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Table

DICI

DESIGN INSTITUTE OF CHEMICAL INDUSTRY
Project DP/VIE/87/016

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Telefax: (84)42 32325

Date : January 10, 93
DICI Ref: TC 03/91
UNIDO Ref: VIE/86/034
Contract No : 91/034

FINAL COMMISSIONING REPORT

On 4-4-91, the "Technical and Commercial Offer for Lubricating Oil Blending Pilot Plant" for Project VIE/86/034 was submitted to Contract Section, UNIDO Vienna by the Design Institute of Chemical Industry (DICI). Upon the receipt of the letter dated 5/8/91 by Mr. M.Kohonen regarding DICI being selected by UNIDO to conduct the construction of the Lubricating Oil Blending Pilot Plant, DICI promptly initiated the work. The Project Team is composed of :

DO DUY PHI	Project Manager
LE QUANG MINH	Engineer
LE MANH HUNG	Engineer
TRAN XUAN HOP	Engineer
PHAM THI HOA	Engineer
BUI NGO QUANG	Engineer
NGUYEN XUAN SON	Engineer

Visits to Institute of Industrial Chemistry (IIC) were made to carry out inspection of the

premises, facilities and Plant Site. Several discussions with the Director of Project DP/VIE 86/034 and IIC Staff were held concerning with Project Objective of the Oil Blending Pilot Plant and other associated technical issues. A number of extensive discussions were made with Mr. Kaijdas, CTA of Project DP/VIE/86/034 and other UNIDO Experts to this Project on their missions.

By early October, 1991, the following documents have been completed:

- Flowsheet
- Overall lay-out drawings
- Overall Piping Layout and detailed piping layout
- Isometric of piping runs
- Specifications of equipments
- Detailed drawings of local equipments
- Instrumentation diagram
- Diagrams and data for electricity requirements
- Scheme of utility and sanitary
- Civil construction drawings

The above documents have been presented to NPD, CTA and other engineers of Project VIE/86/034. Their comments and suggestions have been put into account and the Design was modified in accordance with the Project requirements.

Briefing sessions were organized with Mr. G.Meijer-UNIDO Expert from 25-30/11/91 in which all the technical issues have been carefully discussed in detail between him and DICI Staff. The comments and suggestions of Mr. Meijer were highly appreciated and put into consideration (refer to Report by Mr. Meijer). However, there remained a few problems to be discussed with IIC.

By late February 1992, the Contract No 91/034 between UNIDO and DICI on

establishment of the Lubricating Oil Blending Pilot Plant was signed.

From 9-18/3/1992, a second working visit by Mr.Meijer was made to DICI and a meeting was conducted on 13/3/1992 between NPDs of DICI, IIC and UNIDO Experts (see Note of Meeting in the First Progress Report) in which all the issues and problems of the Oil Blending Pilot Plant were fully discussed in detail and decisions were made on each issue by the participants which constitutes a base for DICI's modification of the Design.

By April 1992, the modification of the design was completed. Hence we initiated manufacturing non-standard equipments and orders for local standard equipments were made in Vietnam. Regarding foreign purchase of equipments as recommended by Mr.Meijer, their specifications have been sent to Grace Instrumentation Services (GIS) Singapore. Vietnam National Complete Equipment and Technics Import-Export Corporation (TECHNOIMPORT) was authorized to sign a contract with GIS on equipment purchase. Under this Contract, the equipment procured from GIS in 20 feet containers are to be shipped to Haiphong Port in one delivery in September 1992. In fact, 2 deliveries were made by GIS. Our first receipt of equipments was on 30/10/92 and the second on 20/11/92. By the end of August 1992, all the equipments manufactured and purchased in Vietnam were brought to Site.

The construction was initiated on 1/7/92 and by middle August 1992, the pump station and tank yard were completed. Equipment installation and pipe erection commenced from 15/8/92.

All the equipments and tools experienced leak-tests and tests for each single item and electric insulation tests of the motors were conducted before placing in their positions.

On 5/12/1992, the installation of the Pilot Plant was finished. The following days, leak test and water loading test were conducted and all the shortcomings were treated (in

terms of leaks). Subsequently, the whole plant was tested with cleaning oil in order to eliminate water out of the equipments, tools and pipes to ensure the quality for oil blending and Performance test which has been carried out from 19/12/1992 and until January 23-92, all the required test-runs and trials were conducted with available respective reports and certificates of results attached. The Pilot Plant is currently carrying out oil blending under Project Programme DP/VIE 86/034.

phi

DO DUY PHI
Project Manager

Enclosures :

- 1- Precommissioning Report on equipment installation (Annex I)
- 2- Report on Performance Test (Annex II)
- 3- Certificate of results of trials and test-runs (Annex III)
- 4- List of technical documents of Oil Blending Pilot Plant (Annex IV)

Hanoi December 18, 92

PRE-COMMISSIONING REPORT ON EQUIPMENT INSTALLATION

Under Contract No UNIDG 91/034 - Project VIE/86/034
 Activity Code : J 13420

Project : Oil Blending Pilot Plant
 Institute of Industrial Chemistry (IIC)-DP/VIE/86/034

Location : IIC Cau Dien- Hanoi

The commissioning committee is composed of :

* IIC Representatives :

- Mr Do Huy Dinh/	Director
- Mr Nguyen Cong Huan/	Engineer
- Mr Nguyen Tien Hung	Engineer

* DICI Representatives :

- Mr Nguyen Khue/	Director
- Mr Do Duy Phi/	Engineer
- Mr Le Quang Minh/	Engineer
- Mr Nguyen Nam/	Engineer

After careful review of the Design Drawings and witness of the leak and pressure tests, pre-commissioning test (no load), the following comments have been concluded:

1- Amount of works:

- All the equipment, machinery of the Plant have been installed in the right positions according to the design.
- Operating Platforms have been installed in accordance with the design.

- All the pipes with their valves and accessories have been completed.
- All the instrumentations have been properly accomplished.
(Please see the attached List of Equipment of the Pilot Plant)

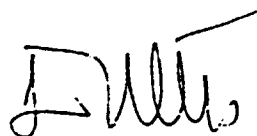
2- Technically:

- All the equipment and machinery operate sufficiently in a good accordance with the technical requirements
- The pipes work without leaks.
- After leak and pressure tests by water, the equipment have experienced flushing and clearing test by washing oil.

CONCLUSIONS:

All the equipment, pumps, fans, heaters, meters, pipes, operating platforms, electrical power with their accessories have been installed in accordance with the technical requirements under Contract No UNIDO 91/034. It was agreed by the two sides to put the Plant into Performance Test.

DIC Representative



Do Huy Dinh /Director

DICI Representative



Nguyen Khue/Director

LIST OF EQUIPMENT OF THE PILOT PLANT

Description	Quantity
1. Oil Blending Vessel 1.5 m ³	2
with - mixer 2HP, 100 - 1400 rot/min	2
- Heater 15 kw	2
2. Tank for drum filling 1.2 m ³	1
3. Tank for cleaned oil 3.5 m ³	2
4. Mixer vessel for solid additives	1
with mobil mixer 1HP, 100 - 1400 rot/min	1
5. Ventilation system	1
6. Steel structure	3
7. Base oil tank 25 m ³	3
8. Contaminated oil tank 25 m ³	1
9. Oil tank for cleaning 10 m ³	1
10. Finish product oil tank 10 m ³	4
11. Filter press 400 X 400	1
12. Lifting machine	1
13. Oil cleaning system for separate water	1
14. Centrifuge high speed	1
15. Fire - extinguisher	1
16. Gear pump	11
17. Flowmeter with combination trainer	4
air climinator	
18. Strainer for pump	10
19. Filter vessel	2
with P05 filter bags	60
P025 filter bags	60
20. Flexible hose	4
21. Electronic floor scale	2
22. Electricity system	
23. Instrumentation system	
24. Piles and valves system	
25. Heating store	1

SPARE PARTS

1- Five valves of DN50

2- Two heating elements (heating coil, thermocouple sensor and temperature control box)

(in the contract required only one)

3- One unit of pump (pump, motor, base plate)

(in the contract required only one pump).

4- One rotor of flowmeter

Manufacturer in Singapore doesn't recommend

Hanoi December 23, 1992

REPORT ON PERFORMANCE TEST

Under Contract No UNIDO 91/034 between UNIDO Vienna
and Design Institute of Chemical Industry (DICI) Hanoi

Project : Oil Blending Pilot Plant
Institute of Industrial Chemistry (IIC) VIE/86/034

Participated in the Performance Test-run are:

* IIC Representatives :

- Do Huy Dinh/	Director
- Dang Van Huu/	Engineer
- Nguyen Cong Huan/	Engineer
- Nguyen Trong Son/	Engineer

* DICI Representatives :

- Nguyen Khue/	Director
- Do Duy Phi/	Engineer
- Le Quang Minh/	Engineer
- Nguyen Nam	Engineer

I- Performance Test-run:

The following types of oils have been blended for the Test-run:

1/ Oil blending of low viscos. oil NO 551 with equipment 42521

- Material feeding	: Oil Grade I : 700 kg
	: Oil Grade II : 340 kg
- Heating	: Initial temperature 2200

- Chosen temperature 50cC
- Time to obtain 50cC 1h15
- Stirring speed : 350 rpm - 450 rpm
- Oil circulating : Pump P05B is used

Results :

- The temperature regulator operates sufficiently.
- The mixer works well with the speed changing properly; the circulating pump operates satisfactorily.
- Analysis results of the product: see the analysis result No 150 PGDM
 - + Density 0.86kg/l
 - + Viscosity at 50cC 19.8cst
 - + Ignition temperature (sealed) 168cC
 - + Water content trace
 - + Mechanical impurity 0.02 %

2/ Oil blending of high viscosity with equipment V05A:

- Material feeding : Oil Grade I 600 kg
Oil Grade II 300 kg
Additives 100kg
- Heating : Initial temperature 22cC
Blending temperature 65cC
Time to obtain 65cC 1h55
- Stirring speed : 350 rpm - 450 rpm
- Oil circulating : Pump P05B is used; pump P07 is used for pumping additives with satisfactory result.

Result:

- The oil blending is completed in 2h50
- The heater operates properly with the temperature regulator working normally.
- The mixer works well with speed changing sufficiently
- Analysis results : see the analysis result No 151 PGDM

+ Density at 20oC	0.890kg/l
+ Viscosity at 100oC	11.7 cst
+ Ignition temperature (open)	225oC
+ TAN	5.6 mgKOH/g
+ Viscosity index	102
+ Impurity content	0.02 %

II - Motor oil blending under project programme

Oil types : Diesel oil : SAE 30 CD; SAE 40 CD
 Engine oil : SAE 30 SE/CC; SAE 30 SF/CC; SAE 40 SF/CC

Materials : SN 500 ; SN 150; BS 150 based oils.
 Additives LZ 7574G
 SAP 2090
 SAP 3113A

+ Diesel oil : Equipment V055

a) SAE 30 API : CD

Material feeding : SN 500 : 930 kg
 SAP 2090 : 70 kg

Heating : Initial temperature : 22oC
 Blending temperature : 65oC
 Time to obtain 65oC : 1h50

Stirring speed : 350 rpm - 450 rpm

Oil circulating : pump P05B is used

Blending time : 2h50

Analysis results : see the analysis result No 152 PGDM

+ Density	0.890kg /l
+ Viscosity at 100oC	11.9 cst
+ Viscosity index	102
+ Ignition temperature (open)	230oC
+ TAN	9.8 mgKOH/g

b) SAE 40 API : Pⁿ

- Material feeding : SN 500 : 900 kg
BS 150 : 30 kg
SAP 2090 : 70 kg

Heating : Initial temperature 22oC
Blending temperature 65oC
Time to obtain 65oC 1h50

Stirring speed: 350rpm - 450 rpm
Oil circulating: pump P05B is used

Result :

- the heater, mixer, pumps work properly
- Analysis results : see the analysis result No 153 PGDM

+ Density at 20oC 0.895kg/l
+ Viscosity at 100oC 12.78 cst
+ Viscosity index 107
+ Ignition temperature (open) 233oC
+ Ph 9.8

+ Engine oil : with equipment V05A

a) SAE 30 API : SE/CC

- Material feeding : SN 500 : 950 kg
LZ 75740 : 50kg
- Heating : Initial temperature : 22oC
Blending temperature : 65oC
Time to obtain 65oC : 1h50
- Stirring speed : 350 rpm - 450rpm
- Oil circulating : pump P05A is used

- Results:

- All the equipment operate well
- Analysis results: see the analysis result No 154 PGDM
 - + Viscosity at 100oC 11.9 cst.
 - + Ignition temperature (open) 230oC
 - + Viscosity index 107
 - TBN 4.35

b) SAE 30 API: /SF/CC:

- Material feeding : SN500 : 940 kg
 LZ 75740: 60kg
- Heating : Initial temperature : 23oC
 Blending temperature: 65oC
 Time to obtain 65oC : 1h15
- Stirring speed : 350 rpm - 450 rpm
- Oil circulating : Pumo P05A is used
- Time blending : 2h50

Result:

- The heater, mixer, pump operate properly.
- Analysis results : see the analysis result No 155 PGDM
 - + Density at 20oC 0.890 kg/l
 - + Viscosity at 100oC 11.5 cst
 - + Viscosity index 107
 - + Ignition temperature (open) 230oC
 - + TBN 5.22mgKOH/g

c) SAE 40 API :SF/CC

- Material feeding : SN 500 : 770 kg
 BS 150 : 170 kg
 LZ 75740 : 60 kg
- Heating : - Initial temperature : 23oC

- Blending temperature: 65°C
- Time to obtain 65°C : 1h50
- Stirring speed : 350rpm - 450rpm
- Oil circulating : Pump P05A is used
- Blending time : 3h

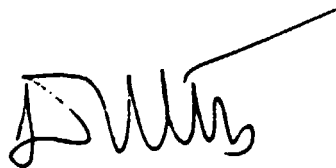
Result:

- All the equipment operate properly.
- Analysis results : see the analysis result No 156 PGDM
 - + Density : 0.898 kg/l
 - + Viscosity at 100°C : 14.5cst
 - + Viscosity index : 104
 - Ignition temperature (open) : 240 °C
 - + TEN : 5.22 mg KOH

GENERAL ASSESSMENT:

- Time for Performance Test-run : 21-23/12/1992
- The whole equipment system operates efficiently with capacity as design.
- The products made from this equipment system in various formulas and technical specifications of each oil all keep up with the quality requirements.

IIC Representative



Do Huy Dinh/Director

DICI Representative



Nguyen Khue/Director

Institute of Industrial Chemistry
No 150 PGDM

Date 23.12.1992

ANALYSIS RESULT

Type of Sample: Oil Blending of low viscosity 20 cst with
equipment V05B

From Oil Blending Pilot Plant DP/VIE/86/034

No	Test	Test Method	Result
1	Density at 20°C Kg/l	ASTMD-1298	0.86
2	Viscosity at 50°C cst	ASTMD-445	19.3
3	Ignition temperature °C (sealed)	ASTMD-93	1e8
4	Water content	ASTMD-1533	trace
5	Mechanical impurity %		0.02

Head of Analysis Department



Dr. Le cann Hoa

Institute of Industrial Chemistry :
No 151 PGDM

Date 23.12.1992

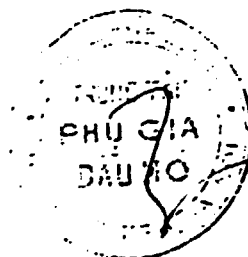
ANALYSIS RESULT

Type of Sample: Oil Blending of high viscosity with
equipment V05A

From Oil Blending Pilot Plant DP/VIE/86/034

No	Test	Test Method	Result
1	Density at 20°C Kg/l	ASTMD-1298	0.890
2	Viscosity at 100°C cst	ASTMD-445	11.7
3	Ignition temperature (open) °C	ASTMD-92	225
4	TBN mg KOH/g	ASTMD-2896	5.6
5	Viscosity Index	ASTMD-976	102
6	Impurity content %		0.02

Head of Analysis Department



Dr. Le canh Hoa

Institute of Industrial Chemistry
No 152 PGGM

Date 23.12.1992

ANALYSIS RESULT

Type of Sample: SAE 30 API : C3
From Oil Blending Pilot Plant DP/VIE/86/034

No	Test	Test Method	Result
1	Density at 20°C kg/l	ASTMD-1298	0.890
2	Viscosity at 100°C cst	ASTMD-445	11.8
3	Viscosity Index	ASTMD-976	107
4	Ignition temperature (open) °C	ASTMD-92	230
5	TGN mg KOH/g	ASTMD-2896	98
6	Metal Content		
	Zn %	AAS	0.114
	Fe %	AAS	5.8×10^{-2}
	Ca %	AAS	0.230
	Pb %	AAS	8.7×10^{-4}
	Mg %	AAS	0.059
	Ni %	AAS	1.1×10^{-2}

Head of Analysis Department



Le Canh Hoa
Dr. Le Canh Hoa

Institute of Industrial Chemistry
No 153 PGDM

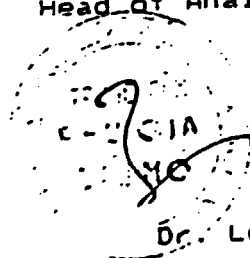
Date 27.12.1992

ANALYSIS RESULT

Type of Sample: SAE 40 API : CD
From Oil Blending Pilot Plant DP/VIE/86/034

No	Test	Test Method	Result
1	Density at 20°C Kg/l	ASTMD-1298	0.895
2	Viscosity at 100°C cst	ASTMD-445	12.78
3	Viscosity Index	ASTMD-976	107
4	Ignition temperature (open) °C	ASTMD-92	253
5	TEN mg KCH/d	ASTMD-2396	9.8
6	Metal Content		
	Zn %	AAS	0.114
	Fe %	AAS	5.3×10^{-4}
	Ca %	AAS	0.230
	Pb %	AAS	6.7×10^{-4}
	Mg %	AAS	0.059
	Ni %	AAS	1.1×10^{-3}

Head of Analysis Department


Dr. Le Canh Hoa

Institute of Industrial Chemistry
No 154 PGDM

Date 23.12.1992

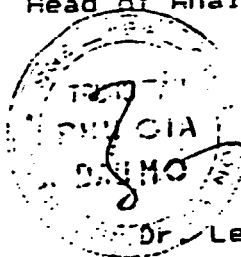
ANALYSIS RESULT

Type of Sample: SAE 30 API : SE/CC

From Oil Blending Pilot Plant DP/VIE/86/034

No	Test	Test Method	Result
1	Density at 20°C Kg/l	ASTMD-1298	0.889
2	Viscosity at 100°C cst	ASTMD-445	11.9
3	Ignition temperature (open) °C	ASTMD-92	230
4	Viscosity Index	ASTMD-976	107
5	TEN mg KCH/a	ASTMD-2896	4.35

Head of Analysis Department



Dr. Le cann Hoa

Institute of Industrial Chemistry
No 155 PGDM

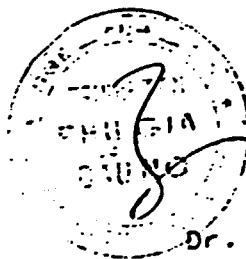
Date 23.12.1992

ANALYSIS RESULT

Type of Sample: SAE 30 API : SF/CC
From Oil Blending Pilot Plant DP/VIE/86/034

No	Test	Test Method	Result
1	Density at 20°C Kg/l	ASTMD-1298	0.890
2	Viscosity at 100°C cst	ASTMD-445	11.5
3	Viscosity Index	ASTMD-97a	107
4	Ignition temperature (open) °C	ASTMD-92	230
5	TBN mg KGH/g	ASTMD-2896	5.22

Head of Analysis Department



Dr. Le cann Hoa

Institute of Industrial Chemistry

No 156 PGDM

Date 23.12.1992

ANALYSIS RESULT

Type of Sample: SAE 40 API : SF/CC

From Oil Blending Pilot Plant DP/VIE/86/034

No	Test	Test Method	Result
1	Density at 20°C kg/l	ASTMD-1298	0.898
2	Viscosity at 100°C cst	ASTMD-445	14.5
3	Viscosity Index	ASTMD-976	104
4	Ignition temperature (open) °C	ASTMD-92	240
5	TBN mg KOH/g	ASTMD-2896	5.22

Head of Analysis Department



Dr. Le cann Hoa

OIL BLENDING PILOT PLANT
Project DP/VIE/86/034

Hanoi, December 23, 1992

CERTIFICATE OF RESULTS
OF TRIALS AND TEST-RUNS

Project : Oil Blending Pilot Plant
Location: Institute of Industrial Chemistry - Hanoi (IIC)

The project is based on the contract No 91/034 between the UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION - Vienna (UNIDO) and DESIGN INSTITUTE OF CHEMICAL INDUSTRY - Hanoi (DICI).

The commissioning Committee consists of:

+ UNIDO Representatives

- Mr. P. Hjorflund, Officer in charge
- Mr. Nguyen Khac Tiep, Program officer

+ IIC Representatives

- Mr. Do Huy Dinh, Director
- Mr. Vu Quoc Phon, Specialist
- Mr. Nguyen Cong Huan, Inspector

+ DICI Representatives

- Mr. Nguyen Khue, Director
- Mr. Do Duy Phi, Project Manager
- Mr. Dinh Nhu Toan, Head of Planning Department
- Mr. Le Quang Minh, Supervisor
- Mr. Nguyen Nam, Supervisor

Subjects of this Report are:

1/ The Oil Blending Pilot Plant has been designed and constructed to meet the demand for an Engine Lubricating Oil Pilot Plant of Capacity 1000 l per batch of the Project DP/VIE/86/034. The Pilot Plant is located within the IIC premises at Caudien - Hanoi.

2/ The Committee has studied following documents:

- 1- Precommissioning Report on equipment installation (Annex I)
- 2- Report on Performance Test (Annex II)
- 3- Certificate of results of trials and test-runs (Annex III)
- 4- List of technical documents of Oil Blending Pilot Plant (Annex IV)

The Conclusions of the Committee after a thorough inspection at the spot are as follows:

A/ The Design and Construction works of the Project are in accordance with the Contract No 91/034 between UNIDO and DICI and within the frame of Project DP/VIE/86/034.

B/ Actual timing of the Construction

- Start July 1, 1992
- Finish December 23, 1992

C/ Capacity of the Pilot Plant

- Design Capacity 1000 l per batch (4 hours each)
- Performance Capacity 1000 l per batch (4 hours each)

D/ The Pilot Plant has been designed with all needed Safety Respects and Environment Protection Measures.

E/ All Equipment is manufactured and installed at high quality and their performance is satisfactory and stable.

F/ Some small changes have been made in comparison with the original Design, but these have no effect on neither the capacity nor the technology of the Plant.

CONCLUSIONS:

The Construction work of the Oil Blending Pilot Plant is in accordance with the Design with all generally accepted Standards and Codes.

The DICI shall warrant the normal Operation of Equipment supplied by them within a period of 12 months from December 23, 1992. The DICI in cooperation with the IIC will solve all problems concerning

possible Trouble-Shooting.

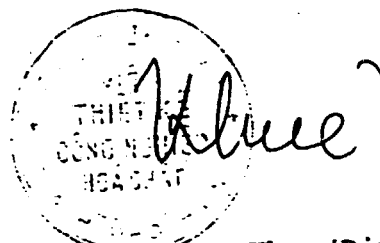
The Commissioning Committee takes the pleasure to authorize the final acceptance of the Pilot Plant and so IIC can use this facility for its work under the .Project DP/VIE/86/034 from December 23, 1992.

Representative of IIC



Do Huy Dinh/Director

Representative of DICI



Nguyen Khue/Director

UNIDO Representative

A handwritten signature in black ink, appearing to read "P. Hjordlund".

P.Hjordlund/Officer in Charge

DICI

DESIGN INSTITUTE OF CHEMICAL INDUSTRY
Project DP/VIE/87/016

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Telefax: (84)42 32325

ANNEX IV

11/12/92

LIST OF TECHNICAL DOCUMENTS OF OIL BLENDING PILOT
PLANT DP/VIE/86/034 GIVEN TO IIC

1. Flowsheet
2. Overall layout drawings
3. Overall piping layout and detailed piping layout
4. Isometric of piping runs
5. Detailed drawings of local equipment
6. Design of electricity system and instrumentation
7. Civil constructions drawing
8. Operating manuals of equipments and the Pilot Plant
9. List of equipments

Receiver



NGUYEN CONG HUAN
Engineer of IIC