be no charges for such meetings.
5. If absolutely necessary 2/3 scientists can be pursued to resign and join the new assignment.

Top secret and confidential
and to be opened personally

From: S15

To: B15

Ref. No.: 106

Translation of original
Arabic letter. Text in
quotes was in English in
original

15 October 1990

Subject: Reply to offer

I refer to your memorandum M78 of 6 October 1990.

As you know, hostile bodies still adopt a policy of embroilment and the thing that we have to be most on our guard against with such offers is that they may be a deliberate attempt to see how the land lies. That is why if your circles could:

- (1) Mislead the requesting entity; and
- (2) Ensure that it is not an attempt to see how the land lies,

we would prefer that paragraph (1) of your memorandum be redrafted to read;

The parties concerned should send a (detailed) specimen of the detailed designs and accompanying calculations in order to produce the detailed design. We suggest the English text below:

“A specimen of the detail design and its accompanying calculations procedure to produce the detail design.”

With appreciation,

SIGNED BY Dhafer Rashid Selbi
13 October 1990

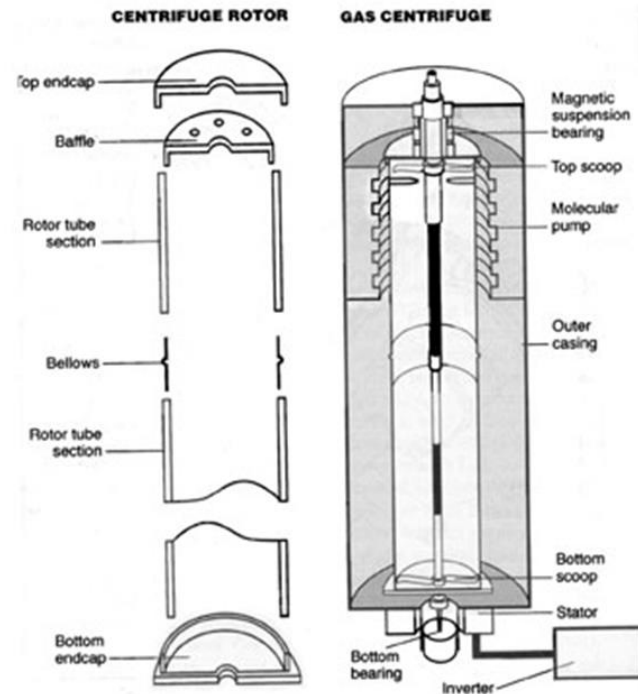
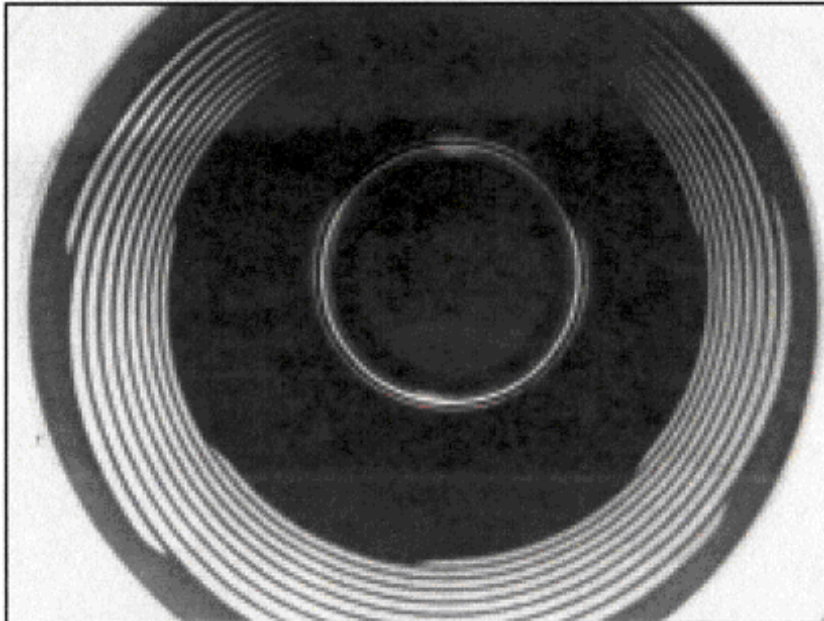
**LIBYA-MAJOR CUSTOMER AT
LAST**

**NON-ROTATING CENTRIFUGE
PARTS MADE UNDER ORDER
AT SCOPE IN MALAYSIA**

P2 Centrifuge Outer Casing: Made by Scope in Malaysia

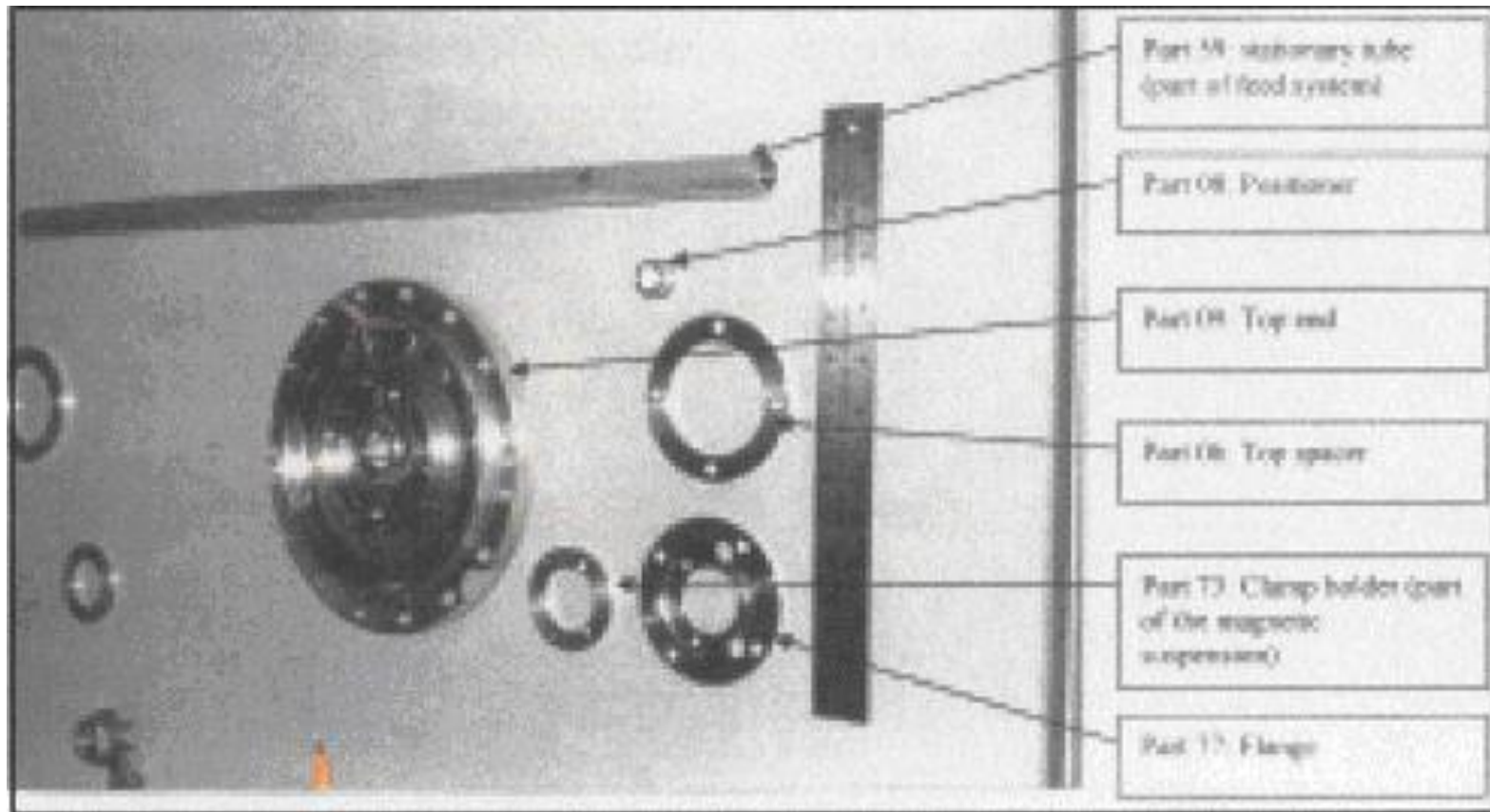


Bird's Eye View of the Interior of P2 Casing and Molecular Pump



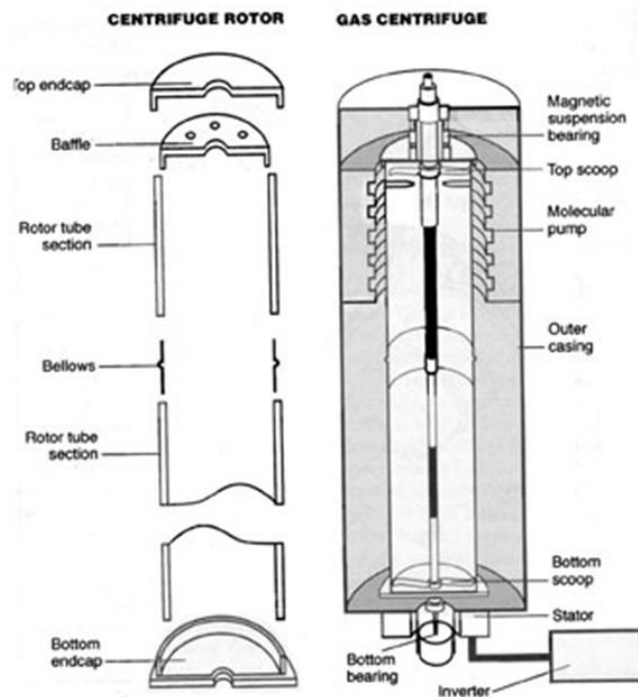
Source: Albright, D. and Hibbs, M., 'Iraq's shop-till-you-drop nuclear program', *Bulletin of the Atomic Scientists*, vol. 48, no. 3 (Apr. 1992), pp. 32 and 33.

P2 Centrifuge Aluminum Components: Made by Scope



**SUPPLY CHAIN OF MOTOR
HOUSING, LOCATED AT
BOTTOM OF CENTRIFUGE**

Motor Housing Located on Bottom of Centrifuge



Source: Albright, D. and Hibbs, M., 'Iraq's shop-till-you-drop nuclear program', *Bulletin of the Atomic Scientists*, vol. 48, no. 3 (Apr. 1992), pp. 32 and 33.

- Motor, in schematic called a stator, spins centrifuge rotor
- Motor is located in a housing made from aluminum
- This section traces the manufacturing of the motor housing of a P2 centrifuge

Competent official :
Tinner Marco W.

Traco Schweiz AG, Postfach, CH-9468 Sax
Gulf Technical Industries L.L.C.
P.O.Box 25328
Dubai - U.A.E.

CH-9468 Sax, 30. Mai 2001/adm

Order confirmation		# 0103-011
		please note on all correspondence
<i>Your reference:</i>	<i>Date of order:</i> 30. Mai. 01	<i>Tel : +971 4 394 0342/333 2226</i> <i>Fax : +971 4 394 0352/333 1656</i>

Item	Qty	Product Description	price/unit	Price Del.time prices in CHF	TC
1	10000 x	9001			
2	10000 x	9003	34.00 / pc	340'000.00	4
2.1	1000 x	Material for Base	87.00 / pc	870'000.00	4
		9001 Material	70.00 / pc	70'000.00	4
3	10000 x	9007			
4	10000 x	9010	1.70 / pc	17'000.00	4
5	10000 x	9013	3.50 / pc	35'000.00	4
6	10000 x	9015	35.00 / %	3'500.00	4
7	10000 x	9016	0.80 / pc	8'000.00	4
8	10000 x	9031	10.00 / pc	100'000.00	4
9	10000 x	9032	12.00 / pc	120'000.00	4
10	10000 x	9033	13.20 / pc	132'000.00	4
11	10000 x	9034	6.90 / pc	69'000.00	4

28	30000 x	9075		6.40 / pc	192'000.00	4
29	10000 x	9076		33.00 / %	3'300.00	4
31	10000 x	9084		6.00 / pc	60'000.00	4
		TAX	4, foreign country of	"020'600.00, =	0.00	0.00
TOTAL					CHF 3'020'600.00	

Delivery : EXW)¹ INCOTERMS 2000
Date of delivery: 30. Jun. 02
TAX type : foreign country
Conditions : prices net, ex work, unpacked
PP Invoice 25% after order
Final payment 75% net within 30 days from delivery

NOTE:

Prices for items 9059 and 9064 are missing !

With best regards
TRACO SCHWEIZ AG

Tinner Marco W.
Managing Director

Aluminum Motor Housings for the Libyan Centrifuge Program

Unknown Al Manufacturer, Italy

Bikar Metal Asia purchased Al rods for Traco, under contract, organized by Urs Tinner

Bikar Metalle

Bikar sent Al rods to Kirag

Kirag, Switzerland

Kirag made housings from rods under contract to Traco, which supplied part design and organized transport of housings to Turkey

ETI Elektroteknik Sanayi ve Ticaret, Turkey

ETI made & added motors to housings
Shipped product to Dubai

UAE

Product shipped on BBC China

Libya

Oak Ridge, USA



METALLE



BIKAR METAL ASIA PTE LTD
HEADQUARTER ASIA
No 8, Pandan Crescent
UE Tech Park, #03-03
SINGAPORE 128464

BIKAR METAL ASIA PTE LTD • No 8, Pandan Crescent
UE Tech Park, #03-03 • SGP • Singapore 128464

KIRAG AG
Rossbodenstrasse 18
7000 Chur
Switzerland

DELIVERY NOTE

No. : 495/ 1
Cust.Acc: 10800
Date : 29.11.2001
Contact : Thorsten Heise/cs

Your Contact : Mr Urs Tinner
Your Purchase Order: by fax dated 10.09.2001

Terms of Delivery: CIF

Purchasers Address:
PRISMA WIBAWA SDN BHD
Lot 519, Jalan Tudin
Kg. Baru Subang
40150 Shah Alam
Selangor/ MALAYSIA

ALUMINIUM 6082 / New: Al Si 1 Mg Mn
Round bar OD 210mm, Temper T6
1500 Pcs app 105 mm lgth
Mat.-No. 3.2315
500 Pcs app 105 mm lgth

Aluminum Motor Housings for the Libyan Centrifuge Program

Unknown Al Manufacturer, Italy



Bikar Metal Asia purchased Al rods for Traco, under contract, organized by Urs Tinner

Bikar Metalle



Bikar sent Al rods to Kirag

Kirag, Switzerland



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ETI Elektrotechnik Sanayi ve Ticaret, Turkey



ETI made & added motors to housings
Shipped product to Dubai

UAE



Product shipped on BBC China

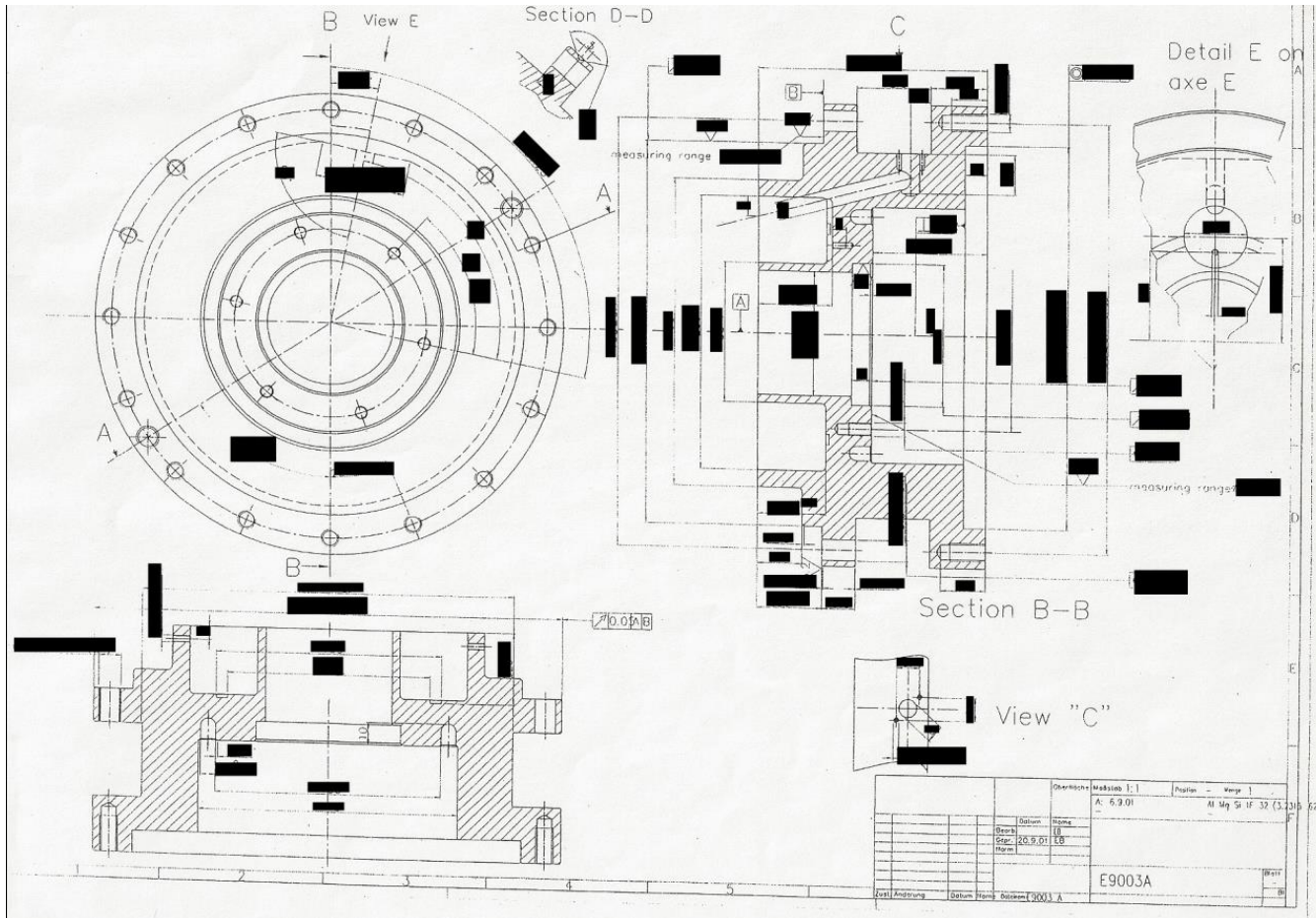
Libya



Oak Ridge, USA



Part 9003



Aluminum Motor Housings for the Libyan Centrifuge Program

Unknown Al Manufacturer, Italy



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Bikar Metalle



Bikar sent Al rods to Kirag

Kirag, Switzerland



Kirag made housings from rods under contract to Traco, which supplied part design and organized transport of housings to Turkey

ETI Elektrotechnik Sanayi ve Ticaret, Turkey



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UAE



Product shipped on BBC China

Libya



Oak Ridge, USA



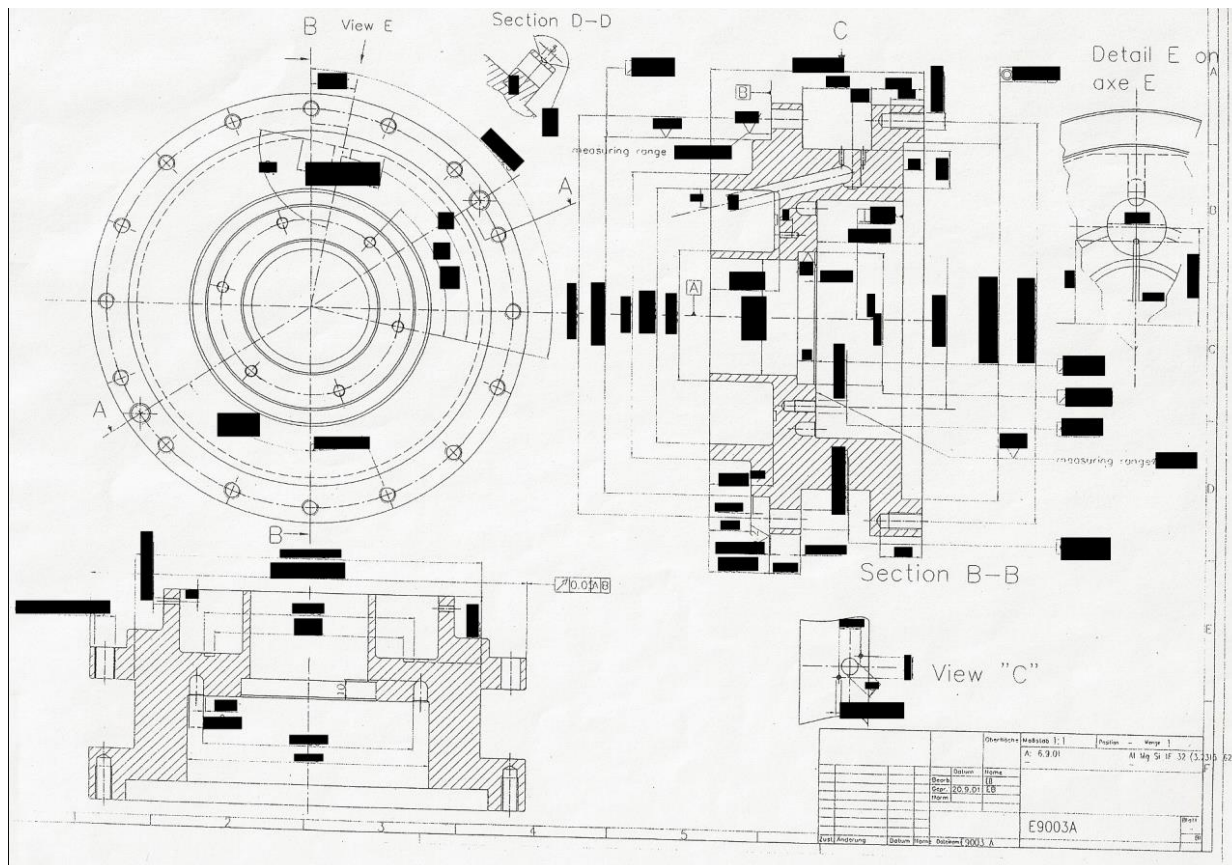
9003

Deliveries

Quantity	Recipient
8118	TK / Tekno Elektrik
1522	USA

Remarks

The flanges were used by the recipient in Turkey for other processes. We had no possibility not to deliver these parts, i.e. retain them. Without delivery, production in Turkey would have fallen behind and we would have had a problem with the buyer, Gulf. We cannot say what happened to the parts after we shipped them to Turkey.



Aluminum Motor Housings for the Libyan Centrifuge Program

Unknown Al Manufacturer, Italy



Bikar Metal Asia purchased Al rods for Traco, under contract, organized by Urs Tinner

Bikar Metalle



Bikar sent Al rods to Kirag

Kirag, Switzerland



Kirag made housings from rods under contract to Traco, which supplied part design and organized transport of housings to Turkey

ETI Elektrotechnik Sanayi ve Ticaret, Turkey



ETI made & added motors to housings
Shipped product to Dubai

UAE



Product shipped on BBC China

Libya



Oak Ridge, USA



President Bush at Oak Ridge, Tennessee holding a finished motor housing turned over by Libya. (motor is white object visible on the bottom of the housing).



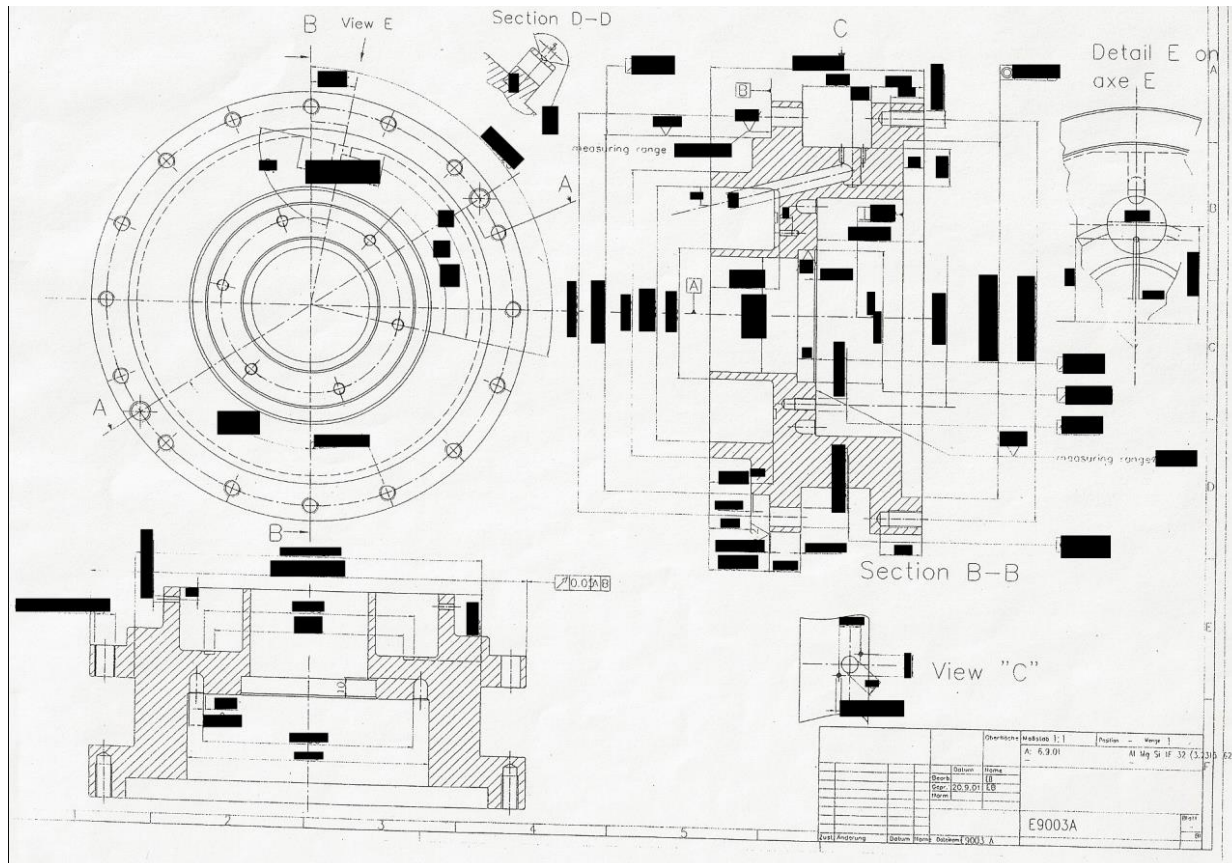
9003

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P2 Rotor Assembly with Bellows



President Bush at Oak Ridge, Tennessee holding a finished motor housing turned over by Libya. (motor is white object visible on the bottom of the housing).



North Korea-A Customer and Member of the Khan Network

P2 Rotor Assembly



Origins of North Korean Centrifuge Program: Pakistan

- North Korea's centrifuge program received significant assistance from Pakistan's Khan Research Laboratories in the 1990s.
- This assistance started under the shadow of the Ghauri missile deal in the early 1990s.
- Initially, North Korean missile experts at KRL received training in making centrifuges.
- Cooperation with KRL and Khan broadened during the late 1990s.
- Cooperation between North Korea and A.Q. Khan ended in early 2000s, possibly interfering in North Korea's progress on centrifuges.

Yun Ho Jin, the man behind NCG's purchases, 1994 photo





November 4, 2010 DigitalGlobe satellite of the North Korean age of gas centrifuge facility located at the fuel fabrication complex facility of the Yongbyon center

Iran-Khan's First Customer

Iranian P1 Centrifuge Cascades

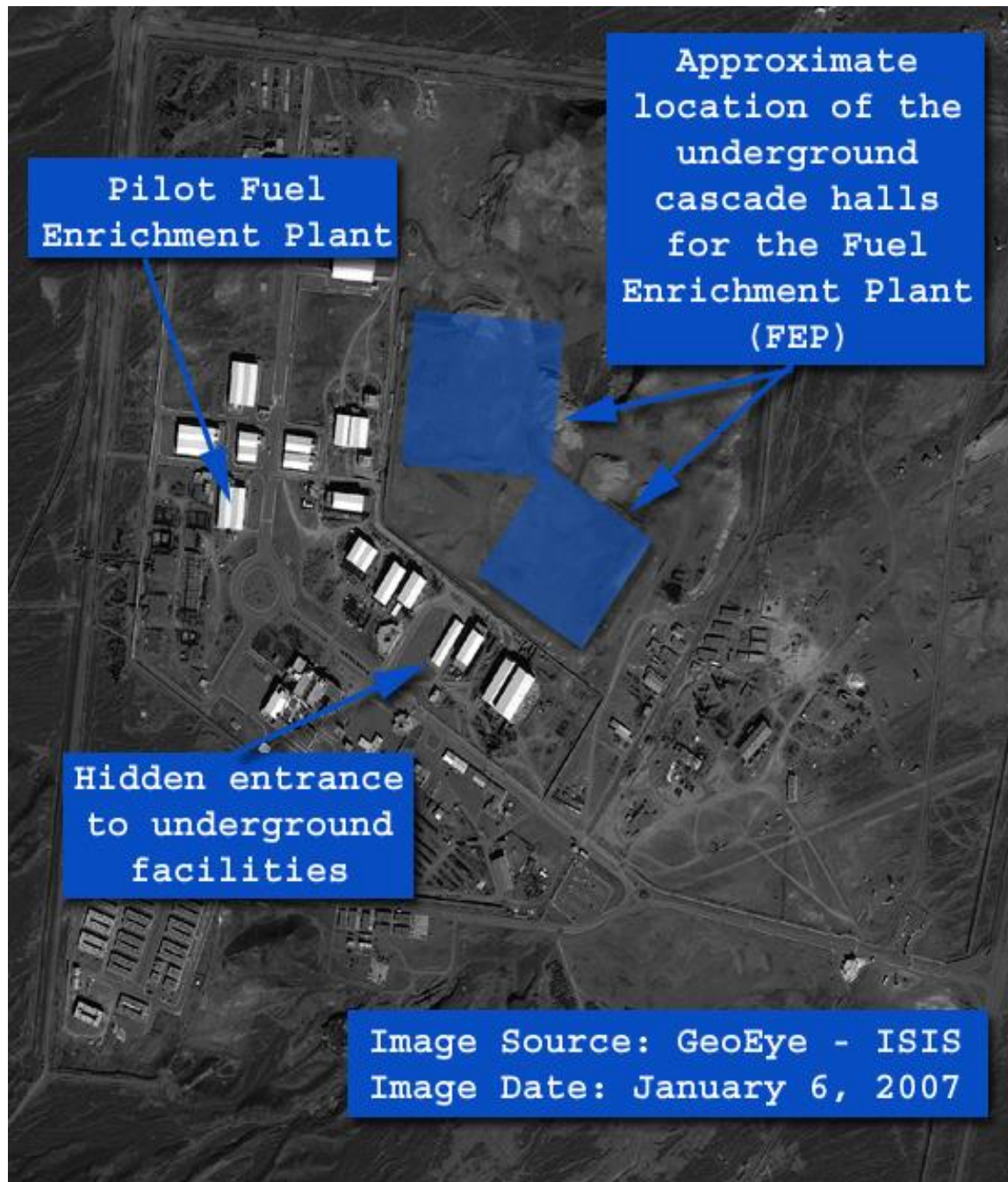


Kalaye Electric





Image Credit: GeoEye via Google Earth
Image Annotation: ISIS
Image Date: May 18, 2008



Pilot Fuel
Enrichment Plant

Approximate
location of the
underground
cascade halls
for the Fuel
Enrichment Plant
(FEP)

Hidden entrance
to underground
facilities

Image Source: GeoEye - ISIS
Image Date: January 6, 2007

Photo of Natanz, DigitalGlobe



Natanz Plant, September 2002



Image Credit: DigitalGlobe-ISIS
Image Date: September 27, 2009

Earth spoils

New excavation covered

Tunnel entrances



Khan Network gave nuclear weapon design information to Iran--IAEA

- In an interview in 2007 with a member of the clandestine nuclear supply network, the International Atomic Energy Agency (IAEA) was told that Iran had been provided with nuclear explosive design information. From information provided to the Agency during that interview, the Agency is concerned that Iran may have obtained more advanced design information than the information identified in 2004 as having been provided to Libya by the nuclear supply network.