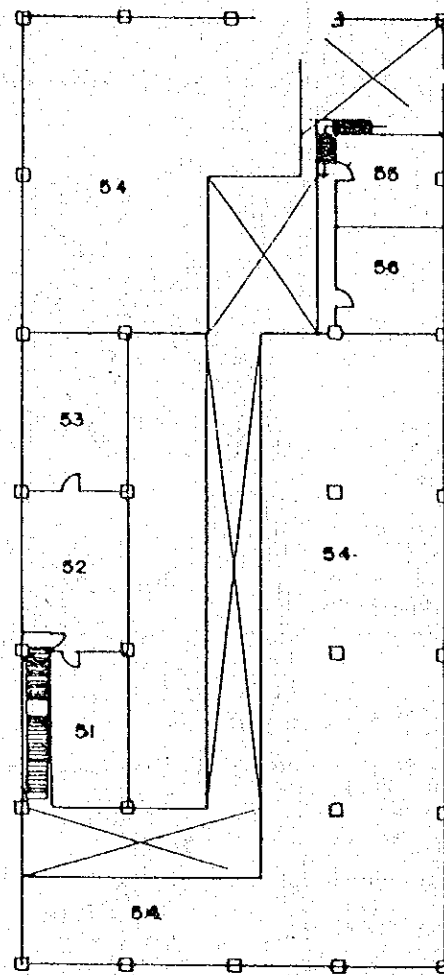


Figure 1

LEGEND:

- 51. STOCK ROOM FOR CHEMICALS
- 52. LIBRARY ROOM
- 53. CLASS ROOM
- 54. PROPOSED MEZZANINE FLOORS
- 55. STOCK ROOM FOR GLASSWARES
- 56. STOCK ROOM FOR EQUIPMENT ACCESSORIES



EXIST'G. 2ND. FLOOR PLAN

MAIN BUILDING
SCALE : 1" = 250 MTS.

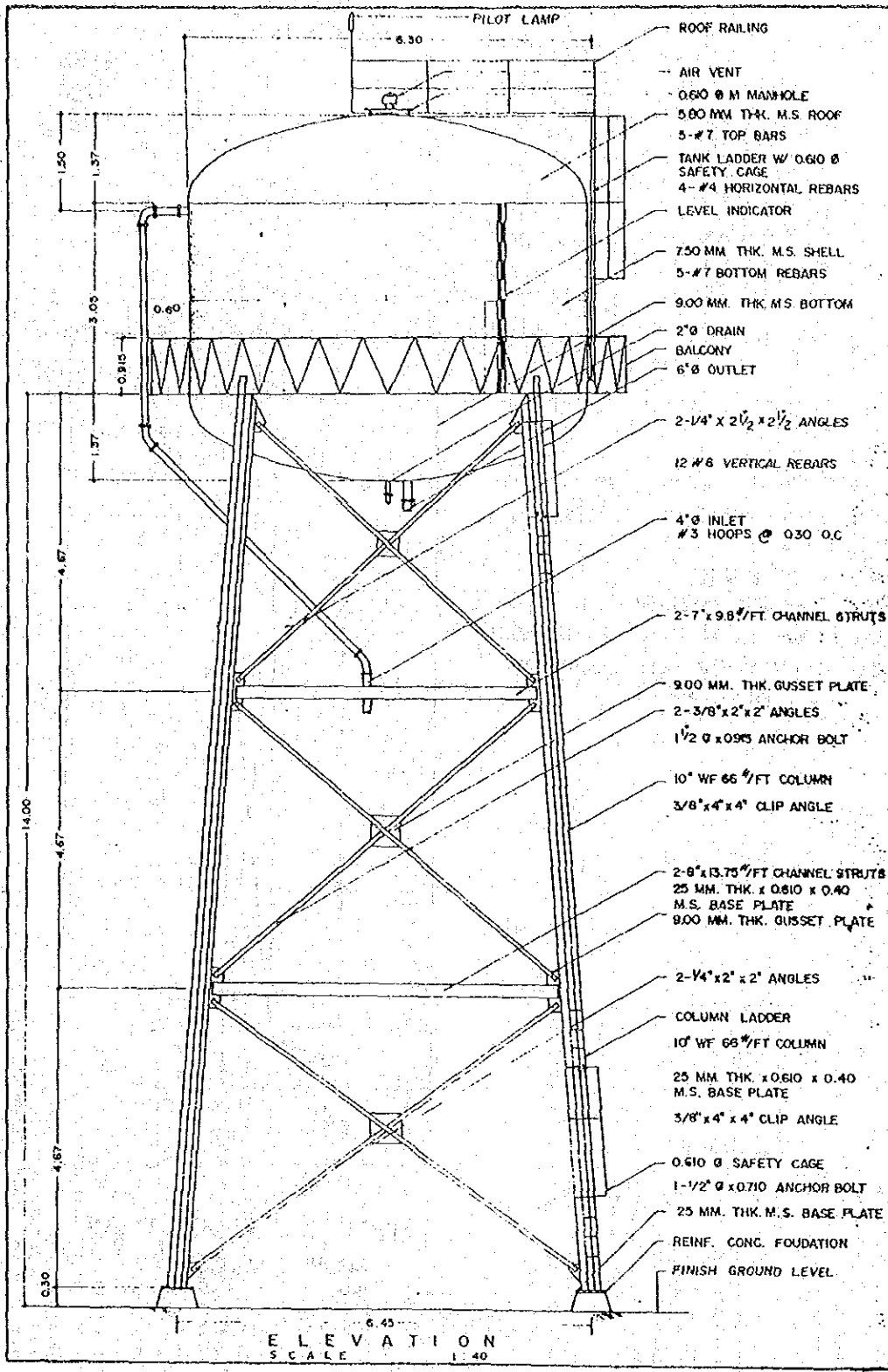


Figure 2

Ceramic Research and Development Center
Functional Chart

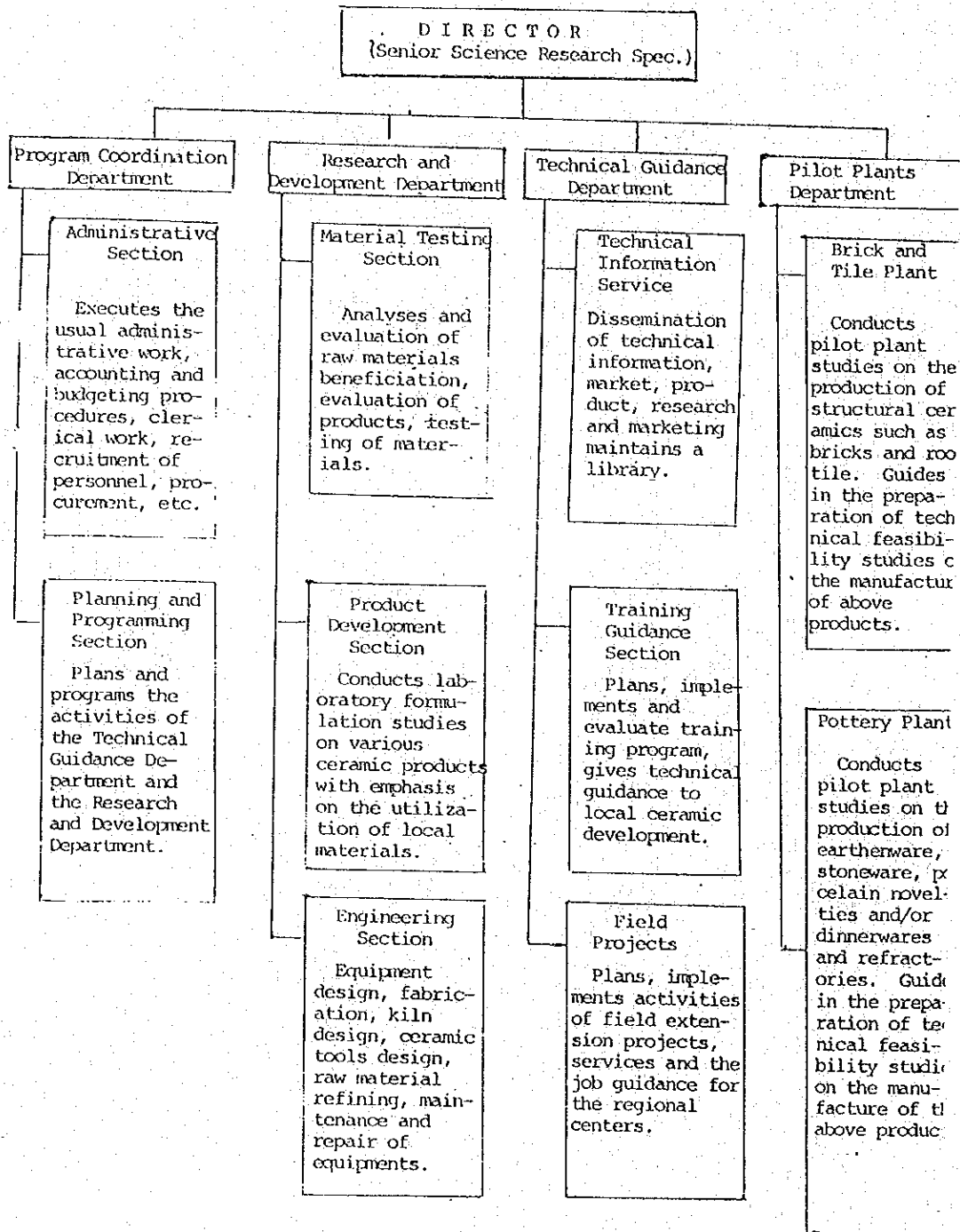
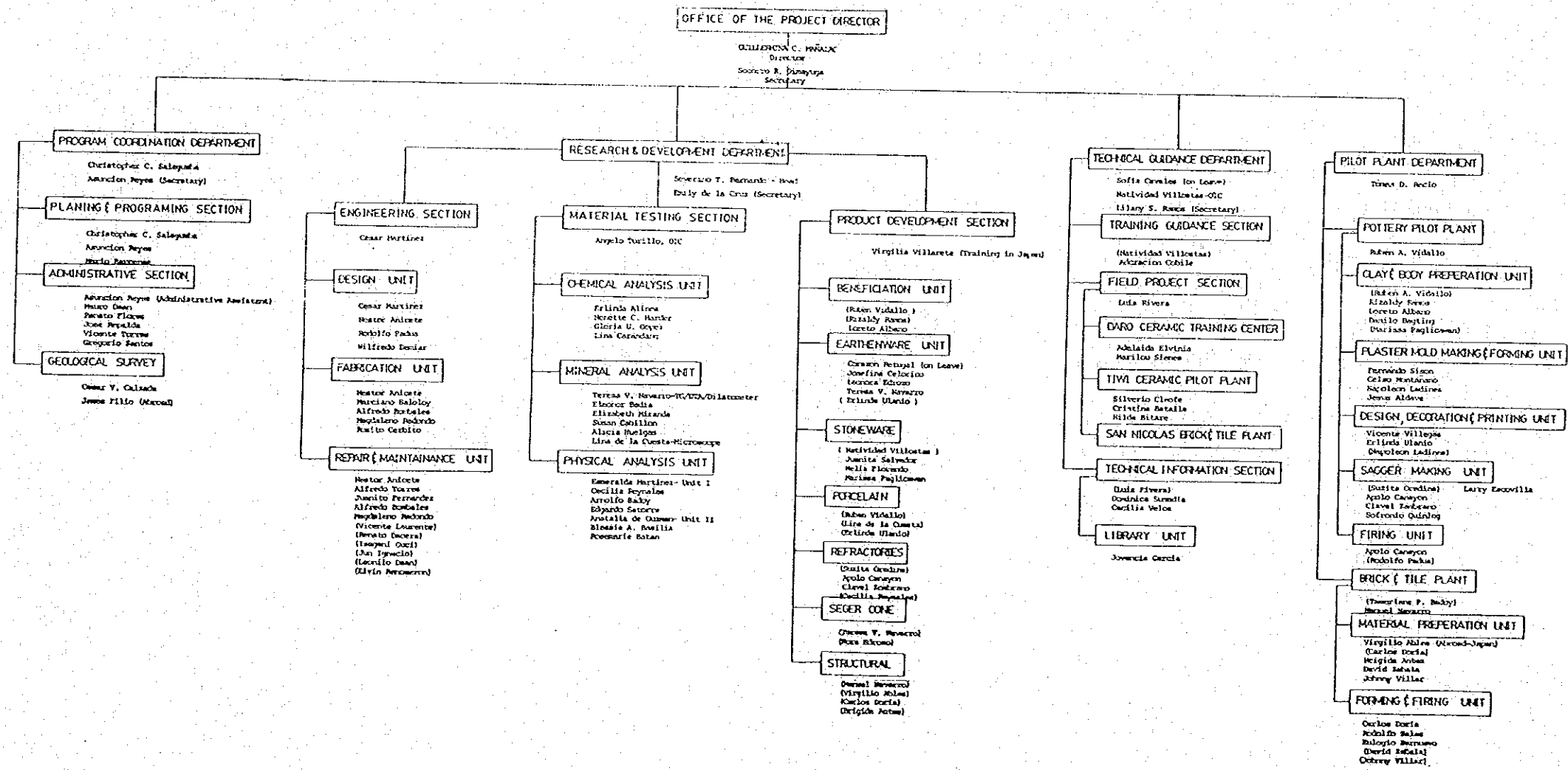


Figure 3

ORGANIZATIONAL CHART
DISTRIBUTION OF CRDC PERSONNEL



B. Accomplishments of Japanese Side

I. Provision of Equipment

During the period of implementation of a full range of tests and analysis equipment as well as test production equipment for brick/tile and pottery production has been provided with a total value of ₱ 10,582,144.33. (See attached detailed list of all equipment provided).

II. Provision of Expert Services

As provided for in the Record of Discussions experts were assigned to the project on long term duration as well as on short term for very specific areas of specialization. The long term experts diligently worked with and consistently guided Filipino Counterparts in various aspects of ceramic technology as well as on Management of the Center's activities. (See attached list of all experts assigned, their field of expertise and duration of assignment).

III. Training of Filipino Counterparts in Japan

A total of thirty-on (31) counterpart were trained in various fields of ceramics of these three were trained on Management and two underwent advanced research training. (See attached List of Trainees, Their Fields of Training and Their Present Assignments).

Ceramic Equipment Provided by the Gov't. of Japan (JICA)
Under JICA-NIST-NSMA (NSDB)
as of June 1982

Date Acquired	As per request in Colombo Plan Form A-4 Item Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
12/3/77	Shimadzu Thermal Analysis Instrument, Model DTG-30H 100V, SN: 5016H Recorder Model R-231, SN 59736 with accessories	1	set	JICA-NIST 598-1	Thermal Analy- sis Room (Rm 110)	good condi- tion in use	
12/3/77	Shimadzu X-ray Diffractometer, Model VD-2 for ope- ration on 2, 220V, 60HZ single phase "Autoclave" AC 100V-2KVA, AC-200V-2KVA, AC-200V-5, SN: 11539 with complete accessories	1	set	JICA-NIST 441-3	X-ray Room (RM 105)	good condi- tion in use	
4/10/78	Rheometer, Model R 4D-J with standard accessories built-in 220V, transformer	1	set	JICA-NIST 585-1	Physical Test II Room (Rm 117)	good condi- tion in use	
4/12/78	Gas-fired Test Kilns, effective inside dimensions 420W x 800L x 600H mm, effective firing volume approx- imately 0.273. Firing temperature, max. 1,500°C, Fuel, LPG, No. of burners: 4 sets Capacity of burner: 70,000 kc al/hr complete with gas cylinders of 50kg capacity, vaporizer of 50kg/ hr primary pipings, secondary pressure regulator, pressure gauge flow meter, turbo blower with motor, ignition torch secondary pipings, pyrometer panel, thermocouples and kiln furnitures	1	set	JICA-NIST	Pottery Bldg.		
11/30/77	Universal Testing Machine 5 tons capacity type: MU No. 5 C.I.V No. of Production 5465 "Maekawa Test- ing Machine". Mfg. company with accessories	1	set	JICA-NIST 32-38	Physical Test Room I (RM 111)	good condi- tion in use	
12/3/77	Shimadzu Atomic Absorption Flame Emission Spectro- photometer, Model AA-630-02 SN:1504 with accessories	1	set	JICA-NIST 185-87	Chemical Ana- lysis Room (RM 109)	good condi- tion in use	

Date Acquired	As per request in Colombo Plan Form A-4 Item Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
4/17/78	Potter's Wheel 220V, 60HZ single phase, "Ringscone" Type HK-1 Mfg. No. 60180073, Date, 1978	1	set	JICA-NIST 342-4	Pottery Bldg.		
11/30/77	Full Automatic Dilatometer, Model HD-213 with accessories	1	set	JICA-NIST 60101	Thermal Room (Rm 110)	good condi- tion in use	
12/27/77	Stirrerless Autoclave Experimental Apparatus Sakashita D type	1	set	JICA-NIST 63-22	Kiln Room (RM 116)	Good condi- tion in use	
4/12/78	Mixing and Grinding Machine: Type "ISHIKAWA" No. 16, 2 booth type complete with alumina mortars, 2 alu- mina grinding bars and 0.2 kw motor 220V, 60HZ, type with motor BFGUG single phase output 200 watts "TAKASAGO IND" with 2 motor each set	4	sets	JICA-NIST 512-2 -5	Sample Pre- paration Room (RM 113)	Good condi- tion in use	
4/10/78	Maruto Crystal Cutter Model MC-701 Output: 200W, 100V Mfg. Dates March 1978 with standard clamp and special clamp 220V, 1kw transformer and standard with accessories	1	set	JICA-NIST	Sample Pre- paration Room (RM 113)	Good condi- tion in use	
4/10/78	Diamond Brick Cutter, Model 5-KW, with Specimen holder: 220V, AC 3 phase 60 cycles spindle speed 2800 rpm Mfg. date, March 1975 "MIIKE RIKI CO."	1	set	JICA-NIST 536-1	Sample Pre- paration Room (RM 113)	good condi- tion in use	
4/10/78	Ltd. with motor "Super line" 4 poles SN:49570 1840 with accessories						
4/10/78	Color Measuring and Difference Calculating Digi- tal Display System Model: ND-504 DE. SN: 3535 with standard accessories and spare parts	1	set	JICA-NIST 584-1	Physical II Room (RM 117)	good condi- tion in use	

Date Acquired	As per request in Colombo Plan Form A-4 Item Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
3/31/78	Air Conditioner window type Model: W45BUE 110V, 50/60HZ "DAIKIN" - SN:6720-400	12	units	JICA-NIST 327-316-327 327-354 327-357 6720-402 327-345 RM112A 327-319 327-318 327-317 327-316 327-355 327-323	RM 117 RM 112 RM112A RM 110 RM118 RM 105	Good condi- tion in use -do- -do- -do- -do- -do- -do-	
12/3/77	H-530 Type Roll Crusher with two motors attached a) 7.5 kw 6 poles "Little King" Maidensha brand 3 phase SN: NA 30510011 b) 5.5 kw "Little King" Maidensha brand 6 poles, 3 phase SN: NA 3404004, Type ED70	1	set	JICA-NIST 240-7	Pottery Crush- ing Room Kiln Room	Good condi- tion in use	
12/3/77	Type ED70-MN RY YHP-400 Type Pug Mill	1	set	JICA-NIST 135-25 JICA-NIST 36502		Good condi- tion in use	
3/17/76	LPG Mini Kiln with accessories, Type MGK-70, O.2, M3	1	set	JICA-NIST 281-8	Pottery Bldg.	Good condi- tion in use	

Date Acquired	As per request in Colombo Plan Form A-4 Item Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
12/3/77	BC-3 Type Box Feeder with tow motors attached: a) 3 phase Para-power Matsushita 2.2kw 4 poles SN: 70706054 b) 2.2kw Para-power Matsushita SN: 70706024	1	set	JICA-NIST 586-1	Brick & Tile Bldg.	Good condi- tion in use	
3/17/76	De-Airing Auger Machine with accessories and clay cutting machine "TOKI" (41) 1219 attached motor, 3.7kw "Para-power" 3 phase, 6 poles SN: 70705073	1	set	JICA-NIST 581-2	Brick & Tile Plant	-do-	
12/3/77	Belt conveyor-M35 7S B4-Frame with Serial Numbers	5	sets	JICA-NIST 579-1 -5	-do-	-do-	
4/12/78	Mixing and Binding Machine Type: Ishikawa "AGA-W" Complete with agate mortar (120mm x 300mm) agate grinding bar and pore grinding bar, SN: 34543	1	set	JICA-NIST 582-1	Sample Pre- paration Rm (RM 113)	-do-	
3/17/76	Friction Press for roofing tiles with accessories "TOKI" (41) 120 with motor 1.5kw, 4 poles, "Para- power" SN: 6110601	1	set	JICA-NIST 1080-2	Brick & Tile Plant	-do-	
12/27/77	Pot Mill: Size of Pot 300mm x 3 pcs. and 240 x 3 pcs., per set item No. 13, 220V, 60HZ with motor "MOSHIBA" 3 phase 0.7 5 kw, 6 poles and pots with ball	3	sets	JICA-NIST 1330-4	Pottery Bldg.	-do-	
3/31/78	HITACHI General Laboratory centrifuge with accessories	1	set	JICA-NIST 94A-23	Beneficiation Bab. Room 115	-do-	
12/27/77	JIS Impact Tester, Model "UBESHIMA" IM-503	1	set	JICA-NIST 32-87	Physical Test I (Room 111)	-do-	

Date Acquired	As per request in Colombo Plan Form A-4 Item Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
3/31/78	Standard Sieve Set	2	sets	JICA-NIST	Sample Preparation Room (RM113)	good condition in use	
3/31/78	IBM Typewriter Model 895, 100V 60HZ 15.5 inch carriage, 50v. SN:8953-449357 complete. SN 8953-44356 with supplies and accessories	2	sets	JICA-NIST 15-10-11		-do-	
3/31/78	Sharp Calculator, PC3600, 220V, 60HZ Programmable SN: 705069 with supplies	1	set	JICA-NIST 569-1	Room 112A	-do-	
12/27/77	NIKOH Polarizing Microscope, Model POH-3	1	set	JICA-NIST 61-44	Microscopy Room (RM111-A)	-do-	
3/31/78	Hiruma Photo-Electric Photometer with accessories	1	set	JICA-NIST 597-1	Chem. Lab. (RM109)	-do-	
3/31/78	Crucible Platinum No. 30 with cover	9	pcs.	JICA-NIST 65-88 to 97	-do-	-do-	
4/10/78	Yamato Auto Still, WAG-28 with Ion Exchanger B-51 110V 16 amp. SM: 113074 with transformer step-down	1	set	JICA-NIST 97-3	-do-	-do-	
4/10/78	Yamato Drying Oven DX-58 100V with transformer each set	3	sets	JICA-NIST 424-4 to 6	1 Beneficis-ion Lab. 1 Physical Test IIRM 1 Thermal Rm	-do-	
12/27/77	NIKOH Photographic Equipment with accessories	1	set	JICA-NIST			
12/27/77	Chino Portable Temp. Indicator (Pyrometer) Model:	10	sets	JICA-NIST 90-27-36			

Date Acquired	As per request in Colombo Plan Form A-4 Item Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
3/31/78	Small Polisher for Rock, 220V "NICHKA" brand with accessories	1	set	JICA-NIST 325-26	Microscopy Rm (RM 111-A)	Good condi- tion in use	
3/31/78	pH Meter TOB, Model HM5BS 220V, 60HZ with standard accessories	2	sets	JICA-NIST 303-35 -36	1 set Chem. Lab.	-do-	
4/10/78	Yamato Pipette Washer, AW-31; 100V, SN:07271 with stepdown transformer	1	set	JICA-NIST 268A-1	Chem. Lab. (Rm) 109)	-do-	
3/31/78	Ro-Tap Sieve Shaker, 220 V 60HZ Model CM25-2 with motor 1/4 H.P. output; 220V, Mfg. No. G-7	1	set	JICA-NIST 262-8	Sample Prep. Room (RM113)	-do-	
12/27/77	Microflex Type AFMB consisting of microflex AFM basic unit relay lens 1/2 K, Camera adapter "B" and plain dark box M-358 SN: 78410 with the accessories	1	set	JICA-NIST	Microscopy Room (RM114-A)	Shutter hou- sing out of order	
4/10/78	Yamato Drying Oven Vacuum DPG-31 100V, 10 amp. 50/60 H7 single phase SN; 11820-with transformer	1	set	JICA-NIST 37A-74	Thermal Rm (RM 110)	Good condition (In use)	
3/17/76	Turbo Blower (2.2kw) "HOPE" with motor 3 phase, 4 poles	1	set	JICA-NIST 275-22			
11/17/76	Cabinet Safe Fireproof "ITOKI" brand Gray in color with dial combination size: 76 x 133 x 62 cm	1	pc.	JICA-NIST 8-11	PCD (RM 102A)	-do-	
4/10/78	YHP-97 Portable Computer with 220V adaptor, SN: 1801591737 Hewlett Packard and with special accessories	1	set	JICA-NIST 591-1	Thermal Rm (RM 110)	-do-	
4/10/78	HITACHI ARC Welder with standard accessories 60HZ Weight: 126kg, Model: AT-SSSP5; 220V. SN: 37118001	1	set	JICA-NIST			
3/31/78	Chino Optical Pyrometer Model AB-100, 1500/2000°C with standard accessories: SN:AB748007; AB748006	2	sets	JICA-NIST 90-25-26	1-Physical Test I (RM111)	Good condi- tion. in use.	

Date Acquired	As per request in Colombo Plan Form A-4 Item Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
12/3/77	Shimadzu GM Survey Meter transistorized FPH-6 class 2.5. SN:10132 with special accessories	1	set	JICA-NIST 578-1	X-ray Room (RM 105)	good condi- tion. in use	
3/31/78	Refrigerator NK-454SA, 22V; Input: 220W; Wt. 131kg NATIONAL brand; SN: 5800212	1	unit	JICA-NIST			
3/31/78	Refrigerator NR-454SA Input 200W; Wt. 131kg. NATIONAL brand; SN:5860230	1	unit	JICA-NIST 128-53			
3/31/78	Abbe's Refractometer; SN:2660	1	set	JICA-NIST 127-10	Optical Mic- roscopy Room (RM110-A)	-do-	
3/31/78	ARC Welder Model RB-1 with 220V transformer step- down. Specification: AC100V 20 amp. Mfg. No. 2152240. Date Mfr. 1978	1	set	JICA-NIST 41-20			
4/11/78	Pugmill "SHIMPO" Mill. Cap. 500kg/hr with motor 400 watts, 4 poles single phase 50/60 HZ, 200V, DRH-04 Mfg. No. 101308	1	unit	JICA-NIST 365-3			
4/10/78	Yamato water Bath 5-44 with stepdown transformer, Bath ser. no. 119 both SN: transformer a) 199 b)203	2	sets	JICA-NIST	Chem Lab. (RM109)	1-good condi- tion 1-out of order	
3/30/78	Ozawa Boiler Type Distiller; SB-25; 5 li/hr; 220V 60HZ 3kw SN:6724	1	set	JICA-NIST 102A-33	-do-	good condition 2x repaired	
3/31/78	Vaporating Dish Platinum No. 75	3	pcs.	JICA-NIST 66A-21 to -23	-do-	good condition	
3/31/78	Mayarama Balance T-100 Cap. 1000g.	9	sets	JICA-NIST 144-93 -101			

Date Acquired	As per request in Colombo Plan Form A-4 ITEM Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
11/30/77	Storage Cabinet of glass sliding door on top and steel sliding door at the bottom, gray in color "ITOKI" size: 185cm x 40cm x 176cm	3	Nos.	JICA-NIST 110-390-392	PCD (RM102-A)	Good Condition in use	
3/31/76	Air Compressor "IWATA" Model SP-07NB 220V 60 HZ with volt. 6.0 amp. SN: 317621 WA w/ motor "Superline" 4 pole type SCL-R with accessories	1	Set	JICA-NIST 534-3			
3/31/78	Vacuum Pump "HITACHI" Oil Model: 160VP-D with standard accessories with motor single phase, 4 poles, 200V 0.4 kw; SN: D162787 and stepdown transformer	1	set	JICA-NIST 113A-7	Phy. Test II (EM 117)		
3/31/78	Murayama Balance T-500. cap. 500g with complete set of weights each	9	sets	JICA-NIST 14A-84 -92			
3/31/78	Electric Tool Sets "HITACHI", Model# DL-10H transformer "Super Workshop Kit" DL-304 with special accessories	1	set	JICA-NIST 28-28			
4/17/78	Potter's Wheel Super 220V 60HZ, single phase "RING-CONE" RK-2 type Mfg. No. 60281302 with clutch	1	unit	JICA-NIST 342-5			
4/10/78	Vacuum Pump PC-5 with motor mfg. no. 7837020, 200 watts, 450rpm, mfg. no. of motor K7	1	set	JICA-NIST 113-86	Thermal Room (RM 110)	-do-	
3/31/78	Intercom VL-207	12	sets	JICA-NIST 592-1 to -12		-do-	
3/31/78	Olympus POS Microscope, SN: 208710	1	set	JICA-NIST 61-45	Opt. Microscopy (RM 110A)	-do-	
3/31/78	Infrared Moisture Meter, Model F-2B, 220V, 60 HZ SN: 801800	1	set	JICA-NIST 272-2	-do-	-do-	

Date Acquired	AS per request in Colombo Plan Form A-4 Item Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
3/31/78	Electric Grinder "HITACHI" model GBK-2; 220V, 60HZ 0.4 kw SN: 118002	1	set	JICA-NIST 54A-21	Chem Lab. (RM 109)	Good condition in use	
4/10/78	Yamato Labo Cart, LG-20 with transformer each set	2	sets	JICA-NIST 429-4 to -5			
11/30/77	Filing Cabinet 4 drawers gray color "ITOKI", Size 140cm x 62cm x 46cm	3	nos.	JICA-NIST 110-393 to -395		-do-	
3/31/78	Refrigerator, NR-205 AW "NATIONAL" Brand 220V Input: 165 kw, 56kg. SN: 865736	1	set	JICA-NIST 128-55		-do-	
3/31/78	K Type Refractometer	1	set	JICA-NIST 121-11	Opt. Micros- copy Room (RM 110-A)	-do-	
12/27/78	NIXON Camera with	1	set	JICA-NIST 122-A-1	-do-	-do-	
4/10/78	Yamato Handy Aspirator WP-33 with Yamato Flat Ear for above aspirator and transformer	1	set	JICA-NIST 577-1			
3/31/78	M7a 000108 with 2 pieces thermocouple 700-A1 23	5	pcs.	JICA-NIST 117E-1 to -5			
11/30/77	Drafting lamp flexible 100V 24.5 with stepdown transformer each	5	pcs.	JICA-NIST 110-387 -388 -389	PCD (RM102A)	-do-	
11/30/77	Storage Cabinet with double door, gray in color, "ITOKI" brand. Size 179cm x 88cm x 38 cm	3	pcs.				

Date Acquired	As per request in Colombo Plan Form A-4 Item Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
4/10/78	Yamato Mag Mixer, MH-61 100V, 250 watts, with step-down transformer each SN: 117 and 117	2	sets	JICA-NIST 141-12 -83	Chem Lab (RM109)	good condition in use	
4/10/78	Sony FM/AM Cassette Recorder Model: CF-1775 with standard accessories SN: 106160	1	set	JICA-NIST 313A-2		lost	
3/31/78	Murayama Balance T-200 Cap. 200gm SN: 12789, 12738 at CRL; 7 sets at stock room	9	sets	JICA-NIST 14A-75 -85	X-ray Room (RM 105)	good condition in use	
12/27/77	Platform Scale: capacity 250 kgs. Item No. 31 220V, 60HZ TAKASAGO Industry Co. Ltd. with sets of weights	1	set	JICA-NIST 100-42			
11/30/77	Trac Tape Drafter	1	set	JICA-NIST 599-1			
4/10/78	Yamato Labo Stirrer LS-18 100V with transformer 200 watts	1	set	JICA-NIST 96-55			
3/31/78	Chino 350 Indicator 100mV/25mV SN: M7A000109	2	sets	JICA-NIST 90-37-38			
3/31/78	Electric Drill, Mitsubishi Model SD-13C, 220V, 60HZ single with special accessories	1	set	JICA-NIST 28-27			
11/30/77	Filing Cabinet, 2 drawers gray in color "ITOKI" Size: 74cm x 46cm x 62cm	3	nos.	JICA-NIST	FCD (RM102A)	-do-	
4/10/78	Hanza Super Auto Dryer Model-2 220V-50/60HZ	1	pc.				
4/17/78	SM-1500 Hand Pallet truck 1,500kg. capacity Model: DM 1500	1	pc.	JICA-NIST 158-2			

Date Acquired	As per request in Colombo Plan Form A-4 Item Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
4/10/78	Thermo Magnetic GP-H-1 WIT 220V; SHIBATA SN: 0871333 and 0871323	2	units	JICA-NIST 583-1 -2			
11/30/77	Hand Truck "Plus" 86 x 56cm capacity, 300kgs with 4 casters detachable stainless steel handle	2	pcs.	JICA-NIST 878-1 -2			
3/31/78	Sharp PC-1200 Calculator SN: 70005927; 70006717 with adaptors for above	2	sets	JICA-NIST 596-3-4			
11/30/77	Letter case 7 shelves "LION" brand size 35.5cm x 33.5cm x 27cm	10	pcs.	JICA-NIST 600-1 to 10	1-X-ray Room	Good condition in use	
4/10/78	Yamato Labor Stirrer Model LS-58, 100V AC with stepdown transformer	1	set	JICA-NIST 96-56			
3/31/78	Cover and Spal Stainless Steel 2006 60M	6	sets	JICA-NIST 60A-7 to 12			
3/31/78	Berek Compensator NICHIKA SN:7938	1	pc.	JICA-NIST	Opt. Mic. RM (RM 110-A)	-do-	
4/12/78	Weighing machine capacity 50kgs with sets of weights 220V, 60HZ HOULTON SCALE CO., LTD.	1	set	JICA-NIST 100-48			
4/10/78	Chemical Cart Shelf with 3 shelves and a tray at the bottom with 4 wheels	2	units	JICA-NIST 399-2 -5			
11/30/77	Card Cabinet 4 drawers gray in color "ITOKI" Size: 44.5 x 62 x 74 cm	1	each	JICA-NIST 110-336			

Date Acquired	As per request in Colombo Plan Form A-4 Item Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
4/10/78	Tracing Stand S-60, 60cm x 90cm, 100V-50/60 M7 with 220V transformer	1	pc	JICA-NIST 389-1			
11/30/77	Pantograph			JICA-NIST 301-4			
11/30/77	Drawing Instrument	1	set	JICA-NIST 18-18			
3/31/78	YHP Mini 25 Calculator with adaptor SN: 1709	1	set	JICA-NIST 606-2			
3/31/78	Maryama Table Weighing Machine Model: W-10 cap. 10kgs.	1	set	144-108			
4/10/78	Fuji Enlarger S69 100V 50/60HZ with 220V transformer SN: 1540628	1	pc	JICA-NIST 267-3	Pottery Bldg-good condition in use		
3/31/78	Maryama Balance Table Weighing Machine Model: M-5 capacity: 5kgs. with set of weights	1	set	JICA-NIST 14A-113	Phy. Test I Rm (RM111)	-do-	
3/31/78	Quartz Wedge "NICHUKA"	3	pc	JICA-NIST 595-1	Microscopy Room (RM 110A)	-do-	
11/30/78	NIXON Binocular Microscope 7 x 50 ZCF with hard leather case. SN: 16624	3	pcs.	JICA-NIST 111-26-27-28			
3/31/78	Stop Watch Seiko Model ACRP a) SN: 752864	3	pcs.	JICA-NIST			
3/17/76	Indicating Pyrometer (O-1600 C)	1	set	JICA-NIST 90-24			
11/30/77	Filing Cabinet with three drawers gray in color "TOKI" size: 74 x 62 x 35 cm	1	set	JICA-NIST 110-385			

Date Acquired	As per request in Colombo Plan Form A-4 Item Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
4/17/78	Thrive car (hand truck) THC-501, capacity 500kg	2	pcs.	JICA-NIST 878-3 -4			
11/30/77	Alarm Clock "SEIKO" white and orange in color	5	pcs.	JICA-NIST 458-10 -14		Good condi- tion in use	
11/30/77	Paper Trimmer Size 45cm x 36.5 cm x 42cm blade	2	pcs.	JICA-NIST 50-15 -16			
4/17/78	Thrive Car (Hand truck) THC-502 Capacity 500kg	1	pc.	JICA-NIST 878-5			
4/10/78	Sanyo Electric Table griddle HPS-800, 220V	2	pcs.	JICA-NIST 587-1-2			
11/30/77	Drawing Board	1	pc.	JICA-NIST 214-3	Thermal Room (RM 110)	-do-	
4/10/78	Eye Light Tripod LWT-21	4	pcs.	JICA-NIST 142-5 -8			
11/30/77	Planimeter Type KP-27	1	pc.	JICA-NIST 265-3			
3/31/78	Vacuum Cleaner MCGOOP National Brand 220V, 900W SN:019148	1	set	JICA-NIST 326-6	X-Ray Room (RM 105)	-do-	
3/13/78	Ventilation FV-180BA, National Brand 100V color Blue and white	1	set	JICA-NIST 593-5			

Date Acquired	As per request in Colombo Plan Form A-4 Item Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
3/31/78	Ventilation PV-15 FFZ-C National 15cm 100V SN: 300181 both	2	sets	JICA-NIST 593-1 -2			
11/30/78	Puncher "LION" brand small model: 150	5	pcs.	JICA-NIST 315-33 -37			
3/31/78	Ventilation PV-20PVZ-C National 100V, 20cm SN: 110181 both	2	sets	JICA-NIST 593-3 -4			
11/30/77	Timer (Emees)	5	pcs.	JICA-NIST 450-35 -39			
11/30/77	Puncher "LION" brand Model 160	1	pc.	JICA-NIST 315-38			
3/31/78	Vacuum Cleaner MC 6320C National brand 220V SN: 010721	1	set	JICA-NIST 326-5	SEM (RM109A)	good condi- tion. in use	
3/31/78	Eye Light Tripod	2	pcs.	JICA-NIST 142-11			
4/10/78	Hanza Dark Room Timer SN: 3ST003 3ST003	2	pcs.	JICA-NIST 588-1 -2	Dark Room	-do-	
3/31/78	Ventilation FW-CGL 100V National Brand SN: 73223	1	set	JICA-NIST			

Date Acquired	As per request in Colombo Plan Form A-4 Item Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
4/10/78	Hakuba RAC-3 Tripod with square stand	1	pc	JICA-NIST 142-9			
4/10/78	Slik Hoodman Sliding Tripod wt. 1700g. round stand	1	pc	JICA-NIST 142-10			
11/30/77	Drawing Board (small): 13 pcs. 1-2032	1	pc.	JICA-NIST 18-17			
11/30/77	Stapler, Big HD-3 Stainless Steel	5	pcs.	JICA-NIST 276-181 -185			
11/30/77	Letter case with plastic shelves "plus" small size: 33cm x 25cm x 25cm	1	pc.	JICA-NIST 600-11			
3/3/79	Compact Vertical Process Camera Model: 620-BII complete with accessories and stepdown transformer	1	set	JICA-NIST 1-13	Decal Print- ing Room (RM 121)	Good condi- tion in use	
3/3/79	Vacuum Contact Printer Model: P-604-D complete with standard accessories and stepdown transformer	1	set	JICA-NIST 1-13	-do-	-do-	
3/3/79	Vacuum Printing Frame Model P-2-GM complete with main printing frame and stepdown transformer	1	set	-do-	-do-	-do-	
-do-	Pulsed xenon lighting equipment with stand as accessory for vacuum printing frame, Model: P-2-GM	1	set	-do-	-do-	-do-	
-do-	Film Processing Sink, Model TC-A3 complete with standard accessories and stepdown transformer	1	set	-do-	-do-	-do-	
-do-	Horizontal Light Table Model LT-7-F	1	set	-do-	-do-	-do-	
-do-	Film Drying Cabinet Model S-24-D, complete with standard accessories and stepdown transformer	1	set	-do-	-do-	-do-	

Date Acquired	As per request in Colombo Plan Form A-4 Item Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
3/3/79	Hand Printing Table Model: Hino-MRT with standard accessories and stepdown transformer	1	set	JICA-NIST 1-14	Decal Printing Room (RM 121)	Good condition in use	
-do-	Dry Rack SO-Step	1	set	-do-	-do-	-do-	
-do-	Squeegees, Ink Kneading plates, ink kneading spatulas, working gloves, screen mesh, frames, binder, making-up emulsion, etc.	1	set	-do-	-do-	-do-	
-do-	Mar resistance Tester with accessories	1	set				
-do-	Hydraulic 200 Ton Compression Testing Machine Type: AL No. 200BC and with standard accessories	1	set		Ehy. Test I Room (RM111)	-do-	
-do-	Pendulum Dynamometer (MU-PB) for above use and with standard accessories	1	set				
-do-	Air Compression Pycnometer Model: 930 with special and standard accessories, Rockwell Hardness No. Testing Machine, Model 3R, etc.	1	set				
-do-	High sensitive one-pen recorder Model: VP551A with complete accessories	1	set				
3/5/79	Constant Temperature Water Bath, Model: BK42 with complete accessories	1	set	JICA-NIST 1-14			
-do-	TOYOTA DYNA Pick-Up Model: RV20L-OR, Equipped	1	set	JICA-NIST 1-14			
5/4/79	Standard Weight Set for Balance	1	set	JICA-NIST 101/102			
-do-	Vacuum Gauge, Bennert Type: RKI Cat. No. 4123	2	pcs.	-do-			
-do-	Platinum Evaporating Dishes	3	pcs.	-do-			

Date Acquired	As per request in Colombo Plan Form A-4 Item Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
5/4/79	Thermometer, Wall use	10	pcs.	JICA-NIST 107/102			
-do-	Power Solder, 1kg/roll	2	pcs.	-do-			
-do-	HOZAN Electro Tool Set S-10, 220V	1	set	-do-			
-do-	Solder Cleaner, 220V anger, complete accessories	2	sets	-do-			
-do-	Duplicating Machine HORII MYRIAGRAPH Model: 95 Hand operated with standard accessories	1	unit	-do-	TGD (Rm104)		
-do-	Duplicating Ink "MYRIAGRAPH" brand Black Color, 400g/pc.	24	pcs.	-do-			
4/4/79	Special accessories of Oxypyropane furnace hose- Y-Adaptors tongs, and other accessories	422	pcs.	-do-			
-do-	Nut polished, hexagon W 1/4 & 5/16	2	sets	-do-			
-do-	YEW Circuit Tester, High Tension Probe, Shunt, Clip-on Current Transformer Portable Case, Electric Circuit Tester, Carrying Case	7	sets	-do-			
-do-	TOSHIBA Slidac, Model SD-205 Improved Type (3 models)	5	pcs.	-do-			
-do-	All Drill Bits for vibrator of different sizes	6	pcs.	-do-			
-do-	All Drill Bit for vibrator & Rotary's use	21	pcs.	-do-			
-do-	Drill Sets of Different Sizes	75	pcs.	-do-			
-do-	Hand Sorter Set	1	set	-do-			
-do-	Punch for Hole Sort	3	pcs.	-do-			

Date Acquired	As per request in Colombo Plan Form A-4 Item Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
2/19/80	Geared Motor for 300kg. Ball Mill, 2.2kw-4P-1/10	2	unit				
4/20/80	Varispeed Polisher with Lap 30mmφ 220V	1	set		Opt. Microscopy Room (Rm 110-A)	Good condition in use	
4/8/80	Replacement Lap 300mmφ	3	pcs.				
4/8/80	Clear Crystal, 100 kinds Nichika, Model CMW-100	1	set				
-do-	Wooden Crystal, 100 kinds, Nichika, Model CMW-100	1	set				
-do-	Crystal Axis, 6 kinds Nichika Model CAX-6	1	set				
-do-	Systematic Mineral collection, 200 kinds Nichika Model CMM-200	1	set				
-do-	Systematic Rock Collection 200 kinds, Nichika, Model CRM-200	1	set		Thermal Room (RM110)	-do-	
-do-	"ACE" Wet and Dry Thermometer Model WD-1	1	set				
-do-	NICHIKA Accessories for Microscope	29	pcs.				
-do-	Electromagnetic Separator with transformer	1	set		Opt. Microscopy Room (Rm 110-A)	-do-	
-do-	Mini Synchroscope, Toshiba Model 1032, 220V	1	set		-do-		
-do-	DIS-Humidar with 220V, Hitachi Model RD-800 transformer	5	sets		Thermal Room (RM 110)	-do-	
-do-	Hitachi Variable Beam Attenuator - BA type	1	set				

Date Acquired	As per request in Colombo Plan Form A-4 Item Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
4/8/80	HGS Molecular Models	3	sets				
-do-	Etching Press Equipment, Model MSI type, body only	1	set		Pottery Pl.	Good condition in use	
-do-	JER-4X Vacuum Evaporator with standard accessories and additional accessories	1	set				
-do-	NIXON Profile Projector Model 6C-2M complete set	1	set		Microscopy Room (RM 110 -A)	-do-	
-do-	Polarizing apparatus and Hallogen lamps for above	1	set				
-do-	Precision Wheatstone Bridge, YEW No. 2768	1	set				
-do-	Potentiometer with standard accessories YEW No. 2727	1	set				
-do-	Insulation Tester with standard accessories, YEW No. 2404-03	1	set				
-do-	Coupled Pole Magnetic Separator Model NJ type with DC power supply	1	set				
-do-	Viscosimeter, Redwood type with standard accessories	1	set				
-do-	YAMATO Draft Chamber with duct pipes	1	set		Chem Lab (RM 109)	good condi- tion in use	repaired once
-do-	YAMATO Heavy Metal Eliminator with special acces- sories	1	set			not used yet	

Date Acquired	As per request in Colombo Plan Form A-4 Item Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
4/8/80	YAMATO Drying Oven with transformer and special accessories	2	sets		Chem Lab (RM 109)	Good condition in use	
-do-	Drying Oven, Model DX-58 with transformer and accessories	2	sets				
-do-	YAMATO Ultra-Sonic Cleaner Model 52 with transformer and standard accessories	1	set				
-do-	YAMATO Auto-Still Model WAG-28 special accessories	1	set		Chem Lab (RM 109)	Good condition. In use. once repaired	
-do-	YAMATO Labor-Card. Model LC-20	2	sets				
-do-	Hi-Speed Vibrating Machine Sample Model TI-200 and special accessories	1	set				
-do-	Vibration Sieve Model 500D-3S with Motor (0.4Kw) with spare screen and standard tools	1	set				
-do-	Body of Mixing Agitator with accessories	1	set				
-do-	Cup Glazing Machine with mixing tank and accessories	1	set				
-do-	Heat Generator, Model HP-2 with motor, .4kw and accessories	1	set		Pottery Plt.	not yet installed	
-do-	Filter Press with filter plate, membrane pump and .4 kw Motor and accessories	1	set		Beneficiation Unit	good condition in use	

Date Acquired	As per request in Colombo Plan Form A-4 Item Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
4/8/80	Vacuum Agitator, Model VC-2 with vacuum pump and 0.4kw motor and control board	1	set		Pottery Plant	Good condition in use	
-do-	Kneading Machine and accessories	1	set				
-do-	Rotary Sieve with 0.75kw motor and 0.4kw motor	2	sets				
-do-	Electric Furnace and accessories	1	set				
-do-	Screen Stencil Equipment and special accessories	1	set				
-do-	Enlarger with transformer complete set of monochrom	1	set				
-do-	Boiler Type Distiller Model SB-2	1	set				
-do-	LINDBERG Laboratory Box Furnace Model 5100 II, 1100 degree temperature automatic controlled	2	sets			out of order	
-do-	Piping Unit for Daikin split type air conditioner Model SV45GVEQ	2	sets				
-do-	DAIKIN Window Type Room air conditioner Model W45G6Ve	3	sets				
-do-	Indoor Unit Model FV45BVEQ for DAIKIN Split type air conditioner	2	sets				
-do-	Outdoor Unit Model R45GVEQ for DAIKIN split type air conditioner	2	sets				
-do-	SHIMADZU Electronic Reading Balance LIBROR ED-200-10	1	set			Good condition	
-do-	SHIMADZU Direct Reading Balance Model L-200D	1	set			-do-	
-do-	Furnace, SHIMADZU Model DFG-30H	2	sets				

Date Acquired	As per request in Colombo Plan Form A-4 Item Description	Qty	Unit	Property No.	Location	Status of Equipment	Remarks
4/8/80	TABAI Perfect Oven, Model PS-222, original and height temperature with standard accessories	1	set				
-do-	TABAI Platinum Humidar Model PH-1E with standard special accessories and repairing parts	3	sets				
4/15/81	De-Airing Pug Mill for laboratory use with accessories	1	set				
-do-	Tile Mold Nozzle for A-2 De-Airing Pusher Machine	1	set				
-do-	DC Voltage/Current Standard with accessories	1	set				
-do-	Copying Machine with transformer and accessories	1	set				
-do-	Olivetti Electric Typewriter with transformer and accessories	2	units				
-do-	AC ARC Welding Machine B-300, 220V, single phase 300A and accessories	1	set				
-do-	Shelf-Plate, carborundum for 1300°C Furnace, parts and accessories	300	pcs.				
-do-	Oil Pump Unit consisting of oil gear pump, oil strainer, motor, pump base, pipes and receiver plate	1	set				
-do-	Shov Case, aluminum made with glass shelves with connector for corner, interfoot pole, base plate, shelf pole, socket shelf receiver, drawer aluminum square pipe						

Date Acquired	As per request in Colombo Plan Form A-4 Item Description	Qty.	Unit	Property No.	Location	Status of Equipment	Remarks
6/26/81	Toyota Corona Deluxe Station Wagon with CAC Cooler Model TT132LQ-TMKDS ED No. 263883	1	unit				
-do-	Toyota Dyna Pickup Diesel Model BU20L-QR ED. No. 431810Q	1	unit				
-do-	Toyota Land Cruiser Hard Top Diesel with cooler Model: BJ40LV-KC ED No. 523247	1	unit				
-do-	Spare Parts for above vehicle spare tire and battery	3	cases				
4/16/82	Belt Conveyor Model M35-7; 350W x 7000L AC 220V 60Hz	3	sets				CRDC - still in crate
4/16/82	Labo Stirrer with Transformer Model IS - 18	2	sets				
July, 1982	Labo Stirrer with Transformer Model IS - 08	2	sets				
-do-	Roll Crusher "Kajiseki" Model SH2R - 500	1	pc		Pier	Still at pier	
-do-	De-Airing Pugmill "Kajiseki" Model DE-10R-BR Complete with Accessories	1	set		-do-	-do-	
-do-	Manual Friction Press, Kajiseki Model TDP-2 Complete with accessories	1	set		-do-	-do-	
-do-	Rotary Sieve	1	pc		-do-	-do-	
-do-	Grinder Mixer "Ishikawa" Model no. 16	3	sets		-do-	-do-	
-do-	Wet Pan Mill "Takashago"	1	pc		-do-	-do-	
-do-	Spherometer "Shimadzu"	1	pc		-do-	-do-	
-do-	Press (200 tone)	1	pc		-do-	-do-	

List of Experts assigned in CRDC

Long-term Experts

N A M E	FIELD	DURATION	HOME AGENCY/COMPANY
Kozo Esaki	Chief Advisor	Aug. 19, 1977 - July 15, 1980	Ministry of Inter- national Trade and Industry (MITI)
Dai Ohkubo	Applied Mineralogy	January 10, 1978 - July 15, 1980	
Motoo Ueno	Production of Ceramic Products	April 17, 1978 - July 15, 1980	
Ryuichi Yamamoto	Beneficiation of Raw Materials	August 17, 1977 - July 15, 1980	Government Industrial Research Institute, Nagoya (GIRIN), AIST, MITI
Minoru Maeda	Physical Property Test	Dec. 20, 1977 - July 15, 1980	- do -
Yasuo Ito	Program Analysis	Dec. 13, 1977 - July 15, 1980	Japan International Cooperation Agency (JICA)
Kanji Kano	Chief Advisor	July 1980 - July 15, 1982	
Motoo Ueno	Production of Ceramic Products	July 1980 - July 15, 1982	
Ryuichi Yamamoto	Beneficiation of Raw Materials	July 1980 - July 15, 1982	Government Industrial Research Institute, Nagoya (GIRIN), AIST, MITI
Koya Shimosaka	Mineralogy	July 1980 - July 15, 1982	
Setsuo Takemoto	Program Coordinator	July 1980 - July 15, 1982	

Short-term Experts

N A M E	FIELD	DURATION	HOME AGENCY/COMPANY
Kozo Esaki	Planning Coordination	Jan. 20, 1977 - Mar. 19, 1977	Ministry of Inter- national Trade and Industry (MITI)

Mr. Ryuichi Yamamoto	Planning Coordination	Jan. 20, 1977 - Mar. 19, 1977	Government Industrial Research Institute Nagoya (GIRIN), AIST, MITI
Dr. Minoru Maeda	Planning Coordination	Jan. 20, 1977 - Mar. 19, 1977	Government Industrial Research Institute Nagoya (GIRIN), AIST MITI
r. Teruo Nishimura	Physical Test	Oct. 4, 1977 - Dec. 3, 1977	Government Industrial Research Institute Nagoya (GIRIN), AIST, MITI
r. Tsutomu Yanagami	Installation of X-Ray Diffractometer	Mar. 8, 1978 - April 1, 1978	Shimadzu Seisakusho Limited
r. Sadahiko Sumiya	Installation of Brick and Tile Production	Mar. 8, 1978 - May 7, 1978	Ishikawa Toki Iron Company, Limited
r. Kazuo Kato	Installation of Brick and Tile Production Machines	Mar. 8, 1978 - May 7, 1978	Ishikawa Toki Iron Company, Limited
r. Jyuzo Maekawa	Installation of Universal Testing Machine	Mar. 27, 1978 - Mar. 31, 1978	Maekawa Testing Machine Manufacturing Company, Limited
r. Takashi Aoshima	Installation of Load Test and Dilato- meter	Apr. 16, 1978 - Apr. 21, 1978	EKO Instruments Trading Company, Limited
r. Hideo Kurosawa	Piping of Atomic Absorption Spec- trophotometer	June 12, 1978 - June 18, 1978	Kurosawa Asanki Industry Co., Ltd.
r. Junichi Nishida	Installation of Atomic Absorption Spectrophotometer	June 16, 1978 - June 29, 1978	Shimadzu Seisakusho Limited
r. Kiyoshi Ito	Installation of TG- DIA	June 16, 1978 - June 29, 1978	Shimadzu Seisakusho Limited
r. Nobuhiro Takeda	Installation of Scanning Electron Microscope	Feb. 16, 1979 March 15, 1979	J E O L.
r. Takashi Kusano	Installation of Infrared Spectro- photometer	Mar. 25, 1979 - Apr. 7, 1979	HITACHI
r. Hiroo Takashima	Chemical Analysis	Jul. 1, 1979 - Aug. 31, 1979	Government Industrial Research Institute Nagoya (GIRIN), AIST, MITI
r. Masao Sano	Kiln Construction and Installation of Production Machines	October 15, 1979 - Dec. 18, 1979	Takasago Industry Company, Limited

· Kazuhisa Niwano	Brick and Tile Production	Jan. 22, 1980 - Mar. 21, 1980	Industrial Research Institute, Hyogo Prefecture
· Hideyasu Horibe	Installation of Screen Printing Outfit	Mar. 25, 1980 - Apr. 11, 1980	Mishima Company, Limited
· Yukio Nishimura	Beneficiation of Ceramic Raw Materials	Jul. 7, 1981 - Sep. 4, 1981	
· Usaburo Cozawa	Sagger Making	Aug. 6, 1981 - Aug. 27, 1981	
· Yasuhiko Aichi	Copper Plate Printing	Aug. 25, 1981 - Sep. 14, 1981	
· Kazuhisa Niwano	Structural Ceramic Products	Sep. 12, 1981 - Oct. 3, 1981	
· Takeichi Yokoyama	Manual Method of Forming Roof Tiles	Mar. 1, 1981 Mar. 31, 1982	
· Isanu Miwa	Ceramic Design	Mar. 4, 1982 - Mar. 31, 1982	
· Akio Ito	Mold - Making	Mar. 26, 1982 - Apr. 23, 1982	

List of CRDC Personnel Trained in Japan

<u>Name</u>	<u>Field of Training</u>	<u>Present Assiignment</u>
1. Virgilia H. Villarete	Physical Test of Ceramic Materials	On Advanced Training
2. Nenette G. Cilindro	Chemical Analysis of Ceramic Materials	Analyst, Chemical Analysis Unit
3. Tamerlane P. Badoy	Kiln, Firing	Resigned
4. Cesar V. Martinez	Kiln, Firing	Head, Engineering Section
5. Augusto V. Caraig	Product Development	Resigned
6. Angelo R. Torillo	Physical Test of Ceramic Materials	OIC, Material Testing Section
7. Esmeralda R. Martinez	Physical Test of Ceramic Materials	OIC, Physical Test I Unit
8. Christopher Salegumba	Management Kiln Firing	OIC, Program Coordination Dept.
9. Juanita B. Salvador	Production Technology (Porcelain)	Researcher, Product Development Section
10. Corazon P. Retuqal	Production Technology (Earthenware)	On Leave
11. Vicente Villégas	Glaze and Decoration (Screen Printing)	Artist, Design and Decoration Unit
12. Ruben A. Vidallo	Beneficiation of Raw Materials	Head, Beneficiation Unit and OIC-Pottery Pilot Plant
13. Fernando M. Sison	Mold Making and Forming	Mold Making Unit
14. Nestor G. Anicete	Ceramic Machinery	Engineering Section
15. Guillermina C. Mañalac	Management	Project Director
16. Adelaida Elvinia	Low Temperature Glazes	Head, Daro Ceramic Training Center
17. Natividad R. Villoasts	High Temperature Glazes	OIC, Technical Guidance Department
18. Severino T. Bernardo	Ceramic Seminar	OIC, Research and Development Dept.
19. Sofia A. Cavales	Physical Test of Ceramic Materials	On Leave

<u>Name</u>	<u>Field of Training</u>	<u>Present Assignment</u>
20. Luis I. Rivera	Physical Test of Ceramic Materials	Head, Field Project Section and OIC-Technical Information Section
21. Apolo S. Canayon	Refractory Manufacturing	Refractory Unit
22. Erlinda A. Ulanio	Glaze and Decoration	Researcher, Design and Decoration Unit
23. Ma. Susana L. Cabillon	Mineral Analysis of Ceramic Raw Materials and Products	Analyst - X-Ray
24. Lina C. dela Cuesta	Mineral Analysis of Ceramic Raw Materials and Products	Analyst - Optical Microscopy
25. James M. Filio	Geological Exploration of Ceramic Materials	On Training (Japan)
26. Virgilio F. Ables	Manufacture of Structural Products	On Training (Japan)
27. Nuna Almanzor	Ceramic Seminar	Planning and Programming Division, N S T A
28. Josefina Celorico	Glaze and Decoration	On Training (Japan)
29. Blessie Ambata	Beneficiation of Ceramic Raw Materials	On Training
ADVANCED TRAINING		
30. Virgilia H. Villarete	Effect of Mineral Composition of Clays in Relation to Properties of Ceramic Products	On Training
31. Cesar V. Martinez	Kiln Firing Techniques	Head, Engineering Section

PROJECT COST PROVIDED BY THE JAPANESE GOVERNMENT

	1975		1977		1978		1979	
	Yen	Pesos	Yen	Pesos	Yen	Pesos	Yen	Pesos
Expert Services	11,000,000	366,666.00	26,000,000	866,666.66	72,000,000	2,400,000.00	72,000,000	2,400,000.00
Training Filipino counterparts in Japan			15,000,000	500,000.00	15,000,000	500,000.00	18,374,994	612,499.80
Equipment	5,173,148	172,438.26	76,048,230	2,534,941.00	154,000,000	5,133,333.00	43,000,000	1,432,333.00
	1980		1981		1982			
	Yen	Pesos	Yen	Pesos	Yen	Pesos	Total Project Cost From 1976 to 1982	
Expert Services	72,000,000	2,400,000.00	79,200,000	2,640,000.00	43,560,000	1,452,000.00	P 12,525,333.	
Training Filipino counterparts in Japan	14,000,000	450,000.00	21,175,000	705,833.00	6,352,500	211,750.00	3,010,032.	
Equipment	26,000,000	866,666.00			12,600,285	441,010.00	* 10,543,144. P 26,073,559 VVVVVVVVVVVVVVVV	

C. JOINT EVALUATION ON CRDC ACTIVITIES

CATEGORY	TITLE	TARGET	ACCOMPLISHMENT	REMARKS	PERCENTAGE
0.1/101	Establishment of the CRDC Management System	Development of CRDC Management System	<p>In addition to standard accepted procedures of NIST management and coordination of CRDC activities was attained thru the establishment of the following sub-systems:</p> <ol style="list-style-type: none"> 1. Property Control System 2. Records Control System 3. Project Identification, Planning, and control System 4. Directives and Report Flow System 5. System for accepting requests for and delivery of technical services 6. Format for Monthly and Quarterly and Annual Reports 7. Accident/Abnormality Reporting System 8. System for evaluating and recruiting applicants for employment <p>CRDC offices for Research Director, Chief Advisor, Program Coordination, Technical Guidance and Conference Room, have been provided complete with office furniture and facilities. Laboratories for tests, analysis and product development have also been provided. Library and stock rooms with required shelves, cabinets and other furniture have also been provided.</p>	<p>These sub-systems have been adopted thru the issuance of either a memorandum or CRDC instruction after due deliberation by either:</p> <ol style="list-style-type: none"> a. Special committee meetings b. Evaluation Committee Meetings <p>A complete and rather ideal management manual for the eventual spin-off of the CRDC into an Institute was prepared for possible use after institutionalization</p>	80%
0.2	Physical Facilities	1) Repartitioning of IRC Building			95%

C. JOINT EVALUATION ON CRDC ACTIVITIES

CATEGORY	TITLE	TARGET	ACCOMPLISHMENT	REMARKS	PERCENTAGE
1	Technology on Survey and Evaluation of Raw Material Deposits	1. To have established a standard methodology of survey and assessment of ceramic raw material deposit.	1.1 In order to attain targets as specified, the CRDC employed two (2) geologists and one (1) mining engineering graduate. The two (2) geologists have been trained on actual geologic survey of ceramic material deposits while the mining engineer have been engaged on the beneficiation of selected ceramic raw materials. At present, one (1) geologist is undertaking a one (1) year training in Japan on Survey and Evaluation of Ceramic lateral deposits. 1.2 A standard methodology of survey and assessment of ceramic raw material deposit has been established and is now available as reference in the CRDC library.	1.1.1 Manual of Survey and Assessment of Ceramic Raw Material Deposits have been established and served to guide geologists in conducting actual field survey. This manual, however, is subject for improvement.	(1) 100%
		2. To have conducted systematic survey and evaluation of selected ceramic raw material deposits.	2.1 Using the developed methodology in 1.2, about 3 geologic/reconnaissance survey have been conducted. Reports of survey are available in CRDC library.	2.1.1 actual detailed geologic evaluation of a single deposit has not yet been conducted. Such an activity, however, can be done by CRDC. It was not yet done since no request of this nature was asked/directed.	(2) 100%
		3. To have systematically compiled data on ceramic raw material deposits.	3.1 Systematic compilation of data gathered from survey is on-going. Distribution Map of Ceramic Raw Material Deposits have been made pending publication in science journal and now available in CRDC library.		(3) 100%

SELF EVALUATION REPORT

CATEGORY	TITLE	TARGETS	ACCOMPLISHMENT	REMARKS	RATING
2	Laboratory Test and Analytical Technology	<p>1. To have established standard methodologies/procedures of conducting tests/analyses of ceramic materials and/or products.</p> <p>2. To have built-up at least two (2) competent staff for each method/procedure.</p>	<p>1.1 Methodologies/procedures of tests/analyses i.e.; Chemical, physical, rheological, mechanical, thermal) and micro-radiological (optical, micro-structure) have been established. Manuals/procedures of chemical analysis, physical test of ray/fired state, strength determination particle size distribution, color test, optical, PCF, X-ray diffraction; S₁/T₁ test, etc, have been established and now serving analysts of the CRDC as Guide in conducting routine tests/analyses.</p> <p>2.1 Building-up of at least two (2) competent staff members for each method/procedure has been attained through training in Japan, in-service training in CRDC and actual tests/analyses through continuous application of these methods/procedures.</p>	<p>1. Although methods/Procedures test/analyses have been established, CRDC analysts are continuously studying for further improvement.</p>	(1) 100%
3	Evaluation Technology of Ceramic Materials and Products.	<p>1. To have established standard evaluation methodology for ceramic materials.</p>	<p>1.1 A methodology for the preliminary evaluation of clay was made and is now available in CRDC.</p>	<p>1.1.1 There is no clear cut method in determining the potential of ceramic material. Methodology for evaluation of ceramic materials developed by the CRDC will just serve as a guide on how to utilize a particular material.</p>	(1) 80%

1.9. JOINT EVALUATION ON CRDC ACTIVITIES

CATEGORY	CRITERIA	TARGET	ACCOMPLISHMENT	REMARKS	ATTAIN, %
			<p>1.2 Technical reports on the evaluation of ceramic raw materials based on the results of test/analyses were prepared. (Reports include evaluation of clays from Mind, Albay, Sta. Maria, Isabela and Bureau of Mines, about 80 in total)</p> <p>1.3 Silica from various parts of the country were tested. Evaluation was based mainly on chemical analysis.</p> <p>1.4 Feldspar from Cebu and Pasuquin were tested and evaluated. Evaluation was based on Chemical analysis and firing test.</p>	<p>1.2.1. See Annex 7 (List of Technical Reports)</p> <p>1.4.1 Methodology for the evaluation of Feldspar is still being studied.</p>	
	<p>2. To have established standard evaluation methodology for ceramic products.</p>		<p>2.1 Procedure for evaluating common red bricks was made and is now available in CRDC.</p>	<p>2.1.1 Only standard methodology for common bricks was developed by CRDC. However, CRDC has been testing/evaluating ceramic products based on ASTM/JIS standards.</p>	(2) 40%
	<p>3. To have tested/analyzed and evaluated commercially sold clay body and glaze for small-scale earthenware producers/hobbyists.</p>		<p>2.2. Assisted the Bureau of Standards in formulating product standards for common bricks, stoneware/porcelain dinnerware and fire bricks.</p> <p>3.1 Assessment of problems confronting the small-scale earthenware producers was made. Preliminary tests, analyses and evaluation of commercially sold body and glaze commonly used were conducted.</p>	<p>3.1.1 Some specific tests for commercially sold clay body and glaze were not conducted. This study is still being completed.</p>	(3) 80%

C. JOINT EVALUATION ON CRDC ACTIVITIES -

CATEGORY	TITLE	TARGET	ACCOMPLISHMENT	REMARKS	PERCENT
		<p>4. To have tested and evaluated commercial products.</p>	<p>4.1 Common bricks produced in Metro Manila and nearby areas were tested and evaluated.</p> <p>4.2 Performed tests on commercial products i.e., PCE of refractories, mechanical strength of common bricks, water of absorption of rooftile, autoclave/color tests for vitrified wall/floor-tiles, mineralogical test by x-ray/optical microscopy, cadmium/lead test of earthenware for export by chemical analysis, etc. All of the above tests were evaluated based on ASTM/JIS Standards.</p>	<p>4.2.1 Through target No. 4, acquired expertise on testing/evaluating ceramic products based on recognized standards such as ASTM, JIS/JP set standards.</p>	(4) 100%
4	<p>Production Technology for Ceramic Construction Materials</p>	<p>1. To have established a technology for manual production of common bricks and rooftiles from clay appropriate for local use.</p> <p>2. To have established a technology for mechanized production of common bricks and rooftiles adaptable locally.</p>	<p>1.1.1 Technology for manual production of common bricks and rooftiles appropriate for local use has been established. Operating procedures/brochures are now available in CRDC as a form of technical service.</p> <p>2.1.1 Technology for mechanized production of common bricks and rooftiles adaptable for local use has been established. Operating procedure is now available in CRDC.</p>	<p>1.1.1 Established technology for manual production of common bricks and rooftiles is not actually 100% manual method. This technology also make use of mechanized machines such as roll kneader, brick forming machine and wooden tools/gadgets for forming rooftiles.</p>	(1) 100%
					(2) 100%

G. JOINT EVALUATION ON CRDC ACTIVITIES -

CATEGORY	TITLE	TARGET	ACCOMPLISHMENT	REMARKS	PERCENTAGE
5	Production Technology B (Other Products; and Common Technology)	<p>3. To have developed bricks and roof-tiles from local materials.</p> <p>1. To have established an appropriate technology for the production of stone-ware from local raw materials.</p>	<p>3.1 Development of bricks/roof-tiles out of clays from San Nicolas, Tivi and Montaban has been completed. Utilization of clays from other areas of the country are likewise being conducted.</p> <p>1.1 Test run of pottery equipments was conducted simultaneously with the trial production of stone-ware dinnerwares. These activities provided pottery staff members expertise on the use of the different pottery equipments and production of stone-ware. As a result, a technical report on the first trial production of stone-ware was prepared and a manual of operation for pottery equipments was made and is now available in CRDC.</p>	<p>1.1.1 Technical report on the first trial production of stone-ware dinnerware is still being finalized.</p>	(1) 100%
		<p>2. To have studied the feasibility of producing porcelain from local raw materials.</p>	<p>2.1 Study on the test production of porcelain using local materials was conducted pending the preparation of a technical feasibility study. Out of this study, porcelain body and glaze were developed; porcelain wares were produced and now exhibited in the CRDC Exhibited Room.</p>	<p>2.1.1 Technical feasibility on porcelain production is still to be made. This activity was not yet started.</p>	(2) 80%
		<p>3. To have established standard procedures on functional production technologies such as a) processing, b) forming and beneficiation and c) kiln operation, with the use of equipment installed in pottery unit.</p>	<p>3.1 Manual of operation on the different functional production technologies such as a) processing and beneficiation b) forming c) printing and decoration and d) kiln operation were prepared and are now available in CRDC.</p>	<p>3.1.1 Development of stone-ware using ceramic materials from Central Luzon was not done due to the unavailability of raw materials in the area.</p>	(3) 100%

C. JOINT EVALUATION ON CRDC ACTIVITIES

CATEGORY	TITLE	TARGET	ACCOMPLISHMENT	REMARKS	ESTIM. \$
6	Production Technology (Refractory)	<p>4. To have developed ceramic stoneware from local materials in the Visayan Region, Northern Luzon, Central Luzon, Southern Luzon and Mindanao which will serve as guide to local ceramic industries.</p>	<p>4.1 Stonewares using materials from Mindanao, Visayas, Southern Luzon and Northern Luzon were developed. These stonewares are now being exhibited in the CRDC Exhibit Room. A trial production of stoneware dinnerwares using mainly Visayan Materials is being conducted.</p>		(4) 100%
		<p>5. To conduct studies on the improvement of the quality of earthenware produced by small-scale and/or cottage industries.</p>	<p>5.1 A study to develop better quality earthenware was completed. This study made use of imported talc and frit needed for the body and glaze, respectively.</p>	<p>5.1.1 So as to further improve the quality of earthenware produced by small-scale industries will be made continuous. For this purpose, studies on the use of Dolomite is being conducted.</p>	(5) 100%
		<p>1. To have studied the technology for the production of refractories such as low cost firebricks, kiln furnitures and low cost insulating bricks from local raw materials.</p>	<p>1.1 Studied/evaluated results of test/analysis of refractory raw materials available in the CRDC.</p>	<p>1.1.1 Studies on the development of other materials such as refractory/insulating bricks were not yet conducted so as to give preference for the development of saggers for stoneware production.</p>	(1) 80%
		<p>1.2 From the data gathered in No. 1, conducted body formulations studies so as to develop refractory shelves/saggers/post for stoneware production. Out of these studies, 40 body formulations were prepared, tested and evaluated in the laboratory.</p>	<p>1.2.1 Although some of the formulations developed can be used for producing firebricks, actual size and pilot plant production of this product was not undertaken</p>		

- C- JOINT EVALUATION ON CRDC ACTIVITIES -

CATEGORY	TYPE	TARGET	ACCOMPLISHMENT	REMARKS	RATING, %
			<p>1.3 From the results of laboratory studies, trial production of saggars was conducted. The saggars produced were used in the first trial production of stoneware using equipments in the Pottery Building.</p> <p>1.4 Selected body formulations developed in the laboratory were further studied in the pottery pilot plant through the assistance of Japanese short term expert. Results of this study showed that the spalling strength of test products was not sufficient for the production of stoneware.</p>	<p>1.2.2 Technical problems are also encountered due to poor quality of local materials and inadequate/inappropriate facilities for processing refractories.</p>	
		<p>2. To have studied the technology for the production of pyrometric cones.</p>	<p>2.1. Developed pyrometric cones SK 7, SK 8 and SK 9 test products pending acceptability tests.</p>	<p>2.1.1 Development of lower melting cones such as SK 051, 041 and 036 is still being conducted. This activity is about 10% completed.</p>	(2) 50%

U.S.S.R. JOINT EVALUATION ON CRDC ACTIVITIES

CATEGORY	TITLE	TARGET	ACCOMPLISHMENT	REMARKS	PERCENT
7	Ceramic Equipment	<p>1. To have designed and fabricated simple equipments for manual production of brick and tile.</p> <p>2. To have designed and fabricated simple machineries for ceramic production (other than brick and tile)</p> <p>3. To have designed and fabricated ceramic kilns.</p>	<p>1.1 Design, fabricated and tested brick press, decorative tile press and roll kneader. Said roll kneader is used in the processing of clay body.</p> <p>1.2 Fabricated several units of brick press and roll kneader for use by small scale ceramic producers in the rural areas.</p> <p>2.1 Fabricated high speed blunger now being used in the laboratory, beneficiation of ceramic materials in the CRDC.</p> <p>2.2 Prepared design/working drawings of vibrating screen, roll-crusher-kneader, pugmill (single and double shaft) and belt conveyor (3-meters long). Material for the fabrication of these equipments have already been requested.</p> <p>2.3 Designed fabricated a manual jiggering machines for production of flower pots.</p> <p>2.4 Prepared working drawings for manual forming machine of roof tiles. (This equipment is presently being fabricated).</p> <p>2.5 Fabricated jigger head/templates for production of thermocor.</p> <p>3.1 Fabricated laboratory low temperature electric kilns.</p> <p>3.2 Design/fabricated up-draft/down-draft kilns for production of bricks/roof tiles and potteries.</p>	<p>1.1.1 Design/working drawing of fabricated and/or constructed machines/equipments/kilns are all available in CRDC.</p> <p>See Annex 3: List of Simple Machines/Equipments designed and fabricated at CRDC.</p> <p>3.1.1 is a technical service, CRDC have been engaged in the designing, fabrication/construction of equipments/kilns at very minimal cost.</p> <p>See Annex 4</p>	(1) 100%

C. JOINT EVALUATION ON CRDC ACTIVITIES

CATEGORY	OBJECTIVE	TARGET	ACCOMPLISHMENT	REMARKS	PERCENTAGE
8	1. Staff Training	1. To have acquired technical expertise in various fields of ceramics including management and other related technology through training in Japan.	1.1. Technical expertise on material testing and product development was attained through training in Japan of CRDC technical staff. However, advanced study on product development was not pursued due to the exigency of upgrading first the basic knowledge and skills of the technical staff before going into specialized training. 1.2. Most of the management staff of CRDC had undergone management training in Japan and partly in the Philippines.	Advance study course training in Japan as mentioned in the record of discussion was not fully attained. See List of Trained Personnel (Amex 5)	55%
	2. Establishment of Standard Training Manual	2. To have created a standard training manual in the field of staff training, local professional training and management training program.	2.1. Standard training manuals/procedures have been established in CRDC in which the following training activities were made: a. General Ceramic Technical Seminar and Workshops b. NIST-NSDB Technical Training Program on Ceramics c. Ceramic Training Program for foreigners d. Training Program for Ceramic Hobbyist e. Orientation on Brick and Tile Production f. Orientation on Ceramics	Different training procedures were introduced to determine the most suitable procedure and thus establish a standard training manual. However, some ceramic training courses were not conducted by CRDC.	

C. JOINT EVALUATION ON CRDC ACTIVITIES

CATEGORY	TITLE	TARGET	ACCOMPLISHMENT	REMARKS	PERCENTAGE
9	1. Instructor Training	1. To have enhanced the development of manpower in various fields of ceramics and to have transferred ceramic technology to small-scale industries with respect to new products and production methods developed by CRDC.	1.1. In order to disseminate information as to the specified targets, representative staff from different ceramic companies were trained in CRDC on the following areas: a. Raw material testing b. Mold making c. Kiln designing and construction technique d. Brick and tile production e. Pottery making	Due to the work load on certain priority projects of CRDC, some training activities for small scale producers were tentatively deferred. Annex 6 is a list of training programs conducted.	80%
	2. Technical Symposium	2. To bring about concerted action regarding issues of common interest toward the development of ceramic industries.	2.1. CRDC conducted a Seminar Workshop on Ceramics in which the functions and operations of sophisticated CRDC equipment were discussed to ceramic manufacturers. Lecturers were CRDC researchers, assigned on specified equipment. 2.2. Participated in one of the Seminar Workshop on Ceramics sponsored by Philippine Council for Agriculture and Resources Research.	In as much as CRDC is in the stage of establishment and the technical staff is in the process of acquiring the technology from Japanese experts, a technical symposium has not been conducted. Such an activity can be carried out in the future, during CRDC's self-reliance stage.	50%

C. JOINT EVALUATION ON CHOC ACTIVITIES

CATEGORY	TITLE	TARGET	ACCOMPLISHMENT	REMARKS	RATING, %
10	Technical Service	<p>1. To have served the needs of the private sectors for tests and analyses of ceramic materials</p> <p>2. To have provided information dissemination and consultation services</p> <p>3. To have provided technical assistance thru special arrangement</p>	<p>1.1. Tested and evaluated submitted samples of outside clients which include individuals, private firms and other government agencies.</p> <p>1.2. Compiled results of the tested ceramic materials.</p> <p>2.1. Provided free consultation services at the technical guidance office upon request of any individual, personnel from private companies or any other government agencies who seek advice and recommendation on problems encountered in the field of ceramics.</p> <p>2.2. Provided library assistance to the public.</p> <p>2.3. Prepared brochures, hand-outs and manuals about ceramics.</p> <p>3.1. Provided technical supervision of the kiln construction in San Juan, Bantagan, San Nicolas, Ilcosorte and Naasin, Southern Leyte. Repaired, renovated and improved the kilns in Tiwi, Albay, UP, P. Faura and Daro, Negros Oriental.</p> <p>Evaluated the kiln by conducting actual firing in Naavan, Misamis Occidental.</p>	<p>Compiled results are recorded in a Data Card.</p> <p>Consultation period is between 8:00 A.M. to 4:00 P.M.</p> <p>Other inquiries on related fields e.g., cement and glass, are referred to other government agencies.</p> <p>Special arrangement on requests coming from individuals/official requests from other government agencies.</p>	<p>90%</p> <p>90%</p> <p>95%</p> <p>95%</p>

1. C. JOINT EVALUATION ON CRDC ACTIVITIES - I

CATEGORY	CRITERIA	TARGET	ACCOMPLISHMENT	REMARKS	PERCENTAGE
			<p>3.2. Surveyed deposits and evaluated clay samples of the surveyed areas in the provinces: Albay, Bohol, Bukidnon, Bulacan, Capi, Camarines Norte, Cavite, Cebu, Cotabato, Ilocos Norte, Iloilo, Isabela, Laguna, Marinduque, Mt. Province, Negros Oriental, Pangasinan and Southern Leyte.</p> <p>3.3. Provided lectures, seminars and trainings upon request in: Atulu, Cagayan; UP, Padre Faura; BMC, Herran; Antipolo, Rizal; Guinobatan, Albay.</p>	<p>All surveys made are already completed and samples from the surveyed areas had all been tested and evaluated.</p>	100%

C. JOINT EVALUATION OF CRDC ACTIVITIES

CRDOPV	TITLE	TARGET	ACCOMPLISHMENT	REMARKS	PERCENT
2213-1 //	Local Facilities (Local Field Centers)	Operation/assistance to San Nicolas Brick and Tile Project. Turnover of the plant to Local Government	<ul style="list-style-type: none"> - Constructed one (1) Horizontal Draft Kiln in 1976 with a capacity of 7,000 pieces bricks. - Improvement of physical facilities of the Center. - Conducted trial production of bricks produced 70,000 pieces of bricks. - Conducted training of San Nicolas brick makers. 	<p>Operation was tentatively stopped due to some minor engineering problem on production.</p> <p>Resumption of activities for final turnover of the Plant will start sometime in August.</p>	80%
2213-2		Operation/assistance to Daro Ceramic Center. Establishment of Daro as Demonstration Center	<ul style="list-style-type: none"> - Repaired and renovated downdraft kiln. - Conducted training of local potters on production of art earthenwares. - Conducted production of traditional products. - Finalized plans and working drawing of one (1) downdraft kiln. 	<p>The construction of the second downdraft kiln was delayed due to delay of funds from local government.</p>	70%
2213-3		Operation/assistance to Ceramic Center and final turnover of the plant	<ul style="list-style-type: none"> - Constructed one (1) horizontal draft kiln with a capacity of 800 pieces standard bricks. - Conducted trial production of bricks. 	<p>The Center was turned over to the Local Government</p>	100%
2213-4		Operation/assistance to Thwi Ceramic Plant Established Production Processes and Standards	<ul style="list-style-type: none"> - Renovated the downdraft kiln - Improved physical facilities of the plant. - Formulated standard stoneware body and stoneware glaze. - Conducted training on trial production of stonewares. 		100%

C. JOINT EVALUATION ON CDDG ACTIVITIES

CROSSREF	TITLE	TARGET	ACCOMPLISHMENT	REMARKS
2312		Establishment of Standard Methodology for Studying the Setting-Up of Ceramic Demonstration/Training Center.	<ul style="list-style-type: none"> - Established procedure and processes for stoneware production. - Conducted demonstration on roof tiles to six Tiwi local potters. - Formulated roof tile body from Tiwi clays for model house and display. - A study of the pottery areas in Negros Daro, Cebu, Bohol, Maasin, Batangas, and the Bicol Region were conducted for this purpose. 	<p>The feasibility study was not consummated because other pottery areas in Central and Northern Luzon has not been completed. This was due to the pressure of work in the Central Office and other technical request. Lack of personnel to do the survey also adds up to the delay.</p> <p>408</p>
2312		Establishment of Ceramic Model Center	<ul style="list-style-type: none"> - It is envisioned that Tiwi Ceramic Pilot Plant will be geared to become the Model Center. 	

C. JOINT EVALUATION ON CRDC ACTIVITIES

CATEGORY	TITLE	TARGET	ACCOMPLISHMENT	REMARKS	STATUS
		2) Construction of Brick and Tile Pilot Plant/ Completion of Utilities	Brick and Tile Pilot Plant with two enclosed rooms for tools and as staff room have been provided complete with permanent electrical installation.		
		3) Construction of Pottery Building/Completion of Utilities	The Pottery Building was completed with the following sections: a) Wet Processing and Dry Processing Section b) Glaze and Decoration Section c) Forming Section d) Firing Section e) Sagger Section f) Mold Making Section g) Engineering and Design Room h) Kiln Section		

List of Operational Manuals Available in CRDC Library:

1. Mechanized Production of Bricks and Roof Tiles
2. X-Ray Diffractometer
3. Scanning Electron Microscope
4. Infrared Spectrophotometer
5. Kett Infrared Moisture Meter
6. Vacuum Drying Oven
7. Color Difference Meter
8. 200-Ton Compression Machine
9. Refractoriness Test Furnace
10. Autoclave
11. Portable Compression Testing Machine
12. Mar Resistance Tester
13. Universal Scale Balance
14. Universal Testing Machine
15. Optical Pyrometer
16. Thermal Shock Furnace
17. Mariotte Tube
18. Viscosimeter Redwood Type
19. Constant Temperature Water Bath
20. Stomer's Viscosimeter
21. Liquid Limit Test
22. Direct Reading Balance
23. Boiler-Type Distiller
24. Glass Electrode pH Meter
25. Photo-electric Photometer
26. Autostill
27. Libror Electronic Reading Balance
28. Mag-Mixer
29. Ultrasonic Pipette Washer
30. Heavy Metal Eliminator
31. Rotary Oil Vacuum Pump
32. Perfect Oven
33. Varispeed Polisher for Rock
34. Thermogravimetric - Differential Thermal Analysis
35. Small Polisher for Rocks
36. Isodynamic Separator
37. Microscopy Apparatus
38. Orsat Gas Analyzer
39. AA/Fe Spectrophotometer
40. Lindberg Laboratory Box Furnace
41. Drying Oven Model DX
42. Tecorundum Furnace
43. Standard Sieves
44. Core Picker
45. Brick Cutter
46. Sample Mill
47. JIS Impact Tester
48. Sieve Shaker
49. Crystal Cutter
50. Ultrasonic Cleaner
51. Stopwatch
52. Thermohygrograph
53. Air Compression Pycnometer
54. Rockwell Hardness Tester

55. Refractoriness Underload
56. De-Airing Extruder Machine
57. Magnetic Separator
58. Slaking Test Apparatus
59. Riffle Dividers
60. Rheometer
61. Humidity Chamber
62. Air Compressor
63. Pfefferkorn Plastometer
64. Sharp Compet PC-3600 (Computer)
65. Sedimentograph
66. Potmill (Porcelain)
67. Dilatometer
68. Manual for Mechanized Pottery Production (Pottery Equipment)
69. Centrifuge
70. Handy Aspirator
71. Synchroscope
72. DC Current/Voltage Standard
73. Wheatstone Bridge
74. Potentiometer
75. 13 Rh/Pt-Pt
76. 20 Rh/Pt-40 Rh/Pt
77. CA
78. Calibration of Thermocouple and Pyrometers
79. Repair of Thermocouples/Use of Handy Arc Welder

List of Technical Reports Completed:

1. Mold Making Procedure by Mr. Itô, Ms. Adelaida E. Elvinia, Mr. Celso Montañano, Mr. Napoleon Ladines and Mr. Fernando Sison - April 23, 1982
2. General Geology of Rocks and Minerals by Mr. Cesar V. Calzada - January 13, 1982
3. Mineralogical Study of Some Clays Used as Ceramic Raw Materials in the Philippines by Ms. Virgilia H. Villarete - November 4, 1981
4. Refractory Manufacturing Technology with Emphasis on Fundamental Studies on the Cordierite-Mullite System for Kiln Furniture by Ms. Ma. Teresa V. Navarro - October 7, 1981
5. Analysis of Ceramic Raw Materials and Products by Optical Microscopy by Ms. Lina C. dela Cuesta - October 7, 1981
6. Analysis of Raw Materials and Formulated Bodies by Ms. Ma. Susana L. Cabillon - October 7, 1981
7. Development of Saggors for Stoneware Using Local Materials by Ms. Suzita Oredina - September 9, 1981
8. Report of Training on Plate Printing for Underglaze Decoration by Ms. Erlinda Ulanio and Mr. Vicente Villegas - September 7, 1981
9. Beneficiation of Some Local Clays by Messrs. Yukio Nishimura, Ruben A. Vidalló and Manuel Navarro - September 3, 1981
10. Improvement of Bending Strength of Saggors Made in CRDC by Dr. Usaburo Ozawa and Ms. Suzita Oredina - August 27, 1981
11. Progress Report of Test/Analysis and Evaluation of Ceramic Refractory Materials from Bicol Region (under NIST-BMG Project) by Mr. Nnette C. Harder - July 22, 1981
12. Progress Report on the Development of Roof Tiles Using Red Clay Materials Found in Tiwi, Albay by Messrs. Tamerlane P. Badoy and Virgilio Ables - May 7, 1981
13. Progress Report on the Development of Stoneware Using Visayan Materials by Ms. Juanita B. Salvador - May 7, 1981
14. Summary Report on Ceramic Pigment Study in Japan by Ms. Erlinda A. Ulanio - May 7, 1981
15. Evaluation Results of Test and Analysis of Some Tiwi Materials by Severino T. Bernardo - April 14, 1981
16. Progress Report on the Development of Roof Tiles Using Red Clay Materials Found in Tiwi by Tamerlane P. Badoy - April 14, 1981

17. Progress Report on the Results of the Formulations of Earthenware Body Using Local Materials by Ms. Corazon P. Retugal - March 12, 1981
18. Status Report on Studies on Low Temperature Glazes by Ms. Corazon P. Retugal - November 12, 1980
19. Report on the Studies of Stoneware Bodies and Glazes by Ms. Juanita V. Banal - November 12, 1980
20. Status Report on Studies on Refractories by Ms. Suzita Oredina - November 12, 1980
21. Report on Brick Trial Production, to compare two (2) pieces mold and multi-cutter mold (6 pieces cutter) a) Pilot Plant Studies and (b) Result of Tests by Mr. Tamerlane P. Badoy and Mr. Virgilio Ables - September 17, 1980
22. Improvement of Wooden Pressing Machine by Mr. Tamerlane P. Badoy and Mr. Nestor G. Anicete - September 17, 1980
23. Process Flow to be Adopted at Site (San Nicolas Brick and Tile Center) by Mr. Augusto A. Caraig and Mr. Motoo Ueno - September 17, 1980
24. Progress Report on Results of Studies on San Nicolas Project by Messrs. Tamerlane P. Badoy, Augusto Caraig and Motoo Ueno - August 13, 1980
25. Shuttle Kiln Construction and Test Firing by Messrs. Cesar V. Martinez, Tamerlane P. Badoy, Nestor G. Anicete and Motoo Ueno - January 18, 1980
26. Results of Tests on Maasin Clay by Mr. James M. Filio and Ms. Virgilia H. Villarete - January 18, 1980
27. San Nicolas Project by Ms. Virgilia H. Villarete and Mr. Augusto Caraig - November 20, 1979
28. Training in Japan by Mr. Nestor G. Anicete - November 14, 1979
29. Training in Japan by Mr. Ruben A. Vidallo - November 14, 1979
30. White Stick by Mr. Lina C. dela Cuesta and Mr. Dai Ohkubo - November 14, 1979
31. Participation in Ceramic Development Seminar, Japan by Mr. Severino T. Bernardo - September 12, 1979
32. Research Production of Brick and Tile for Low Cost Housing by Mr. Tamerlane P. Badoy and Mr. Motoo Ueno - September 12, 1979
33. Phenomena, Experiences at CRDC About Philippine Clays by Mr. Ryuichi Yamamoto - September 12, 1979

34. Sampling by Mr. Luis Rivera and Mr. Ryuichi Yamamoto - August 8, 1979
35. Preliminary Report on Material Survey at Maasin, Southern Leyte by Mr. James M. Filio and Mr. Dai Ohkubo - August 8, 1979
36. Maintenance and Care of Laboratory Equipment, Machine, Apparatus, etc. by Mr. Minoru Maeda - August 8, 1979
37. Progress Report of Activities of the Provincial Training Center Maasin, Southern Leyte by Ms. Sofia A. Cavales - March 27, 1979

List of Technical Papers - Published/Unpublished:

1. The Plan to Develop Various Ceramic Products From Libjo, Batangas - Sonia E. Atienza, Olivia O. Alayon, Fe A. Cruz, and Guillermina C. Mañalac
 - Published in the NSDB Technology Journal, Volume 1, No. 2/ April-June 1976
2. Ceramic Plaster from Synthetic Gypsum - Romeo C. Landig and Virgilia H. Villarete
 - Published in the NSDB Technology Journal, Volume 1, no. 3/July to September 1976
3. Utilization of Clays for Brick and Tile Production
 - Guillermina C. Manalac, Tomas D. Recio, Severino T. Bernardo, Virgilio Opano and Nestor G. Anicete
 - Published in the NSDB Technology Journal, Volume 3. No. 4/October-December 1978
4. Wood-Fired, Horizontal Draft Rectangular Kiln
 - Cesar V. Martinez
 - September 1980
5. Mineralogical Study of Some Clays Used as Ceramic Raw Materials in the Philippines
 - Virgilia H. Villarete, Erlinda R. Alinea, Esmeralda R. Martinez, Angelo R. Torillo, James M. Filio, Anatalia A. de Guzman, Elinor Bedia and Dr. Koya Shimosaka
 - Paper Presented at the GEOSEA Conference in Philippine International Convention Center on November 1981
6. Beneficiation Studies on Selected Clays in the Philippines
 - Ruben A. Vidallo, Severino T. Bernardo, Guillermina C. Mañalac and Mr. Teruo Nishimura
 - Paper Presented at the PCARR-MNR-NSDB Seminar Workshop on Ceramics for Countryside Development at the Regent of Manila on December 10 - 11, 1981
7. Refractory Raw Materials in the Philippines: Evaluation of Possible Raw Materials from Albay, Sorsogon and Legaspi City
 - Nenette G. Cilindro and Guillermina C. Manalac
 - Submitted to the Philippine Journal of Science for Publication
8. Kaolin Rich Clays of the Philippines: A Critical Study of Its Behavior on Heating - Angelo R. Torillo, Esmeralda R. Martinez, Susana L. Cabillon, Elinor Bedia, Guillermina C. Mañalac, and Dr. Koya Shimosaka
9. Scanning Electron Microscopy Examination of Fired Clays
 - Angelo R. Torillo, Guillermina C. Manalac and Dr. Koya Shimosaka
 - Submitted to the Clay Science Society of Japan Furuoka City for publication in the Clay Science Journal

10. Pilot Scale Production of Stoneware Out of Local Materials
 - Cesar V. Martinez and Guillermina C. Manalac
 - Pending submission for publication
11. Studies on the Utilization of Clays from Negros Oriental for Brick Production - Guillermina C. Manalac, Sofia A. Cavales and Mr. Luis Rivera, pending submission for publication
12. Mineralogical Composition and Microstructural Study of Fired Bricks - Lina C. dela Cuesta, Susana L. Cabillon, Alicia Huelgas, Severino T. Bernardo and Guillermina C. Manalac, pending submission for publication
13. Studies on Some Properties of Formulated Bodies from Philippine Ceramic Materials - Susana L. Cabillon, Lina C. dela Cuesta and Guillermina C. Manalac Pending submission for publication
14. Philippine Ceramic Raw Materials, Part I - Angelo R. Torillo, Guillermina C. Manalac, Severino T. Bernardo and Tomas D. Recio, pending submission for publication

List of Simple Ceramic Machines That Were Designed and Fabricated

- a. Name: ROLLER CRUSHER/KNEADER(2 rollers)
 Use: Clay Processing For Brick and Tile Production
 Maximum Capacity: 60kg/20min (1 passing)
 Minimum Capacity: 20kg/10min (1 passing)
 Operator: One Person
 Motor Used: 1.5 HP, 1725 RPM
 Roller: 29"x5", 3/4", 47.04 RPM
 Roller Allowance: 5mm (unless specified)
 Pulley Reducer: 235 RPM
 Gears: 37 Teeth, Spur Gear (clockwise and counter-clockwise rotation)
 Estimated Cost: ₱ 7,800.00
- b. Name: KICK TYPE JIGGERING MACHINE
 Used: Forming of Flower Pots
 Maximum Capacity: 250 pcs. for size 4 flower pots/day
 150 pcs. for size 6 flower pots/day
 100 pcs. for size 8 flower pots/day
 50 pcs. for size 12 flower pots/day
 Minimum Capacity: 150 pcs. for size 4 flower pots/day
 100 pcs. for size 6 flower pots/day
 50 pcs. for size 8 flower pots/day
 25 pcs. for size 12 flower pots/day
 Operator: One person
 Size of Jigger Head: Size 4, 6, 8, 12 inches
 Size of Shafting: 1 1/4 (unless specified)
 Estimated Cost: ₱ 2,200.00
- c. Name: MANUAL BRICK PRESS
 Used: Forming of Bricks
 Maximum Capacity: 1 pc./37.5 seconds
 Minimum Capacity: 1 pc./1 min.
 Operator: One person
 Brick Mold Size: 22.86 x 11.43 x 6.35 cm
 Cost: ₱ 1,500.00
- d. Name: MANUAL ROOFTILE PRESS
 Used: Forming of Scale-type Rooftiles
 Maximum Capacity: 1 pc./37.5 sec.
 Minimum Capacity: 1 pc./1 min.
 Operator: One Person
 Brick Mold Size: 42 x 21.5 x 7.8 cm
 Cost: ₱ 1,500.00
- e. Name: MANUAL FACETILE PRESS
 Used: Forming of Face Tiles
 Maximum Capacity: 1 pc./37.5 sec.
 Minimum Capacity: 1 pc./min.
 Operator: one person
 Facetile Mold Size: 2 3/4 x 8 1/2 x 2 inches
 Cost: ₱ 1,500.00

- f. Name: ROLLER KNEADER/CRUSHER (4 rollers)
 Used: Clay Processing including dry processing
 and wet processing
 Maximum Capacity: 80 kg/20 min (1 passing)
 Minimum Capacity: 40 kg/10 min (1 passing)
 Operator: One Person
 Motor Used: 1.5 H.P., 1720 RPM, Single Phase, 60 cycle
 Roller: 24.5" x 12" Ø
 Roller Allowance: 6mm (unless specified)
 Bearing Flange: 1 1/4"
 Estimated Cost: ₱ 9,000.00
 Note: Design available for fabrication
- g. Name: BELT CONVEYOR
 Used: Clay Transport
 Maximum Capacity: 600 kg/Batch
 Minimum Capacity: 400 kg/Batch
 Size of Conveyor: 45m x 40m
 Roller (big): 30m x 12 Ø
 Roller (small): 1 1/2Ø x 20 cm
 Motor Used: 3 H.P.
 Estimated Cost: ₱ 12,500.00
 Note: Design available for fabrication
- h. Name: PUG MILL (Single Shaft)
 Use : Mixing
 Maximum Capacity: 300 kg/batch
 Minimum Capacity: 150 kg/batch
 Size of Pugmill : 2000mm x 400mm
 Paddle Size: 210 x 80mm
 Shafting Size: 2.4m x 3"Ø
 Motor Use: 3-5HP, 2.25kw-3.75kw, 1000-1175 RPM
 Shafting RPM: 30
 Bearing Flange: 2 3/4"
 Estimated Cost: ₱ 18,000.00
 Note: Design available for fabrication
- i. Name: PUG MILL (Double Shaft)
 Maximum Capacity: 600 kg/batch
 Minimum Capacity: 400 kg/batch
 Size of Pug Mill: 2000mm x 650mm
 Paddle Size: 210mm x 80mm
 Shafting Size: 2.4m x 3"Ø
 Motor Use: 3-5HP, 2.25kw -3.75kw, 1000-1175 RPM
 Shafting RPM: 30
 Bearing Flange: 2 3/4"
 Reducer: Car Transmission
 Estimated Cost: ₱ 22,000.00
 Note: Design subject for evaluation prior to
 fabrication

List of Kiln Designed/Constructed

- a. Up-Draft, Horizontal Draft, Wood-Fired Kiln
 Location: Brick and Tile Plant, Barrio Catuging,
 San Nicolas, Ilocos Norte
 Short Description of the Kiln:
 Inside Dimensions: W-1.8m, L-4.5m, H-1.8m
 including rise of crown
 Effective Volume: 12.8 cubic meter
 Capacity: 7,500 pcs. 5.08cm x 16.16cm x 20.32cm
 bricks
 Optimum Firing Temperature: 350°C
 Fuel Used: Firewood, Ipil-Ipil, Kakawate, etc.
 Fuel Consumption: 8 cubic meter
 Length of Time of Firing: 18 hours
 Length of Time of Cooling: 48 hours
 Cost of Kiln (including materials and labor): ₱78,000.00
 (1976 Costing)
- b. Horizontal Draft, Wood-Fired Kiln
 Location: Brick and Tile Pilot Plant at CRDC,
 Bicutan, Taguig, Metro Manila
 Short Description of the Kiln:
 Inside Dimensions: W-1.5m, L-4.8m, H-1.7m
 (including rise of crown)
 Effective Volume: 8 cubic meter
 Capacity: 5,000 pcs. bricks, 5.08cm x 10.16cm x
 20.32cm
 Optimum Firing Temperature: 950°C
 Fuel Used: Firewood, Ipil-ipil, Kakawate, etc.
 Fuel Consumption/Firing: 6 cubic meter
 Length of Time of Firing: 14 - 16 hours
 Length of Time of Cooling: 48 hours
 Cost of Kiln (including material and labor): ₱ 60,000.00
- c. Firewood-Oil Fired Downdraft Kiln
 Location: Tiwi Ceramic Pilot Plant, Tiwi Albay
 Short Description of the Kiln:
 Inside Dimensions: 3.9 cubic meter
 Effective Volume : 5.9 cubic meter
 Capacity: 400 to 500 pieces of assorted types
 of artwares from 10cm to 30cm High
 and 5cm to 15 cm diameter
 Optimum Firing Temperature: 1250°C
 Fuel Used: Firewood for Biscuit Firing;
 Firewood and Diesel Oil for Glost
 Firing
 Fuel Consumption: 2.5 cubic meter for Biscuit
 Firing (800°C)
 2.5 cubic meter (up to 800°C)
 and 525 liters diesel oil
 (from 800°C-1250°C)
 Length of Time of Firing: 7 hours for biscuit firing
 18-20 hours for glost
 firing
 Length of Time of Cooling: 24 hours for biscuit
 firing and 48 hours
 for glost firing
 Cost of Kiln (Labor and Materials including
 oil and air piping): ₱ 90,000.00

- d. Down-Draft, Wood-Fired Kiln
 Location: Barrio Palahanan, San Juan, Batangas
 Short Description of the Kiln:
 Optimum Operating Temperature: 1000°C
 Effective Volume: 6.5 cubic meter
 Effective Dimension: 1.5m x 2.4m x 1.8 Height
 Number of Firing Chamber: 6
 Volume of Each Firing Chamber: 0.023 square meter
 Total Area of Kiln Floor Opening: 0.165 square meter
 Total Area of Ash Holes: 0.023 square meter
 Horizontal Flue Area: 0.174
 Height of Chimney: 9.2 meter
 Height Cross Section: 0.167 square meter
 Fuel Used: Coconut Husak, Coconut Trunk,
 Bakawan, etc.
 Fuel Consumption: 3 cubic meter (850°C)
 Cost of the Kiln: ₱ 60,000.00
- e. Horizontal Draft, Wood-Fired Kiln
 Location: Maasin, Leyte
 Short Description of the Kiln:
 Inside Dimensions: 2.8 cubic meter
 Capacity: 600 pcs. of bricks, 5.08cm x 10.16cm
 x 20.32cm
 Optimum Firing Temperature: 950°C
 Fuel Used: Firewood, Coconut Husk, Coconut
 Trunk, Coconut Leaves, etc.
 Fuel Consumption/Firing: 3 cubic meter
 Length of Time of Firing: 14-16 hours
 Length of Time of Cooling: 48 hours
 Cost of Kiln: ₱ 35,000.00 (1977 costing)
- f. Down-Draft, Wood-Fired Kiln
 Location: Daro, Dumaguete City
 Short Description of the Kiln:
 Inside Dimension: 3.2 cubic meter
 Effective Volume: 4.5 cubic meter
 Capacity: 200 pcs. flower pot, dia. 6"
 Fuel Used: Firewood, (Ipil-ipil, Kakawate,
 Coconut Husk, etc.)
 Fuel Consumption: 4 cubic meter
 Length of Time of Firing: 8 hours
 Length of Time of Cooling: 24 hours
 Cost of Kiln (Material and Labor): ₱ 50,000.00
- h. Electric Kiln
 Size of Electric Kiln: 18" x 18" x 22"
 Location: San Nicolas, Ilocos Norte
 Libjo, Batangas
 Maasin, Leyte
 Samoque, Mountain Province
 CRDC-Bicutan, Taguig, Metro Manila
 20 kw Kiln (62.5 x 34 x 36) inches
 Tiwi Ceramic Pilot Plant, Tiwi, Albay
 10 Kw Kiln (33.5 x 28.5 x 31) inches
 Ceramic Research and Development
 Center, Bicutan, Taguig, M.M..

List of Training Programs Conducted:

	<u>Title</u>	<u>Date Conducted</u>	<u>Number of Participants</u>
1.	Training Program on Mold Making	April 12 to 23, 1982	Eleven (11)
2.	Orientation on Brick and Tile Production	March 1 to April 7, 1982	Five (5)
3.	Training Program on Brick and Tile Production	March 1-31, 1982	Nine (9)
4.	In-Service Training of CRDC Staff on the Use of Laboratory Equipments	March 1-31, 1982	Thirteen (13)
5.	Training Program on the Use and Operation of Equipments for Determining Rheological Properties	March 1-31, 1982	Three (3)
6.	Training Program of Mr. P. Palomero on Kiln Design Construction Technique	August 10-14, 1981	One (1)
7.	Training Program of Ceramic Hobbyist (Japanese Housewives)	August to September 1981	Ten (10)
8.	Training Program of NSDB Scholars	April 20 to May 30, 1981	Two (2)
9.	Lecture Activities on Brick and Tile Production from Representatives of NSDB-Appropriate Technology Project Staff	May 13, 1981	Fifteen (15)
10.	In-Service Training of CRDC Staff on Mineral Analysis Equipments	May 13, 1981	Five (5)
11.	Training Program of Ms. Brigida Antes, NIST Trainee	April 1 to August 31, 1981	One (1)
12.	Training Program on Brick and Tile Production of Mr. Yusoph Gandarosa representative of Appropriate Technology Project	April 1 to May 31, 1981	One (1)
13.	Training Program of Mr. Simplicio Balce Representative from Development Academy of the Philippines (DAP)	March 23 to June 23, 1981	One (1)

	<u>Title</u>	<u>Date Conducted</u>	<u>Number of Participants</u>
14.	Training Program and Schedule of NIST Trainees: Ms. Marites Nuevo, Ms. Elizabeth Miranda and Ms. Clavel Zambrano	July 7 to November 20, 1980	Three (3)
15.	In-Service Training of CRDC Staff on Physical Testing II - Mr. Arnulfo Badoy	July 1 - 31, 1980	One (1)
16.	In-Service Training of CRDC Staff in Sample Preparation Unit - Mr. Loreto Albano	July 1 - 21, 1980	One (1)
17.	Training Program and Schedule of NIST Trainees: Ms. Lina Carandang and Ms. Elinor Bedia	January 3 to May 30, 1980	Two (2)
18.	Proposed Training Program for Mr. V. Ables	February 4 to March 28, 1980	One (1)
19.	Technical Seminar and Workshop of CRDC Staff	January 1-20, 1980	Nineteen (19)
20.	Syllabus of Training in Orientation on Ceramics	October 2 to 6 and 9 to 13, 1978	Nine (9)

List of Brochures and Hand Outs:

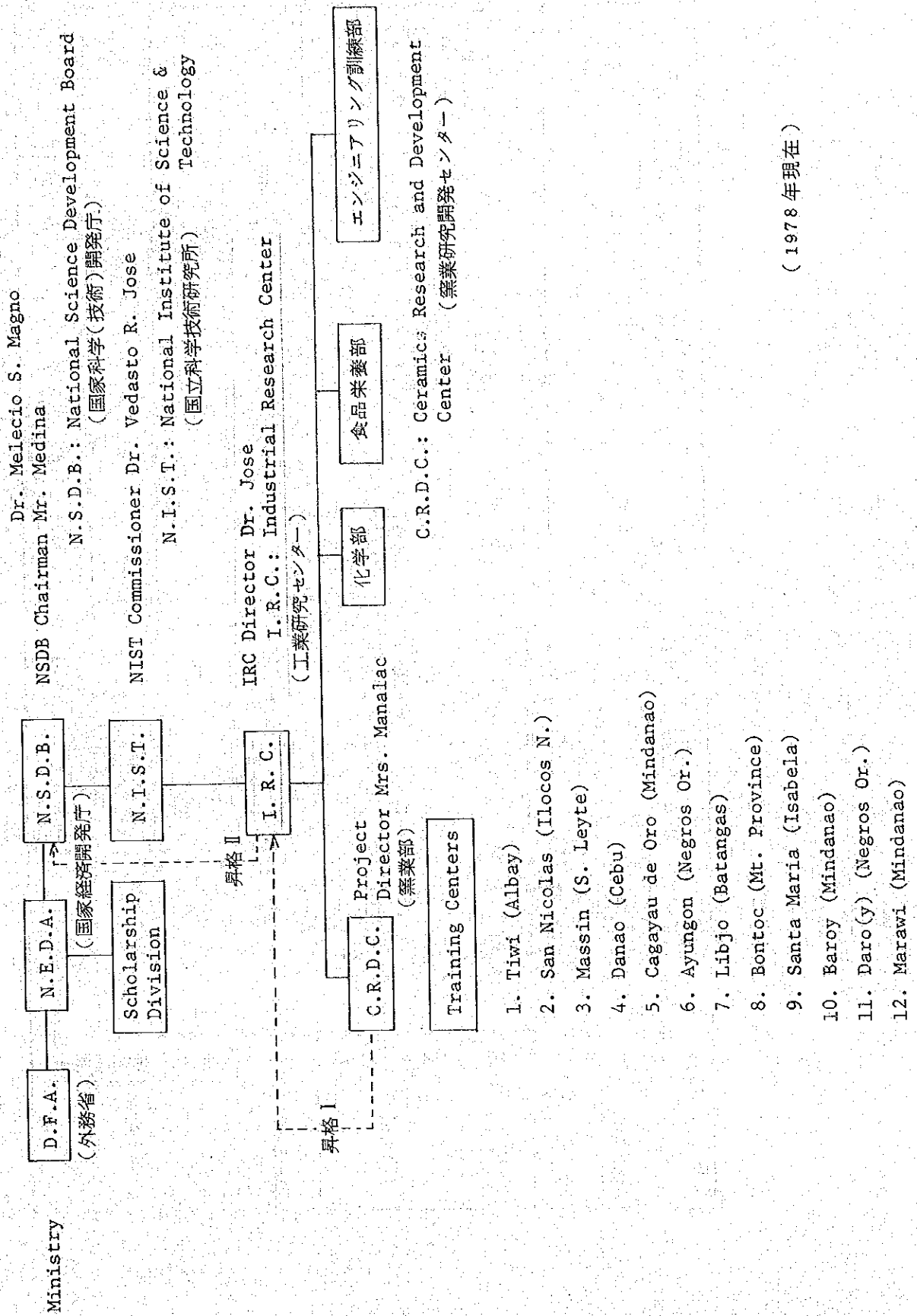
1. Body Preparation, Forming and Drying
2. Ceramic Glazes
3. Ceramic Raw Materials
4. Chemical Analysis of Ceramic Raw Materials
5. Chemical and Physical Analyses of Clay Samples Outside the Training Center
6. Common Bricks
7. Common Brick Manufacture
8. Definition of Terms Used in Thermal Analysis
9. Forming by Hand
10. Grain Size Determination by Andreasen Pipette Method
11. Infrared Spectroscopy
12. Introduction to Ceramics
13. Kiln
14. Manufacture of Common Bricks and Clay Roof Tiles
15. Manufacture of Refractories
16. Mold-Making
17. Mosaic and Vitrified Floor Tile
18. Outline of Manufacturing Process of Seger Cone
19. Physical Testing of Ceramic Raw Materials and Ceramic Products
20. Polarizing Microscope
21. Procedure for Preparing Samples in the Sample Preparation Unit
22. Procedure of Throwing Clay Method on Potter's Wheel
23. Rocks and Minerals
24. Scanning Electron Microscope
25. Standard Test Method for Pyrometric Cone Equivalent
26. Testing Ceramic Products by Autoclave
27. Thermal Expansion of Ceramic Products and Materials
28. Thermal Shock Resistance
29. Thermogravimetric-Differential Thermal Analysis
30. List of Ceramic Manufacturers
31. Improvement and Development of Philippine Pottery Industries
32. The Brick and Tile Project
33. Case Study on the Small-Scale Production of Ash Trays
34. Ceramic Research and Development in the NIST
35. Summary of the Report of the Japanese Preliminary Survey Team
36. Location Maps of Local Ceramic Centers

附 属 資 料

1. プロジェクトの実施概要(1976年～1982年)

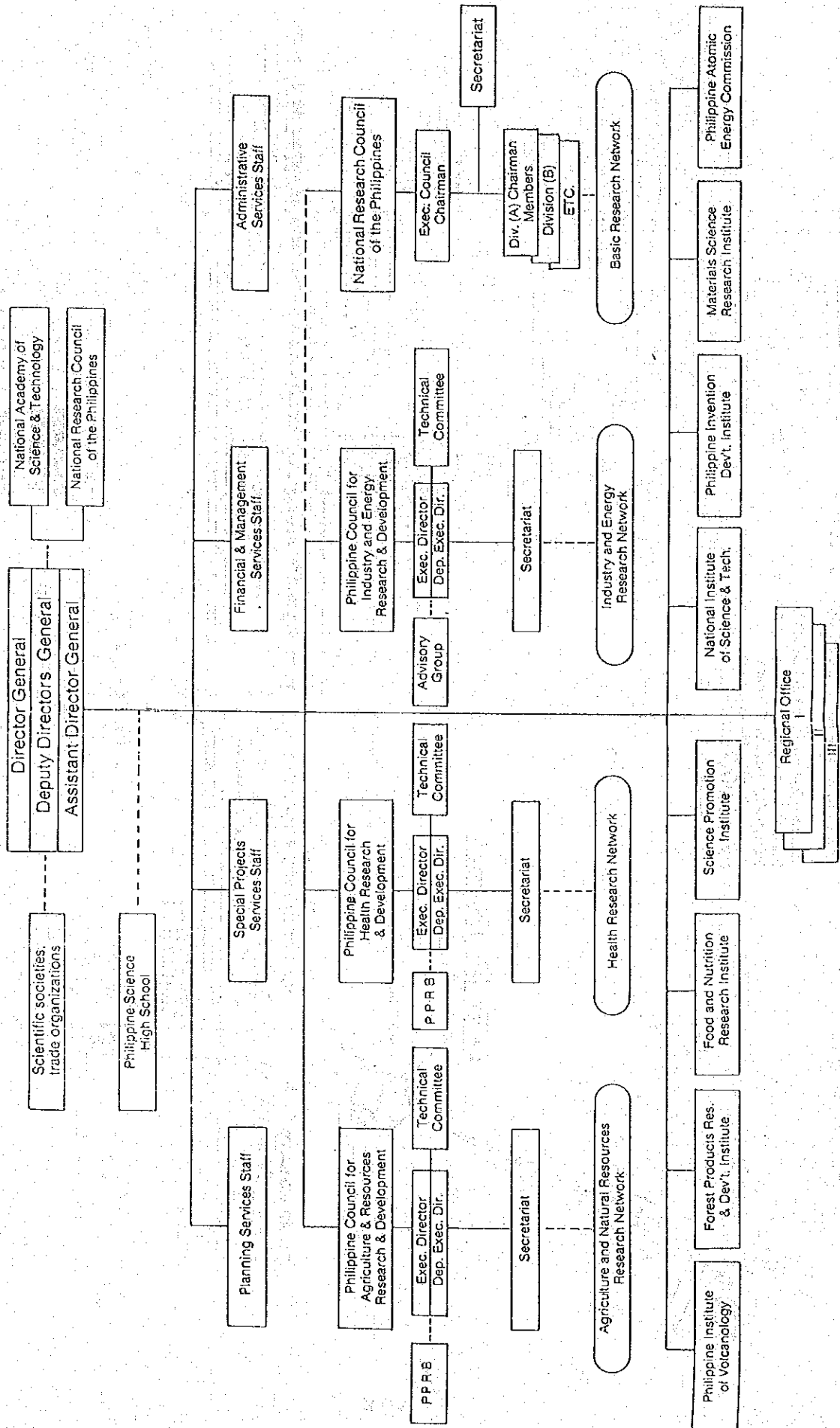
Phase 協力内容	Phase I Base Establishment					Phase II Development	Phase III Self-Reliance
	1976	1977	1978	1979	1980		
年度	1976	1977	1978	1979	1980	1981	1982
R/D 期間	7/16				7/15		7/15
調査団派遣	実施調査 (51/6)		巡回指導 (53/7)	機材修理 (55/2)	エンジニアジョン (55/5)	エンジニアジョン (57/6)	
専門家派遣	長期	0	1名 (6M/Y)	0 (6M/Y)	3名 (5M/Y)	0 (5M/Y)	0
	短期	3名	5名 (5M/Y)	6名	4名	1名	7名
機材供与(千円)		153,803	63,825	39,115	6,600	18,337	
研修員受入	高級		1名				
	準級						
	一般	5名	5名	4名	6名	4名	5名

2. プロジェクト開始当初の相手国協力機関機構図



3. NSTA 機構圖

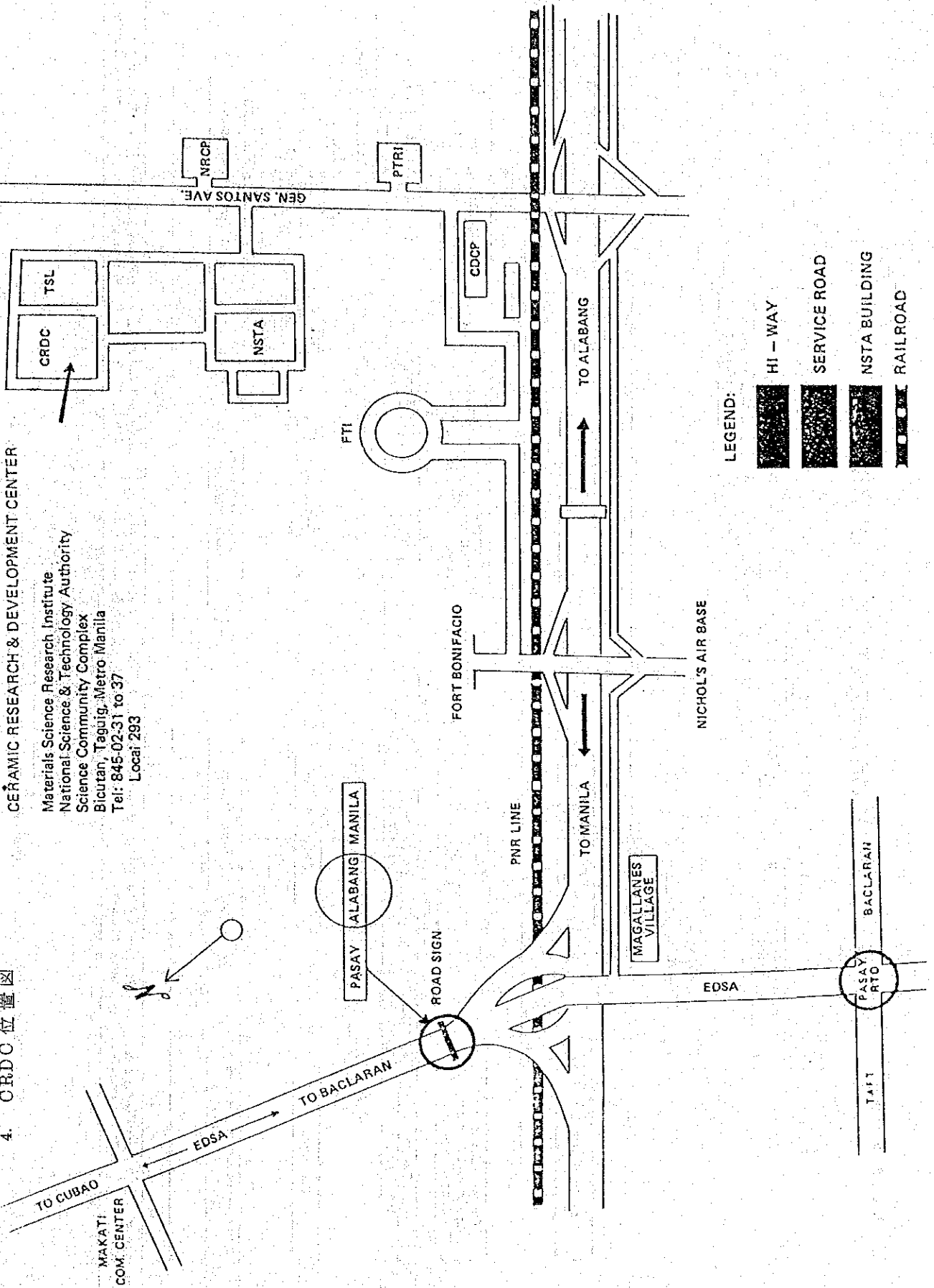
NSTA ORGANIZATIONAL CHART



4. CRDC 位置图

CERAMIC RESEARCH & DEVELOPMENT CENTER

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 National Science & Technology Authority
 Science Community Complex
 Bicutan, Taguig, Metro Manila
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 Local 293



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