

インドネシア共和国
スマトラ化学工業研修開発センター事業
エバリュエーションチーム
報告書

1988年12月

国際協力事業団

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序 文

化学工業分野の中堅技術者の養成を目的とする本プロジェクトは、1986年8月にエバリュエーション調査を行い、その結果技術移転が未完了なことから協力期間を1989年5月まで2年半延長した。

今般、当事業団は延長協力期限を6ヶ月後に控え、これまでの協力実績を評価するとともに、「イ」側とプロジェクト終結に係る必要な協議を行うことを目的として1988年11月10日より11月19日までエバリュエーション調査団を派遣した。

本報告書は、その調査結果を取りまとめたものである。

ここに、今般の調査に対して御協力を頂いた在インドネシア日本国大使館をはじめとする関係各位に対し心より謝意を表するものである。

1988年12月

国際協力事業団
理事 古 閑 俊 彦



ジョイントエバリュエーションレポートの署名
(ジャカルタ：PUSBINLATのオフィスにて)



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1. プロジェクトの概要

1-1 概 要

〈インドネシア共和国〉

スマトラ化学工業研修開発センター

(Chemical Industry Education and Development Center)

1. R / D等署名日 : 昭和56年(1981)11月19日
2. 協 力 期 間 : (R / D) 56.11.19 ~ 61.11.18 (5 年間)
(延長R / D) 61.11.19 ~ 64. 5.18 (2.5 年間)
3. 所 在 地 : 北スマトラ州, メダン市 (Medan, North Sumatra)
4. 先方関係機関 : 工業省 工業専門技術訓練開発センター (PUSBINLAT)
Industrial Skill & Vocational Traininh Development Center
5. 我が方協力機関 : 通産省, [工技院化技研, コスモ・インターナショナル(株), 財団法人化学
品検査協会, コスモ石油(株), 協和発酵(株)]
6. 目 的 ・ 内 容 : 化学工業研修開発センターを設立し, 化学関連工業における,
 - 1) 中堅技術者の養成 (アカデミー・コース)
 - 2) 企業の技術者等に対する技術向上研修 (短期コース)
 - 3) 技術指導・情報サービスを行い, 化学工業の発展に資するとともに, スマトラ地域産業の発展,
雇用の増大, 民生の安定に寄与する。

1-2 経 緯

- (1) インドネシア政府は第3次開発5カ年計画 (1979 ~ 1983) 及び第4次開発5カ年計画 (1984 ~ 1988) において, 化学工業を重点的の開発部門のひとつとしており, その育成・強化に努めている。とりわけ, スマトラ島は天然資源が豊富で関連産業の発展が期待されているが, 化学工業分野の中堅技術者が不足している。そこで同国政府は化学工業分野における中堅技術者の育成を目的とした本センター設立を計画, 1979年3月, 我が国に協力要請越した。
- (2) これを受けて我が国は, 1979年9月事前調査団を派遣し, イ側関係者とプロジェクトの背景, 協力の妥当性について協議を行った。
- (3) 事前調査の結果を受けて, 我が国は本センター設立の為, 無償資金協力 (17.3 億円) を行うことを決定し, 1981年6月20日 E / N を署名交換した。
- (4) 一方, 1981年11月実施協議調査団が派遣され, 11月19日 R / D が署名・交換され, 5年間の技術協力が開始された。

(5) 1986年8月に派遣したエバリュエーションチームは、以下を骨子とするエバレポートを「イ」側と共同で作成し署名・交換した。

1) 現R / D期間中に理論面からの技術移転は、ほぼ終了する。

2) しかしながら、C / Pに対する実習面からの技術移転は、

① 無償援助による施設の建設に1年半を要したこと。

② 「イ」側のC / Pの配置が遅れたこと。

③ 日本側専門家は、教材の作成等、理論面の指導を中心に、技術移転を実施してきたこと。

等により、技術移転のスケジュールは2年半程度遅れているので、技術協力の期間を2年半延長する必要がある。

(6) これを受けて、1986年10月に2年半の延長R / Dを署名交換し、協力期間を1989年5月18日までとした。

2. エバリュエーション調査団の派遣

2-1 調査団派遣の経緯と目的

1986年8月に派遣したエバリュエーションチームは、「イ」側と共同評価を行い、1)無償による建屋の建設の遅れ、2)C/P配置の遅れ、3)理論面に比し、実技面の指導の遅れ等により技術移転のスケジュールが当初目標に比し2年半遅れていることから、2年半協力期間を延長する必要があるとの結論に至った。その後、1986年10月に延長R/Dを署名交換し、1989年5月までの延長を決定した。延長期間における協力目標は、アカデミーコース、短期コース、技術サービスにおけるトレーニング方法の改良により当初計画に基づいた技術移転の達成を図ること、及び「イ」側によるセンター運営の自立としており、今回の調査では同目標達成度について評価するとともに、プロジェクトの「イ」側への引き渡しに関し協議することを目的とした。

2-2 調査団の構成

坂田 武徳	総括	JICA 鉱工業開発協力部 調査役
立沢 清	技術協力計画	通産省基盤産業局化学製品課 課長補佐
石川 武	業務調整	JICA 鉱工業開発技術課

2-3 調査日程表

月日	曜日	日 程
10/10	木	東京 → ジャカルタ
11	金	大使館, JICA事務所, PUSBINLAT表敬 → メダンへ
12	土	総領事館, 北スマトラ州工業局, センター表敬, センター視察
13	日	専門家打合せ, センター所長と協議
14	月	所長と協議, センタースタッフとの打合せ
15	火	総領事館報告 → ジャカルタへ
16	水	合同エバミューティング
17	木	エバレポート作成
18	金	エバレポート署名, 大使館, JICA事務所報告
19	土	帰国

2-4 主要面談者

Mr. Abubakar Soetikno	PUSBINLAT 所長
Mr. Basar Hassan	PUSBINLAT
Mr. A. S. Siagian	工業省国際協力局長
Mr. D. Pratiknyo	センター所長
Mr. Adat Sembiring	北スマトラ州工業局課長

3. 要 約

- (1) 本調査団は、アバカル PUSBINLAT 所長、プラクティニョスマトラ化学工業研修開発センター所長を始めとする「イ」側関係者と本プロジェクトのエバリュエーションに関する協議を行い、11月16日 PUSBINLAT 本部において、「日」・「イ」ジョイントエバリュエーションミーティングを開催し、両国関係者が合同で作成したエバリュエーションレポートをほぼ原案通り承認し、18日アバカル PUSBINLAT 所長及び坂田団長との間で署名を行った。
- (2) 同委員会で承認されたレポートの骨子は、下記の通りである。
 - ① R/D に記載された活動はほぼ技術移転が終了し、プロジェクトは、final stage に達した。
よって、双方とも 89 年 5 月 18 日にプロジェクトを終了することで合意した。
 - ② プロジェクト終了後は、イ側によるセンターの自主運営、機材のメンテナンスを十分に行うことが望ましい。
 - ③ 本センターは、インドネシア化学工業分野における最も優れた教育機関であり、今後はこの施設を十分に活用し、より高いレベルの技術者を創出する教育を行うことが望ましい。

4. プロジェクトの実績

4-1 プロジェクトの投入実績

- ① 専門家派遣実績 (ジョイントエバレポート Annex VII 参照)
- ② 研修員受入れ実績 (" Annex VIII 参照)
- ③ 機材供与実績 (" Annex VI 参照)

4-2 プロジェクトの活動実績

① アカデミーコース (3年制)

1983年より、第一期制の入学が開始された。一学年の定員は約100名で、化学コース及び機械コースに分けられる。

1987年に第一期生80人が卒業し、その内71%が就職し、1988年には第二期生88名が卒業し、その内30%が既に就職している。

1988年9月からは、第6期生が入学し、アカデミーコースは「イ」側O/Pにより順調に運営されている。

② 短期コース

活動実績は、エバレポート Annex XI 参照。

民間企業の新入職員トレーニングコースとして、評価が高い。

延、239名が受講した。

③ 技術サービス

活動実績は、エバレポート Annex XII を参照。

11の組織(北スマトラ大学を含む)に対し、各種コンサルテーションを実施した。

5. プロジェクトの評価

5-1 「イ」側との協議

(1) 実績の確認

① 建屋と施設

1981年6月20日E/Nが署名交換され、無償資金協力により、管理棟、2実験棟、研修棟、講堂、ワークショップが建設され、1983年2月にインドネシア側に引き渡された。この他に協力期間内に日本側の財政支援により、水処理施設、2ヶ所の廃水処理施設、非常用自家発電機を設置した。

② スタッフの配置

当初、プロジェクトが開始された時点では、スタッフの数は十分でなかったが、その後改善され現在は常勤スタッフが104名、非常勤スタッフが24名と十分に配置されている。更に、「イ」側は本センターの機能拡大の為、スタッフ陣の充実を行っていく旨の説明があった。また、スタッフの他のインドネシア国内化学工業関連施設での研修も行われ、その質の向上も積極的に図られている。

③ 機材供与

総額CIF 270百万円の機材が供与された。今後は、これら機材のメンテナンス・システムの改善に、「イ」側が最大限の努力を払うことが必要である。

④ 専門家の派遣

第1次派遣から第3次派遣まで、長期専門家を総計23名派遣した。

⑤ カウンターパートの受入れ

計23名のカウンターパートを受入れた。

⑥ 予算措置

1985年以降、石油価格の下落に伴い、インドネシア政府の財政事情が悪化した中で、本センターは大巾な予算削減が行われることなく、經常予算及び開発予算が十分に確保されてきた。

本センター及びPUSBINLAT、工業省の予算獲得への努力は高く評価されるものである。

(2) 技術移転の達成度

① アカデミーコース

各科目毎のC/Pへの技術移転達成度はジョイントエバレポートAnnex IIIに示すとおりである。(尚、Annex III及びAnnex IIにおけるA~Dのランク付のルールについて、添付資料⑤に示した。)

Annex IIIの中で、一部科目にランクC以下のモジュールが見られるが、これらは、1989

年5月の協力期限までに、技術移転達成ラインのA～B' 達する見込みである。

以上の評価から、本コース14科目のほぼ全てが技術移転達成ラインに達している。

② 短期コース

エバレポート Annex X に示すとおり、8コースが開催された。

現在、短期コースの準備及び実施については、「I」側スタッフのみで行われており、今後これらのコースが継続的に実施されてゆくと考えられる。

③ 技術サービス

インドネシア国内の様々な化学工業関連組織に対して技術サービスを実施して来た。現在、本センターの開発部が技術サービスを担当しており、電子顕微鏡、ガスクロマトグラフィ等の新鋭機器を「I」側スタッフが独力で活用している。

現段階で、技術サービスシステムは確立されており、今後とも継続していくことが重要である。

5-2 その他

(1) 北スマトラ州知事表彰(添付資料⑥)

1987年8月、インドネシア共和国北スマトラ州は、1987年より北スマトラ州における工業振興発展に寄与してきた法人に対し、工業発展功労者表彰を実施することとし、8月12日、同州知事よりJICAインドネシア事務所に対し、スマトラ化学工業研修開発センターに対する長年に亘る協力を評価し表彰状並びに楯を贈呈された。

なお、同日の表彰対象者は16法人であり、JICA以外の残る15法人はメダンを中心に同州内に本社を置く民間企業であった。

(2) アカデミーコース卒業生の就職状況

エバレポート Annex X に示すとおり、本センターの卒業生の就職率は、他の教育機関と比較しても相当高いものとなっている。

これは、本センターでの教育により、理論と実技のバランスの取れた優秀な人材を多く輩出していることが、北スマトラ州地域の民間企業より高く評価されている為と考えられる。

6. 協力終了後の課題

(1) センターの運営・管理について

今回のエバリュエーション協議の場で、再三インドネシア側より日本側の協力終了後、機材・施設の維持管理に対する懸念が表明された。これに対し、日本側より残り6ヶ月の協力期間内に機材・施設のメンテナンス台帳、修理部品調達先リスト作成等に重点を置き、カウンターパートのメンテナンス技術確立に努める旨回答した。

本センターは、化学工業の教育機関という性格から、機材・施設が非常に多種類にわたっており、その維持・管理には、日・伊双方の最大限の努力が必要となる。

(2) 今後の日本側技術協力の可能性について

「イ」側より、協議の席上、Phase II プロジェクト、フォローアップ協力等について、口頭にて協力要請があったが、この件については、エバリュエーション調査団の協議対象外であり、何ら約束はできないことを説明した上で、今後考えられるJICAの技術協力のスキームを下記のとおり説明した。

- ① 個別専門家派遣によるフォローアップ協力
- ② アフターケアの実施
- ③ 2-3年間の自主運営後、Phase II プロジェクト協力

添 付 資 料

- ① ジョイントエバリュエーションレポート (1988年11月)
- ② ジョイントエバリュエーションレポート (1986年8月)
- ③ 延長R/D (1986年10月)
- ④ オリジナルR/D (1981年11月)
- ⑤ 技術移転状況表 (アカデミーコース)
- ⑥ 北スマトラ州知事からの表彰状

① ジョイントエバリュエーションレポート

(1988 年 11 月)

JOINT EVALUATION REPORT

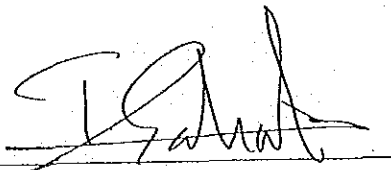
ON THE TECHNICAL COOPERATION
PROJECT FOR THE CHEMICAL INDUSTRY
TRAINING AND DEVELOPMENT CENTER
(DTA - 182)

NOVEMBER 1988

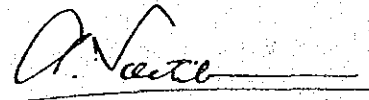
JAKARTA INDONESIA

MUTUALLY ATTESTED AND SUBMITTED
TO ALL CONCERNED

Jakarta, Indonesia
November 18, 1988



Takeho Sakata
Leader
Japanese Evaluation Team
Japan International
Cooperation Agency
JAPAN



Ir. Abubakar Soetikno
Chief
Skill and Vocational
Training and Development
Center
Ministry of Industry
INDONESIA

D a t e : 16 November 1988

Place : Skill and Vocational Training Development Centre
Ministry of Industry, Jakarta

A T T E N D A N T S :

INDONESIAN PANEL

PUSBINLAT

Ir. Abubakar Soetikno : Chief of Centre for Skill and Vocational Training Development
Drs. Basar Hassan : Centre for Skill and Vocational Training Development
Drs. Imasri Sanir : Centre for Skill and Vocational Training Development
Drs. H u d a n : Centre for Skill and Vocational Training Development
Benny Winandry, SMI : Centre for Skill and Vocational Training Development
Drs. Parmanto : Centre for Skill and Vocational Training Development
Endang Kusna, B.Sc. : Centre for Skill and Vocational Training Development
Drs. Armand : Centre for Skill and Vocational Training Development
Drs. Nadi : Centre for Skill and Vocational Training Development
M. Nurdin : Centre for Skill and Vocational Training Development

B A P P E N A S

Ir. Dida Haryadi S. : National Development Planning Board

MINISTRY OF INDUSTRY

1. Drs. A.S. Siagian : Chief Bureau of International Cooperation
2. Hidayat Soewandi, M.Sc. : Bureau of International Cooperation
3. Drs. Kusyanto : Bureau of Planning
4. Drs. Zulkarnaen : Bureau of Finance
5. Drs. Daulat Tjitroprawiro : Directorate of Program Development, Directorate General of Basic Chemical Industry

P U S D I K L A T

Drs. Widjanarko : Centre for Official Training and Development Ministry of Industry

THE CHEMICAL INDUSTRY TRAINING AND DEVELOPMENT CENTER

- Ir. D. Pratiknyo : Chief of Chemical Industry Training and Development Center - Medan
- Drs. Adat Sembiring : Chief of Industrial Skill and Vocational Education Project North Sumatera-Medan.

JAPANESE PANEL

JAPANESE EVALUATION TEAM

Mr. Takeho Sakata : Leader of Japanese Evaluation Team
Mr. Kiyoshi Tachizawa : Member of Japanese Evaluation Team
Mr. Takeshi Ishikawa : Member of Japanese Evaluation Team

JAPANESE EMBASSY

Mr. Takashi Honda : Second Secretary

JICA INDONESIA OFFICE

Mr. Hideki Tomobe : Assistant Resident Representative

JICA EXPERT TEAM

Mr. Hiroyuki Kurumiya : Chief Advisor
Mr. Katsuo Shimizu : Coordinator

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Annex X : The list of Factory who received graduates from the Center	A-49
Annex XI : The list of Short Courses which had already been conducted until October 1988.	A-50
Annex XII : The consultation activities of Development division.	A-51

I INTRODUCTION

1. Objectives

The Japanese Evaluation Team organized by Japan International Cooperation Agency (JICA), headed by Mr. Takeho Sakata visited Indonesia from November 10 to 18, 1988 in order to jointly evaluate with the main staffs of Indonesia Japan - Indonesia technical cooperation project on the Chemical Industry Training and Development Center Project which has been carried out for seven (7) years on the basis of the renewed Record of Discussion signed on November 18, 1986 between Japanese evaluation team and the authorities concerned of the Government of the Republic of Indonesia.

Both parties discussed and studied with Indonesian counterpart personnel concerned and the Japanese experts on the aspects about the performance and achievement of the activities on the Chemical Industry Training and Development Center Project.

Through careful studies and discussions both parties summarized their findings and observations as described in the following chapters and both parties agree to conclude the project on May 18, 1989 in accordance with the renewed Record of Discussion.

By the way, after commemoration of the technical cooperation Indonesian side also made effort to construct buildings such as dormitory, canteen, etc. While Japanese side furnished the supply of many equipments such as electron microscope, mini-plant, etc.

In addition, in the course of operation, the center was approved in December 1986 as an official educational organization which can issue Diploma III. Also, it should be added that the center gained award from Governor of North Sumatera in contribution to the development of industry in Indonesia.

Finally, taking every facts into consideration, we, both Indonesia and Japanese side agree with each other as to the conclusion mentioned hereafter.

2. Brief Background of the project

The Government of Indonesia has been enthusiastically fostering chemical industry which is one of the main targets to be achieved in the third and fourth 5-year Development Plans (1979 - 1983, 1984-1988). Especially in the Sumatera Island enriched in natural resources i.e. petroleum, natural gas, vegetable oil and many others, a demand for middle class skilled workers in the various fields of chemical industry has been increasing.

In March 1979, the Republic of Indonesia requested the Government of Japan to provide a grant aid to establish the Chemical Industry Training and Development Center, which aimed at fostering middle class skilled workers in the field of chemical industry and thus contributing to the development of regional industries concerned in Sumatera.

Upon request, the Government of Japan through JICA dispatched the preliminary survey team to Indonesia from September 6 to 22, 1979.

The preliminary survey team conducted surveys, studies and discussions on the details of the project with the authorities concerned of the Government of Indonesia. On the basis of the report and recommendations of the preliminary survey team, the Government of Japan decided to provide a grant aid to establish the Chemical Industry Training and Development center.

On June 20, 1981 the Exchange of Note (E/N) was concluded between two Governments and the center was constructed about 4 km south of the heart of Medan city with granted sum of ¥ 1,730,000,000. The center consists of an administrative ward, educational wards (class rooms and labos), research/development and technical service wards a

machine workshop, an utility ward, a mini-plant, etc.

Meanwhile, the Japanese Implementation Survey Team organized by JICA Indonesia from November 5 to 18, 1981 for the purpose of working out the details of the Technical Cooperation Program for the Project on the Chemical Industry Training and Development Center.

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II. METHODOLOGY OF EVALUATION

1. In order to evaluate past performance and achievement both qualitatively and quantitatively, following items are applied as reference.

- (1) The renewed Record of Discussion and the former Record of Discussion.
- (2) The official request made by the Government of Indonesia with respect to expert services, training counterpart personnel in Japan and provision of the equipment through A-1, A-2.3 and A-4 form, respectively.
- (3) Technical cooperation program shown in Annex I.
- (4) Result of discussion with Indonesia counterpart in every field respect to the past performance of each side (Refer to the Annex II. III).

2. For the purpose of evaluation both parties discussed various aspects of the project and observed the buildings, machinery, equipment, facilities and utilities if they are available for the project.

III. RESULT OF EVALUATION

1. Buildings and Facilities

Upon the signing the Exchange of Note on June 20, 1981 the construction of the Chemical Industry Training and Development Center was started. The Center consisting of one administration building, two laboratory and development buildings, one training affair building, one lecture hall and one workshop was completed and handed over to the Government of Indonesia in February, 1983.

In addition, during the cooperation period several facilities such as one water treatment facility, two waste watertreatment facilities for laboratory and one set of electrical generator for emergency use were added to the Center.

Meanwhile the staff houses, garage, shelter for the mini-plant were constructed by the Indonesian Government.

2. Staffing

- (1). At the time when the building was handed over from Japanese side to Indonesian side, the number of staffs is not enough to operate the Center. However, the situation has been improved and at present the Center has the 104 permanent staffs and 24 temporary staffs.
- (2). The list of counterpart personnel as of November, 1988 is stated in Annex IV V.
- (3). The Indonesia side fully recognized the importance of strengthening the number and capability of the staffs and in spite of the limited budget, the effort was made by Indonesian side to recruit the new staffs after the joint meeting held in July 1988.
- (4). The full time chief of the Center was designated in March 1988 and the Center has been managed considerably well than before.
- (5). It is desirable that each counterpart personnel belongs to some specialized section for effective technology

transfer.

- (6). The training in other facilities in Indonesia was thought to be useful and in 1988 three persons received training at ethanol plant in Sulusuban Lampung thanks to the cooperation of BPPT.

3. EQUIPMENT

Between November 1981 and November 1988, machinery, equipment and chemical consumables being worth about CIF ¥ 270 million have been donated by the Japanese Government (refer to annex VI) and until the end of the project equipment being worth CIF ¥ 30 million are expected to be donated by the Government of Japan.

The machinery and equipment so far provided have been installed and put into practical use for operation of the Center under the guidance of JICA Experts for local counterpart personnel.

(REMARKS)

- (1) Respecting the maintenance of the machinery and equipment, the system should be improved and Indonesian side also recognizes the importance of keeping everything in good order.
- (2) In spite of shortage of the budget, Indonesian side tried to take equipment sent from Japan at the soonest possible time.

4. JICA EXPERT

For completing the project, JICA had already dispatched 23 long term experts and 11 short term experts for the project.

In addition, for inspecting project six (6) teams already visited the project from JICA (Refer to Annex VII).

5. TRAINING OF COUNTERPART PERSONNEL IN JAPAN

A total of 23 counterpart personnels including the leading staffs of the Center have already been dispatched Japan for training purpose (Refer to Annex VIII).

By the effort of JICA every trainee who studied in Japan was satisfied with the training in Japan and they make the best of their knowledge gained in Japan.

6. BUDGET

The cost required for operating PTKI is responsible for Indonesian side and is shown in Annex IX.

For the fiscal years 1988/89, Indonesia side already obtained the national budget which is divided into two, namely, routine and project budget.

(REMARKS)

In spite of the limitation of the budget of the Government of Indonesia, the effort made by the Indonesia side for obtaining budget should be highly appreciated. Further effort will be necessary to obtain the budget for the Center, after the termination of this Project.

7. PROJECT ACCOMPLISHMENT

(1) Academic course.

The academic course consists of two fields of study, that is, chemical and mechanical engineering course, in which about 350 students are studying. And after graduation from the Center, they are qualified to receive Diploma III after passing State Examination.

On August 1988, around 120 number of the 6th new students were accepted.

On March 1987, 80 students are graduated, most of them are now working in many factories such as PT. Inti Indo Rayon Utama, PT. Pupuk Iskandar Muda, PT. Arun LNG etc. The list of factories which receive those graduates is attached in Annex X.

The degree of technology transfer on all practical and experimental subjects in Academic course that could be achieved by the end of the cooperation period, is summarized in Annex III.

At present, several sub-modules still remain, but they will be finished within the terms of each experts' assignments.

(2) Short Term Course

With reference to the note of Annex A of the renewed R/D, the actual plan of the short term courses was made in the annual work plan signed on February 29, 1984. The Operation Technology course and the Mechanical Maintenance course were conducted in April and in July, 1985 respectively. After these courses, the Operation Technology course (OT Course) with using mini-plant, was conducted so often (refer to Annex XI). Not only OT course but also Electrical and Instrumentation course (for P.T. ARUN), Operation and Chemical Engineering course (for Mobil Oil) were conducted in 1988. At present Mechanical Maintenance Course is planned to be conducted in February 1989.

At present, preparation and implementation of short courses can be carried out by Indonesian counterpart personnel themselves. These courses, as mentioned above, had been conducted successfully and some kinds of short courses could be carried out by Indonesian counterpart

personnel.

(3) Technical Services.

The expert team has supported the activities of Technical services, such as development of product, consultation for many factories, and cooperation program with Univeristy of North Sumatera (refer to Annex XII). The Seminars on Industrial Waste-Water Treatment and on Water Treatment were conducted on February 21, 1985, and March 28, 1985, respectively with technical assistance of the Japanese experts. In November 1988, same kind of seminar is conducted by Indonesian Counterpart personnel and Japanese expert.

Technical service activities are conducted by Development division of the Center. Many kinds of new equipment for these activities were provided, such as electron microscope, gas chromatograph, atomic absorption spectrometer and so on. Almost these equipment now are operated by counterpart personnel.

The technical service system, which was stated in Record of Discussions, has already been established at the Center.

And it is important for Indonesian side to keep on conducting the technical service.

IV. CONCLUSION AND RECOMMENDATION

As a result of the above evaluation, it was apparent that most of the activities programmed in the Record of Discussion and other pertinent papers are successfully implemented and the current situation of the project are in the final stage to conclude this project.

The technical cooperation started on November 19, 1981. However, because the construction of the Center was completed in February 1983, there was no activity at the beginning of the cooperation period. The actual technology transfer activities started around April or May 1983 when the counterpart personnel had been appointed to the center.

After extension of the project period which was decided in November 1986, technology transfer activities were much more accelerated.

The objectives of the technical cooperation during the extended period is to improve the training method and thus achieve self-reliance by the Indonesians through activity of the Center.

In accordance with the above observations, it is thought that both parties agree to terminate the project on 18th of May, 1989.

After the termination of this project, it is expected by the Government of Japan that Indonesian Government will manage the Center in good condition and keep good maintenance for the facilities. Especially mini-plant, various equipment need careful maintenance action.

This Center is best equipped education facility in chemical industry in Indonesia and it is hoped that higher level engineering education can be carried out by using this facilities to provide higher educated engineers to Chemical Industry Field.

It is important that the Center utilize this machinery and equipment fully to this purpose.

JH

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INITIATIVE IMPLEMENTATION PROGRAMME

ITEM	YEAR																		
	1987			1988			1989			1990									
	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5
I. General Schedule	1st Grade			2nd Grade			3rd Grade			1st Grade			2nd Grade			3rd Grade			
II. Indonesian Side																			
1. To secure running fund																			
2. To secure counterpart personnel																			
3. To secure prompt custom clearance																			
4. To secure timely presentation of A visas																			
III. Japanese Side																			
1. Survey team																			
2. Japanese expert																			
1) Long term																			
Lembar																			
Chemical engineering (A)																			
Chemical engineering (B)																			
Industrial chemistry (organic)																			
Industrial chemistry (inorganic)																			
Mechanical engineering (A)																			
Mechanical engineering (B)																			
Instrument engineering																			
Electrical engineering																			
Coordination																			
2) Short term																			
3) Counterpart training in Japan																			
4) Provision of machinery																			

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TECHNICAL COOPERATION PROGRAMS

YEAR MONTH	1987												1988												1989											
	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5					
I. Target	<ul style="list-style-type: none"> Improvement of training method and thus achieving self-reliance by Indonesians 																																			
II. Activity																																				
1. Academy course	<ul style="list-style-type: none"> Improvement of curricurums Improvement of training techniques Acquirement of the practical knowledge and techniques of chemical plant operation and maintenance 																																			
2. Short-term Course	<ul style="list-style-type: none"> Operation technology course and repair maintenance course for engineers and others. 																																			
3. Technical Service	<ul style="list-style-type: none"> Preparation of technical service system, namely the seminar, technical consultation, and execution of laboratory tests mainly in the field of water treatment and industrial waste-water treatment. 																																			

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Minute of the meeting for evaluation
of technology transfer of Physics

Date : 29 Oct, 1988
Place : Meeting room in P.T.K.I. Medan
Attendants : P.T.K.I. Ir. D. Pratikno
Ir. Sujarno Suwan
Ir. Effendi Jantar Effendi
Dra. Roswita Sitorus

J.I.C.A. Mr. H. Kurumiya
Mr. H. Takahashi
Mr. T. Iwamoto
Mr. K. Shimizu

Basically, technology transfer had been finished for almost items of this module in original curriculums.

However, Indonesian Staff wish to provide several more items for this module, as some basic items of physics are necessary. For Japanese side, there is some limitations according to R/D *raised* and original curriculums, but Japanese expert's group will try to assist for providing new modules.

1. Elasticity (Young modulus, Torsion Modulus)
 2. Friction
 3. Kinetic energy
 4. Sound (Vibration frequency)
 5. Viscosity (Stoke's Law)
 6. Spectrum
 7. Refraction
- etc.

For these items, we have to device equipment by assembling some mechanical parts with local purchases.

Module : Pysics

Sub modules	I	II	III	IV	V
1 Measurement of Gravitational Acceleration Speed	5	5	4	3	A
2 Hook's Law and Vibration of Spring	5	5	4	3	A
3 Measurement of Specific Gravity of Solids	5	5	4	3	A
4 Measurement of Specific Heat of Solids	5	5	4	3	A
5 Measurement of Vibration Frequency of a Tuning Fork	5	5	4	3	A
6 Measurement of Focal Distance of Lenses	5	5	4	3	A
7 Measurement of Electromotive Force and Internal Resistance of Batteries	5	5	4	3	A
8 Measurement of Electric Resistance of Metals	5	5	4	3	A
9 Measurement of Heat Equivalent by Electric Current	5	5	4	3	A
10 Discrimination of Types and Electrodes of Transisters (Included in Basic Electrical Engineering)	-	-	-	-	-

Minute of the meeting for evaluation
of technology transfer of Material Test
& Work Shop

Date : 26 Oct, 1988
Place : Meeting room in F.T.K.I. Medan
Attendants : F.T.K.I. Ir.D.Fratiknyo
Ir.Sujarno Suwandi
Ir.M.A.Simajuntak
Mr.Warman B.Sc.
Ir.Sabar sitomorang
Mr. Bachtial Effendi

J.I.C.A. Mr.H.Kurumiya
Mr.M. Miyamoto
Mr.T.wamoto

1. Result of Evaluation

According to the evaluation sheet of technology transfer, all items (sub-modules) of Material Test were finished, the curriculums concerned to Material Test and Work Shop practice were complicated (the curriculum means mentioned in R.D.). It is necessary to readjusting for new curriculums.

Work Shop had already finished at the time Mr.Ohno back to Japan. At the welding training, training space is small, so fume of welding retained in training place. This fume is not good for health, it is desirable to set some ventilation system should be provided.

2. Equipment supply

Almost necessary equipments were supplied and operation is now no problem by staffs.

Module : Material Testing 1
Metallurgy and Industrial Minerals

Sub modules	I	II	III	IV	V
1 Measuring of Transformation points by Thermal Analysis of Metals and Drawing of quilibrium Diagrams	5	5	4	2	A'
2 Observation of Microstructure of Metals	5	5	4	2	A'
3 Heat Treatment Exercise					
i Quenching, Tempering and Annealing	5	5	4	2	A'
ii Observations of Strength Changes and Structure Changes after Heat Treatment	5	5	4	2	A'
iii Drawing Transformation Curves	5	5	4	2	A'
4 Experiments of Corrosion					
i Measuring of Metal Corrosion by Electro-chemical Methods - Measuring Electrtrode Potential	5	5	4	2	A'
ii Measuring of Metal Corrosion by Electro-chemical Methods - Measuring of Polarization curves	5	5	4	2	A'
iii Measuring of Weight Loss	5	5	4	2	A'
Vi Measuring of Generated Gas Volume	5	5	4	2	A'
V Oxidation test of Thirmobalance	5	5	4	2	A'

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Module : Material Testing 2
Practices of Machine Works

Sub modules	I	II	III	IV	V
1 Strength Measurements of Metallic Materials	5	5	4	2	A
2 Accuracy Inspection of Machine Tools	5	5	4	2	A
3 Surface Roughness of Measurement of Various Machined Pieces	5	5	4	2	A
4 Measurement of Elastic Modulus	5	5	4	2	A
5 Strain Measurement with a Resistance Wire Strain Gauge	5	5	4	2	A
Module : Experiment of Basic Engineering					
1 Experiment of Strength Concentration	5	5	4	2	A
2 Measurement of Modulus of Logitudinal Elasticity	5	5	4	2	A
3 Material Testing	5	5	4	2	A

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Module : Work shop

Sub modules	I	II	III	IV	V
1 - Machine Work					
i Lathe	5	3	4	3	A
ii Horizontal Milling Machine	5	3	4	3	A
iii Vertical Milling Machine	5	3	4	3	A
iv Automatic Grinding Machine	5	3	4	3	A
v Vertical Boring Machine	5	3	4	3	A
2 Gas Welding	5	3	4	3	A
3 Arc Welding	5	3	4	3	A
4 Basic Operation of Finishing	5	3	4	3	A

Minute of the meeting for evaluation
of technology transfer of Basic
Electrical Engineering

Date : 25 Oct, 1988
Place : Meeting room in P.T.K.I. Medan
Attendants : F.T.K.I. Ir. D.Pratiknyo
Ir. Sujarno Suwandi
Mr. Mansur B.E.E.
Ir. Rustan Effendi Panjaitan
Mr. Yanto
J.I.C.A. Mr. H.Kurumiya
Mr. S. Abe
Mr. T.Iwamoto

1. Result of Evaluation

According to the technology transfer evaluation sheet, for almost modules in Basic Electrical Engineering, transfer technology level were A', 90 %. now Japanese experts try to level up theoretical knowledge of staffs by lecturing. After Nov, brushing up technic of staffs by practice. It is necessary that all staff should study hard with experts.

2. With using of new generator (which is now being installed in Utility Building, On job training and practical training could be carried out.

3. Maintenance work

Mr.Pratiknyo is consider about maintenance system which will be done by some nominated group consisted of related labo.ataff such as Electrical Engineering labo, Instrumentation , etc. Maybe maintenance for all equipments ,and facilities will be divided into 3 categories ; 1. at first, staffs in each laboratory take care, if possible. 2nd. staffs of electrical engineering labo 3.rd asking to makers or dealers.

Technology transfer evaluation sheet November 88

Module : Basic Electrical Engineering

Sub modules	I	II	III	IV	V
1 Measurement of Electrical Circuit Components (Resistance, Capacitance, Inductance)	5	4	4	2	A
2 Earth Resistance Measurement	5	4	4	2	A
3 Wave Analysis and Frequency Measurement by Electromagnetic Oscilographs and Synchrosopes	5	4	4	2	A
4 Characteristics of rectifiers	5	4	4	2	A
5 Characteristics of Transformers	5	4	4	2	A
6 Characteristics of DC compound Generator	5	4	4	2	A
7 Characteristics of DC Shunt Motor	5	4	4	2	A
8 Characteristics of Three Phase Induction Motor	5	4	4	2	A
9 Speed Control of I.M. by VVVF (Variable Voltage Variable Frequency)	5	4	4	2	A
10 Improvement of Power Factor of AC Loads	5	4	4	2	A
11 Measurement of Characteristics of Transister	5	4	4	2	A

Minute of the meeting for evaluation
of technology transfer of Instrumentation
Engineering.

Date	: 25 Oct, 1988
Place	: Meeting room in P.T.K.I. Medan
Attendants	: P.T.K.I. Ir. D. Pratiknyo Ir. Sujarno Suwandi Mr. Hrisuddin B.Sc. Mr. Mansuyur B.E.E.
	: J.I.C.A. Mr. H. Kurumiya Mr. M. Mizuno

1. Result of Evaluation

According to the evaluation sheet of technology transfer, almost items (sub-modules) of Instrumentation Engineering finished ,and transfer level is A or A'.

Several items were transferred to Material Testing, such as

No.2, Measurements of surface roughness

No.3, Measurements of thickness by Ultrasonic Wave and Magnetic Method

No.6, Measurements of strain

and other items were transferred to Physics, such as

No.11, Measurements of Viscosity

No.13, Measurement of Quantity of Heat.

2. Rearrangement of Instrumentation Practice

The practices for students is conducted according to the items in Attached sheet. However it is better to reconsider that the following items will be transferred to other Laboratory programs, such as:

No.17 Measurements of Length]

No.18 Measurements of Angle]-> to Physics

No.20 Measurements of Spherometer]

For No.19 (Thermocouple) it will be necessary to teach the resistance type thermometer detector. It is better to teach students with thermocouple principle.

Orifice flow experimental apparatus which is arrived at Chemical Engineering Labo, will be useful for Instrumentation Engineering Labo, because Orifice is the most important detector for flow measurement instrument. So it is better for students to learn flow measurement system with orifice practice.

It is recommended that above mentioned matters would be discussed between main staffs of each labo concerned of it and academy administration staffs. After that ,P.T.K.I. would decide it.

3. Mini-plant instrument maintenance

At the present, it is not clear who maintain Mini-plant

instrument. It is necessary to nominate maintenance staffs for maintenance. Several labo. staff combination work will be necessary, staffs of Instrumentation Labo should cooperate to Mini-plant staffs for this purpose.

4. Space of Laboratory

The space of Labo. is rather small, it is necessary to find out suitable room. It will be recommendable that storage of the lecture building can be applied.

5. Future plan

Today, many process plants are operated by DCS (Distributed Control System) with computer system instead of conventional instruments in the world wide. The tendency of introduction of this system is accelerated drastically even in Indonesia such as P.T. Inti Indorayon in Porsea (In this factory, many graduates of P.T.K.I. is working). So it is better to consider to introduce this system to training facility for mini-plant, and Instrumentation Engineering Labo.

Attached Sheet for Instrument Engineering

1. Flow control	III semester	for 2nd Grade
2. Level Control		''
3. Pressure Control		''
4. Temperature Control (Control Valve)		''
5. Temperature Control (S.C.R.)		''
6. PID Tunning		''
7. Humidity		''
8. Transmitter and Recorder (Pneumatic)		''
9. Displacement Level *		''
10. Air Purge Level*		''
11. Cold Junction		''
12. CO2 Analyzer *		''
13. Water Quality analyzer *		''
14. O2 Analyzer **		''
15. Measure of Length	II semester	for 1 st Grade
16. Vacuum		''
17. Dead Weight Test		''
18. Angle		''
19. Thermocouple		''
20. Spherometer		''
21. Digital Manometer		''
22. U Tube Manometer		''
23. Flow meter calibration by using rotameter and Orifice Meter **		''
24. Revolution Speed **		''

* Start from October 1988

** Start from March 1989

Technology transfer evaluation sheet November 88

Module : Instrumentation Engineering

Sub modules	I	II	III	IV	V
1 Measurements of Length	5	5	4	3	A
4 Measurement of Angle	5	4	4	3	A
5 Measurement of Revolution Speed	5	5	4	3	A
7 Measurement of Pressure	5	5	4	2	A
8 Measurement of Degree of Vacuum	5	5	4	3	A
9 Measurement of Quantity of Flow	5	5	4	2	A
10 Measurement of Liquid Level	5	5	4	2	A
12 Measurement of Temperature	5	5	4	2	A
14 Measurement of Humidity	5	5	4	3	A
15 Measurement of Gas Concentration	5	5	4	3	A
16 Measurement of Concentration of Solution	5	5	4	3	A
17 Adjustment of Instrument (Practice of P.I.D. action)	5	5	4	2	A

Minute of the meeting for evaluation
of technology transfer of Physical
Chemistry

Date : 29 Oct, 1988
Place : Meeting room in F.T.K.I. Medan
Attendants : P.T.K.I. Ir.D.Pratiknyo
Ir.Sujarno Suwandi
Ir. Dewi
Ir. Ida Rosita
Ir. Effendi Janter
Ir. Hidayati
Mr. Hendri Perangin Angin

J.I.C.A. Mr.H.Kurumiya
Mr.H.Takahashi
Mr.T.Iwamoto
Mr.K.Shimizu

Basically, technology transfere had been finished for almost items of this module in original curriculums. However, two items still remains as equipment not yet provided. Recently, new staffs introduce for the practice of this module, Japanese expert group will assist for them to obtain enough knowlege and technics as possible as they can.

Remain Items :

- 3.4 Phase Diagram of Alloy --- to be provide aluminum block. Asking to F.T.INALUM
- 5.3 Polarograph ----- Waiting equipment from Japan

Implimentation of Semester III

1. Measurement of Boiling Point of two Components System (3.2)
2. Measurement of Molecular Weight (Victor Meyer's Methods) (4.1)
3. Measurement of Molecular Weight (Freezing point Depression method) (4.1)
4. Measurement of Refraction Index (4.2)
5. Measurement of Pottential Difference between Copper & Copper sulfate solution (5.2)
6. Measurement of Ionic Concentration of Hydrogen (5.4)
7. Measurement of Viscosity (6.2)
8. Measurement of Surface Tension (7.2)
9. Measurement of Activated Energy (out of original curriculums)

Program for Semester IV

1. Calibration of Thermometer (2.1)
2. Measurement of Heat Reaction (2.2)
3. Measurement of Vapor Pressure & Boiling Point of Actone (3.1)
4. Partition Law (3.3)
5. Phase Diagram of Alloy (3.4)
6. Measurement of Optical Rotary Power (4.3)
7. Measurement of Molar Extinction Coefficient (4.4)
8. Measurement of Equivalent Conductivity and Determination of Dissociation Constant (5.1)
9. Polarography (5.3)
10. Measurement of Transference of Number of Ions (5.5)
11. Reaction Velocity (6.1)
12. Drawing of Adsorption Isotherm Curve (7.1)
13. Spectral Analysis (8)
14. Gas and Liquid Chromatograph (9)

Those remain items should be readjusted to adopt or select item for teaching program.

For example, No. 7 can be included to No. 13 Spectral analysis, No. 11 can be combine to No. 9 in Semester III.

And in this first year, adopted items are temporary, as urgent situation, so please consider that next year program should be rearranged in more systematic way.

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Module : Physical Chemistry 1

Sub modules	I	II	III	IV	V
1 Introduction					
i Experimental Values and Errors	5	5	4	3	A
ii Indefinite Errors and Mean Values	5	5	4	3	A
iii Significant Figures	5	5	4	3	A
iv Arrangement of Experiment Results	5	5	4	3	A
2 Thermochemistry					
i Calibration of Thermometers - Mercury Thermometer, Thermocouples	5	5	4	3	A
ii Measurement of Heat of Reaction - Dissolution Heat of Sodium Thiosulfate	5	5	4	3	A
3 Multiphase Equilibrium					
i Measurement of Vapor Pressures and Boiling Point of Acetone	5	5	4	3	A
ii Measurement of Boiling Point of Two Components system-MeOH: Benzene	5	5	4	3	A
iii Partition Law - Benzoic acid-Benzene system	5	5	4	3	A

Sub modules	I	II	III	IV	V
iv Phase Diagram of Alloy - Pb-Sn System	4	1	1	1	C
4 Molecular Constants					
i Measurement of Molecular Weight - Victor Meyer's Method, Freezing-point Depression Method	5	5	4	3	A
ii Measurement of Refraction Index - Benzene, Ethylalcohol	5	5	4	3	A
iii Measurement of Optical Rotatory Power - Succrose	5	5	4	3	A
iv Measurement of Molar Extinction Coefficient - Copper Sulfate Ammonium Solution	5	3	2	1	B
5 Electrochemistry					
i Measurement of Equivalent Conductivity Determination of Dissociation Constant - Acetic acid	4	3	3	1	E
ii Measurement of Potential Difference between Copper and Copper sulfate	5	4	3	1	E
iii Polarography	1	1	1	1	D
iv Measurement of Ionic Concentration of hydrogene	5	5	4	3	A
v Measurement of Transference Number of Ions	4	3	3	1	E

Sub modules	I	II	III	IV	V
6 Reaction Velocity					
i Measurement of Reaction Velocity at Homogenous Reaction of First Order - Inversion reaction of Sucrose	5	5	4	3	A
ii Measurement of Viscosity - Colloid	5	5	4	3	A
7 Surface Chemistry					
i Drawing of Absorption Isotherm Curve - Oxalic acid Adsorption on Activated Carbon in Oxalic acid solution	5	5	4	3	A
ii Measurement of Surface Tension	5	5	4	3	A
8 Spectral Analysis	5	5	4	3	A
9 Gas and Liquid Chromatography	5	5	4	3	A

Minute of the meeting for evaluation
of technology transfer of Industrial
Chemistry (Inorganic, Organic)

Date : 26 Oct, 1988
Place : Meeting room in P.T.K.I. Medan
Attendants : P.T.K.I. Ir. D.Pratiknyo
Ir. Sujarno Suwandi
Mr. Irwan Raphmiaji B.Sc.
Miss. Rempah Tarigan B.Sc.
Miss. Nurindas Siregal D III
J.I.C.A. Mr .H.Kurumiya
Mr .H.Takahashi

1. Result of Evaluation (Inorganic Chemistry)

According to the technology transfer evaluation sheet,
two Items (sub-module) still remains, because some
difficulties and lack of numbers of equipments.

Item 2. Electrolysis of water solution of NaCl

For this item, facility was set in development division
and it is difficult and little bit high level to teach
student, now this system is being transfered to two new
staff such as Miss Dewi and Miss ida.

For teaching to students, this item to change to electrolysis
water, but unfortunately number of quipments (double bulets)
is not enough (two sets) . It is necessary to add.

Item 3. Copper Plating

For this item, number of apparatus is not enough (5 sets) .
And it is necessary to prepare test specimen with assistance
of work shop.

It is necessary to supply 8 DC sources for Item 2 and 3.

Item 2 and 3 is delay to transfer, within end of December
this work will be finished.

Item 1, 4 and 5 had been finished already.

2. Results of Evaluation (Organic Chemistry)

No.1 to 4, No.6 to 7 and 10 had been finished already,
for No.8, Indonesian staff can do by himself, and for No.5
Styrene monomer is difficult to get in Indonesia, so if
this item is adopted to a routine student experiment, supply
of this chemicals will be difficult. This item changed to
synthesis of urea resin, and this resin is popular adhesive
for plywood production in Indonesia. But to Indonesian staff
this item will be transferred. No.9, chemicals arrived from
Japan , will start to transfer soonest.

Module : Industrial Chemistry Inorganic

Sub modules	I	II	III	IV	V
1 Manufacture of Potassium Permanganate	5	5	4	2	A
2 Electrolysis of Water Solution of sodium Chloride (changed to Water Electrolysis) *	4	3	2	1	B
3 Copper Plating	4	3	2	1	B
4 Purification of sodium Chloride	5	5	4	3	A
5 Preparation of Complex Salts and Double Salts	5	5	4	3	A

* The equipments system of this item was installed in Development Division, being transferred to Div. staffs, so this item is changed to Water Electrolysis.
 For this item , 8 sets of DC source would be necessary to supply. these DC source is also used for item No.3

Module : Industrial Chemistry Organic

Sub modules	I	II	III	IV	V
1 Synthesis of Benzoic Acid	5	5	4	3	A
2 Synthesis of Nitrobenzene	5	5	4	3	A
3 Synthesis of Aniline	5	5	4	3	A
4 Synthesis of Acetic Acid	5	5	4	3	A
5 Polymerization of Styrene	5	5	4	3	A
6 Flash point Test of Petroleum	5	5	4	2	A
7 Synthesis of Dyestuff	5	5	4	3	A
8 Preparation of Soap	*	-	-	-	-
9 Preparation of Detergent	5	1	1	1	C
10 Purification of Organic Substance	5	5	4	2	A

* C/P can carry out themselves.

Minute of the meeting for evaluation
of technology transfer of Chemical
Engineering

Date : 27 Oct, 1988
Place : Meeting room in P.T.K.I. Medan
Attendants : P.T.K.I. Ir.D.Pratiknyo
Ir.Sujarno Swandy
Mr.Yulsal Yahya
Ir.Jawaris Sinaga
Miss. Ida Khairani D III
Miss. Darni Paramita D III
Miss. Korlinim Sembiring D III

J.I.C.A. Mr.H.Kurumiya
Mr.M.Kuwabara
Mr.K.Shimizu

1. Result of Evaluation

According to the original curriculum ,module of Chemical Engineering is 19 items, but several items were added ,such as heat and mass transfer (cooling Tower), extraction, filtration crushing (Ball Mill), Gas absorption, adsorption, fractional distillation, as these item is important unit operation for Chemical Engineering practice. So total item is 26 ,(refer to Attached sheet 1,2). However among them , some items were rearranged as follows:

No.5 Performance Test of Boiler : included in Mini Plant Prctice.

No.15 Tubular Reactor : included in No.16 Analysis of catalytic reaction in a packed bed

No.17 Measurement of Pressure Loss in a Packed Tower : included in No.18 Measurement of Pressure Loss in Fluid Bed

No.19 Process Analysis (Manufacturing Process of Synthesis gas from Natural gas): Not suitable for student practice, cancelled

No.21 xtraction : included in Physical Chemistry Practice

So total 21 items are transferred to Indonesian Counter ersonnel. For No.1, No.3, No.9, equipments are arrived newly. But within November, transfer will be completed.

In attached sheet 1, Practice item and transfer program are shown in details. In attached sheet 2, the program of new Semester (III) and coming Semester (IV), and Staff who has responsibility for implementation of each practice are shown.

As a result of above disscusion, it was approved that technology transfer of Chemical Engineering Module was almost completed.

Technology transfer evaluation sheet November 88

Module : Chemical Engineering 1

Sub modules	I	II	III	IV	V
1 Dimention analysis	5	5	4	3	A
2 Measurement of Friction Loss of Fluid in pipes	5	5	4	3	A
3 Inspection of gas & fluid orifice meters	4	3	3	2	B
4 Sedimentation analysis	5	5	4	3	A
5 <u>Performance test of boiler</u>	Transferred to Mini Plant				
6 Measurement of Over-all Heat Transfer Coefficient of Heat Exchanger	5	5	4	3	A
7 Measurement of Thermal Conductivity of Heat Insulator	4	4	3	3	B
8 Measurement of Heat Transfer Coefficient of Tube Wall	4	3	3	3	B
9 Drying of Solids	4	3	3	2	B
10 Agitation and Dissolution	4	5	2	1	B
11 Vaporization of Water in a Wetted-wall Column	5	5	4	3	A
12 Vapor-Liquid Equilibrium Distillation	5	5	4	3	A

Technology transfer evaluation sheet November 88

Module : Chemical Engineering 2

Sub modules	I	II	III	IV	V
13 Simple Distillation	5	5	4	3	A
14 Agitated Tank Reactor	5	5	4	3	A
15 Tubular Reactor	Included in No.16				
16 Analysis of Catalytic Reaction in a Packed Bed	4	3	2	2	B
17 Measurement of Pressure Loss in a Packed Tower	Included No.8				
18 Measuremnt of Pressure Loss in Fluidized Bed	5	5	4	3	A
19 Process Analysis (Manufacturing Process of Synthetic Gas from Natural Gas)	Cancelled				
20 Heat and Mass Transfer (Cooling Tower)	5	4	3	2	A
21 Extraction	Included in Physical Chemistry				
22 Filtration , 23 Crushing (Ball Mill)	5	5	4	3	A
24 Gas Absorption	5	5	4	3	A
25 Adsorption	5	5	4	3	A
26 Fractional Distillation	5	5	4	3	A

Minute of the meeting for evaluation
of technology transfer of Mini Plant

Date : 25 Oct, 1988
Place : Meeting room in P.T.K.I. Medan
Attendants : P.T.K.I. Ir.D.Fratiknyo
Ir.Sujarno Swandy
Mr.Hendry Sitepu
J.I.C.A. Mr.H.Kurumiya
Mr.T.Iwamoto
Mr.K.Shimizu

1. Result of Evaluation

According to the confirmation, the module of the curriculum for Mini Plant (Practice by the Practical Training acility) technology transfer level were almost A for all items, but for item (sub- module) 2. Safty (7) Static Electricity Hazards and (8) Prevention of Electric Shock ; some work remains, such as practice notes.

The skillness of Operation of facility is in good condition according to many experience of Academy Training and Short course training. Practice notes have been prepared.

2. Overhole of distilation tower

On February in next year, overhole of distillation tower will be tried by setting up a scaffolding beside tower on the deck.

Technology transfer evaluation sheet November 88

Module : Mini Plant

Sub modules	I	II	III	IV	V
1. Orientation	5	5	4	2	A
2. Safety	5	4	4	2	A
3. Basic Skill	5	5	4	2	A
4. Basic Knowledge	5	5	4	2	A
5. Instrumentation	5	5	4	2	A
6. Construction and Function of Utilities Equipment	5	5	4	2	A
7. Operation of Distillation Tower	5	5	4	2	A
8. Operation Analysis	5	5	4	2	A
9. Maintenance	5	5	4	2	A

Total Evaluation Result of Technology Transfer - 1

		I	A	A'	B	B'	C	C'	D	Re.
1	Physics	87.7	10	7		1			2	
		87.12	10	7		2		1		
		88.7	9	7		2				*1
		88.10	9	9						
2	Analytical Chemistry	87.7	6	6						
		87.12	6	6						
		88.7	6	6						
		88.10	6	6						
3	Organic Chemistry			all						*2
4	Metallurgy & Industrial Materials (Material T)	87.7	10	7					3	
		87.12	10	7	3					
		88.7	10	7	3					
		88.10	10	10						
5	Machine Works (Material Test 2)	87.7	5	5						
		87.12	5	5						
		88.7	5	5						
		88.10	5	5						
6	Basic Mechanical Engineering (Material)	87.7	3	3						
		87.12	3	3						
		88.7	3	3						
		88.10	3	3						
7	Basic Electrical Engineering	87.7	12	4					8	
		87.12	11	11						
		88.7	11	11						
		88.10	11	11						
8	Instrumentation & Control Engineering	87.7	17	4	8	1			4	
		87.12	13	5	4	1	1			
		88.7	13	5	5	1				
		88.10	12	8	4					
9	Physical Chemistry	87.7	25	18					7	
		87.12	25	18		1		1	5	
		88.7	25	18	1	4	1		1	
		88.10	25	18	1	2	2	1	1	

* Column I : Number of Modules

** Column A to D : Number of each evaluation level

*** Column Re. : Remarks

*1 : One sub-module transferred to Elec. Engineering Labo.

*2 : Written in "Exp. of Chemistry" as only "Identf. of Org. Compounds"

November 8, 1988

Total Evaluation Result of Technology Transfer - 2

			I	A	A	B	B	C	C	D	Se
10	Industrial Chemistry (Organic)	87.7	10	7				1	2		
		87.12	10	7			3				
		88.7	10	5		2	2	1			
		88.10	9	6	2			1			*1
11	Industrial Chemistry (Inorganic)	87.7	5				3			2	
		87.12	5				3			2	
		88.7	5				3		2		
		88.10	5	2	1		2				
12	Chemical Engineering	87.7	26		10	5		1	1	9	
		87.12	26		10	6	1	1		8	
		88.7	24		10	7	2	1		4	
		88.10	21	14	1	5	1				*2
13	Machine Works (Work Shop)	87.7	8			8					
		87.12	8			8					
		88.7	8			8					
		88.10	8			8					
14	Mini Plant	87.7	9		3	3	1	2			
		87.12	9		4	4	1				
		88.7	9		4	5					
		88.10	9		9						

*1 : One sub-module can be carried out by C/P himself

The Rule of Writing of Evaluation Sheet

Column I. Equipment

0. Not yet
1. -Designed or Ordered
2. In shipping
3. Received at the project site
4. Tested
5. Operated in routine

Column II. Practice note (Text book of Practice)

0. Not yet
1. In preparation in English
2. In preparation in Indonesian
3. Completed in English
4. In translation to Indonesian
5. Completed in Indonesian

Column III. Technical Transfer to C/P

1. Not yet
2. Explanation and testing
3. In training (implementation of operating)
4. Completion (Already applied in routine)

Column IV. Final improvement

1. Not yet
2. In process
3. Almost Finished

Column V. Degree of Technology Transfer in %

Remarks. Comment about situation at present/ in future (at the end of term)

Estimation :

In column I	5	5	4	4	4	3	1/2/3
In column II	5	5	3/4	3/4	1/2	1/2	1/2
In column III	4	3	3/4	2/3	2	2	1
In column IV	3	2	1	1	1	1	1
	100 %	90%	80%	70%	60%	50%	40%-
Grade	A	A'	B	B'	C	C'	D

At final stage, all items should be at the grade of B or B'.

Annex IV

COUNTERPARTS ASSIGNED TO CHEMICAL ENGINEERING LABORATORY

Name of expert	Masao Kuwabara	
Speciality	Chemical Engineering	
Term (From-To)	1986.12 --- 1988.12	(Long Term Expert)
Counterparts	*1 Mr. Aman Sentosa	(Asst. Instructor of Chem. Eng. Labo.)
	*1 Mr. Warman	(Asst. Instructor)
	B.Sc. Yursal Yahya	(Asst. Chief Instructor/Instructor)
	Mr. Syamsul Rizal	(Part-time Asst. Instructor from Mini Plant)
	B.Sc. M. Nasim	(Part-time Asst. Inst. from Develop. Dept.)
	*2 Ir. Edison Sihombing	(Instructor)
	*3 Mr. Delwizau	(Asst. Instructor/Temporary Asst. Chief. Inst)
	*2 Ir. Jawaris Sinaga	(Instructor/Provisional Chief Instructor)
	Ir. (Mrs.) P. Tarigan	(Instructor)
	*3 Miss I. Khairani	(Trainee Asst. Instructor)
	*3 Miss D. Paranita	(Trainee Asst. Instructor)
	*3 Miss N. Siregar	(Trainee Asst. Instructor)
	*2 Ir. (Miss) D. Tambunan	(Part-time Instructor from Develop. Dept.)
	*2 Ir. (Miss) I. Rosita	(Part-time Instructor from Develop. Dept.)
	*3 Miss K. Sembiring	(Asst. Instructor)
	*2 Ir. J. Effendi Janter	(Part-time Instructor from Physical Chem.)

Note *1: Trained before by predecessor

*2: University graduate (Chemical Engineering Dept.)

*3: Graduate of PTKI (Chemical Engineering Course)

Name of Expert	HIROYUKI KURUMIYA	
Speciality	Industrial Chemistry (Organic Chemistry)	
Term (from -to)	1985.3 - 1989.5	
Counter Personnel	Ir. Soebroto M.Sc.	Former Chief of PUSBINLAT
	Ir. Abubakar Soetikno	Chief of PUSBINLAT
	Endang Suprijatna M.Sc.	Former Director of PTKI
	Ir. D. Pratiknyo	Director of PTKI
	Drs. Adut Sembiring	Project Manager of KANWIL
	Ir. Sujarno Swandi	Coordinator of PTKI
	Drs. S. Brahamana	Chief of Development Div.
	Irwan Rafmiadji B.Sc.	Staff of Industrial Labo.
	Maltalius B.Sc.	Staff of Development Div.
	M. Nasim B.Sc.	Staff of Development Div.
	Yelmizal	Staff of Development Div.
	Dra. Rosmerry	Staff of Development Div.
	Rosmiati Bk.Tex.	Staff of Industrial Labo.
	Rempah Tarigan B.Sc.	Staff of Industrial Labo.
	Warman B.Sc.	Staff of Material Test Labo.
	Ir. Sabal Situmorang	Staff of Material Test Labo.
	Bactical Effendi	Staff of Material Test Labo.
	Ir. Dewi Astina	Staff of Dev.Chem.Phys.Lab.
	Ir. Ida Rosita	Staff of Dev.Chem.Phys.Lab.
	Ir. Hidayati	Staff of Dev.Chem.Phys.Lab.
	Ir. Effendi Janter	Staff of Chem.Phys.Lab.

Name of expert Setsuo Abe
 Speciality Electrical Engineering (& Electrical Maintenance)
 Term (From-To) 1985.10 --- 1986.02 (Short Term Expert)
 1987.05 --- 1989.05 (Long Term Expert)
 Counterparts B.Sc. Mansyur Bee (Senior Electrical Engineer)
 Mr. Yanto (Junior Electrical Engineer)
 Mr. Agus (Junior Electrical Engineer)----not here now
 B.Sc. Harisuddin (Senior Instrumentation Engineer)
 Ir. Rustam Effendi Panjaitan (Senior Electrical Engineer)---
 ---Newcomer

Name of expert M. Mizuno
 Speciality Instrument Engineering
 Term (From-To) 1987.11 --- 1989.5
 Counterparts B.Sc. Mansyur Bee (Senior Instrument Engineer)
 Mr. Yanto (Junior Instrument Engineer)
 Mr. Victor (Junior Instrument Engineer)
 *B.Sc. Harisuddin (Senior Instrumentation Engineer)
 Ir. Rustam Effendi (Senior Instrument Engineer)---Newcomer
 *Chief Instructor

Name of expert H. Takahashi
 Speciality Inorganic chemistry
 Physical chemistry
 Term (From-To) 1987.2 --- 1989.2
 Counterparts Anal.Chem.
 Adil Barus, B.Sc.
 Teddy
Ind.Chem. (Inorganic)
 Irwan Rahmiadji, B.Sc.
 Rosmiaty, Bk. Teks
Phys. Chem.
 (Drs. Ratnawaty Trg.)
 Dewi Astina, Ir.
 Ida Rosita, Ir.
 Hidayati, Ir.
 Effendi Janter, Ir.

Development

Drs. Sucarman Brahmama

Martalius B.Sc

Dewi Astina, Ir.

Ida Rosita, Ir.

Hidayati, Ir.

Name of expert MASAHIRO MIYAMOTO
Speciality Material - Test Laboratory
Term 1986.12 --- 1988.12

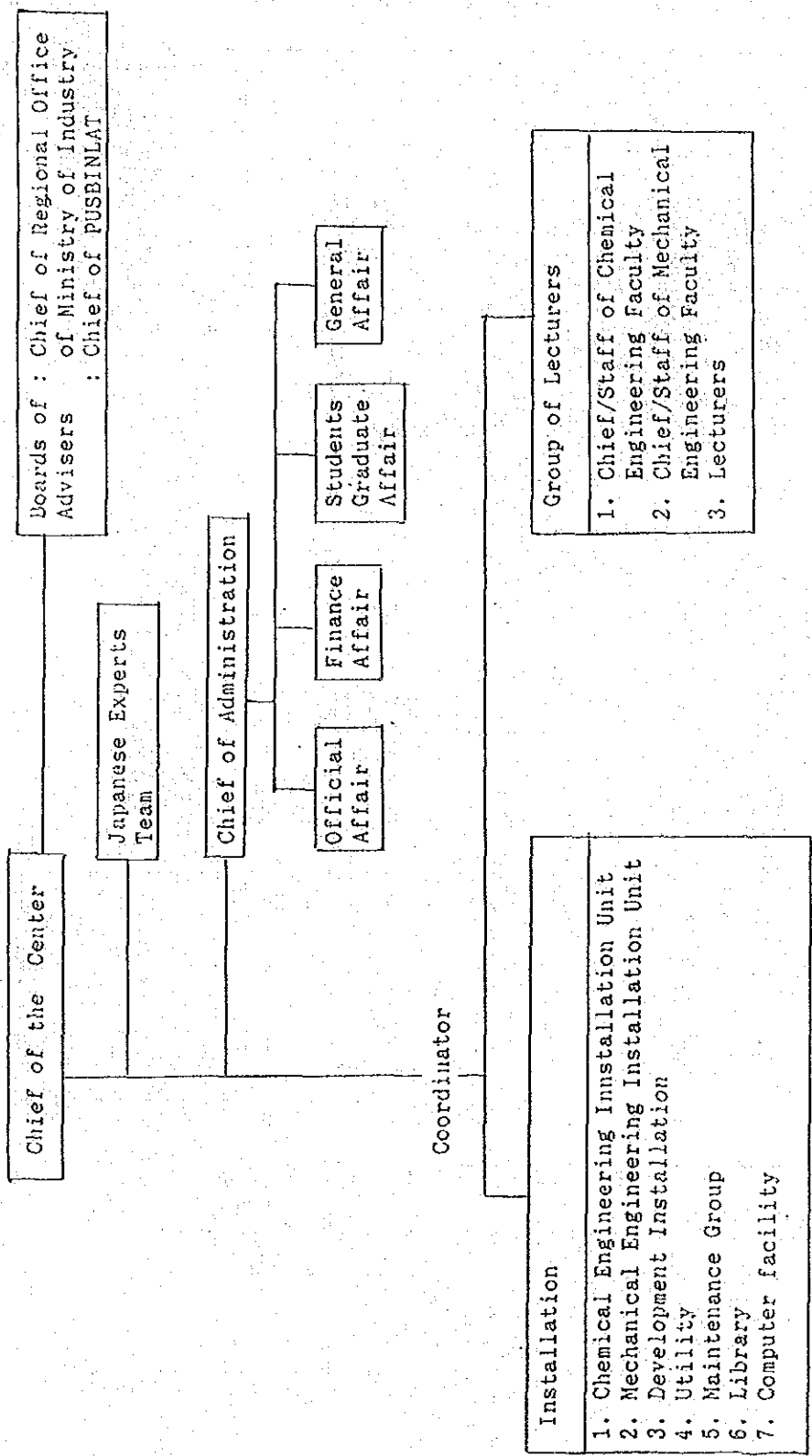
Counterpart : Teaching Staff
 Mr. Warman B.Sc.
 Mr. Ferlu Palembang
 Mr. Rezeki Maha
 Mr. Bahtiar Effendi
 Mr. Sabar Situmorang
 Mr. Syahrudin
 Miss Tompau

Name of expert TAKASHI IWAMOTO
Speciality Mini Plant
Term 1987.10 --- 1989.5

Counterpart : 1. Tole Purbaf
 2. Henry Sitepu
 3. Rizal
 4. Rejeki Maha
 5. M. Yusuf
 6. Ir. Hadi Chairudnas

Annex V

Organization of the Center



Annex VI : Provision of Machinery and Equipment

	F Y	BL / A W B	ARRIVAL	RECEIVED	CIF PRICE (¥)	FOB PRICE (¥)
1.	82	126-64087613	30/ 1/83	18/ 5/83	1,594,056	1,032,000,-
2.	82	BEL - 1001	12/3/83	18/ 4/83	16,613,553	15,743,200,-
3.	82	BEL - 1004	18/ 3/83	30/ 4/83	15,793,802	14,637,350,-
4.	82	618-4112339	11/ 4/83	9/ 2/84	2,912,881	2,550,943,-
5.	82	BEL - 1002	24/ 4/83	10/ 9/83	295,591	256,800,-
6.	82	BEL - 1003	24/ 4/83	10/ 9/83	26,195,053	24,625,000,-
7.	82	BEL - 1013	24/ 4/83	10/ 9/83	41,617,954	39,892,650,-
8.	82	BEL - 1003	23/ 5/83	10/ 9/83	6,265,237	5,375,000,-
9.	83	618 - 4209135	16/ 5/83	9/ 2/84	525,404	129,320,-
10.	83	618 - 4209136	16/ 7/83	9/ 2/84	1,267,267	974,845,-
11.	83	618 - 4377334	2/12/83	21/ 3/85	663,333	616,500,-
12.	83	BEL - 1003	15/ 1/84	10/10/84	4,715,120	4,346,500,-
13.	83	618 - 5077124	23/ 3/84	21/12/84	2,239,505	2,000,000,-
14.	83	BEL - 1004	16/4/84	19/ 9/84	59,335,952	56,200,000,-
15.	84	618 - 50548363	14/ 5/84	v	3,107,197	2,517,400,-
16.	84	618 - 5054848	4/ 5/84	21/ 3/85	1,927,287	1,297,495,-
17.	84	YEMW - 801	29/ 5/84	4/ 9/85	23,109,339	20,719,030,-
18.	84	618 - 51548160	11/11/84	5/ 9/85	329,045	300,000,-
19.	84	618 - 55006125	30/12/84	5/ 9/85	84,905	26,000,-
20.	84	BEL - 1001	21/ 2/84	12/10/85	401,026	300,000,-
21.	84	YEMW - 801	23/ 6/85	28/ 1/85	19,044,660	17,643,000,-
22.	84	YEMW - 001	20/10/85	29/ 1/86	6,597,120	6,235,000,-
23.	85	618 - 57671051	21/ 8/85	3/ 4/86	846,355	532,350,-
24.	84	618 - 55003431	24/ 9/85	10/ 4/86	643,590	533,754,-
25.	85	618 - 58196213	2/11/85	22/ 2/86	988,217	898,000,-
26.	85	618 - 58196235	12/11/85	v	711,630	610,470,-
27.	86	YEMW - 002	27/ 9/86	9/ 1/87	1,643,240	1,457,000,-
28.	87	YEMW - 002	26/ 1/87	4/ 8/87	1,508,908	1,394,050,-
29.	87	BEL - 1003	16/ 2/87	4/ 8/87	29,517,201	28,326,000,-
30.	87	BEL - 1002	23/ 3/87	4/ 8/87	7,909,694	7,542,000,-
31.	87	YEMW - 002	31/ 3/87	4/ 8/87	1,974,989	1,829,170,-
32.	87	YEMW - 001	9/ 7/87	13/5/87	3,054,093	2,905,210,-
33.	87	-0002	3/10/87	13/ 5/87	1,176,253	1,051,630,-
34.	87	BEL - 1007	3/12/87	13/ 5/87	24,548,939	23,750,000,-

CHRONOLOGICAL AMOUNT OF GRANTED EQUIPMENT

F L YEAR	ITEM	AMOUNT OF EQUIPMENT	C I F	F O B
1982			111,286,107	89,475,595
1983			69,746,591	69,642,255
1984			94,700,579	49,038,895
1985			3,194,792	2,574,574
1986			1,643,240	1,457,000
1987			69,700,127	65,797,110
1988			32,889,573	
TOTAL			342,161,047	

ACADEMY

LABORATORY : Physical Chemistry

Equipment
Auto Still
Optical Experimental Apparatus
Various Kinds of Volt meters & Ampere Meters (AC,DC)
Slide Resister
Battery Charger
Galvanometer
Uni-Thermobath Viscosity
Drying Oven
Polax
Water Bath
Adiabatic Bomb Calorimeter
Photo-meter
Flame Photometer
PH meter

LABORATORY : Chemical Analysis

Equipment
Auto Still
PH Meter
Refrigerator with Freezer
Chemical Balance
Muffle Furnace
Centrifuge
Dry Oven

LABORATORY : Instrumentation

Equipment
Level Transmitter (NO1210-51N3307W-X)
Potential Meter
Ultrasonic Thickness Gauge
Pressure Tester
Controller Recorder (Pneumatic type)
Temperature Recorder
Humidity Meter (Digital hygrometer)
Universal Vibrometer
Process Feedback Control Study Unit
BEBICON (Model 075-95T)
BEBICON (Model 020P-5S)
PH meter

LABORATORY : Electorical Engineering

Equipment
Universal Bridge (LCR-6)
Ossillator (AJ-1011)
Photo Corder (Model 2931)
D-A Converter Circuit Trainer
A-D Converter Circuit Trainer
Portable Kohlrausch Bridge (BF-62A)
Recording Oscillograph (Visigraph Model 5L40)
Multi-electrical training system

ACADEMY

LABORATORY : Chemical Engineering

LABORATORY : Industrial Chemistry

Equipment
Fluid Friction Loss in Pipe Experimental Apparatus
Overall Heat Transfer Experimental Apparatus
Wetted Wall Column Experimental Apparatus
Vapor-Liquid Equilibrium Distillation Experimental Apparatus
Fluidized Bed Experimental Apparatus
Heat and Mass Transfer (Cooling Tower)
Filter Press Experimental Apparatus
Ball Mill Experimental apparatus
Gas/Liquid Absorption Experimental Apparatus
Adsorption Experimental apparatus
Fractional Distillation Apparatus
Gas Chromatograph (Recorder)
Hammer Crasher
Auto Screening

Equipment
Auto Still
Water Bath
Chemical Balance
Crucible Furnace (Temp. Controller)
Dry Oven
Pensky-Martence Flash Point Tester
Red-Wood Viscosi Meter
Seibolt Viscosi Meter
Refrigerator
Hoffman's Electrolysis H-Tube
Rotary Evaporator
Autoclave

ACADEMY

LABORATORY : Work Shop

Equipment
Lathe (Pros 400 × 620)
Horizontal Milling Machine (NK 65)
Bending Machine (Model S-3)
Bending Roll Machine (Noguchi)
Shearing Machine (Model NS-1504)
Vertical Milling Machine (VKV-1)
"550 mm" Shaping Machine (SUD-550)
Universal Grinding Machine (Higloss-450-H.TS)
"KIRA" Vertical Boring Machine (KRTG-480)
High Speed Hydraulic hack Sawing Machine
BABICON (Compressor (HITACHI)
Benchi Vice
AC Arc Welder (Model BCP)
"HITACHI" High Speed Cutting Machine
Disc Grinder (180 mm)
Disc Grinder (100 mm. PDA 100C)
Disc Grinder (100 mm RED 100)
Surface Table (1×1×0.12m)
Table Type Boring Machine (NSD-340)
Benchi Grinder (Hitachi)

LABORATORY : Material Test -

Equipment
Hardness Tester (Vikers)
Hardness Tester (Rockwell)
Universal tensile Tester Accessory: Strain-Stress Senser X-Y Recorder
Charpy Impact tester
Urtrasonic Flaw Detector
Magnetic Powder Flaw Detector Accessory: Black Light
Digital Strain Indicator Accessory: 10 point switch- ing & Ballancing Box
Urtrasonic Thickness Meter
Metallographic Pregrinder
Specimen Dryer
Mounting Press
Metallographic Cut-off Machine
Sump Kit
Electric Crucible Furnace Accessory: Thermo Controller
Lamino Gauge
Travelling Microscope
Thermal Analyzer
Micro-Vikers Hardness Tester

DEVELOPMENT

LABORATORY : Inorganic (Development)

Equipment
Conductivity meter
PH meter
Water quality checker (DO, COND & PH)
Atomic Absorbance Spectrometer (Recorder)
Jar Tester
Multi Magnetic stirrer
NaCl Electrolysis System
Ion Meter (Ion sensors)
UV-Vis spectrophotometer Auto Still
Muffle Furnace
Centrifuge
Mercury Analyser
Chemical Balance
Potentiometric Titrater

LABORATORY : Electron Microscope

Equipment
Scanning electron Microscope (Ion coator, Critical Point dryer, Cooling Unit, Voltage stabilizer)
Microcomputer (CPU, Disc unit, Printer)
N.M.R. Proton type
Biological Microscope (Photograph system, camera)
Metal Surface Microscope (Photograph System, Camera)
Projecter

LABORATORY : Organic Labo (Development)

Equipment
Gas-chromatograph (Integrator)
Infra-Red Spectrometer (Tablet molding unit with Press)
Dry oven
Vacuum Dry Oven
Fraction Collector
TLC System
Steam Distillation Boiler
Fractional Distillation Tower

LABORATORY : Agro Labo (Development)

Equipment
Water Bath
Water Bath Incubator
Stem Pastilyzer
Incubator
Polax
BOD Incubator
Extraction System
Kjeldahl heating set
Ice Maker
Adiabatic Bomb Calorimeter
Dry Oven
Ultra Sonic Cleaner

LABORATORY : Mini Plant

Equipment
Mini Plant
Boiler
Cooling Tower
Distillation Tower
Storage System
Control Room
Gas Perge System
etc.

LABORATORY : Studio

Equipment
Portable color TV Camera (Carrying cart, Vidio Casset Recorder, Battery adaptor, Battery Charger)
Automatic Editing Control System (Color TV, Video Casset Recorder)
Monitor Color TV
Slide projector
Over head projector
Photo print and development system

Annex VII

JAPANESE EXPERTS

O Long term (First Group)

Kitoshi Uematsu	Chief Advisor	Apr. 26, 83 - Apr. 25, 85
Aiichiro Yamamoto	Coordinator	Apr. 26, 83 - Apr. 6, 85
Junya Sakai	Chemical Engineering	Dec. 21, 84 - Dec. 20, 84
Minoru Takata	Chemical	Jan. 25, 83 - Jan. 24, 85
Michiaki Ihara	Instrumentation	Apr. 5, 83 - Apr. 4, 85
Touru Aihara	Mechanical Engineering	Apr. 5, 83 - Apr. 4, 85

o Short term Experts

Masanori Uchida	Mini-plant (Instrumentation)	Nov. 27, 84 - Jan. 30, 85
Tadashi Kuwabara	Mini-plant	Nov. 27, 84 - Dec. 26, 84
Masatoshi Tamayama	Work-shop	Feb. 19, 85 - May 9, 85
Masayuki Kobayashi	Plant Operation	Nov. 27, 84 - Aug. 31, 85
Kinya Sono	Waste water treatment	Nov. 27, 84 - Feb. 25, 85
Hisashi Takanaga	Water Treatment	Jan. 9, 84 - Apr. 5, 85

o Long term expert (Second Group)

Kisou Tsuruoka	Chief Advisor	May 13, 85 - Nov. 18, 86
Yoshihisa Kondo	Coordinator	Mar. 31, 85 - Nov. 18, 86
Sadashi Chikaoka	Chemical Engineering	Apr. 24, 85 - Nov. 18, 86
Seisuke Ishimaru	Instrumentation	Apr. 24, 85 - Nov. 18, 86
Teiji Okubo	Industrial Chemistry (Inorganic)	May. 22, 85 - Nov. 18, 86
Hiroyuki Kurumiya	Industrial Chemistry(Organic) Team Leader	Mar. 26, 85 - May 19, 89

Hirobumi Goto	Mechanical Engineering	Aug. 14, 85 - Nov. 18, 86
Junichi Ohno	Work-shop	Oct. 23, 85 - Feb. 18, 88
o Short term Expert		
Setsuo Abe	Electrical Engineering	Oct. 23, 85 - Feb. 6, 86
Masatoshi Tamayama	Mechanical Engineering	Jan. 29, 85 - Feb. 6, 86
o <u>Long term Expert (Third Group)</u>		
Hiroyuki Kurumiya	Chief Advisor Organic Industrial chemistry	Assigned term (Mar. 26, 85 - Nov. 18, 88)
Maasao Kuwabara	Chemical Engineering	Assigned term (Des. 17, 86 - Dec. 18, 88)
Ryozo Saruwatari	Chemical Engineering	Assigned term (Oct. 20, 86 - Jan. 19, 86)
Hideo Takahashi	Inorganic Industrial Chemistry	Assigned term (Feb. 2, 87 - Feb. 1, 89)
Seisuke Ishimaru	Instrumentation	Assigned term (Apr. 24, 85 - Nov. 18, 87)
Setsuo Abe	Electrical Engineering	Assigned term (May 13, 87 - May 14, 89) (Arrival on May 13, 87)
Junichi Ohno	Mechanical Engineering	Assigned term (Oct. 24, 85 - Nov. 18, 87)
Masahiro Miyamoto	Mechanical Engineering	Assigned term (Dec. 18, 86 - Dec. 17, 88)
Takashi Iwamoto	Plant Operation & Maintenance	(Oct. 22, 87 - May 18, 89)
Masahiko Mizuno	Instrumentation	(Oct. 22, 87 - May 18, 89)
Coordinator Katsuo Shimizu	Administration and general affairs	(Nov. 13, 86 - May 18, 89)

o Short term experts

Nakano	Electron microscope	Oct. 25.87 - Nov.5.87
Setsuo Yabe	Chemical Engineering	Nov. 10.87 - Jan.10.87
Kitoshi Uematsu	Waste water treatment	Aug. 22, 88 - Nov. 23, 88)

Long term expert total 23

Short term expert total 11

Annex VIII

The List of Counterparts who had been trained in Japan

FY	N A M E	DURATION	
1982	Budi Haryanto	1982.10.28-83	2.4
	Buhha Tambunan	1983. 3. 2-83	7.6
	Ramli Hassan	1983. 3. 2-83	7.6
	Widjanarko	1983. 3. 2-83	7.6
1983	Sujarno Suwandi	1984. 3. 2-84	7.6
	M.M. imanjuntak	1984. 3. 2-84	7.6
	Ahmad Sofian	1984. 3. 2-84	7.6
	Ismari Samir	1984. 3. 2-84	7.6
1984	Ratnawaty Tarigan	1985. 2.28-85	8.4
	Nasim	1985. 2.28-85	8.4
1985	Irawan Rachmiadji	1985.10.30-86	2.28
	Sukarman Brahma	1985.10.30-86	2.28
	Warman	1985.10.30-86	2.28
	Tole Purba	1986. 2.14-86	9.13
	Hendry Sitepu	1986. 3.14-86	9.13
1986	Endang Suprijatna	1986. 6.27-86	7.15
	Harisuddin	1987. 2. 8-87	6.13
1987	Adil Barus	1987.11.19-88	5.10
	Martalius	1987.11.19-88	5.10
	Yursal Yahya	1987.12. 8-88	5.31
	Mansyur	1988. 3. 1-88	6.25
	Pardi Bonar Pardede	1988. 3.14-88	8.12
1988	Irwansyah	1988. 9.25-89	3.12
	Bachtial Effendi	1989. 1--	
	Yanto	1989. 1--	
	Adil Pangabea	1989. 3--	
	D. Praticnyo	1989. 2--	
	Adut Sembiring	1989. 2--	

Annex IX

INLET FROM NATIONAL BUDGET BY THE GOVERNMENT OF INDONESIA
TO CHEMICAL INDUSTRY EDUCATION AND DEVELOPMENT CENTRE IN
TERMS OF RUPIAH VALUE.

(unit : one thousand rupiah)

Category.	1980/		1981/		1982/		1983/		1984/		1985/		1986/		1987/		1988/		1989/	
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Personnel cost.	-	-	2.740	5.460	24.900	36.870	14.436	45.878	31.320	30.810	221.054									
Construction cost:																				
- Land.	700.000	-	-	1.900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	701.900
- Building.	-	130.400	393.250	-	-	-	30.000	74.450	-	-	633.100	-	-	-	-	-	-	-	-	-
- Infrastructures.	-	95.500	188.905	162.471	3.900	57.300	3.400	527.640	-	-	-	-	-	-	-	-	-	-	-	-
Operation cost:																				
- Equipment.	-	250	860	-	1.310	14.415	-	-	-	-	16.235	-	-	-	-	-	-	-	-	-
- Installation.	-	-	53.531	2.820	16.800	30.760	23.050	880	125.301	-	-	-	-	-	-	-	-	-	-	-
- Others.	-	2.029	6.730	3.748	17.151	30.391	22.610	3.940	20.058	144.717	-	-	-	-	-	-	-	-	-	-
Cost of Revising and Installing Equipment.	-	-	32.000	-	10.000	19.000	4.000	20.500	10.000	84.500	-	-	-	-	-	-	-	-	-	-
Cost of Facility of Japanese Experts	2	-	7.400	-	2.720	3.000	3.000	3.000	3.000	22.120	-	-	-	-	-	-	-	-	-	-
Others.	-	525	835	1.428	11.325	20.456	7.240	3.166	52.163	-	-	-	-	-	-	-	-	-	-	-
Total.	700.000	231.040	703.751	155.507	100.076	249.759	183.453	61.926	86.055	2.511.535	-	-	-	-	-	-	-	-	-	-
TEKAP (can't spend effectively)	-	118.128,60	34.975,25	31.787,50	2.660,73	50.109,102	4.053,122	-	-	-	-	-	-	-	-	-	-	-	-	-
Effective.	700.000	112.915,40	688.775,71	1160.729,50	97.415,27	199.648,998	179.484,878	-	-	-	-	-	-	-	-	-	-	-	-	-

Annex X

THE LIST OF FACTORY WHO RECEIVED GRADUATES FROM THE CENTER

No.	Personal Resource	Total Number	% Getting Work	% Waiting for Work	Place they have worked	Place they are waiting for work
1	First graduates of the Center	80	71 %	29 %	<ul style="list-style-type: none"> - PT Inti Indo Rayon (25) - PT Inalum (2) - PT Pupuk Iskandar Muda - PT Kraft Paper (12) - PT Kaltim Fertilizer (4) - PT Dino Mugi (1) - PT Starpindo (1) - PTP V (1) - PT Kertas Kraft Aceh (7) etc 	<ul style="list-style-type: none"> - PT Petro Chemical factory Gresik - PT Kaltim fertilizer (2) - PT Asahi Mas - PT Semen Andalas - PT Kertas Kraft Aceh (4) etc.
2	Second Graduates of the Center	88	30 %	70 %	<ul style="list-style-type: none"> - PT Inti Indo Rayon (20) - PT Kaltim fertilizer (6) - (3) etc. - PT Asahi Mas (3) 	<ul style="list-style-type: none"> - PT Inti Indo Rayon (4) - PT Petro Chemical factory Gresik - PT Asahi Mas - PT Kaltim Fertilizer (6) - PT Cement Andalas

Annex XI

Short Course Activity

I. The Operation Technology Course

1.	July 1985	5 weeks	34 percipitants	For P.T.ARUN
2.	March 1986	4 weeks	14 "	For General Factories
3.	January 1987	3 months	45 "	For P.T.ARUN
4.	April 1987	3 months	46 "	For P.T.ARUN
5.	January 1988 (Including Chemical Engineering Training)	3 weeks	16 "	For Mobil Oil
6.	February 1988 (Including Chemical Engineering Training)	4 days	4 "	For Mobil Oil

II. The Electrical & Instrumentation Engineering Course

1.	March 1988	3 weeks	16 Percipitants	For P.T.ARUN
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III. The Mechanical Maintenance Course

1.	April 1985	4 weeks	34 Percipitants	For General
2.	March 1989 (In planning)	4 weeks	30 "	For General

November 1, 1988

Technical consultation for PTKI

1. P.T. Pupuk Iskandal Muda

Development of Refining process of Nilam Oil

Cooperation research between PIM and PTKI has been contracted , the works finished on Dec 1987.

2. P.T. Native Prima Canned Food Industry Ltd.

Water treatment Facility about Boiler Water

3. P.T. PPP in Lanser

Consultation about waste water treatment for Palm Oil Factory

5. Balai Penelitian Sungai Putih (Rubber Research Institute of P.T.P)

Operation and readjusting of Instrument Analyzer

4. USU. (Universitas Sumatera Utara)

* Several cooperation works : student training programs

(1) Essential oil analysis : Extracted oil from leaf of pine tree.

(2) Essential oil analysis : Extracted oil of garlic

(3) Essential oil analysis : Lemon grass oil from serih

* Back up program for Master Course which will be provided in Faculty of Chemistry in near future.

July 8, 1987

Technical consultation for PTKI

1. P.T. Pupuk Iskandal Muda

Development of Refining process of Nilam Oil

[Cooperation research between PIM and PTKI has been contracted]

2. P.T. Native Prima Canned Food Industry Ltd.

(1) Technical consultation for boiler water treatment system. Preparation of special train program.

(2) Water treatment Facility

(3) Corrosion problem about can coating

[About (1) , contracted]

3. P.T. Soda Sumatera

PTKI performed several times the composition test for their products by thire requestion .

4. P.T. ASEAN FERTILIZER

There three items for consultion proposal.

(1) Development of manufacturing process of "nata de coco "

(2) Activated carbon from coconut shell

(3) Rubber seed oil

5. P.T.P IX

Añalysis for Waste water from factory

6. USU. (Universitas Sumatera Utara)

Analysis of Pb in vegitables, Protein content in buiscket, etc.

ETC.

② ジョイントエバリュエーションレポート

(1986年8月)

JOINT EVALUATION REPORT
ON THE TECHNICAL COOPERATION
PROJECT FOR THE CHEMICAL INDUSTRY
TRAINING AND DEVELOPMENT CENTER

AUGUST 1986

JAKARTA, INDONESIA

MUTUALLY ATTESTED AND SUBMITTED
TO ALL CONCERNED

Jakarta, Indonesia

August 14, 1986

Keiji Timura

Keiji TIMURA,

Leader,

Japanese Evaluation Team,

Japan International

Cooperation Agency,

Japan.

[Signature]

Soebroto,

Chief,

Industrial Skill and Vocational

Training Development Centre,

Ministry of Industry,


Indonesia.

[Signature] (B.H.C.)
[Signature] (B. Keu.)
ass (Biro KUN)
XH (IKD)
R (Biro Casu)

MUTUALLY ATTESTED AND SUBMITTED
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Jakarta, Indonesia

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Keiji TIMURA,

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Japanese Evaluation Team,

Japan International

Cooperation Agency,

Japan.



Soebroto,

Chief,

Industrial Skill and Vocational

Training Development Centre,

Ministry of Industry,

Indonesia.

INDONESIAN PANEL

PUSBINLAT

- Ir. Soebroto, M.Sc. : Chief of Centre for Skill and Vocational Training and Development, Department of Industries
- Ir. Coenadi : Centre for Skill and Vocational Training Development Centre
- Drs. Haryatmo : Centre for Skill and Vocational Training Development Centre
- Ir. Sudiharto, SH : Centre for Skill and Vocational Training Development Centre
- Drs. Rasisman : Centre for Skill and Vocational Training Development Centre
- Drs. Imasri Sanir : Centre for Skill and Vocational Training Development Centre

DEPARTMENT OF INDUSTRIES

- Drs. Harjanto Arjunadi : Chief of Bureau of Finance, Department of Industries
- Drs. Oton Suhadi : Bureau of Finance, Department of Industries
- Ny. Erly Pardede, SH : Bureau of Law and Organization, Department of Industries
- Drs. A.S. Siagian : Chief of Bureau of International Technical Cooperation, Department of Industries
- Drs. Djarwadi : Bureau of International Technical Cooperation, Department of Industries
- Mr. M. Munir : Bureau of International Technical Cooperation, Department of Industries
- Mr. D. Tjitro Projitno : Directorate General of Basic Chemical Industries, Department of Industries
- Mr. Suyanto : Directorate General of Basic Chemical Industries, Department of Industries
- Prihatiningrum : Bureau of Planning and Programming Department of Industries

Discussion seeting between the evaluation team of the Japan International Cooperation Agency (JICA) and the indonesian evaluation team on the evaluation of the Technical Cooperation Project for the Chemical Industry Training and Development Center.

Date : August 14, 1986

Place : Industrial Skill and Vocational Training Development Center
(PUSBINLAT)

Attendance:

JAPANESE PANEL

JAPANESE EVALUATION TEAM :

1. Mr. Keiji Iimura, Leader, Japanese Evaluation Team.
2. Mr. Yuji Tokumasu, Member, Japanese Evaluation Team.
3. Mr. Toshio Sugihara, Member, Japanese Evaluation Team.

JICA INDONESIA OFFICE :

1. Mr. Hideo Endo, Resident Representative, JICA Indonesia Office.
2. Mr. Hisamitsu Nishio, Asst. Resident Representative, JICA Indonesia Office.

JICA EXPERTS

1. Mr. Kiso Tsuruoka - Chief Advisor
2. Mr. Yoshihisa Kondo - Coordinator

DEPARTMENT OF FINANCE

Drs. Kadarisman, SH : Directorate General of Budgeting Department of Finance
Drs. S.P. Saragih : Directorate General of Budgeting, Department of Finance
Abdul Rochim : Directorate General of Budgeting, Department of Finance

PUS-PPIK

Mr. Endang Supriatna, M.Sc : Director, Chemical Industry Training and Development Centre

INDUSTRIAL EDUCATION PROJECT OF NORTH SUMATRA

Drs. Adat Sembiring : Project Officer, Industrial Education of North Sumatra

I INTRODUCTION

1. Objective

The Japanese Evaluation Team organized by the Japan International Cooperation Agency (JICA), headed by Mr. Keiji Iimura, visited the Republic of Indonesia from August 6 to 15, 1986 in order to jointly evaluate with the Indonesian Evaluation Team organized by the Industrial Skill and Vocational Training Development Center, headed by Mr. Soebroto, the Japan-Indonesia Technical Cooperation Project on the Chemical Industry Training and Development Center which has been carried out for five (5) years on the basis of the Record of Discussions signed on November 19, 1981 between the Japanese Implementation Survey Team and Authorities concerned of the Government of the Republic of Indonesia.

Both teams discussed and studied with the Indonesian counterpart personnel concerned and the Japanese experts on a number of aspects regarding the performance of commitments achievements of the functions of the Chemical Industry Training and Development Centre (hereinafter referred to as "PUS-PPIK") and constraints which hampered past activities.

Through careful studies and discussions, both teams summarized their findings and observations as described in the following chapters.

2. Brief background of the project

The Government of Indonesia has been enthusiastically exerting to foster chemical industry which is one of the main targets to be achieved in the third and fourth 5-year Development Plans (1979-1983, 1984-1988). Especially in the Sumatra Island enriched with natural resources i.e. petroleum natural gas, vegetable oil and many others a demand for middle class skilled workers in the various fields of chemical industry has been increasing.

In March 1979, the Republic of Indonesia requested the government of Japan to provide a grant aid to establish the Chemical Industry Training and Development Center (PUS-PPIK), which aimed at

fostering middle class skilled workers in the field of chemical industry and thus contributing to the development of regional industries concerned in Sumatra as a whole.

Upon request, the Government of Japan through JICA sent the preliminary survey team to Indonesia from September 6 to 22, 1979. The preliminary survey team conducted surveys, studies and discussions on the details of the project with the authorities concerned of the government of Indonesia. On the basis of the report and recommendations of the preliminary survey team, the Government of Japan decided to provide a grant aid to establish the Chemical Industry Training and Development Center.

On June 20, 1981, the Exchange of Notes (E/N) being concluded between the two governments, about 4Km south east of the heart of Medan City was constructed the Centre with the granted sum of ¥1,730,000,000.- consisting of an administrative ward, educational wards (class rooms & labs), research development & technical service wards, a machine workshop, an utility ward, a mini-plant, etc.

Meanwhile, the Japanese Implementation Survey Team organized by JICA visited Indonesia from November 5 to 18, 1981 for the purpose of working out the details of the Technical Cooperation Programme for the Project on the Chemical Industry Training and Development Center.

After careful studies and discussions, both parties agreed to recommend to their respective Governments the implementation of the project as described in the "Record of Discussions" signed on November 19, 1981 between the Chief of the Education & Training Centre and the Leader of the Japanese Implementation Survey Team. This recommendation was accepted by both governments and as a result, the technical cooperation programme was started.

II. METHODOLOGY OF EVALUATION

1. In order to evaluate the past performance and achievement both quantitatively and qualitatively, following items are adopted as reference.
 - (1) The Record of Discussions
 - (2) The official request made by the Government of Indonesia with respect to expert services, training of counterpart personnel in Japan and provision of equipment by means of A-1, A2-3, and A-4 Forms respectively.
 - (3) Minutes of Meetings and the Annual Work Plans agreed or accepted in the course of implementation of project.
2. For the purpose of evaluation, both teams discussed various aspects of the Project and observed the buildings, machinery, equipment, facilities and utilities made available for the Project.

III. RESULT OF EVALUATION

1. Building and Facilities

Upon the signing of the Exchange of Note on June 20, 1981, the construction of the Chemical Industry Training and Development Center was started. The Center consisting of an administrative building, training and development building, training affairs building, lecture hall and work-shop was completed and handed over from the Government of Japan to the Government of Indonesia in February, 1983.

Meanwhile, the dormitory, staff houses, garage, roof for the mini-plant were constructed by the Indonesian Government.

(REMARKS)

In spite of the limitation of the national budget of the Government of Indonesia, the effort made by the Indonesian side for the construction of the dormitory and staff houses, etc. is highly appreciated.

2. Staffing

- (1) When the building of PUS-PPIK was handed over from the Japanese side to the Indonesian side, the number of staff is not enough to operate PUS-PPIK. However, the situation has been improved year by year and at present PUS-PPIK has 84 permanent staff and 20 temporary teaching Staff.
- (2) The list of counterpart personnel as of August, 1986 is in Annex 1.
- (3) The Indonesian side fully recognized the importance of local training and provided 6 staff with the opportunity of local training in the various fields such as analytical chemistry, treasury, etc.

(REMARKS)

- (1) Though the present director of PUS-PPIK is not assigned on the full time basis, PUS-PPIK has been managed and operated considerably well.
- (2) The assignment of the full time director as well as the necessary number of counterpart personnel is necessary for the attainment of the effective technology transfer.
- (3) Some counterpart personnel hold two posts at PUS-PPIK. For the promotion of the effective technology transfer, it is desirable that each counterpart personnel belongs exclusively to some specialized section.
- (4) The local training, if it is available, is considered to be the most useful and effective means of training. The effort made by the Indonesian side for the realization of the local training is highly appreciated.

3. Management and Administration

All administrative and managerial services especially for operating the academy courses are being provided by the existing staff of the PUS-PPIK, Ministry of Industry.

The joint committee which consists of delegates from the PUS-PPIK, PUSBINLAT, Ministry of Industry, and other ministries concerned and the Japanese side were held at least once a year for the smooth implementation of the project. Besides, the regular Project review meetings were held among the PUS-PPIK, PUSBINLAT, and Ministry of Industry.

The organization chart of PUS-PPIK is as in Annex 2.

(REMARKS)

- (1) Thanks to the effort made by the Indonesian side, especially by the Director of PUS-PPIK, the management and administration of PUS-PPIK has been carried out without much difficulty.
- (2) The Joint Committee and Project Review Meetings are well organized and these meetings were very useful for the smooth and effective implementation of the project.

- (3) The further effort by the Indonesian side is expected to be made for the speedy custom clearance of the machinery and equipment provided by the Japanese Government in order to carry out the technology transfer effectively in a limited cooperation period.
- (4) In addition to (3) above, the further effort by the Indonesian side is expected to be made for the timely presentation of A Forms relevant to this Project for the smooth and effective implementation of the Project.

4. Equipment

Between November 1981 and July 1986, machinery and equipment worth CIF ¥ 237,928,069 have been donated by the Japanese Government. (Refer to Annex 3).

The machinery and equipment so far provided have been installed and put on operation under the guidance of JICA experts and local counterpart personnel.

In addition to the equipment shipped as above, some more will be provided before November 1986. The amount of which is estimated to be approximately ¥ 45,000,000.

(REMARKS)

- (1) The main articles of machinery and equipment which are needed for the PUS-PPIK to function as Chemical Industry Training & Development Center have been already provided.
- (2) The maintenance system should be established and improved.
- (3) The Indonesia side should provide Rp 15,000,000.- within a shortest time for the handling cost in this fiscal year.

5. Japanese Expert

JICA has dispatched fourteen(14) long term experts and eight (8) short term experts. (Refer to Annex 4). In addition, five (5) JICA teams were also dispatched in connection with the Project. (Refer to Annex 5).

(REMARKS)

- (1) In general, all the experts worked very closely with Indonesian counterpart personnel in all lines of activities.
- (2) All the efforts exerted by the experts in an attempt to achieve the successful technology transfer are appreciated by the Indonesian staff.

6. Training of Counterpart Personnel in Japan

A total of sixteen (16) persons consisting of four (4) officials and twelve (12) counterpart personnel have been sent to Japan either for observation or technical training. (Refer to Annex 6)

(REMARKS)

The individual training courses carried out at National Chemical Laboratory for Industry, Industrial Research Institute of Kanagawa Prefecture and others were satisfactory with the efficient coordination of JICA.

7. Budget

A summary of the Project cost spent by the Indonesian side is shown in Annex 7.

(REMARKS)

In spite of the limitation of the national budget of the Government of Indonesia, the effort made by the Indonesia side for securing the budget as above is greatly appreciated.

8. Project Accomplishment

(1) Academy course

The academy course consists of two departments, chemical and mechanical, in which 311 students are at present enrolled in three levels of two classes through the entrance examination given to those who are graduated from senior high schools. The number of enrollments/applications are about three hundred each year, whereas the accepted students are about 110 each year for both departments.

The degree of technology transfer on all practical and experimental subjects in academy course that could be achieved by the end of the cooperation period set by the Record of Discussions in each field was summarized in Annex 8.

(REMARKS)

- (1) As to the items of measurement of length, measurement of humidity, basic technical drawing, mechanical drawing, and finishing of metal machining, the technology transfer on these items has been almost achieved.
- (2) Technology transfer on many experimental items of chemical engineering are behind schedule because of the lack of equipment.
- (3) According to the result of evaluation, 63 percent of experimental items are on the B stage in its degree of achievement of technology transfer.

Through the discussions with the Indonesian counterpart personnel and the Japanese experts as well as the observation of situation, the evaluation teams understand that the Project is on the development stage. The Indonesian counterpart personnel have just learned the basic training techniques by the practical training facilities and have not yet obtained the ability of practical application which is indispensable to the attainment of the self-reliance.

(2) Short Term Courses

With reference to the Note of ANNEX-I of the R/D, the actual plan of the short term courses was made in the annual work plan signed on February 29, 1984. The operation course and the maintenance course were conducted in April and in July, 1985 respectively.

(REMARKS)

- 1) These courses, mentioned above, have been successfully conducted and the same kind of future courses could be carried out only by Indonesian counterpart personnel.
- 2) The evaluation teams recognized that it would be necessary to conduct courses on operation technology and repair-maintenance to meet the needs of industries and other relevant organizations.

(3) Technical Services

The seminars on industrial waste-water treatment and water treatment were conducted on February 21, 1985 and on March 28, 1985 respectively with the technical assistance of the Japanese experts.

(REMARKS)

The technical service system, which was stated in the Record of Discussions, has not yet been established at the Center. Therefore, it is necessary to start the preparation for establishing the technical service system, namely the seminars, technical consultation, and execution of laboratory tests mainly in the field of water treatment and industrial waste-water treatment as soon as possible.

Conclusion and Recommendation

1. As a result of the above evaluation, it became apparent that most of the activities programmed in the Record of Discussions and other pertinent papers are behind schedule, and the current situation of the Project are on the Development Stage (Phase 2). (Refer to the Technical Cooperation Programme of the Project)

The technical cooperation started on November 19, 1981. However, because the construction of the Center had been carried out until February 1983, there was no activity in the beginning of the cooperation period. The actual technology transfer activities started around July or August 1984 when most of the counterpart personnel had been appointed to the Center.

2. In accordance with the above observations, it is deemed that further cooperation between both countries are still needed for two years and a half from November 19, 1986.

The objectives of the technical cooperation during the extended cooperation period is to improve the training method and thus achieve the self-reliance by the Indonesians through the following activities.

(a) Academy course

Continuation of the academy courses in chemical engineering and mechanical engineering.

(b) Short-term course

Operation technology and repair-maintenance courses for engineers and technicians from industries and others.

(c) Technical service

Preparation of technical service system, namely the seminars, technical consultation, and execution of laboratory tests mainly in the field of water treatment and industrial waste-water treatment.

ANNEX I. ASSIGNMENT STATE OF COUNTERPART PERSONNEL

Chemical Industry Training & Development Centre

(As of Aug. '86)

NAME	FIELDS	NAME OF COUNTERPARTS	PRESENT POST
K. TSURUOKA Y. KONDO	ADMINISTRATION OF THE PROJECT	Ir. Soebroto	CHIEF, PUSBINLAT
		Ir. Goenadi	ASST. CHIEF, PUSBINLAT
		Drs. A. Sembiring	Head, Planning, MOI, Sumatra
		Endang Suprijatna, MSc. K. Sembiring	Director of the CENTRE Deputy Director
S. CHIKAKA	CHEMICAL ENGINEERING	Yursal Yahya B.Sc.	A-CHIEF, Mech. engineering
		Aman Sentosa Bangun	Assistant
		Warman	Assistant
		Ir. Tole Purba	Chief, Mini Plant
	MINI-PLANT	Drs. Nelson Simanjuntak	Asst. Chief, Mini Plant
		Irt. Adil Panggabean	Assistant
		Hendry Sitepu B.Sc.	Assistant
		Syamsu Rinal M. Yusup Andry	Assistant Assistant Assistant
S. ISHIMARU	INSTRUMENT ENGINEERING	Harissuddi B.Sc.	Asst. Chief, Instrument
		(Mansyur B.Sc.)	Assistant
	ELECTRICAL ENGINEERING	Lukber Sitompul	Assistant
		Mansyur B.Sc. Agus Irawan Yanto	Asst. Chief, Electrical eng. Assistant Assistant
T. OKUBO (H. KURUMIYA)	ANALYTICAL CHEMISTRY	Ir. Sujarno Suwandi	Chief, Chemical eng.
		Adil Barnus B.Sc.	Asst. Chief, Chemical eng.
		Teddy	Assistant
	INDUSTRIAL CHEMISTRY	Marulak Simalango	Assistant
		Irwan Rahmiadji B.Sc.	Asst. Chief, Analytical Ch.
		Rempah Tarigan B.Sc.	Assistant
	PHYSICAL CHEMISTRY	Rosmiaty Bk. Teks.	Assistant
		Dra. Ratnawaty Trg.	Asst. Chief, Industrial Ch.
	PHYSICS	Warman B.Sc.	Assistant
		Haloman Simalango	Assistant
(Dra. Ratnawaty Trg.) H. Perangin Angin B.A. Haloman Simalango		Asst. Chief, Physics Assistant Assistant	
(H. KURUMIYA)	TECHNICAL DEVELOPMENT	Drs. S. Brahmua	Chief, Technical Development
		(Ir. Sujarno Suwandi)	Assistant
	Maltalius B.Sc. M. Nasim B.Sc. Yelmizar	Asst. Chief, Tech'l Development	Assistant Assistant
H. KURUMIYA (H. GOTO)	ORGANIC IND'L CHEMISTRY	(Irwan Rahmiadji B.Sc.)	Asst. Chief, Ind'l Chemistry
		Rempah Tarigan B.Sc. (Rosmiaty Bk. Teks.)	Assistant Assistant
	ELEC. MICROSCOPY MATERIAL DYNAMICS	(Nasim B.Sc.)	Assistant
		(Warman B.Sc.) Rejeki Maha	Assistant Assistant
H. GOTO M. TAMAYAMA J. ONO	MECHANICAL ENGINEERING	M.M. Siganjuntak	Chief, Work Shop eng.
		Kagaludin Saragih	Asst. Chief, Work Shop Eng.
		Buchari Hasiholan	Assistant
		Hanaban Hutagalung	Assistant
		Bachtiar Effendi	Assistant
		Ridwan	Assistant
		M. Svarifudin	Assistant
		Irawansyah B.Sc.	Assistant
		Tengku Aminullah	Assistant to the drawing
		Ngentang Tarigan	Assistant to the same