

LIST OF ANNEXES

- ANNEX - 1 Project Design Matrix (PDM) for Evaluation
- ANNEX - 2 Chronological Review of the Project
- ANNEX - 3 Tentative Schedule of Implementation
- ANNEX - 4 Technical Cooperation Program for the Project
- ANNEX - 5 Organization Chart of DIP
- ANNEX - 6 Items of Technical Transfer and Accomplishment
- ANNEX - 7.1 Record of Activities of CDC (Seminars and Trainings)
- ANNEX - 7.2 Record of Ceramic Factory and Mine Visits
- ANNEX - 8 List of the Dispatched Japanese Experts
- ANNEX - 9 Japanese Study Team Dispatched by JICA
- ANNEX - 10 List of the Thai Counterpart Personnel Trained in Japan
- ANNEX - 11 Machinery and Equipment Provided by the Japanese Side
- ANNEX - 12 Expenses by the Japanese Side
- ANNEX - 13 List of Thai Counterpart Personnel and Supporting Staff
- ANNEX - 14 Machinery and Equipment Provided by the Thai Side
- ANNEX - 15 Construction Record of Ceramic Development Center
- ANNEX - 16 Expenses by the Thai Side

MT

I.P.

ANNEX - 1 PROJECT DESIGN MATRIX (PDM) FOR EVALUATION

The Northern Ceramic Development Center Project

Narrative Summary	Verifiable Indicator	Means of Verification	Important Assumptions
<p>Overall Goal Quality of northern Thai ceramic ware is improved.</p>	<p>1) Improvement in quality of the products 2) Sales amount of ceramic products</p>	<p>1) Interviews with/questionnaires to the people engaged in ceramic industry. Sampling test by NCDC. 2) Statistics on sales of products.</p>	<p>- Demand for ceramic products does not fall drastically - Government's policy on promoting small-medium industry is maintained.</p>
<p>Project Purpose NCDC is able to provide information and technical guidance on material use and production techniques to the northern Thai ceramic factories.</p>	<p>1) Frequency of access by the factories to NCDC for technical services. 2) Number of newly developed/introduced techniques employed by the factories. 3) Participation of the factories in the training/seminars offered by the project.</p>	<p>1) Interviews with/questionnaires to the factories 2) Interviews with/questionnaires to the factories 3) Records of training/seminars</p>	<p>- Factories employ trained personnel on stable bases. - Domestic production machineries are supplied at reasonable price.</p>
<p>Outputs 0) Managerial and operational system of NCDC is established. 1) Equipment for research and development (R&D) on material use and production is installed and maintained properly. 2) C/P are trained in material use and production techniques. 3) R & D on material use and production techniques is conducted. 4) Result of R & D is disseminated through publications, training and seminars. 5) Technical guidance for ceramic factories is provided individually.</p>	<p>0) Organizational structure and content of annual operation plan 1) Installation and use of equipment 2) Number and technical level of C/P trained 3) Newly developed techniques and result of research 4) Topics, contents and number of participants in training/seminars held, and titles and contents of publications produced. 5) Number of consultations from the factories and number of visits made by NCDC</p>	<p>0) Annual plan of operation 1) Maintenance book 2) Interviews with experts, project reports 3) Project reports, technical reports 4) Project reports, record of training/seminars and publication list 5) Records of consultation from the factories and list of factories visited</p>	<p>- The factories consult with NCDC more frequently - Trained C/P are retained.</p>

M.H.

S.P.

<p>Activities</p> <ul style="list-style-type: none"> 0-1) Allocate staffs planned. 0-2) Formulate and implement annual operation plan. 0-3) Formulate and implement annual budget. 1-1) Make a plan of arrangement of facilities and equipment and implement it accordingly. 1-2) Install and operationalize equipment. 1-3) Maintain facilities and equipment. 2-1) Make a plan to train C/P. 2-2) Train C/P in accordance with the plan. 2-3) Train selected C/P in Japan. 3-1) Assess needs of the ceramic industry for R. & D. 3-2) Select themes for research and development. 3-3) Make a plan of R & D. 3-4) Conduct R & D as planned. 3-5) Compile research result in reports. 4-1) Assess needs of the ceramic industry for training/seminars. 4-2) Make a plan of training and seminar courses. 4-3) Prepare training/seminar curriculum and materials. 4-4) Conduct training/seminars. 4-5) Publish result of R & D. 5-1) Study conditions of the factories by visits. 5-2) Provide guidance for consultations from the factories. 5-3) Provide technical guidance for the factories on site. 	<p style="text-align: center;">Inputs</p> <p><u>Japanese Side</u></p> <ul style="list-style-type: none"> (1) Experts: long-term 8, short-term 30 (cumulative) (2) Accepted trainees: 17 (3) Equipment: material use, production technics etc. (4) Total budget: approx. JPY 830million <p><u>Thai Side</u></p> <ul style="list-style-type: none"> (1) Land and buildings: facilities of NCDC costing to 118.7million Baht. (2) Materials and equipment: equipment for use of raw materials and production technics, raw materials, chemicals, fuel and vehicles (3) Counterparts and assistant staff: official 17, permanent 11, temporary 22, as of September, 1997 (4) Local budget: approx. 57.6 million Baht 	<p>- Trained C/P do not leave NCDC.</p> <p>Pre-conditions</p> <ul style="list-style-type: none"> - Facilities of NCDC are constructed as planned. - Supply of raw materials and consumables necessary for lab testing and factory operation is stable. - Raw material mines are cooperative to the research and study.
---	---	--

Handwritten signature

Handwritten initials

ANNEX - 2 CHRONOLOGICAL REVIEW OF THE PROJECT

Year	Month / Date	Item
1988	February	The Thai government submitted a request for a project-type technical cooperation to the Government of Japan
1991	February	Dispatch of the Preliminary Survey Team
1992	May	Dispatch of the Experts Survey Team
	October	Dispatch of the Implementation Survey Team
	October 14	Sign of the Record of Discussion (R/D) / Start of the Term of the Cooperation
1993	April 20	Dispatch of the 1st Group of Japanese Long-Term Experts
	May 18	Completion of NCDC Building
	June 25	Visit by Vice-Minister of Industry
	September 21	Ceremony of the First Firing
	August - September	Dispatch of the Consultation Team
1994	February 16 - 20	Opening Ceremony & 1st Ceramic Fair
	March - April	Training of the 1st Thai Counterparts in Japan
	July - August	Dispatch of the Technical Guidance Team
	August 19	Visit by Japanese Ambassador to Thailand
1995	February 2 - 6	2nd Ceramic Fair
	November - December	Participation in exhibition "World Tech '95" in Nakhorn Ratchasima
	December 6 - 12	Ceramic Fair '95
	December 28	Visit by Vice-Minister of Industry
1996	October - November	Dispatch of the Advisory Team
	November 22 - December 1	Ceramic Fair '96
1997	March 4	Visit by Japanese Ambassador to Thailand
	August 28	Seminar "New Processing Method of Lampang China Stone"
	September	Dispatch of the Evaluation Team

MM

i.p.

ANNEX 3. TENTATIVE SCHEDULE OF IMPLEMENTATION FOR THE PROJECT

Calendar Year	1991	1992	1993	1994	1995	1996	1997	
Quarter	I	II	III	IV	I	II	III	IV
Term of the Project (5 Years)	II	III	IV	I	II	III	IV	I
The Thai Side								
I. Staff Assignment								
II. Construction of the Center								
III. Procurement of Machinery & Equipment								
IV. Allocation of Operational Costs								
V. Operation & Management of the Center								
VI. Preparation of Progress Report								
The Japanese Side								
I. Dispatch of Survey Teams								
1) Implementation Survey Teams								
2) Consultation Team								
3) Technical Guidance Team								
4) Advisory Team								
5) Evaluation Team								

Calendar Year	1991				1992				1993				1994				1995				1996				1997			
	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	
II. Dispatch of Experts																												
1) Long term Experts																												
① Chief Adviser																												
② Coordinator																												
③ Ceramic Raw Material																												
④ Ceramic Processing																												
2) Short term Experts																												
① Supervisor for Installation of Machinery & Equipment																												
② Research & Development																												
③ Seminar																												
④ Others																												
III. Training of Counterpart Personnel in Japan																												
① Observation																												
② Raw Materials & Processing																												
③ Research & Development																												
IV. Provision of Machinery & Equipment																												
V. Preparation of Progress Report																												

PH

i.p.

ANNEX-4 TECHNICAL COOPERATION PROGRAM FOR THE PROJECT

PLAN		1992	1993	1994	1995	1996	1997
Calendar Year	Quarter						
Term of the Project (5 years)							
I. Training Ceramic Making Technology							
(1) Ceramic Raw Materials Technology							
	① Selection						
	② Beneficiation						
(2) Ceramic Processing Technology							
	① Prepared mass & Prepared glaze						
	② Forming						
	③ Firing						
	④ Glazing & Decoration						
	⑤ Gypsum mould making						
(3) Research & Development							
	① Ceramic raw materials testing						
	② Materials testing						
	③ Ceramic products testing						
(4) Others							
	③ Seminars						
II. Center Training Course Program							
	(1) Basic Technology						
	(2) Applied Technology						

MMH

S.P.

1993-1994 Implemented

Month	4	5	6	7	8	9	10	11	12	1	2	3
I. Training Ceramic Making Technology												
1) Basic Training												
① Raw Material												
② Glaze												
③ Forming												
④ Firing												
⑤ Testing & Analysis												
2) Seminars												
II. Inspection & Research												
III. Center Activity Program												

MEL

I.P.

1994~1995 Implemented												
Month	4	5	6	7	8	9	10	11	12	1	2	3
I. Training Ceramic Making Technology												
1) Basic training												
① Raw Material												
② Glaze												
③ Forming												
④ Firing												
⑤ Testing & Analysis												
⑥ Gypsum mould making												
2) Advanced Training												
① Analysis of Lampang Endowed Material												
② Study of Glaze												
③ Improvement of Firing Technic												
④ Improvement of material processing												
⑤ Creative Designing Technic												
⑥ Utilization of by-product from clay washing process												
3) Seminars												
II. Inspection & Research												
III. Center Activity Program												

PH

L.P.

1995~1996 Implemented

Month	4	5	6	7	8	9	10	11	12	1	2	3
I. Training Ceramic Making Technology												
1) Advanced Training												
① Analysis of Lampang Endowed Material												
② Study of Glaze												
③ Improvement of Firing Technic												
④ Improvement of material processing												
⑤ Development of Forming Technic												
⑥ Development of Gypsum mould making												
⑦ Creative Designing Technic												
2) Application Training (3rd year Training)												
① Development of Lampang Endowed Material												
② Porcelain Development												
③ Research on Thai Raw Material												
④ Glaze Development												
⑤ Improvement of Firing Technic												
⑥ Improvement of Material Processing Technic												
3) Seminars												
II. Inspection & Research												
III. Center Activity Program												

NIL

1.P

1996~1997 Implemented

Month	4	5	6	7	8	9	10	11	12	1	2	3
I. Training Ceramic Making Technology												
1) Application Training (3rd-4th year Training)												
① Development of Lampang Endowed Material												
② Porcelain Development												
③ Research on Thai Raw Material												
④ Glaze Development												
⑤ Lab Test Standard Set-Up												
⑥ Experiment on Dolomite Ware												
⑦ Improvement of Material Processing Technic												
⑧ Improvement Forming Technic												
⑨ Improvement of Firing Technic												
⑩ Development of Utilization of Lampang Material												
⑪ Study of QC												
II. Inspection & Research												
III. Center Activity Program												

MH

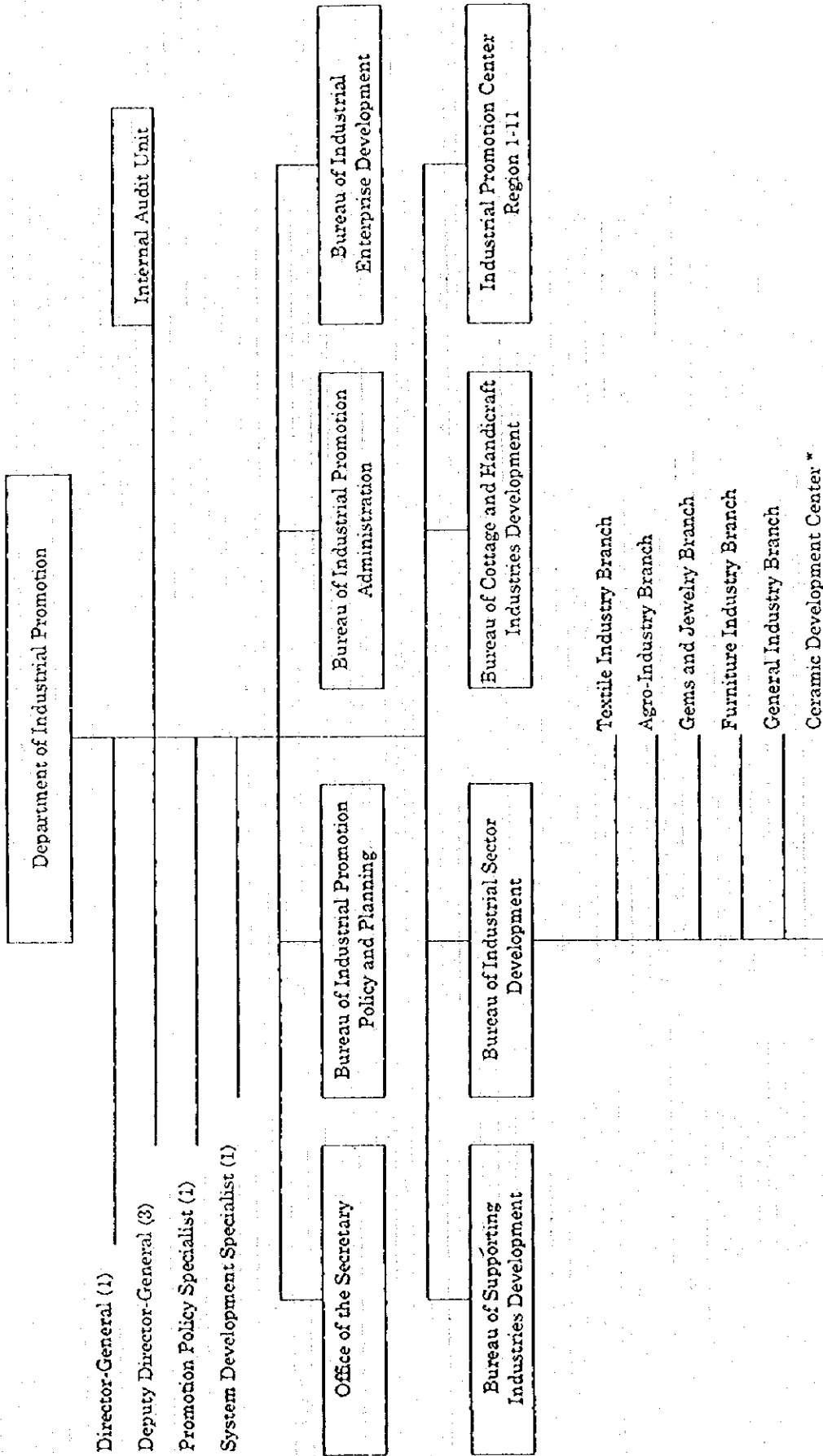
S.P.

1997 Implemented	4	5	6	7	8	9	10	11	12	1	2	3
Month												
I. Training Ceramic Making Technology												
1) Application Training (5th year Training)												
① Research of Lampang Endowed Material												
② Development of Utilization of Lampang Material												
③ Glaze Development												
④ Lab Test Standard Set-UP												
⑤ Improvement Forming Technic												
⑥ Improvement of Firing Technic												
⑦ Improvement of Creative Designe												
2) Seminars												
II. Inspection & Research												
III. Center Activity Program												

MWC

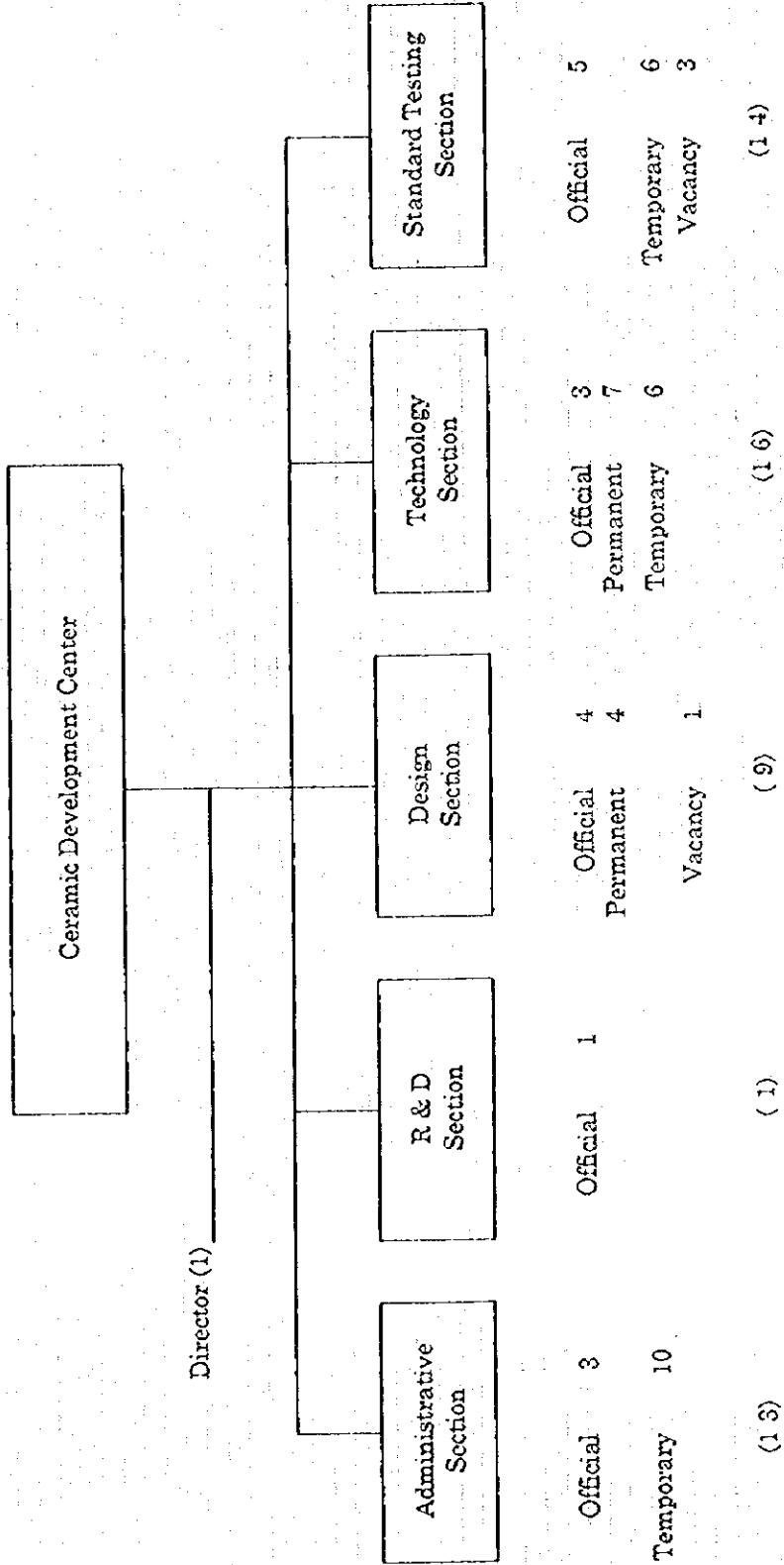
L.P.

ANNEX - 5 ORGANIZATION CHART OF DIP



MH

J.P.



MH

i.p.

ANNEX - G ITEMS OF TECHNICAL TRANSFER AND ACCOMPLISHMENTBASIC TRAINING

1. General principles

1) It is required of an CDC staff, as an industrial promotion officer, regardless of his/her field of specialty, to have overall knowledge on production process of tableware. Therefore, this training is designed for all the eligible CDC staff to acquire knowledge on overall process of tableware production, including development of minimum manual handling skill required in the tableware production process.

2) The ceramic production technology requires repeated practice and experiment. Therefore, the training program is made up with due emphasis on practice and experiment.

3) Quality control is a very important requisite in production of high quality ceramic wares. Therefore, quality control, or QC, will be given high priority throughout this training program.

4) The training must be conducted with active participation by the CDC staff. Questions and discussions are encouraged. Group activities will be adopted in as many cases as possible in order to strengthen the spirit of team-work and mutual collaboration.

5) The training program will be organized so as not to hinder the routine works of the Center, in order for all the eligible staff to make full participation in the training program. At the same time, once the training program has been set up, it must be given the utmost respect.

2. Study items

1) Raw Material

Method and purpose of clay washing

Preparation of body clay

Particle size and its affect on quality

Particle size adjustment

Flow of production and production control

2) Gypsum Mold

Method of mold making

3) Forming

Method of forming

Selection of forming method in relation to body clay

Drying and finishing method

Cause of defect and rectification method

4) Firing

Biscuit, Glost, Over-glazing firing

Defect in firing process and its prevention

Conditions for firing and loading

Firing record and control of firing

Unloading method

5) Decoration

Glazing method

Decoration method and choice of method

Preparation of pigment and decalcomania

MA

6) Inspection

- Inspection and appraisal of products
- Study and review of the defect and production process

ADVANCED TRAINING

The advanced training had been implemented from September 1994 to September 1995.

1. General principles

1) The training curriculum consists of research and studies. Research subjects are specified by each section of the CDC. Result of the studies shall be developed as training and information materials for use of direct guidance to factories and be presented in seminars. The CDC bulletin will feature the results of the studies.

2) Implementation program must be made on each study subject. Each study shall strictly follow the implementation plan.

3) The study items are selected, taking into consideration the problems that the ceramic industry is facing with, and also the present level of the CDC.

2. Study items

Standard Testing Section

* Material analysis

- a. Analysis of Lamphang materials, crude and washed clay. Collect samples from mines and clay washing factories periodically in order to observe changes in quality;
- b. Research on utilization of silica and feldspar materials;
- c. Analyses of the materials from other parts of Thailand.

* Study of Celadon glaze

- a. Analysis of available wood ash;
- b. Development of synthetic celadon glaze.

Technology Section

* Study on firing technic

Research on firing curve applied in the factories and study to improve the firing technic.

* Study on effects of de-ironing process

* Study on most appropriate grinding conditions

Design Section

* Study on creative designing technic of ceramic products

- a. Improvement of gypsum mold making;
- b. Improvement of designing technic and new product development

Joint study of Standard Testing Section & Technology Section

* Study on utilization of by-product in clay washing process

- a. Application to wall and floor tile production

MH

I.P.

APPLICATION TRAINING

The application training is scheduled to start in October 1995 and it lasts until the end of the Project.

1. General principles

1) The training curriculum will consist in line with General guideline of training curriculum that is decided at the beginning of the Project. The participants will improve their knowledge, technology learned in past 2 years, and study further practicable subject. The study items are taking into consideration the problems that the ceramic industry is facing with, in order to promote the cooperation between CDC & ceramic factories.

2) Planning and implementation of program must be made by each participants independently. The expert undertake the task of teaching or give advice in case of need.

3) Promotion of arrangement, summing, and publishing the result of study.

2. Study items

- 1) Development of technology about utilization of Lampang materials
(Whole crude grinding method)
- 2) Development of stone-ware body using whole crude
- 3) Research about distribution of Thai materials
- 4) Development of porcelain body in which Thai materials is main components
- 5) Development of insulator body in which Thai materials is main components
- 6) Development of high temperature glaze
- 7) Creating the testing standard of Laboratory section
- 8) Study on improvement of firing technology
- 9) Training of hand-making technic
- 10) Study and testing on raw material of dolomite
- 11) Training of quality control technology
- 12) Improvement of ceramic design ability

MA

L.P.

ANNEX - 7.1 RECORD OF ACTIVITIES OF CDC (SEMINARS AND TRAININGS)

ACTIVITY	TIME	NUMBER of PARTICIPANT
Training [1994]		
- Basic Glaze	Nov. '93	60
- Forming by Throwing Technic (Basic step) (In cooperation with Payoa Industrial Office)	Jan. '94	20
- Basic Ceramic Testing	Jan. '94	15
- Forming by Throwing Technic (Basic step) (In cooperation with Nan Industrial Office)	Mar. '94	20
- Calculation Basic Glaze	Apr. '94	15
- Basic Glaze	Apr. '94	15
- Silk screen on Transferpaper Printing (In cooperation with Industrial Service Division Department of Industrial Promotion)	Apr. '94	15
- Basic Glaze	Jun.-Jul. '94	23
- Basic Ceramic Testing	Jun. '94	15
- Calculation Basic Glaze	Aug. '94	15
Total		213
Seminar [1994]		
- Ceramic Fibre Kiln Construction	Oct. '93	60
- Product Development together with JETRO	May. '94	30
- Marketing for Ceramic Product Exporting	Mar. '94	60
- Stoneware 1200C	Aug. '94	50
Total		200
Individual Service [1994]		
- Consultation about Management in connection with Production	1994	82
- Testing Analysis Service	1994	38
- NCDC Machine Service	1994	1
Total		121
Training [1995]		
- Basic Glaze	Oct. '94	25
- Forming by Throwing Technic	Jan. '95	5
- Basic Glaze	Jan. '95	23
- Forming by Throwing Technic	Mar. '95	20
- Begining class for Ceramic Process	Apr. '95	15
- Forming by Throwing Technic	Apr. '95	20
- Firing Technic with local Kiln Development	Apr. '95	42
- Middle Level Glaze	Jun.-Jul. '95	15
- Middle Level Glaze	Jun. '95	20
Total		185

ACTIVITY	TIME	NUMBER of PARTICIPANT
Seminar [1995]		
- Stoneware Development together with JETRO	Oct. '94	49
- Production and Designing in Ceramic Industry (In cooperation with MTEC)	May. '95	51
- Increasing Capability in Ceramic Industry (In cooperation with Industrial Productivity Division)	Mar. '95	57
- Seminar and Field Trip for Improvement of Capability in Ceramic Industry (In cooperation with Lampang Industrial Office)	Aug. '95	61
Total		218
Individual Service [1995]		
- Data and Consult Service	1995	243
- Analysis and Testing Service	1995	72
- NCDC Machine Service	1995	1
Total		316
Training [1996]		
- Basic Glaze	Oct. '95	4
- Middle Level Glaze	Feb. '96	23
- Basic Glaze	Apr. '96	12
- Introduction to Ceramic Processing	May. '96	10
- Painting Underglaze Decoration	Jun. '96	13
- Forming by Throwing Technic	Apr. '96	35
- Forming by Throwing Technic	Aug. '96	5
- Forming by Throwing Technic	Aug. '96	29
- Forming by Throwing Technic	Sep. '96	10
- Middle Level Glaze	Sep. '96	7
Total		148
Seminar [1996]		
- X-Ray Analysis in Ceramic Field (In cooperation with Phillips Electronic Co.Ltd. Thailand)	Jun. '96	50
- LPG 2 Valve System (In cooperation with Petroleum Authority of Thailand)	Jun. '96	100
Total		150
Individual Service [1996]		
- Data and Consultancy Service	1996	165
- Analysis and Testing Service	1996	60
- NCDC Machine Service	1996	15
Total		240

MA

I.P.

ACTIVITY	TIME	NUMBER of PARTICIPANT
Training [1997]		
- Introduction to Ceramic Processing	Nov. '96	18
- Oxide Glaze 2	Jan. '97	11
- Oxide Glaze 1	Mar. '97	10
- Firing Technic	Apr. '97	21
- Mould making	May. '97	10
- Slip Casting	Jun. '97	14
- Under Glaze Decoration Technic	Jul. '97	7
- Over Glaze Silk screen	Jul. '97	12
Total		103
Seminar [1997]		
- Manufacturing of Whiteware In cooperation with National Science and Technology Development Agency	Oct. '96	50
- New Processing Method of Lampang China Stone	Aug. '97	42
Total		92
Individual Service [1997]		
- Data and Consultancy Service	1997	212
- Analysis and Testing Service	1997	42
- NCDC Machine Service	1997	8
Total		262

RECORD OF PUBLICATION OF CDC

TITLE	TIME
1. Basic Glaze	1994
2. Technical Report Vol. 1	Apr. '95
3. Technical Document Vol. 1	Oct. '95
4. Technical Report Vol. 2	Feb. '96
5. Technical Report Vol. 3	Mar. '97
6. Hand Book Of Ceramic Tableware	Mar. '97
7. Technical Report Vol. 4	Sep. '97

M.H.

S.P.

ANNEX - 7.2 RECORD OF CERAMIC FACTORY & MINE VISITS
for Inspection, Research and Technical Guidance

	DATE	NAME	LOCATION	PRODUCT
1	93/06/07	MASHER CRAFT	Lampang	Novelty
2	93/06/10	T. W. CERAMIC CO., LTD.	Lampang	Table Ware
3	93/06/11	THEP PRA THAN CO., LTD.	Lampang	Novelty
4	93/06/17	MUANGKAMN CERAMICS LTD., PART	Lampang	Sanitary Ware, Railing
5	93/07/12	SANGATHI CERAMIC CO., LTD.	Lampang	Flower Pot, Vase
6	93/07/13	INDRA CERAMIC CO., LTD.	Lampang	Novelty, Table Ware
7	93/07/14	SANG ARUN CERAMIC CO., LTD.	Lampang	Novelty, Table Ware, Flower Pot
8	93/07/15	CERAMIC LAND CO., LTD.	Lampang	Novelty, Vase
9	93/07/16	THAI CERAMIC LAMPANG CO., LTD.	Lampang	Novelty, Table Ware
10	93/07/19	S. P. P CERAMICS CO., LTD.	Lampang	Table Ware, Novelty
11	93/07/20	TONGPO CERAMIC FA.	Lampang	Table Ware, Flower Vase
12	93/07/21	SOMBOON KRANG KLUAP FA.	Lampang	Flower Pot, Vase, Novelty
13	93/07/22	LAMPANG KOON CERAMIC CO., LTD.	Lampang	Novelty, Flower Vase
14	93/07/28	CIRCLE CERAMIC CO., LTD.	Lampang	Raw Materials, Table Ware
15	93/08/05	THAI KAOLIN LTD.	Lampang	Raw Materials
16	93/10/06	SIAM CERADON	Chiangmai	Table Ware
17	93/11/15	THAI KAOLIN LTD.	Lampang	Raw Materials
18	93/12/16	THAI KAOLIN LTD.	Lampang	Raw Materials
19	94/02/22	TKK CERAMIC CO., LTD.	Lampang	Novelty
20	94/03/31	MRD-ECC CO., LTD. (BANPU)	Lampang	Raw Materials
21	94/04/27	KITTIROJ WHITE CLAY	Lampang	Raw Materials
22	94/07/07	TEERAVUT CO.	Lampang	Raw Materials
23	94/07/29	THAI KAOLIN LTD.	Lampang	Raw Materials
24	94/09/08	FELLOP CO.	Saraburi	Flit
25	94/09/08	COTTO CO.	Saraburi	Tile
26	94/09/09	STAR SANITARY CO.	Saraburi	Sanitary Ware
27	94/09/10	PUPAE CO.	Bangkok	Novelty
28	94/09/15	THAI CERADON	Chiangmai	Table Ware, Novelty
29	94/07/15	MAERIM CERAMIC	Chiangmai	Table Ware, Novelty
30	94/07/16	SIAM CERADON	Chiangmai	Table Ware, Novelty
31	94/07/16	MAENGRAI XLIN	Chiangmai	Table Ware, Novelty
32	94/07/17	SAENGSEU CERADON	Chiangmai	Table Ware, Novelty
33	94/07/17	BANN CERADON	Chiangmai	Table Ware, Novelty
34	94/09/19	DIN KHAO LAMPANG	Lampang	Raw Materials
35	94/09/21	SATAPORN	Lampang	Raw Materials
36	94/09/28	LAMPANG PHUM WATANA	Lampang	Raw Materials
37	94/10/06	THAI KAOLIN LTD.	Lampang	Raw Materials
38	94/10/12	TEERAVUT CO., LTD.	Lampang	Raw Materials

MA

I.P.

39	91/10/13	THAI CHAROEN CERAMIC CO., LTD	Lampang	Novelty, Flower Pot
40	91/10/20	SANG ARUN CERAMIC CO., LTD	Lampang	Novelty, Table Ware, Flower Pot
41	91/10/26	LAMPANG PHUM WATTANA	Lampang	Raw Materials
42	91/11/03	TEE CERAMIC	Lampang	Novelty
43	91/11/15	TKK CERAMIC	Lampang	Novelty
44	95/02/22	TIC 1991 CO. LTD.	Lampang	Raw Materials
45	95/03/07	KHON SAN CERAMIC	KHONKAEN	Flower Pot, Table Ware
46	95/03/08	KHONKAEN CERAMIC	KHONKAEN	Sanitary Ware
47	95/03/09	MARAI DINPHAO	Nakonratchasima	Tile
48	95/03/09	CHAOW DIN POTTERY	Nakonratchasima	Tile
49	95/03/10	DIN PHAO	Nakonratchasima	Novelty
50	95/03/10	AUM BENG CERAMIC	Nakonratchasima	Novelty
51	95/03/27	SANG ARUN CERAMIC CO., LTD	Lampang	Novelty, Table Ware, Flower Pot
52	95/05/29	DAKE CHUPRA FACTORY	Lampang	Railing
53	95/06/01	THAI PORCELAIN CO., LTD	Lampang	Table Ware
54	95/06/02	THAI KAOLIN LTD.	Lampang	Raw Materials
55	95/06/13	POTTER HOUSE	Hat Yai	Table Ware, Flower Pot
56	95/06/14	THAKSINRACHANIWET PALACE PROJECT	Hat Yai	Table Ware, Flower Pot
57	95/06/14	BECHAN BESAR KAOLIN DEPOSIT	Narathiwat	Raw Materials
58	95/06/16	SURATHANI BALLCLAY DEPOSIT & MINE	Surathani	Raw Materials
59	95/06/16	SURAT DINTHONG	Lampang	Water Pot
60	95/06/17	MKD-ECC (BANPU)	Ranong	Raw Materials
61	95/06/19	PATTANAKOSIN POTTERY	Ratchaburi	Water Pot
62	95/07/26	SK CERAMIC	Lampang	Vase
63	95/08/01	PAK HUI CHALONG MINE	Uttaradit	Raw Materials
64	95/08/02	BAN T. PHA JUK MINE	Uttaradit	Raw Materials
65	95/08/07	TIC 1991 CO.	Lampang	Raw Materials
66	95/08/07	TEERAYUT CO.	Lampang	Raw Materials
67	95/08/09	SANG ARUN CERAMIC CO., LTD	Lampang	Novelty, Table Ware, Flower Pot
68	95/08/10	LAMPANG KHUN WATANA	Lampang	Raw Materials
69	95/08/10	SATAPORN	Lampang	Raw Materials
70	95/08/11	TKK CERAMIC CO., LTD.	Lampang	Novelty
71	95/08/11	LAMPANG SHUPANAKORN CO. LTD	Lampang	Table Ware, Vase
72	95/08/14	THAI CHAROEN CERAMIC CO., LTD	Lampang	Cup, Novelty, Pot
73	95/08/15	LAMPANG KOON CERAMIC CO., LTD.	Lampang	Novelty
74	95/08/15	INDRA CERAMIC CO., LTD	Lampang	Table Ware, Novelty
75	95/08/17	THAI PORCELAIN CO., LTD	Lampang	Table Ware
76	95/10/03	TIC 1991 CO.	Lampang	Raw Materials
77	95/10/03	SATAPORN KAOLIN MINING	Lampang	Raw Materials
78	95/10/04	LAMPANG PHUM WATTANA	Lampang	Raw Materials
79	95/10/04	TEERAYUT CO.	Lampang	Raw Materials
80	95/10/05	THAI KAOLIN LTD.	Lampang	Raw Materials

MA

81	95/10/06	MRD TCU (BANPU)	Lampang	Raw Materials
82	95/10/06	CLAYMIN CO.	Lampang	Raw Materials
83	95/11/14	SANG ARUN CERAMIC CO., LTD.	Lampang	Novelty, Table Ware, Flower Pot
84	95/11/15	ATLANTIC INTERNATIONAL	Lampang	Raw Materials
85	95/12/18	SANG ARUN CERAMIC CO., LTD.	Lampang	Novelty, Table Ware, Flower Pot
86	95/12/18	QUALITY CERAMIC CO., LTD.	Lampang	Cup, Novelty, Flower Pot
87	95/12/20	TIC 1991 CO.	Lampang	Raw Materials
88	95/12/20	CLAYMIN CO.	Lampang	Raw Materials
89	96/01/11	MELIAR CERAMIC LTD. PART.	Lampang	Vase, Flower Pot
90	96/01/15	FORATTANA CO., LTD.	Uttaradit	Raw Materials
91	96/01/26	SOMSAK CERAMIC FA.	Lampang	Table Ware, Railing
92	96/03/13	ASIA CERAMICS FA.	Lampang	Railing, Vase
93	96/03/13	CHAI CERAMIC FA.	Lampang	Ginger Jar, Vase
94	96/03/29	SANGCHAI CERAMIC CO., LTD.	Lampang	Jar, Flower Pot
95	96/05/02	ASIA CERAMIC	Lampang	Railing, Vase
96	96/06/13	KITTIROJ CERAMICS, FA.	Lampang	Novelty
97	96/06/15	MENGRAI KILN	Chaingmai	Table ware and pot of celadon
98	96/06/15	SIAM CELADON	Chaingmai	Table ware and pot of celadon
99	96/06/15	PAMPACHA	Chaingmai	Sales of ceramics and textiles
100	96/06/20	LAMPANGKON CERAMIC CO., LTD.	Lampang	Table ware, Novelty
101	96/06/24	T. K. K CERAMIC CO., LTD.	Lampang	Novelty
102	96/06/27	QUALITY CERAMIC CO., LTD.	Lampang	Table ware
103	96/07/01	CIRCLE CERAMIC CO., LTD.	Lampang	Table ware, Novelty
104	96/07/11	THAI KAOLIN LTD.	Lampang	Raw Materials processing
105	96/07/13	PAHOMMATAYA MINING CO.	Kanchanaburi	Mining of Dolomite
106	96/07/13	RAJANAKOSIN RATCHABURI	Ratchaburi	Making of large pot and sales of many kinds of ceramics
107	96/07/25	PATRA RAJANA CLAYS & MINERALS	Lampang	Raw Materials processing
108	96/08/01	LAMPANG THEPSET	Lampang	Novelty, Railing
109	96/08/01	TARK HANDCRAFT	Lampang	Novelty of small type
110	96/08/01	CHU PRA	Lampang	Flowerpot
111	96/08/01	LAMPANG THEPSET SHOW ROOM	Lampang	Sales of ceramics
112	96/08/08	OM CERAMIC ROOF CO., LTD.	Chaingmai	Roofing tile (Japanese type)
113	96/08/08	THUMLANG CERAMIC CO., LTD.	Chaingmai	Table ware
114	96/08/08	MAE RIM CERAMIC SUADHO	Chaingmai	Sales and making of ceramics (also export to Japan)
115	96/08/08	SURIWANNA FACTORY	Chaingmai	Flowerpot, Table ware, Novelty
116	96/08/15	REANUVAE CERAMIC	Lampang	Railing
117	96/08/20	STANDARD INSULATOR CO., LTD.	Samutprakarn	Insulator
118	96/08/21	COMPOUND CLAY CO., LTD.	Bangkok	Raw Materials processing
119	96/08/28	SANG ARUN CERAMIC CO., LTD.	Lampang	Novelty, Table Ware, Flower Pot
120	96/08/29	MUEJAN	Lampang	Raw Materials processing

MCA

121	96/09/05	TECHWORLD Plant-2	Lampang	Table ware, Pot
122	96/09/19	MEE SILP CERAMIC CO., LTD.	Lampang	Large pot, Umbrella stand, Flower vase, Earthen pot
123	96/09/26	MEELAP CERAMIC CO., LTD.	Lampang	Novelty
124	96/10/17	PN CERAMIC CO., LTD.	Lampang	Novelty, Table ware (Porcelain)
125	96/11/22	CERAMIC TIME CO., LTD.	Lampang	Baling
126	96/11/22	LAMPANG SIEPANAKORN CO., LTD.	Lampang	Table ware, Pot
127	96/11/28	PAIRA RATANA CLAYS & MINERALS	Lampang	Raw Materials
128	97/01/09	IRECOM CERAMIC FACTORY CO., LTD.	Lampang	Small Flowerpot
129	97/01/17	SAW CHLADON CO., LTD.	Chiangmai	Table Ware, Novelty
130	97/01/29	TR 1991 CO., LTD.	Lampang	Raw Materials
131	97/02/06	BENJAPORN CO., LTD.	Lampang	Raw Materials
132	97/02/11	SATAPORN CO., LTD.	Lampang	Raw Materials
133	97/02/20	THAI KAOLIN LTD.	Lampang	Raw Materials
134	97/02/27	PAIRA RATANA CLAYS & MINERALS	Lampang	Raw Materials
135	97/03/01	BAN THONGLUANG VILLAGE	Sukhothai	Flowerpot
136	97/03/18	TSK ENGINEERING Co., Ltd.	Chonburi	Ceramic Machine
137	97/03/19	PETKASEM CERAMIC MACHINE Co., Ltd	Nakhonpatom	Ceramic Machine
138	97/03/19	MRD-ECC (BANPU) Co., Ltd.	Lampang	Study Room of Ceramic
139	97/03/21	THAI CHARACK Co., Ltd	Lampang	Flowerpot
140	97/03/28	KOKHA PHANDINPHYO CO., LTD	Lampang	Bowl, Raw Materials
141	97/05/29	SAENGCHAI CERAMIC Co., Ltd	Lampang	Table ware and pot
142	97/06/12	KORAT POTTERY Co., Ltd.	Nakhonratchasima	Vase
143	97/06/12	DINPAO FACTORY	Nakhonratchasima	Vase Ceramic Ornament
144	97/07/09	LAMPANG DISAKHO	Lampang	Raw Materials
145	97/07/18	THAI KAOLIN LTD.	Lampang	Raw Materials
146	97/08/06	THAI CERAMIC LAMPANG CO., LTD.	Lampang	Vase fable Ware
147	97/08/07	KITTIROJ CO., LTD.	Lampang	Raw Materials

* = Visits for technical guidance

MIA

I.P.

ANNEX - 8 LIST OF THE DISPATCHED JAPANESE EXPERTS

No.	Name of Experts	Assigned Scope	Assigned Term
a. Long-Term Experts			
1	Mr. Mitsuo Kinjo	Chief Adviser	93/4/29 - 97/10/13
2	Mr. Takao Horibata	Coordinator	93/4/29 - 97/4/19
3	Mr. Kazuhisa Inoue	Coordinator	94/4/14 - 96/4/13
4	Mr. Yoshiaki Miura	Coordinator	96/3/29 - 97/10/13
5	Mr. Shigeji Kuchina	Ceramic Raw Materials	93/7/1 - 95/6/30
6	Mr. Hirotooshi Morikawa	Ceramic Raw Materials	96/5/21 - 97/10/13
7	Mr. Hachiro Miyachi	Ceramic Processing	93/12/1 - 96/1/31
8	Mr. Satoshi Matsubara	Ceramic Processing	96/1/17 - 97/10/13
b. Short-Term Experts			
1	Mr. Hachiro Miyachi	Installation of Equipment and Machinery	93/7/1 - 93/10/8
2	Mr. Akio Aichi	Installation of Equipment and Machinery	93/8/9 - 93/9/6
3	Mr. Tsunejiro Kumagai	Installation of Equipment and Machinery	93/8/9 - 93/10/8
4	Mr. Kazuya Yamasaki	Installation of Equipment and Machinery	93/8/20 - 93/9/5
5	Mr. Nobukazu Yamauchi	Seminar	93/10/1 - 93/12/10
6	Mr. Hitoshi Higuchi	Potter's Wheel	94/7/1 - 94/8/31
7	Mr. Nobukazu Yamauchi	Ceramic Making Technology	94/7/1 - 94/10/31
8	Mr. Kunio Ohgushi	Gypsum Mold Making	94/9/1 - 94/10/31
9	Mr. Toshinori Nakashima	Ceramic Processing	95/4/4 - 95/7/3
10	Mr. Motoji Igarashi	Mold Making	95/6/1 - 95/7/31
11	Mr. Nobukazu Yamauchi	Ceramic Making Technology	95/6/1 - 95/8/31
12	Mr. Aizo Tanaka	Ceramic in General	95/8/3 - 95/8/30
13	Mr. Tadanori Maeda	Gypsum Mold Making	95/9/26 - 95/12/23
14	Mr. Jinichiro Yamaguchi	Ceramic Raw Materials	95/9/26 - 96/3/30
15	Mr. Etsuzo Kato	Glaze	95/12/10 - 95/12/23
16	Mr. Takashi Onohara	Pottery Development	95/12/19 - 96/4/18
17	Mr. Nobukazu Yamauchi	Ceramic Making Technology	96/5/25 - 96/7/24
18	Mr. Hirohisa Ogawa	Mold Making	96/5/25 - 96/7/24
19	Mr. Hiroo Takashima	Ceramic Material Development	96/6/20 - 96/8/31
20	Mr. Aizo Tanaka	Material Utilization	96/7/18 - 96/8/27
21	Mr. Osamu Ishibashi	Instrument Analysis	96/10/22 - 96/12/19
22	Mr. Ryuuichi Yamamoto	Quality Control	97/2/25 - 97/3/8
23	Mr. Hachiro Miyachi	Raw Material Treatment Facility	97/2/28 - 97/3/28
24	Mr. Nobukazu Yamauchi	Ceramic General	97/4/19 - 97/7/18
25	Ms. Sachiko Horuta	Instrument Analysis	97/5/13 - 97/7/12
26	Mr. Kazuhiko Yamaguchi	Insulator Development	97/6/3 - 97/8/20
27	Mr. Yasuhiko Shirakata	Potter's Wheel	97/6/3 - 97/8/9
28	Mr. Hachiro Miyachi	Raw Material Treatment Facility	97/6/14 - 97/8/30
29	Mr. Hiroo Takashima	Material Utilization	97/6/14 - 97/8/30
30	Mr. Isamu Miura	Ceramic Design	97/8/4 - 97/9/30

MA

I.P.

ANNEX - 9 JAPANESE STUDY TEAM DISPATCHED BY JICA

- | | |
|-------------------------------|--------------------|
| 1. Preliminary Survey Team | 91/5/12 - 91/2/23 |
| 2. Experts Survey Team | 92/5/19 - 92/5/27 |
| 3. Implementation Survey Team | 92/10/6 - 92/10/15 |
| 4. Consultation Team | 93/8/31 - 93/9/9 |
| 5. Technical Guidance Team | 94/7/26 - 94/8/4 |
| 6. Advisory Team | 96/10/29 - 96/11/8 |
| 7. Evaluation Team | 97/9/2 - 97/9/19 |

ANNEX - 10. LIST OF THE THAI COUNTERPART PERSONNEL TRAINED IN JAPAN

No.	Name of Counterpart	Subject of Training	Duration
1	Mr. Bhothong Keowsuddhi	Observation	94/3/28 - 94/4/10
2	Mr. Somboon Aranyabhaga	Observation	94/3/28 - 94/4/10
3	Ms. Keadsuda Pothikamol	XRF Operation	94/3/28 - 94/5/3
4	Mr. Suthep Tantivirasut	Ceramic Technology	94/8/27 - 94/10/8
5	Mr. Kanok Yingyong	Ceramic Technology	94/8/27 - 94/10/8
6	Mr. Aungard Naruepai	Ceramic Building Material	94/8/30 - 95/3/3
7	Ms. Napat Chanmee	Ceramic Development Technology	95/4/18 - 95/10/27
8	Ms. Kanokporn Naruepai	Ceramic Development Technology	95/4/18 - 95/10/27
9	Mr. Suraporn Pleumjai	Ceramic Kiln and Firing Technology	95/9/11 - 96/3/1
10	Mr. Suksan Chaichana	Ceramic Kiln and Firing Technology	95/9/11 - 96/3/1
11	Mr. Aphinan Charoensook	Gypsum Mould Making and Ceramic	96/5/20 - 96/12/15
12	Mr. Mit Siriang	Design	96/5/20 - 96/12/15
13	Mr. Nikorn Karbkheow	Gypsum Mould Making and Printing	96/5/20 - 96/12/15
14	Ms. Kanokporn Naruepai	Potter's Wheel Forming	96/9/1 - 96/12/22
15	Mr. Singkum Ayashu	Equipment Analysis	96/9/17 - 97/2/28
16	Mr. Somsak Pusitsiri	Ceramic Kiln and Firing Technology	97/4/14 - 97/10/20
17	Ms. Pornpan Yompook	Ceramic Development Technology Ceramic Design	97/9/15 - 98/4/2

MH

E.P.

ANNEX - II MACHINERY AND EQUIPMENT PROVIDED BY THE JAPANESE SIDE

Fiscal Year	No.	Item	Unit Price (Yen)	Quantity	Amount (Yen)
1993	115-01 3081	PRESSING MACHINE FOR PIECE MAKING Type: Hydraulic Compressive strength tester Model: CH-500 Load indication: 0.5 Ton Diameter: 200 mm	1,700,000	1	1,700,000
1993	115-02 3088	AUTOMATIC PARTICLE SIZE ANALYZER Model: CAPA 300 Principle: Photosedimentation with gravitational and centrifugal acceleration Range: gravitational sedimentation 10-300 μ m Centrifugal Sedimentation 0.04-30 μ m Power: 110/120 V AC or 220/240 VA : 50/60 Hz approx. 200 VA Dimensions: 480 W x 394 D x 294 H	5,480,000	1	5,480,000
1993	115-03 3090	HIGH TEMPERATURE GAS KILN Type: LPG and Oxygen direct fired type Firing Temperature: Max. 1800 °C Consisting of: 1-Furnace body with burner 1-Turbo blower with 3.7 KW motor Inside size: 500 dia x 450 H mm	22,060,000	1	22,060,000
1993	115-04 3097/1	FLUORESCENCE SPECTROMETER Model: RIX 1000 X ray Counting system and system controller with standard accessories - Bead Sample 1 set - Disk TYPE VIBRATING MILL 1 set - AVR AUTO TRANSFO 1 set	43,600,000	1	43,600,000
1993	115-05 3098/1-2	BALL MILL Capacity : 500 kg 1200 dia x 1200 L mm Electric Motor : 5.5 KW with lining stone	4,604,000	2	9,208,000
1993	115-06 3099/1-2	BALL MILL Capacity : 100 kg 712 dia x 813 L mm Electric Motor : 1.5 KW with lining stone	2,550,000	2	5,100,000

Fiscal Year	No.	Item	Unit Price (Yen)	Quantity	Amount (Yen)
1993	H5-07 3100	BALL MILL Capacity : 50 kg 578 dia x 736 l mm Electric Motor : 0.75 KW with lining stone	2,040,000	1	2,040,000
1993	H5-08 3108/1	FILTER PRESS Type : Hydraulic Rocking No of Filter Plate : 55 pcs Plate Size : 24" x 24" Capacity : 600 kg/charge Diaphragm Pump Fitted with Filterpress (1 set) Electric Motor : 2.2 KW Size of Diaphragm : 14" Capacity : 1,400 - 2,000 l/hr	9,940,000	1	9,940,000
1993	H5-09 3109	HYDRAULIC PUMP UNIT FOR FILTER PRESS Electric Motor : 0.75 KW Max. Pressure 700 kg/cm ²	2,650,000	1	2,650,000
1993	H5-10 3110	DE-AIRING AUGER MACHINE Capacity : 0.4 - 0.7 T/hr Electric Motor : 1.5 KW Blade : SUS Wquipped with Vacuum Pump & Manual Cutter	2,060,000	1	2,060,000
1993	H5-11 3112	ROLLER HEAD JIGGER MACHINE Type : Electric Heading Type Shape of Forming plate (Max 9") Shaping Head : 2 Head Electric Motor : 1.5 KW x 1 0.4 KW x 1 0.2 KW x 2 Accessories : Vacuum Pump	6,070,000	1	6,070,000
1993	H5-12 3113	VACUUM CASTING SLIP TANK Type: Vacuum Slip Tank Agitator Capacity : 500 l Blade & Shaft : SUS Electric Motor : 0.4 KW x 2	2,580,000	1	2,580,000
1993	H5-13 3118	AIR COMPRESSOR Capacity : 720 l/min	2,170,000	1	2,170,000
1993	H5-14 3119	CHAMBER DRYER Size : 1,400L x 2,200W x 2,000H mm x 4 Chamber	3,524,000	1	3,524,000
1993	H5-80 3121	HOT AIR GENERATOR LPG 100,000 kcal/hr	2,450,000	1	2,450,000
1993	H5-15 3124/1-2	BELT CONVEYER Size of Frame: 455W x 9,000L mm Size of Belt : 300W x 9,000L mm	1,778,000	2	3,556,000

MIA

L.P.

Fiscal Year	No.	Item	Unit Price (Yen)	Quantity	Amount (Yen)
1993	H5-16 3126	BISCUIT FIRING SHUTTLE KILN Unit assembling type Kiln size : 800W x 1,300L x 1,000Hmm Inside useful volume : 1 m ² Firing temperature: Max.900 °C Fuel : L.P.G. Consisting of : Burner 10 pc Gas stabilize 1 pc Kiln car 1 set Rail 1 set Refractories 1 set Vaporize 1 set	20,800,000	1	20,800,000
1993	H5-17 3127	GLOST FIRING SHUTTLE KILN Unit assembling type Kiln size : 800W x 550L x 1,200H mm Inside useful volume : 1.48 m ² Firing temperature Max.1350 °C Fuel : L.P.G. Consisting of : Burner 12 pc Gas stabilize 1 pc Kiln car 1 set Rail 1 set Refractories 1 set Kiln automatic-control unit 1 set Consisting of : Oxidizing Reduction & Neutral O ₂ Fuel Gas Pressure & Damper Atmosphere : Reduction-Oxidation	20,890,000	1	20,890,000
1993	H5-18 3128	DECORATION ELECTRIC KILN Kiln size : 500D x 1,680W x 840Hmm Inside useful volume : 0.7 m ² Electricity :380 V 3phase 25KW Firing temperature: Max 900 °C	1,877,000	1	1,877,000
1993	H5-19 3136	DISINTEGRATING AGITATOR with 1 53 Tank Electric Motor : 5.5 KW	3,400,000	1	3,400,000
1993	H5-20 3108/2	FILTER PRESS Type : Hydraulic Rocking No of Filter Plate : 55 pcs Plate Size : 24" with Diaphragm Pump Electric Motor : 2.2 KW Capacity : 1400-2000 l/h	10,260,000	1	10,260,000

MN

E.P.

Fiscal Year	No.	Item	Unit Price (Yen)	Quantity	Amount (Yen)
1993	H5-21 3137	VIBRATION SIEVE Model KF700 Type: Double Step Electric Motor: 1.5KW Size of Screen: 100-200mesh	1,275,000	1	1,275,000
1993	H5-22 3200	LAND CRUISER (TOYOTA) Model: HZJ80R-GSMNS	2,581,787 (1,573,730)	1	2,581,787
1993	H5-23 3078	COLORIMETER Model: PEC-1 Selenium AC100 or 220 50/60Hz single phase	363,000	1	363,000
1993	H5-24 3079	REFRACTORINESS TESTER Type: High temperature furnace 220V 50Hz with 100V down transformer Max. temperature: 2,000 °C Fule: Oxygen LPG	1,470,000	1	1,470,000
1993	H5-25 3080/1	ELECTRIC KILN Model: KY-4 Max. temperature: 1,350 °C 240V single phase 6 KW Type: Lid open type with wheel Kiln size inside: 300 x 300 x 300mm with automatic controller and refractories	710,000	1	710,000
1993	H5-26 3082/1-2	PORTABLE HARDNESS TESTER Model: D Dial indication type	640,000	2	1,280,000
1993	H5-27 3083	PORTABLE THERMO COUPLE Model: (STD-15S-080C000350 U00R1D13000)	153,000	1	153,000
1993	H5-28 3084	PH-METER Model: HM-35V	502,000	1	502,000
1993	H5-29 3086	VISCOSITY METER Model: BL	870,000	1	870,000
1993	H5-30 3087	O2 ANALYZER Type: Portable oxygen measuring with a high temp. sampling probe Max. temperature: 900 °C	540,000	1	540,000
1993	H5-31	OPTICAL PYROMETER Model: SD10-100012-JR817C0	118,000	1	118,000
1993	H5-32 3089	DIAMOND CUTTING MACHINE Model: MC-100 Vice & Protection cover Power: 220V 100W with Transformer approx. 200 VA Dimension: 480W x 394D x 294H	754,000	1	754,000

MIA

I.P.

Fiscal Year	No.	Item	Unit Price (Yen)	Quantity	Amount (Yen)
1993	H5-33 3091	CONSTANT DRYING OVEN Model : MOV-212F Temperature : 40°C - 200°C Interior Dimension : 730 x 645 × 870mm Effective capacity: 150 liter(5.3 cu.ft.)	549,000	1	549,000
1993	H5-34 3092	STANDARD SIEVE SET WITH VIBRATOR Type : Standard sieve set with Electromagnetical sieve shaker Size : 200 dia x H 60 mm Consisting of (each 1 pc/st) ISO : 6.70, 1.00, 0.075 5.60, 0.85, 0.053 4.00, 0.60, 0.045 3.35 - 0.50, 0.032 2.00, 0.25, 1.40, 0.106 with Lid & bottom Vessel	1,080,000	1	1,080,000
1993	H5-35 3093/1-5	AUTOMATIC MORTAR GRINDER Model: ROM with hard porcelain Vessel & Pestle Electricity : AC. 220V 50Hz Motor : 130W	1,116,000	5	5,580,000
1993	H5-36 3094/1-2	POT MILL SET Pot Dia : 210 mm Pot Number of accommodation	705,000	2	1,410,000
1993	H5-37 3095/1-3	ELECTRIC BALANCE Model : FY 3000 Pan Size : 150 dia mm. Operating Operating Temp. Range : 5-40 °C	255,000	3	765,000
1993	H5-38 3096	ELECTRONIC PRECISION BALANCE Model : ER-180 Max. Capacity 180 g Minimum division : 0.1 mg. Operating Temp. Range : 5-40 °C	647,000	1	647,000
1993	H5-39 3101/1-2	MAGNETIC FERRO FILTER Model : PF-1000 1c/hr	1,435,000	2	2,870,000
1993	H5-40 3102	VIBRATION SIEVE Type : EVS-B 180 mesh 1 t/hr 0.2 KW	891,000	1	891,000
1993	H5-41 3103	VIBRATION SIEVE Type : EVS-B 120 mesh 1 t/hr 0.2 KW	891,000	1	891,000
1993	H5-42 3104/1-2	AGITATOR FOR BODY Type : Fixed Type Tank Dimension : 1.5m x 2.2m Electric Motor : 15 KW Shaft and Blade-SS Steel 1 set SUS Steel 1 set	1,125,000	2	2,250,000

MIA

I.P.

Fiscal Year	No.	Item	Unit Price (Yen)	Quantity	Amount (Yen)
1993	H15-43 3105	AGITATOR FOR GLAZE Type : Fixed Type Tank Dimension : 1m x 1m Electric Motor : 0.75 KW Shaft and Blade: SUS	980,000	1	980,000
1993	H15-44 3106/3	PORTABLE AGITATOR Electric Motor : 0.7 KW	145,000	1	145,000
1993	H15-45 3107/1	SLIP PUMP Diameter : 10 B Capacity : 1500 - 2000 L/Hr	922,000	1	922,000
1993	H15-46 3111	WEIGHING BALANCE Capacity : 500 kgs	409,000	1	409,000
1993	H15-47 3114/1-10	ELECTRICALLY JIGGER WHEELS	436,000	10	4,360,000
1993	H15-48 3115/1-5	MACHANICAL JIGGER Electric Motor : 0.4 KW	889,000	5	4,445,000
1993	H15-49 3116/1-2	FINISHING JIGGER Electric Motor : 0.2 KW	753,000	2	1,506,000
1993	H15-50 3117	HIGH SPEED AGITATOR Type : High Speed Fixed Type Tank : 500l Electric Motor : 3.7 KW x 1 Shaft and Blade : SUS	1,515,000	1	1,515,000
1993	H15-51 3122	DUST CLEANING MACHIN Electric Motor : 0.2 KW	728,000	1	728,000
1993	H15-52 3123/1-2	DE-GLAZING MACHINE Electric Motor : 0.2 KW	537,000	2	1,074,000
1993	H15-53 3106/1-2	PORTABLE AGITATOR Electric Motor : 0.7 KW Shaft and Blade : SUS	146,000	2	292,000
1993	H15-54 3125	DUST COLLECTOR Electric Motor : 0.75 KW with Duct House	620,000	1	620,000
1993	H15-55 3129/1-2	POLISHING MACHINE Model : UH-600S Electric Motor : 0.6 KW	757,000	2	1,514,000
1993	H15-56 3130/1-2	AUTOMATIC CENTERING MACHINE Model : AR-15FS Electric Motor : 15W Single Phase with centering equipment Model : RS-20 Electric Motor : 20W Single Phase Model : RS-20FC Electric Motor : 25W Single Phase Spare parts : 1 lot	287,000	2	574,000

MAH

I.P.

Fiscal Year	No.	Item	Unit Price (Yen)	Quantity	Amount (Yen)
1993	H5-57 3131/1-2	STAMPING PAD Model : DS-15 Electric Motor : 15W Single Phase	154,000	2	308,000
1993	H5-58 3133	VACUUM AGITATOR Model : VC-2 Type : Small Double Type Electric Motor : 0.4 KW Vacuum case : Aluminium Vacuum Pump	1,498,000	1	1,498,000
1993	H5-59 3134	ORIGINAL MOULD JIGGER Model : HR-400 Electric Motor : 0.4 KW Wheel size : 400 dia Wheel revolution : 90-360 RPM with foot switch	1,095,000	1	1,095,000
1993	H5-60 3135	FINISHING JIGGER Electric Motor : 0.2 KW x 2 Table diameter : 240 dia Table revolution : 180 RPM with foot switch	1,095,000	1	1,095,000
1993	H5-61 3101/3	MAGNETIC FERRO FILTER Model : PF-1000	1,438,000	1	1,438,000
1993	H5-62 3107/2	SLIP PUMP Diaphragm : 10 Capacity : 1500-2000 l/h	926,000	1	926,000
1993	H5-63 3104/3	AGITATOR Electric Motor : 1.5 KW Shaft and Blade : SUS with angle, channel, frame	1,275,000	1	1,275,000
1993	H5-64 3138	TABLE GRINDER Type : Two head type with Dust collector Size of wheel : 205 dia x 19 mm Electric motor : 0.4 KW Spare parts : 1 lot	560,000	1	560,000
1993	H5-65 3142	ELECTRIC ARC WELDER SET (250 - 65A)	385,000	1	385,000
1993	H5-66 3144	SMALL LATHE L - 1000	144,000	1	144,000
1993	H5-67 3145, 3146	AV TRAINING AIDS: VIIS MOVIE CAMERA. & VIIS VTR	690,000	1	690,000
1993	H5-68	Slip Rotor Electric Motor : 3W Single Phase with Transformer	89,000	2	178,000
1993	H5-69	Potter Wheel 200 ϕ \times 35 h mm (3 set) 250 ϕ \times 35 h mm (3 set)	15,370	6	92,220

MH

I.P.

Fiscal Year	No.	Item	Unit Price (Yen)	Quantity	Amount (Yen)
1993	H5-70	Potter Wheel 200 φ × 180 h mm	15,400	5	77,000
1993	H5-71	Motor Pastel	2,200	6	13,200
1993	H5-72	Disk Grinder Type: Portable Type	27,800	1	27,800
1993	H5-73	Portable Drill Type: Portable type with 650w Motor Spare Parts: 1 lot	56,000	2	112,000
1993	H5-74	Mechanical Tools	99,000	1	99,000
1993	H5-75	Electrical Tools	58,000	1	58,000
1993	H5-76	Electrical Circular Saw Type: Portable type Blade Dia: 180mm	57,000	1	57,000
1993	H5-77	Carpenter Tool	83,000	1	83,000
1993	H5-78	Standard Bit Drill Bit: 1.0mm - 13mm 25pcs/lot	47,500	1	47,500
1993	H5-79	Portable Grinder Type: Straight Grinder	84,000	1	84,000
1994	H6-01 3185	TIHERMO MECHANICAL ANALYZER 802 8F2 TAS-100 (1pc) Accessories for TAS-100(1set) TMA basic unit (1pc) Accessories for TMA 3pen recorder RC-250 F3(1pc) Electric furnace(1pc) Shielding tube(1pc) Shield tube(2pcs) Lid(3pcs) PU-1K main unit Power supply cable(1set) Insulated transformer(1pc) Detecting rod/Supporting rod(1set) Protecting tube DTA/IR(1pc) Standard sample(1set) 9329Y2 Stepdown transformer(1set) 8533A2 Detecting rod(4pcs) 8536A3 Supporting rod(2pcs) 9904C6 Chart paper(3sets) 9904Y1 Recorder pen(set of 10) 9904Y2 Recorder pen(set of 10) 9904Y3 Recorder pen(set of 10)	7,290,000	1	7,290,000
1994	H6-02 3187/1	JAW CRUSHER Model BBI	2,730,000	1	2,730,000
1994	H6-03 3191/1	AUTOClave	4,700,000	1	4,700,000
1994	H6-4 3148	DOUBLE TYPE CASTING STAND	634,000	1	634,000
1994	H6-5	PLASTER MOULD 7.5" Plate with Roller Head	323,600	2	647,200

MMA

I P.

Fiscal Year	No.	Item	Unit Price (Yen)	Quantity	Amount (Yen)
1994	H6-7	PLASTER MOULD 10" Plate for Casting Mould	236,000	2	472,000
1994	H6-8	PLASTER MOULD 12" Plate for Casting Mould	322,800	2	645,600
1994	H6-9	PLASTER MOULD 9" Plate with Roller Head	380,800	2	761,600
1994	H6-10	PLASTER MOULD 6.5" Plate with Roller Head	312,600	2	625,200
1994	H6-11	PLASTER MOULD 7.5" Soup Plate with Roller Head	343,400	2	686,800
1994	H6-12	PLASTER MOULD 9.5" Soup Plate with Roller Head	408,800	2	817,600
1994	H6-13 3188/1	COMPACT TYPE DEHYDRATOR Filter Cloth(10pcs) Rubber Sheet(15pcs)	1,053,000	1	1,053,000
1994	H6-14 3189/1	HANDY TYPE TEMPERATURE RECORDER Compensation Conductor(5m X6pc) Thermo-electric couple(500mm X 6PCS) Recording Paper(6sheets X2pcs) Pen(2pcs)	775,000	1	775,000
1994	H6-15 3190/1	BENDING TESTER Step down transformer	1,138,000	1	1,138,000
1995	H7-01	Gas Kiln (Boorakanung Engineering) Loading Capacity : 0.1728 cubic m (0.4m X 0.72m X 0.6m) Firing Temperature : 1350 Normal 1400 Maximum Fuel : LPG Insulation : Fiber & Brick No. of Kiln Car : 1 No. of Burner : 8 Gas Supply : 3 hoses for LPG with Regulator, Pressure Gauges and Pipe	766,700 (187,000 B)	1	766,700
1995	H7-02 3203/1	Edge Runner System (L-Thai Engineering) Edge Runner 1 Rotary Screen + Sieve 5mm 1 Sieve 2mm 1 Sieve 10mm 1	414,677 (110,1215 B)	1	414,677
1995	H7-03 3204/1	Lapping Machine Diamond Disc 1 Diamond Pad 2 Magic Plate 2 Down Transformer 1	972,000	1	972,000
1995	H7-04 3205/1	Pot Mill Set 40-90 φ Porcelain Pot with Porcelain Ball Driving Support Frame with 0.75kw Motor 1	853,000	1	853,000

M.H.

J.P.

Fiscal Year	No.	Item	Unit Price (Yen)	Quantity	Amount (Yen)
1995	H7-05 3206/1	Portable Agitator RW-20DZM Middle Size Type Shaft : 8 φ × 350 mm sus made Blade : 50mm, 4 pcs Blade Motor : 30W Stand : 16 φ × 1000 mm	413,000	1	413,000
1995	H7-06 3206/2	Portable Agitator L-35 Small Size Type Shaft : 7 φ × 300 mm sus made Blade : 60mm, 4 pcs Blade Stand : C-Type Stand	160,000	1	160,000
1995	H7-7	Flint Pebble Size : 3 - 4 inches (2,000 kg)	84,050 (20,500 B)	1	84,050
1995	H7-8	Kiln for Furniture for Overglaze Decoration for 8 - 10.5" Plate Holder	9,500	5	47,500
1995	H7-9	Kiln for Furniture for Overglaze Decoration for 8 - 10.5" Ball Holder	9,500	5	47,500
1995	H7-10	Kiln for Furniture for Overglaze Decoration for Saucer Holder	9,500	5	47,500
1995	H7-11	Kiln for Furniture for Overglaze Decoration for 10 - 12" Oval Plate Holder	9,500	5	47,500
1995	H7-12	Kiln for Furniture for Overglaze Decoration for Basket for cup and others	19,000	5	95,000
1996	H8-01	Pot Mill Set Porcelain Pot Mill 180 mm φ 8 pcs 210 mm φ 4 pcs 300 mm φ 4 pcs Porcelain Ball 30 mm 100 kg 40 mm 60 kg Flint Pebble 50 - 60 mm 2,000 kg	581,596 (126,740 B)	1	581,596
1996	H8-03	Vacuum Casting Apparatus High Speed Agitator HMC-5 Vacuum Pressure Tank CVP-002H Casting Table VC-1SRH Vinyl Hose 1/2 inch × 600 mm Joining Metal (SUS) Cramp Grand Packing 2 pcs	2,346,000	1	2,346,000
1996	H8-04	Vacuum Extruder Main Body Model VIE-50H 380V 50hz 3 Phase Mould Die 4 × 15mm 10 φ mm 20 × 30 mm	3,777,000	1	3,777,000
1996	H8-05	Vibration Mill Main Body Model NB 0 Case No. 2322-400-01 1 pcs Alumina Pot No. 230-102-01 2 pcs Alumina Ball No. HD-10 1 kg 3 set Alumina Ball No. HD-15 1 kg 3 set	505,000	1	505,000

MIT

I.P.

Fiscal Year	No.	Item	Unit Price (Yen)	Quantity	Amount (Yen)
1996	H8-02	Electric Operated Hydraulic Press for XRF Analysis Main Body Model 9302-D5 Parts - O Ring P-6 1 pcs - Back up Ring p-6 2pcs - O Ring P-130 2 pcs - Back up Ring P-140 1 pcs - O Ring P-7 1 pcs - O Ring P-21 1 pcs - O Ring P-22 1 pcs - O Ring 1014 1 pcs - Round Belt (1 m) 1pcs - V Belt A-26 1 pcs - Pilot Lamp NL-52 2 pcs - Load Adjust Spring 1 pcs - Spring for Balancer 1 pcs - Seal Washer W6Si 2 pcs - Seal Washer W8Si 1 pcs - Seal Washer W12Si 2 pcs - Seal Washer W14Si 1 pcs - Seal Washer W18Si 2 pcs - Seal Washer W22Si 1 pcs	2,023,000	1	2,023,000
1996	H8-06	Filter Press Main Body Model M14-S Spare Parts - Filter Cloth 2 set - V Belt 5 pcs - Diaphragm 5 pcs - Ball 5 pcs	1,214,000	1	1,214,000
1997	H9-01	Beams 1,250 mm × 60mm × 50 mm	36,621 (8,200 B)	12	439,452
1997	H9-02	Flint Pebble Size: 40 - 50 mm 2,000kg	100,494 (27,000B)	1	100,494
1997	*	Slide Calipers Digital Display Type	40,000	2	80,000
1997	*	Sic Slab (1 set: 150 pcs) Size: 400 × 350 × 10 mm Material: Silicone	500,000	1	500,000
1997	*	Agate Mortar and Paste Size: (inside) φ 150 mm (outside) φ 180 mm (depth) 45 mm	600,000	1	600,000
1997	*	Filter Cloth (1 set: 250 pcs) for Filter Press Type: PP3600 for 620 square P-board	570,000	1	570,000
1997	*	Platinum Crucible for sample making of XRF Platinum 95 % Gold 5 %	230,000	3	690,000
Total				Y	278,742,476

* Under shipment

MH

I.P.

ANNEX-12 EXPENSE BY THE JAPANESE SIDE

As of August '97 (Unit: Thousand Yen)

Japanese Fiscal Year	1990	1991	1992	1993	1994	1995	1996	1997	Total
Acceptance of C/P in Japan				2,094	10,157	27,340	34,929	15,392	89,912
Dispatch of Experts			2,053	74,312	81,340	79,069	87,063	52,139	375,976
Dispatch of Study Team	5,111		4,087	6,777	3,177	0	3,763	6,686	29,601
Provision of Machinery and Equipment			244,908	21,679	21,283	6,601	5,589	14,054	314,114
Hand-carry Equipment				5,861	3,519	2,479	3,919	934	16,712
Total	5,111	0	251,048	110,723	119,476	115,489	135,263	89,205	826,315

Note) Expenses in Japanese Fiscal Year 1997 includes estimate.

ANNEX 13 LIST OF THAI COUNTERPART PERSONNEL AND SUPPORTING STAFF
(AS OF 1 SEPTEMBER 1997)

1. COUNTERPART PERSONNEL (17 PERSONS)

NAME	EDUCATION	ACTUAL POSITION
1. Mr. Somboon Aranyabhaga	B.Sc.(General Sc.)	Director
2. Mr. Amarint Ukoskit	Diploma Arch.(Design)	Design Section / Chief
3. Mr. Suthep Tantiveerasut	B.Eng.(Industrial)	Technology Section / Chief
4. Mr. Porathep Karnsub	B.Econ	R&D Section / Chief
5. Mr. Aungard Naruepai	B.Sc. (Physics)	Standard Testing Section / Acting Chief
6. Ms. Tanaporn Chareonsook	B.Econ	Administrative Section / Acting Chief
7. Mr. Pranom Suwanprasit	B.A. (Painting)	Design Section.
8. Mr. Annat Mongkontheb	Diploma (Design)	Design Section
9. Ms. Kanokporn Naruepai	B.Sc.(Physics)	Standard Testing Section
10. Mr. Aphinan Chareonsook	B.Arch.(Ind.Design)	Design Section
11. Ms. Lalida Weeraboonyarit	Diploma(Marketting)	Administrative Section
12. Mr. Surapon Pluemjai	B.Sc.(Chemistry)	Standard Testing Section
13. Ms. Keadsuda Pothikamol	B.Sc.(Geology)	Standard Testing Section
14. Mr. Singkum Aryachoo	B.Eng.(Industrial)	Technology Section
15. Mr. Sooksan Chaichana	B.Sc.(Ind.Chemistry)	Standard Testing Section
16. Mr. Somsak Pusitsiri	B.Eng.(Industrial)	Technology Section
17. Ms. Pensri Poaploy	Diploma(Account)	Administrative Section

2. SUPPORTING STAFF (33 PERSONS)

NAME	EDUCATION	ACTUAL POSITION
1. Mr. Kanok Yingyong	Diploma(Design)	Technology Section
2. Mr. Mit Siriaring	Diploma(Design)	Design Section
3. Mr. Nikorn Karbkheow	Diploma(Mechanics)	Technology Section
4. Mr. Nivat Keapradit	High School	Design Section
5. Mr. Thanat Suriya	Secondary School	Technology Section
6. Mr. Eak Panyaban	Diploma(Ceramic)	Technology Section
7. Mr. Vichai Kheawkeaw	Secondary School	Technology Section
8. Mr. Sinchai Prompan	Secondary School	Design Section
9. Ms. Maneerat Pangchue	Diploma(Ceramic)	Design Section
10. Ms. Pornpan Yompook	B.F.A (Graphic Art)	Technology Section
11. Mr. Sai Taowboonhong	Secondary School	Technology Section
*12. Ms. Nuchanat Khumpech	B.Management	Administrative Section
*13. Mr. Naratip Songmee	B.Sc.(Physics)	Standard Testing Section
*14. Ms. Chaleerat Luojum	B.Econ	Standard Testing Section
*15. Ms. Amornrat Silamai	Diploma(Account)	Administrative Section
*16. Ms. Jintana Thakeow	Diploma(Account)	Administrative Section
*17. Mr. Sawad Chantui	Diploma(Machine)	Technology Section
*18. Mr. Bandit Singthorn	Diploma(Electronic)	Technology Section
*19. Mr. Sanli Jaturongkrittaya	Diploma(Machine)	Technology Section
*20. Ms. Jeeranan Panyawai	Diploma(Account)	Administrative Section
*21. Ms. Patcharee Panyayong	Diploma (Marketing)	Administrative Section
*22. Ms. Napaporn Meesuk	High School	Secretary for Director
*23. Mr. Wittaya Viseskun	Diploma(Electric)	Standard Testing Section
*24. Mr. Praiswan Suppaso	High School	Standard Testing Section
*25. Ms. Wanna Piromlawan	High School	Standard Testing Section
*26. Mr. Watcharavoot Somwan	Secondary School	Technology Section
*27. Mr. Chareon Yodsamut	High School	Technology Section
*28. Mr. Panumad Rajjarit	Primary School	Technology Section
*29. Mr. Nattavoot Thaveekum	Secondary School	Standard Testing Section
*30. Mr. Somsak Intanond	Primary School	Driver
*31. Mr. Nipon Tatrak	Primary School	Driver
*32. Mr. Kriangkrai Santip	High School	Driver
*33. Mr. Somnuek Kaewdeaw	Primary School	Driver

REMARK * TEMPORARY

MKT

I.P.

ANNEX - 14 MACHINERY AND EQUIPMENT PROVIDED BY THAI SIDE
THAI FISCAL YEAR 1993 - 1997

Item	Quantity	year
1. Vehicle (microbus)	1	1993
2. Frit Furnace	1	1994
3. Beater Mill	1	1994
4. Magnetic Ferro Filter	1	1994
5. Hand Lift	1	1994
6. Air Condition	18	1994
7. X-Ray Diffractometer	1	1994
8. Platinum Crucible	1	1994
9. Magnetic Stirrer with Hot Plate	1	1994
10. UV-VIS Spectrophometer	1	1994
11. Stand for Glaze Grinding	1	1994
12. Balance (2 Beam)	1	1994
13. Pot Mill for Galze	2	1994
14. Electric Balance	4	1994
15. Air Compressor	1	1994
16. Crushing Machine	1	1994
17. Electric Mortar Grinder	1	1994
18. Distillater	1	1994
19. Suction Fan	18	1994
20. Combustion Analyser	2	1994
21. Ball Mill	1	1994
22. Filter Press (small)	2	1994
23. Hammer Mill	1	1994
24. Roller Crusher	1	1994
25. Radiation Pyrometer	1	1994
26. Jigger Machine	1	1994
27. PH-Meter	1	1994
28. Atomic Particle Size	1	1994

MLH

I.P.

29. Electric Kiln	1	1994
30. Viscometer	1	1994
31. Microscope	1	1994
32. Spray Booth	1	1994
33. Extruder	1	1994
34. Air-Pump for AAS	1	1994
35. Air-Pump for Filter press	1	1994
36. Manetic Separation	1	1994
37. Throwing Machine	5	1994
38. Decoration Kiln	1	1994
39. De-Aring Agur Machine	1	1994
40. Color meter	1	1994
41. Lathe	1	1994
42. Differential Thermal Analysis and Thermal Gravitation	1	1995
43. Hot Plate 12 x18 in.	1	1995
44. Atomic Absorbtion Spectrophometer	1	1995
45. High Speed Mill (Retsch)	1	1995
46. Plotter	2	1995
47. Jaw Crusher	1	1995
48. Dilatometer (for termal Expantion)	1	1995
49. Electric Cutting Machine	1	1995
50. Fibre Cutter	1	1995
51. Drilling Machine	1	1995
52. Dyer	1	1995
53. Sand Polishing Machine	1	1995
54. Blue Printing Machine	1	1995
55. Magnetic Electric Portable Agitator	1	1995
56. Mixer	1	1995
57. Gradient Kiln	1	1995
58. Hydro Press (water press)	1	1996
59. Port-O-Kiln	1	1996

MMH

I.P.

60. Microcomputer	2	1996
61. Pot Mill	1	1996
62. Portable Agitator	1	1996
63. Edge Runner	1	1996
64. Hot Plate	1	1996
65. MuffieFurnace	1	1996
66. Ultra Sonic Cleaner	1	1996
67. Kiln for Gas fuel	1	1996
68. Film Printing Machine	1	1996
69. Screen Paper Dryer Holder	1	1996
70. Fabric Stretching Machine	1	1996
71. High Temperature Kiln (1700 C)	1	1996
72. Vehicle (Pick-up)	1	1996
73. Graphic Design Computer	1	1996
74. Vacuum Screen Printing	1	1997
75. Laser Particle Size Distribution	1	1997

*MN**I.P.*

ANNEX - 15 CONSTRUCTION RECORD OF CERAMIC DEVELOPMENT CENTER

Beginning of Construction September 27, 1991

Completion May 18, 1993
(Main building, 3 training buildings and staff houses)

Completion of Dormitory March 31, 1997

Land Development Fee
3,720,000 Baht

Construction fee for buildings and staff houses
115,000,000 Baht

for dormitory
7,800,000 Baht

MA

I.P.

ANNEX - 16 ALLOCATION EXPENSES BY THE THAI SIDE

(Unit : Baht)

Item	Thai Fiscal Year (Oct. ~ Sep.)					
	Project Period					After Project
	1993	1994	1995	1996	1997	1998
1. Operational expense	1,199,000	1,649,000	2,323,000	3,375,700	2,636,850	3,039,515
2. Expense of hardware purchase	2,028,100	8,269,200	3,519,500	2,048,900	5,677,000	163,000
3. Land & construction expense	90,430,000	400,000	3,000,000	4,800,000	0	0
4. Overhead expense (electricity water supply, communication)	128,000	636,000	900,000	900,000	900,600	900,600
5. Wages of officials and permanent employees	0	0	1,817,200	2,160,700	2,260,200	2,395,800
6. Wages of temporary employees	522,100	1,153,900	1,360,200	1,593,900	1,614,500	1,614,500
7. Expenses of northern ceramic exhibition & ceramic contest	130,000	150,000	150,000	150,000	150,000	150,000
Total	94,437,200	12,258,100	13,069,900	15,029,200	13,239,150	8,263,415

MH

i.p.

3 協議議事録 (M/D)

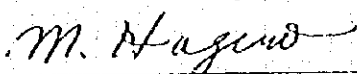
MINUTES OF THE DISCUSSIONS
BETWEEN THE JAPANESE EVALUATION TEAM
AND THE AUTHORITIES CONCERNED
OF THE GOVERNMENT OF THE KINGDOM OF THAILAND
ON THE JAPANESE TECHNICAL COOPERATION FOR THE PROJECT
ON NORTHERN CERAMIC DEVELOPMENT CENTER

The Japanese Evaluation Team (hereinafter referred to as "the Japanese Team") organized by Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Mitsuru Hagino, Industrial Development Specialist, JICA, visited the Kingdom of Thailand from September 2 to September 19, 1997 for the purpose of joint evaluation with the Thai Evaluation Team on the achievement of the Japanese Technical Cooperation Project on the Northern Ceramic Development Center in the Kingdom of Thailand (hereinafter referred to as "the Project") on the basis of the Record of Discussions signed on October 14, 1992.

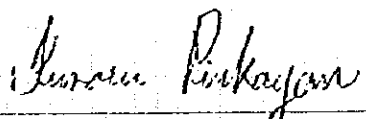
After the Joint Evaluation of the Project, the Japanese Team discussed with the authorities concerned of the Government of the Kingdom of Thailand over the matters regarding the successful completion of the Project.

As a result of the discussions, both sides mutually agreed upon the matters referred to in the document attached hereto.

Bangkok, September 18, 1997



Mr. Mitsuru Hagino
Leader
Japanese Evaluation Team
Japan International Cooperation Agency
Japan



For Mr. Manu Leopaibrot
Director-General
Department of Industrial Promotion
Ministry of Industry
The Kingdom of Thailand

ATTACHED DOCUMENT

1. Confirmation of the Joint Evaluation Report

The Joint Committee of the Project confirmed the Joint Evaluation Report for the Japanese Technical Cooperation Project on the Northern Ceramic Development Center in the Kingdom of Thailand (hereinafter referred to as "the Project") which was submitted by the Japanese Evaluation Team (hereinafter referred to as "the Japanese Team") and the Thai Evaluation Team.

Both sides agreed that the Project would be terminated on October 13, 1997 which is stipulated in the Record of Discussions signed on October 14, 1992 (hereinafter referred to as "the R/D").

2. Further input to the Project during the technical cooperation period stipulated in the R/D

2-1 The Japanese side

- 1) To continue the services of the Japanese long-term experts in the following fields:
 - a. Chief Advisor (until October 13, 1997)
 - b. Coordinator (until October 13, 1997)
 - c. Ceramic Raw Materials (until October 13, 1997)
 - d. Ceramic Processing (until October 13, 1997)
- 2) To continue the services of the short-term experts in the field of "Creative Design" until September 30, 1997.
- 3) To provide the equipment requested by the Thai side for Japanese fiscal year 1997.
- 4) To continue receiving the Thai personnel concerned with the Project for training in Japan in the following fields:
 - a. Ceramic Development Technology (April 14, 1997 - October 20, 1997)
 - b. Ceramic Design (September 15, 1997 - April 2, 1998)

2-2 The Thai side

To provide all the necessary inputs as agreed upon in the R/D

3. Further Cooperation

The Thai side explained that the Ceramic Development Center (hereinafter referred to as "CDC") had already submitted the Form A-1 requesting an individual expert, to the Department of Technical and Economic Cooperation

MH

(DTEC) in the field of "Ceramic Processing" to further strengthen the technical capability of CDC.

In addition, the Japanese Team introduced other cooperation schemes of the Government of Japan through Japan International Cooperation Agency to support further strengthening the activity of CDC after the Project termination such as

- a) After-care Program for the Project
- b) The Third Country Training Program by Utilizing the Facility of CDC.

The Japanese Team explained that the implementation of the Japanese cooperation stated above including expert dispatch, when requested by the Thai side, would be decided taking into account the budgetary situation of the Japanese side and the efforts taken by the Thai side to sustain the CDC activity, with mentioning the recent severe budgetary condition of the official development assistance of Japan.

4. List of Attendance

The list of attendance is as shown in Appendix.

MH

I.P.

APPENDIX

A. Evaluation Teams

(1) Japanese Evaluation Team

Mr. Mitsuru Hagino	Leader
Ms. Yoko Kato	Technical Cooperation Planning
Mr. Hiroshi Nakao	Ceramics Technology
Mr. Akio Nakamoto	Coordinator
Ms. Ikuko Suzuki	Project Analysis

(2) Thai Evaluation Team

Mr. Insorn Pinkayan	Leader
Mr. Damri Sukhotanang	Ceramic Engineer
Mr. Satit Sirirangkamanont	Planning of Technical Cooperation
Mr. Virat Tadaechanurat	Administration
Ms. Supralee Limcharoen	Cooperation Evaluation
Ms. Jiraporn Unkasem	Cooperation Evaluation
Mr. Prayoon Sukapattee	Ceramic Technology

M.H.

P.P.

B. Participants in the Meeting

(1) Japanese Experts

Mr. Mitsuo Kinjo	Chief Adviser
Mr. Yoshiaki Miura	Project Coordinator
Mr. Hirotooshi Morikawa	Ceramic Raw Materials
Mr. Satoshi Matsubara	Ceramic Processing

(2) JICA Thailand Office

Mr. Yoshitaka Sumi	Deputy Resident Representative
Mr. Hirofumi Hayashi	Assistant Resident Representative

(3) Department of Industrial Promotion (DIP)

Mr. Rak Charoensiri	Foreign Relations Officer, Foreign Relations Sub-Division
---------------------	--

(4) Ceramic Development Center (CDC)

Mr. Somboon Aranyabhaga	Director
-------------------------	----------

(5) Department of Technical and Economic Cooperation (DTEC)

Ms. Kanistha Thanoot	Officer, Japan Sub-Division
----------------------	-----------------------------

MA

I.P.

NCDC Project Evaluation Study
Result of Questionnaire Survey to Ceramic Factories

Methodology:

English questionnaires were translated into Thai and distributed to the ceramic factories in/out of Lampang by mail or by hand at a seminar held at the CDC. 22 factories returned the questionnaires or have been interviewed, out of approx. 100 questioned.

Result**1-1 How did you know about CDC ?**

(answers overlapped)

- | | |
|--|--|
| a. it is very famous | 8 |
| b. introduced by Lampang Ceramic Association | 8 |
| c. read its publications | 4 |
| d. heard from friends | 2 |
| e. others | (through DIP:2, received information on training:1) |

1-2 Which service(s) have you/your employees used so far ?

(answers overlapped)

- | | |
|------------------------------------|----------------------|
| a. technical guidance/consultation | 15 |
| b. testing and analysis | 12 |
| c. training | 16 |
| d. seminars | 15 |
| e. others | (factory visit : 2) |

1-2-1 If you choose <a>.

i) How many times did you consult with CDC ?

1,2, 2, 2, 3, 3, 4, 4-5, 5, 6, 20, several times (2)

ii) What was/were the content of the consultation ?

glaze:9, raw materials:5, firing:3, clay:3, kiln installation, quality improvement of crude, production, slip, Gypsum mold making,

iii) Was the guidance given by the CDC useful ?

Yes: 14 / No:1

(Reasons for "Yes")

- The guidance was utilized for improvement of production process.
- Could obtain information on slip compound.
- Could solve the problem.(6)
- It was useful for preparing information on the raw materials.
- Was taught about some techniques on production process.
- Was taught about basic techniques.
- Yes, but it took too long to receive the guidance.

(Reasons for "No")

- The Center staff do not have sufficient knowledge.
- Explanation was not good.

iv) How did you find the CDC staff in handling your consultation?

Excellent	6	<ul style="list-style-type: none"> - Gave guidance kindly. - Ready to receive request for support. - Met our expectation. - Gave guidance on the spot. - Taught location of the mine. - Should develop further in the future.
Good	6	<ul style="list-style-type: none"> - There was no follow-up after the guidance, though the - The problem could not be solved. - The guidance was given too broadly and took several steps before identifying the cause. - Useful guidance was given for improvement of production process. - Responded quickly. - Gave advise when there was a problem. - Gave information.
Fair	1	<ul style="list-style-type: none"> - The guidance was given too late.
Unsatisfactory	1	<ul style="list-style-type: none"> - The technology was too sophisticated to introduce to the factory.

1-2-2 If you choose .

i) How many times did you request CDC for analysis and testing ?

1, 1, 2, 2-3, 3, 3, 6, 5, 10 times in last year, 20
Request for analysis was rejected.

ii) Why did you request CDC for the analysis and testing ?

- Because the Center has technical personnel and equipment.(3)
- Because we do not have equipment nor knowledge.
- Because of the reliable analysis and guidance.
- Because the results of researches conducted by the Center were good.
- Tested if the body would be useful.
- Needed information on chemical analysis for our customers. (2)
- Because we had problem with glaze.
- Because we had to solve the problem.
- It was necessary for development of ceramic industry.

iii) How did you utilize the result of the analysis and testing ?

- Explained characteristics of the materials to the customers.(2)
- Sometimes the results came too late.
- Could solve the problem in production process.(3)
- Upgraded quality of the products through improvement in production process.(3)

iv) How did you find the quality of the analysis done by CDC ?

Excellent	1	<ul style="list-style-type: none"> - Its chemical analysis is reliable.
Good	9	<ul style="list-style-type: none"> - Received the results quickly. - Received the data in detail. - Could be used in improving production process.

			- Used for the production process of new products.
Fair	1		- In some cases, took too long.
Unsatisfactory	0		

v) How did you find the charge for the analysis and testing ?

Cheap	0		
Reasonable	7		
Expensive	2		: Expensive for a government institution.

1-2-3 If you choose <c>,

i) Which course(s) did you/your employees attend ?

Slip(5), Glaze(9), Over/under-glaze decoration(2), QC(2), Body, Firing(2), Gypsum mold making(4), Silk-screen printing(2), Production(2), Raw material processing, Cannot remember

ii) Was the training useful ?

Very much	6		- Could learn useful knowledge for work.(5) - Could obtain knowledge from foreign countries. - It is theoretical.
To some extent	8		- Some points were useful, some were not. (2) - Explanation was not clear. - The content was not related to the theme. - Binders were too expensive for practical application.
Not at all	1		- Trainers do not have sufficient knowledge.

iii) How did you find the content of the training ?

Too general	4		- The factories have much more complicated problems.
Moderate	10		- Some training courses were too theoretical.
Too difficult	1		- Too theoretical and not practical.

iv) Please assess the performance of the trainer(s).

Excellent	5		- But should increase technical training. - Arouse my interest throughout the course. - Understandable. - Excelled in the knowledge about the topic.
Good	4		- I could improve glaze after the training. - Explained repeatedly and it was very useful. - Depends on the topic.
Fair	2		- Some points were utilized practically. - Most of the Center staff have little practical experience and did not understand problems in the field.
Unsatisfactory	3		- Not very accurate. - Content of the training could not be used practically.

v) Please assess the training facilities of the CDC ?

Good	8	:- But should take into account the situation of the factories in Lampang.
Sufficient	4	
Poor	4	

vi) What kind of training courses would you like to attend or send your employees in the future ?

- Jigger forming
- Firing, and Kiln
- Glaze compounding
- Mold making
- Information for utilization of local raw materials
- Insulator
- Knowledge on machinery
- Testing machine
- Production process and management
- Production process; not for large scale industries
- Human resource development; how to derive responsible attitude (2)
- Some companies hesitate to send their employees to the training courses for fear of job transfer by the employees after training. Therefore, the owners attend the training but could not understand because of lack of basic knowledge.
- Do not want to attend unless the staff obtain the same technical level as the factories.

1-2-4 If you choose <d>,

i) Which seminar(s) did you/your employees attend ?

Stone ware 1200C (2), Design (2), Decoration (2)
 Marketing, Quality Control, Glaze, Gypsum mold making, Basics in ceramics
 Raw materials, Utilization of Lampang china stone (2), Production techniques
 Many (2), Cannot remember (2)

ii) Was the seminar useful ?

Very much	5	:- Could be used to solve the problem at the factory(3) - All the makers should know this knowledge to reduce the quantity of raw materials required.
To some extent	9	
Not at all	0	

iii) How did you find the content of the seminar ?

Too general	0
Moderate	13
Too difficult	1

iv) Please assess the performance of the trainer(s).

Excellent	1	- Do their best.
Good	9	- Should choose experienced scientists. - Have experience in/knowledge of foreign countries.(2) - Because he was from Noritake Company. - Understandable.
Fair	2	
Unsatisfactory	0	

v) Please assess the facilities of the CDC.

Good	6
Sufficient	5
Poor	1

vi) What kind of seminars would you like to attend or send your employees in the future ?

- Production technique (2)
- Low cost production
- Design (2)
- Raw materials for conventional ceramic products
- Compound cake
- Insulator
- Porous ceramic
- Marketing
- Management
- Problem solving method
- Latest technology
- Any

2-1 Do you know any other activities undertaken by the CDC, beside the services stated above ?

	(answers overlapped)
a. Publication of technical reports	14
b. Seminars and training services outside Lampang	6
c. Assistance for rural development projects	4
d. Ceramic contest	14
e. Others	(Ceramic fair:1)

2-2 Is there any impact on the ceramic production from the activities of CDC ?

Yes: 10 / No: 10

(Reason for "Yes")

- Increased knowledge of factory owners.
- Improved production techniques.
- Facilitated quality improvement of the ceramic products.
- Contributed to development of production.
- Solved a lot of problems.
- If the Center supports factories sincerely
- Yes, but needs more PR.
- Yes, but there is a difference in facilities between the center and the factories, which contributed to make less impact on the factories.

2-3 What is your expectation towards CDC in developing your company?

(answers overlapped)

- | | |
|--|----|
| a. Obtain information on the use of raw materials | 14 |
| b. Learn how to process raw materials | 13 |
| c. Develop new glaze | 11 |
| d. Introduce new equipment | 11 |
| e. Others (latest production technology design which have market needs, give on-site guidance to the micro-scale industries, human resource development(3), low-cost and high-efficiency kiln, publish textbooks) | |

3-1 What is/are needed to develop the ceramic industry in Northern Thailand ? (answers overlapped)

- | | |
|---|----|
| a. Improve the quality of workers. | 16 |
| b. Increase the number of skilled technicians. | 13 |
| c. Assure stable supply of raw materials. | 9 |
| d. Install production equipment. | 6 |
| e. Marketing. | 16 |
| f. Develop new products of original design. | 16 |
| g. Provide a financial support from the government. | 13 |
| h. Efforts by the private investors. | 8 |
| i. Others () | |

3-2 Do you have any comment on the activities by the CDC ?

- Keep it up.
- Thai people have tendency to hesitate to consult with government institutions. Therefore, the Center should go into the field and understand the situation.
- To know how to develop small-medium scale factories to large scale factories is very important.
- The Center should collect and analyse information from all over the country.
- We would like to employ the method introduced by Japanese experts on how to utilize local raw materials.
- The Center should coordinate between raw materials factories and production factories.
- Some trainings were too long to fully attend.
- Modernization.
- Streamline the procedure to get technical guidance. If the problems are solved in a short time, we can reduce the number of unqualified products.
- Seminars/training in Bangkok were more useful.
- Development of ceramic industry is too little.
- The Center staff have no practical skills.
- The technology of the Center is out dated.
- The Center has trouble with the Association.

5 評価グリッド

NCDC evaluation - 1

タイ北部セラミック開発センター事業 終了時評価調査 評価グリッド

評価項目	確認事項	情報源	調査結果 (括弧内は情報源、専：専門家、プロ要：プロが要) (表中にあるAnnexは合同調査報告のものを行す)	備考
1. 目標達成度 1-1 成果の達成状況と達成阻害要因	1.1.0. NCDCの組織体制の整備 1.1.0.1. 人員配置の状況 1.1.0.2. 財政基盤の確立 1.1.0.3. 年間活動計画の策定と実施	プロジェクト報告	1.1.0.1. 現在の人員配置と内訳：公務員、長期、臨時 総務13：3.0.10 研究調査11：1.0.0 試験11：5.0.6 技術16：3.7.6 デザイン8：4.4.0 - この人数、特に公務員籍のスタッフは今後増加していく業務をこなすには不足している (専、C/P)。 - 人数は適当であるが今後さらに経験を積んでいく必要がある (C/P)。 1.1.0.2. 5年間に総計148万パーツの予算が確保された。センターの活動予算は十分であり、消耗品の購入など問題はなかった (C/P)。 1.1.0.3. 各年度の項目別事業計画が策定され、実施された。また、技術課では週間計画も策定している。ただし、セクション間の業務調整は不足。 - 次年度の計画策定に当たって地元企業を求め研修・研究などのニーズをヒヤリングした (所長)。	
	1.1.1. 原料利用及び製造技術の研究開発に必要な資機材の整備・維持管理 1.1.1.1. 実験機器 1.1.1.2. 製造機器	プロジェクト報告、専門家、C/Pからの聞き取り	1.1.1.1. よく利用されている。C/Pの取扱技術、維持管理技術ともに十分であり、概ね信頼できる。ただし、データを見なおさなくいかどうかを判断する力は不足 (専)。 1.1.1.2. 日本側供与分、タイ側購入分ともに全般的に活用されている。C/Pの取扱技術、維持管理技術ともに十分 (専)。	
	1.1.2. 原料利用及び製造技術に関する知識・技術を身につけたC/Pの育成 1.1.2.1. 原料利用技術に係るC/Pの人数、技術の習熟度 1.1.2.2. 製造技術にかかるC/Pの人数、技術の習熟度 1.1.2.3. 研究開発技術に係るC/Pの人数、技術の習熟度	プロジェクト報告、専門家、C/Pからの聞き取り	1.1.2.1. standard testing sectionが中心。機器分析は全員が一通りできるようになり、そのうえで専門を有する。セミナーや研修も実施でき、企業からの相談にもかなり応じることができるようになった (専、C/P)。ただし、これまでに得られた分析結果が集中管理されていないため、データの活用が図られておらず、また散逸の恐れがある (現地調査)。 1.1.2.2. technology sectionが中心。design sectionを含む。製造技術は多岐にわたるので、全部がわかる人材の育成を図り、スタッフの半分は全体が一通りできるようになった (専)。デザインについては企業の相談に応じられるようなレベルに達していない (C/P)。 1.1.2.3. standard testing および technology sectionが担当。タイ側独自の研究も実施している。 なお、組織体制のうち、R&Dセクションは、技術の研究開発でなく、経営面の調査研究を行う課である。	

評価項目	確認事項	情報源	調査結果	備考
	<p>1.1.3. 原料利用及び製造技術に関する研究開発。 1.1.3.1. 新たに開発された技術の種類 1.1.3.2. 研究成果</p>	<p>プロジェクト報告</p>	<p>1.1.3.1. および1.1.3.2. ランパン陶石の特性説明、ランパン陶石活用技術の開発（ポセリン素地、ストーンウェア素地、ドロマイト素地、陶石丸ごと利用技術の開発、ろくろ成形技術、各種釉薬の開発、石膏型製造技術の向上（プロ姿）-5年間としては十分成果を上げたといえるが、もう少し地元企業の現状に合わせた内容や方法を考慮するとさらに効果的であった（現地調査）。</p>	
	<p>1.1.4. 研究開発による成果の出版物、研修コース、セミナーを通じた普及。 1.1.4.1. 研修やセミナーの内容、実施回数、参加数 1.1.4.2. 出版物の種類、部数、内容</p>	<p>プロジェクト報告、企業へのアンケート、出版物</p>	<p>1.1.4.1. Annex - Record of Activities参照。94年度から各年の実績は 研修：107-7213名、95-7185名、107-7148名、87-7103名セミナー：4回 200名、4回218名、2回150名、1回50名 1.1.4.2. Basic Glaze, Technical Report Vol. 173、Technical Document、これら出版物は地域の企業に送付した。 このほか、毎年Ceramic Fairへの参加とそでのCeramic Contestの開催、およびNCDC Home Pageの開設を行った。</p>	
	<p>1.1.5. 陶磁器企業に対する個別の技術指導 1.1.5.1. 企業からの相談件数 1.1.5.2. 企業への出張相談件数</p>	<p>プロジェクト報告、企業へのアンケート</p>	<p>1.1.5.1. Annex - Record of Activities参照。94年度から各年の実績は 82件、243件、165件、212件であった。 1.1.5.2. Annex - Record of Ceramic Factory and Mine Visiting参照。93年6月から97年8月までの間に14件の出張技術相談（専門家が同行する形での）を実施。このほか視察、試料採取等の目的で133件の企業訪問を行った際、技術相談を提供したケースも多い。</p>	
<p>1.2. プロジェクト目標の達成状況と達成阻害要因</p>	<p>1.2.1. 企業がNCDCの技術サービスを利用した回数 1.2.1.1. 技術相談 1.2.1.2. 分析・試験 1.2.1.3. 出版物</p>	<p>プロジェクト報告、企業へのアンケート</p>	<p>1.2.1.1. 実績は1.1.5.。対応は：即応してくれた、親身に相談にのってくれた、回答を受け取るまでに時間がかかりすぎる、回答の的が絞られていない、問題は解決できなかつたのにフォローアップがない（企業）。 1.2.1.2. Annex - Record of Activities参照。94年から各年実績は：38件、72件、60件、42件。対応は：すばやく対応してくれた、詳細なデータをもらった、遅い、依頼したが断られた（企業）。 1.2.1.3. 17社中11社が「見たことがある」と回答。またセミナーでの配布資料も活用されている（現地調査）一方、理論が多く専門知識のない中小企業の経営者には難しすぎる（企業）との批判もある。</p>	

評価項目	確認事項	情報源	調査結果	備考
	1.2.2. NCDCが開発・指導している技術の数、企業により活用されている技術の数、件数	プロジェクト報告書、企業へのインタビュー	石膏型の作り方、釉薬の配合の仕方、窯の改善、焼成、製造工程の改善など。また、「陶石の丸ごと利用」にも取り組みたい(企業)との声も聞かれた。 ただし、研究室レベルの量で成功した技術が、現場での量産に適用できなかった(企業)との意見もある。	
	1.2.3. 企業からの研修・セミナーへの参加数	プロジェクト報告書	実績は1.1.4.1。 研修参加者の反応：基礎を学べて有益だった、基本的すぎず問題解決に役立たない、手作業の多い中小企業には利用できない技術だった(企業)。セミナー参加者の反応：テーマと内容があつていなかった、理論が多く実務直結型でない、製造工程の改良に活用できた(企業)。	
	1.3. 成果がプロジェクト目標の達成につながるのを阻害した要因	専門家、C/Pからの聞き取り	中小企業向け技術提供はかなりできるようになったが、周辺状況の変化からセンサーに求める技術内容が変化している。 -新技術指向：中〜大企業の中には、工業材料としてのセラミック利用に関心を示すところが増えているが、センサーの陣容では対応できない(専、C/P)。 -マーケティング努力の必要性：これまでは質が悪くても安価であれば売れていたが、不況に駆逐して品質管理、デザイン、市場開拓などへの支援要望が急増している。これらは当初計画ではあまり重視されていなかった(専、C/P)。	
2. 効果	2.1.1. 陶磁器製品の輸出額	統計	1992年5,413、93年6,387、94年7,430、95年7,769、96年7,111(単位：百万円)。 総額では96年に落ち込み。ただし、食器類については96年も95年とほぼ同額を維持(タイ国関税局協賛統計センター資料)。	
	2.1.2. 陶磁器製品の輸出価格	統計	統計資料未入手	
	2.1.3. タイの陶磁器開発におけるNCDCの役割	DPへのインタビュー	NCDC設立に当たって期待された役割は 1)原料の利用法開発 2)効率性の高い製造方法の開発 3)デザイン能力の開発 4)衛生陶器、タイル、磁子など工業用陶磁器製品の開発 このうち、1)および2)については十分な活動ができたが、3)と4)に関してはまだ不十分(DP)。	

評価項目	確認事項	情報源	調査結果	備考
2.2. プロジェクトの対象地域開発への貢献度	2.2.1. タイ北部の陶磁器生産額	地域統計	投資総額は1997年の数値で1,231百万バーツであるが、売り上げについては統計がない(ランバン県工業事務所資料)。	
	2.2.2. タイ北部の陶磁器産業の規模(企業数、雇用者数、売り上げなど)	地域統計	1993年から1997年の変化(ランバン県工業事務所資料) - 企業数: 合計147→184 (大企業0→3、中企業16→16、小企業131→165) - 従業員数: 全体で21%の伸び(中企業では1%減少、小企業は24%増加)	
	2.2.3. タイ北部の陶磁器産業界のNCDCに対する期待	企業・組合への質問票	NCDCには北部の各企業の問題解決を支援することが期待されており、利用企業からは相当の評価を得ているが、「企業がNCDCをあまり利用しない」という批判が多い。理由は - センターは多忙でセンターに相談に行く余裕がない。 - センターは役所なので敷居が高い。 - 問題が解決されるまで面倒を見てももらえない: ときどき訪問するのでもなく、継続的に指導して具体的成果を見せてほしい。 - 企業側がセンターの活動について知らない、知ろうとしていない(以上、企業)。 他方、Sagget開発、碍子開発などは企業側の提案により共同研究(原料や燃料を企業側が負担)を行った。	特定セクターの研究所が産地に設置されており、NCDCは非常にユニークな存在(DIPの意見)
2.3. 環境面への正・負のインパクト	2.3.1. 開発または導入された技術は環境にインパクトを与えているか	CDC DIPへのインタビュー	「陶石の丸ごと利用」により資源の有効活用と、廃棄物の減量が期待される。ただし、丸ごと利用には設備投資が必要であり、企業側がその利点を理解することが普及の前提条件(専)。 木材の伐採が禁止され、薪の需からガス薪への転換が図られている。また、木灰を使った釉薬にかわる人工釉薬など代替品の開発が必要となつてい	
	2.3.2. 陶磁器産業の発展は環境にインパクトを与えているか	DIP	- 女性の手先が器用であるとして絵付け作業を中心に多数雇用されている。賃金は男性よりもやや低い技術力のある人では男性より高賃金の場合もある(現地調査)。 - 就業者数は5年間に14%増加しているが、男性の就業者数の伸び34%と比較して少ない。 - 家族経営の企業が多いため、女性の工場長や役員も多い。	
2.4. WDへの正・負のインパクト	2.4.1. 企業での女性の雇用状況	統計		

評価項目	確認事項	情報源	調査結果	備考
2.5. その他の 正・負のインパ クト	2.4.2. 開発または導入された技術は 女性の役割や収入に変化を与えてい るか	女性従業員 へのインタビュー 専門家 C/P DPへのイ ンタビュー	<ul style="list-style-type: none"> - タイ各地の村産開発事業として陶磁器が検討されており、依頼を受けたC/Pによりろくろ技術の指導や起業活動の支援が行われている(専、C/P)。 - 日本の陶磁器企業も数多く見学に訪れ、企業間の交流が促進された(プロジェクト報告書)。 	
3. 効率性 3.1. 投入の質・ 量・時期の適正 度	3.1.1. 専門家の派遣人数、分野及び 期間	プロジェクト 報告書	<p>Annex - List of Japanese Experts Dispatched参照。とくに短期専門家はR/Dよりも大幅に多い人数が派遣された。</p> <p>長期専門家：8名(チーフ、原料、製造、業務調整)</p> <p>短期専門家：30名(機材提供、製造、原料、釉薬、ろくろ成形、石膏型成形、機器分析、品質管理、磚子開発、デザインなど)</p> <ul style="list-style-type: none"> - 機器分析の専門家派遣はもう少し早い方が良かった(C/P)。 - 短期専門家が一時期に集中して派遣され、C/Pが重複するなどプロジェクト側の負担が大きかった(専)。 	
	3.1.2. 供与機材の金額、品目、利用 状況	プロジェクト 報告書	<p>Annex - Machinery and Equipment Provided by the Japanese Side</p> <ul style="list-style-type: none"> - 概ね適切であった(専、C/P)。 - 機材自体はよいものであるが、研究用のものであり民間企業のニーズに必ずしも合わないものもあった(C/P)。 - 一部現時点で使用頻度が低い機材がある(現地調査)。 	
	3.1.3. 研修員の受入人数、分野	プロジェクト 報告書	<p>Annex - List of Thai C/P trained in Japan参照。</p> <ul style="list-style-type: none"> - のべ17人が蛍光X線分析、窯業技術、焼成技術、石膏型成形、ろくろ成形、機器分析、デザイン等の分野で日本で研修した。 - 研修内容は概ね適切であった。 - 一部センターでの業務と関連性の低い内容があった。 - 習得すべき技術内容に対して研修期間が短かった。 - 集団研修であったため、研修員のレベルがまちまちで結果的に基礎的な内容を学ぶにとどまった(C/P)。 	

評価項目	確認事項	情報源	調査結果	備考
	3.1.4. タイ側の投入内容、質、量	プロジェクト報告書	<p>Annex - Organizational Chart of CDC および Budget of the CDC 参照。</p> <ul style="list-style-type: none"> - センターの職員数は今後ますます増加する業務量に比して不足している(専、C/P)。 - 施設は十分である。一部雨漏りがあり修理した(専、C/P)。 - 運営・管理予算は十分にあり時に問題はなかった。ただし、今年度予算が削減され、燃料確保に困難が生じた(専、C/P)。 	
	3.1.5. 投入の計画は適切であったか	専門家、C/Pへのインタビュー	<ul style="list-style-type: none"> - 全体として概ね適切であった(専、C/P)。 - 日・タイ双方の語学力が十分でなく、技術移転の障害となった。双方とも語学力のある人材が手当てできないのであれば、通訳の確保などが必要であった。(専)。 	
3.2. プロジェクトの支援体制	3.2.1. ジョイントコミティは機能したか	専門家、DIPからの聞き取り	<ul style="list-style-type: none"> - 計画打合せ、巡回指導調査団の際に開催し、各年の活動計画などを確認した。 	
	3.2.2. 外部関係機関の支援は得られたか	CDC, DIPからの聞き取り	<ul style="list-style-type: none"> - MTEC、科学技術開発庁、ランバン工業事務所などの協賛によりセミナーを多数開催した(プロジェクト報告)。 - チェンマイ大学から学生がセミナーや研修に参加しているが、これまではJICAプロジェクトで忙しく共同研究はできなかった(所長)。 - チェンマイ大学薬学科との連携はもっと緊密に図られるべきであった(専)。 	
3.3. 他の協力形態とのリンク	3.3.1. 他のプロジェクトとのリンク	専門家、CDCからの聞き取り	<ul style="list-style-type: none"> - パナマ/セラミック開発プロジェクト(個別専門家C/P)と技術交流を行った。 - マレーシアSIRIMプロジェクトでスタッフが研修を受けた。 	
	3.3.2. 国際機関等による協力とのリンク	専門家、CDC, DIPからの聞き取り	<ul style="list-style-type: none"> - カナダNGOから技術者が派遣され、セミナーを行った。 - JETROとの共催という形でセミナーを2回開催した。 	

評価項目	確認事項	情報源	調査結果	備考
4. 妥当性	4.1.1. タイの窯業振興において、ランパンを窯業開発の拠点としたことは妥当であったか	DIP, 企業へのインタビュー	<ul style="list-style-type: none"> - DIPの資源は中小企業の振興にあり、中小窯業が多く存在するランパンを拠点としたことは妥当であった(専、CIP)。 - ランパンでは地元原料を利用した窯業が展開されており、ここを拠点としたことは妥当であった。 - 大企業はバンコクにあり、全国レベルで見ればランパンにあることが妥当である(専)。 	
	4.1.2. 「タイ北部産陶磁器の質が高くなる」は現在も政府の政策と合致しているか	DIP	<p>陶磁器はタイ政府の輸出振興策の重点項目とされており、その質を向上させることが輸出拡大のためのポイントと考えられている。したがって、上位目標は政府の政策と現在も合致している (DIP)。</p>	
4.2. プロジェクト目標の妥当性	4.2.1. プロジェクト目標はNCDCのニーズと合致したものであったか	専門家、CIPへのインタビュー	<ul style="list-style-type: none"> - 合致していた(専、CIP)。 - ただし、企業に対し、どのような情報や技術サービスを提供するかについては、プロジェクト関係者さらに企業の間でも考え方に違いがあった。 	
	4.2.2. プロジェクト目標は上位目標と整合したものであったか	専門家、CIPへのインタビュー	<ul style="list-style-type: none"> - センターは技術支援を行うが、企業側に受け皿となる技術者がいない(企業)。 - 市場開拓に対する企業側の努力が必要になってきている(専)。 - 陶磁器産業の振興にはセンターによる技術支援の他に、次のような方策が必要である(DIP)。 1) 資金援助 (DPの関連団体にSmall Industry Financial Cooperationがあり、中小企業向け融資を行っている) 2) 教育・普及活動 3) マーケティング支援 (Trade Fairなど) 4) 研究機関との提携 (科学技術省材料科学研究所との連携) 	
	4.2.3. 政府の中小企業振興に関する政策・方針	DIP	<p>タイの企業は95%が中小企業であり、その振興は産業育成上、非常に重要である。中小企業振興戦略は</p> <ol style="list-style-type: none"> 1) 技術力の開発 2) 人材育成 3) 大企業との連携 4) 大企業の地方部への展開 5) 資金援助 6) マーケティング支援 <p>窯業はその大半が中小企業であり、中小企業振興の観点からも重要産業である (DIP)。</p>	

評価項目	確認事項	情報源	調査結果	備考
4.3. プロジェクトのデザインとデザインの妥当性	4.3.1. プロジェクトのデザインは問題がなかったか	各調査項目を総合して	<p>職員の大半は窯業の経験も浅く、技術移転を職員研修として日常業務とは別に実施した。同時に企業からの技術相談や試験・分析も行っていたために、日本側では短期専門家の派遣期間中にC/Pが不在である、タイ側には日常業務が継続的にできない、業務が多すぎる、という不満が生じた。</p>	
4.4. 計画段階で外部条件を十分分析していたか		専門家、企業へのインタビュー	<p>・タイ経済の好況が一転したことから企業の関心事も変化し、セクターに対する期待も多様化した。この変化は予想外であった。しかし計画段階で地元企業のニーズを十分把握していたとも言え切れない。 - C/Pの定着についてはほとんど問題がなかった。しかし公務員籍でないpermanentおよびtemporaryのスタッフ（C/Pとは報告されていないが、実質的にC/Pとなり、日本での研修もうけている者もいる）が約半数おり、待遇の悪さから転職が相次いだ。</p>	セクター全体の業務を遂行するためには、C/Pのみならずsupportingスタッフの確保も重要
5. 自立発展性	5.1.1. 政府のCDCに対する支援の有無	DPへのインタビュー	<p>政府は輸出拡大を重要課題としており、陶磁器産業は国内原料を利用して地方部で生産を行っているという特徴もあり、今後も輸出拡大の重点製品として重視している。同時に近年、CDCによって農村開発の活動もおこなわれるようになり、地方産業振興の役割も期待されている（DP）。</p>	
5.1. 組織的自立発展性	5.1.2. CDCの運営管理能力	専門家 CDCへのインタビュー	<p>・総務課の課長が長期間空席になっていたため、運営管理が滞っていた。 現在には人員が確保され、体制が整備されている。ただし、セクター内各部署の間の調整能力などは十分とは言えない。 - 将来計画については、当面セクターの人員確保をDPより確認した。</p>	
	5.1.3. CDCと地域の企業との関係	CDC、企業へのインタビュー	<p>2.2.3参照。 - CDCに対する地域の企業の要望・期待は多様化しており、今後の関係については現在双方で模索中。 - また企業規模の発展、各企業の技術力の向上に対応して、CDCの職員が技術サービスを提供できるようにするには、今後もCDC側の多大な努力が必要（専）。 - 資金力のある企業は欧米や日本の民間企業に専門的指導を求めるところもある。ただし、企業秘密の保持の問題等あり、またそうしたつてのいない中小企業にとつてCDCへの期待は大きい（企業）。 - セラミック協会との連携によりCDCの活動がより効果的に行えるのではないか（現地調査）。</p>	企業研修や企業との共同開発などのも検討しても良いのではないかと

評価項目	確認事項	情報源	調査結果	備考
5.2. 財政的自立 発展性	5.2.1. CDCの今後の予算と財源	DIP, CDCへのインタビュー	<ul style="list-style-type: none"> ・今年度予算は年度途中で削減されたため、様々な問題を引き起こした。今後はあらかじめ予算枠がわかっているのが対応は容易。また、CDC予算はDIP予算全体のわずか1%であり、必要であれば予算の追加も可能である(DIP)。 ・今後は予算の絞り込みが必要。また、企業との共同研究なども検討したい(所長)。 ・トレーニングや試験・分析に係る経費のセンターによる回収は法規により規制されている(DIP)。したがって、必要な資機材の現物提供や企業との共同研究など、規制の枠内でコストの軽減の工夫が必要。 	
	5.2.2. スペアパーツや消耗品の調達方法の確保	CDC、専門家へのインタビュー	<p>調達の方法は確保されているが、時間がかかると、予算申請の際に説明があれば今後也十分対応可能である(DIP)。</p>	
5.3. 技術的自立 発展性	5.3.1. 育成されたC/Pの活動内容	C/P、専門家へのインタビュー	<ul style="list-style-type: none"> ・調査研究活動を行い、成果をセミナー等で発表している。 ・セミナーや研修で講師を務めている。 ・ろくろ部門ではチームを組んで地方へ出張し、農村開発の助言・指導活動を担当している。 ・今後取り組みたい活動は：罫子の開発、デザイン開発の人材育成(所長)、地元企業へ出かけての技術相談、中小企業を対象にした分析・試験の実施、農村開発のための起業支援、製造工程全体の改善、セラミックに関する情報収集とデータベース化、基礎的技術の指導、よりレベルの高い研修(C/P)。 	
	5.3.2. 施設・機材の維持管理体制	CDC	<ul style="list-style-type: none"> - 機材の故障については各課の課長から所長へ報告し、所長が指示を出す体制。施設の維持管理はTechnology Sectionの課長が責任者となっている。 - 現在のC/Pで十分維持管理が実施できる(C/P)。 - ただし、特に日本からの供与機器が故障した場合の修理については、タイに代理店がないものが多く、問い合わせから修理が完了するまでに時間がかかる(専、C/P)。また、スベアパーツの購入なども費用と時間がかかる。 	

JICA

