ATTACHMENT 2

ATTACHED TABLES

Attached Tables

1. Compulsory Standards (29 Standards)

2. Standards Scheduled to be Compulsory

3. Certification Testing Requested to Accredited Testing Laboratories

4. Statistics of TISI Activities in Industrial standardization

5. Accredited Testing Laboratories

6. List of Test Equipment (TISI) Certification Division
   List of Test Equipment (TISI) Standardization Division

7. List of Test Equipment (TISTR)

8. List of Metrological Equipment
   1. DC Calibration Facilities of TISTR
   2. AC Calibration Facilities of TISTR
   3. Fundamental Temperature Standards of TISTR
   4. Basic Equipment for Maintaining Temperature Standards
   5. Basic Equipment for Photometric Standards
   6. Fundamental Standards in Photometry
   7. Mechanical Metrology in TISTR
   8. Equipment for Measurement of Mass & Its Derived Units

Attached Table 1

Compulsory Standards (29 Standards)

Chemical

TIS 30-1984	Nitrous oxide for medical purposes	Oct. 27 '85
TIS 78-1985	Laundry detergent powder	Nov. 1 '85
TIS 539-1984	Carbon dioxide for medical uses	Oct. 27 '85
TIS 540-1984	Oxygen for medical uses	Oct. 27 '85

Mechanical Engineering

TIS 27-1985	Liquefied petroleum gas cylinders	Nov. 1 '85
TIS 196-1976	Automotive safety glass: laminated safety glass	Jun. 14 '79
TIS 197-1976	Automotive safety glass: tempered safety glass	Jun. 14 '79
TIS 198-1976	Automotive safety glass: zone tempared	Jun. 14 '79
TIS 369-1981	Protective helmets for road users	Mar. 25 '87
TIS 370-1982	Liquefied petroleum gas cylinders for internal combustion engines	May 2 '83

Agricultural

TIS 52-1973	Tapioca products	Jun. 26 '74
TIS 330-1982	Hard tapioca pellets	Jun. 2 '84

Electrical Engineering

TIS 4-1979	Incandescent lamps	May 1 '87
TIS 10-1986	Low-voltage distribution link fuses	Nov. 21 '87
TIS 11-1975	PVC-insulated cables and flexible cords	Aug. 14 '76
TIS 23-1978	Ballast for fluorescent lamps	Apr. 1 '79
TIS 183-1985	Starters for fluorescent lamps	Sep. 29 '89
TIS 293-1983	PVC-insulated aluminium cables	Dec. 1 '83
TIS 366-1985	Electric irons	Jun. 6 '86

Consumer Products

TIS 17-1980	Polyvinyl chloride pipes for drinking water services	Jun. 1 '84
TIS 53-1985	Safety matches	Dec. 1 '85
TIS 309-1982	Mosquito coils and sticks	May 15 '83
TIS 531-1984	Plastics containers for sterile pharmaceutical products	Jun. 18 '86

Metallurgical

TIS 20-1984	Steel bars for reinforced concrete: round bars	Mar. 1 '85
TIS 24-1984	Steel bars for reinforced concrete: deformed bars	Mar. 1 '85
TIS 211-1984	Steel bars for reinforced concrete: re-rolled round bars	Mar. 1 '85

Non-Metallic Products

TIS 496-1983	Lacquer thinner	Mar. 31 '85
TIS 520-1984	Automotive nitrocellulose lacquer thinner	Oct. 27 '85

Food

TIS 51-1973	Canned pineapple	Feb. 1 '77

Attached Table 2

Standards Scheduled to be Compulsory

Chemical

TIS 322-1986	Dry chemical portable fire extinguishers

Mechanical Engineering

TIS 340-1985	Exhaust system for automobiles
TIS 341-1985	Exhaust system for motorcycles
TIS	Hydraulic set for trucks

Architectural

TIS 178-1976	Plywood

Electrical Engineering

TIS 25-1973	Lampholders: bayonet types
TIS 92-1985	A.C. electric table type fans
TIS 127-1985	A.C. electric pedestral type fans
TIS 166-1976	Plugs and socket-outlets for general electrical use
TIS 191-1976	Capacitors for tubular fluorescent, high pressure mercury and low pressure sodium vapor discharge lamp circuits
TIS 205-1985	A.C. electric ceiling type fans
TIS 209-1977	Electric stove: open type heating elements
TIS 236-1977	Fluorescent lamps
TIS 344-1980	Lampholders and starter holders for fluorescent lamps

Consumer Products

TIS 90-1987	Metal cans for foods and drinks

Metallurgical

TIS 16-1981	Tinplate
TIS 348-1980	Low carbon steel wire rods
TIS 349-1980	High carbon steel wire rods

Attached Table 3

Certification Testing Requested to Accredited Testing Laboratories

	1984			1985			1986			1987		
	Total	Per-centage	Com-pulsory	Total	Per-centage	Com-pulsory	Total	Per-centage	Com-pulsory	Total	Per-centage	Com-pulsory
DSS	913	26.2	373	1,370	33.1	738	2,010	40.5	1,089	1,457	33.5	627
TISTR	783	22.5	529	1,178	28.4	778	842	17.0	356	1,362	31.2	457
DHW	241	6.9	11	283	6.8	0	826	16.6	0	491	11.3	0
DMR	195	5.6	145	428	10.3	372	358	7.2	285	242	5.5	156
PEA	161	4.6	97	134	3.2	110	189	3.8	175	115	2.6	101
CCU	25	0.7	19	62	1.5	59	181	3.7	120	208	4.8	31
MEA	228	6.5	155	232	5.6	163	151	3.0	113	97	2.2	65
DMS	51	1.5	40	159	3.8	149	90	1.8	58	68	1.6	53
FECU	74	2.1	52	95	2.3	67	77	1.6	58	110	2.5	90
DOA	40	1.1	40	0		0	77	1.6	77	44	1.0	44
NSD	0		0	14	0.3	14	52	1.1	52	30	0.7	30
FOD	0		0	6	0.1	0	52	1.1	0	6	0.1	0
RFD	12	0.3	0	10	0.2	0	23	0.5	0	22	0.5	0
DIP	7	0.2	0	12	0.3	0	11	0.2	0	7	0.2	0
TTO	5	0.1	0	11	0.3	0	9	0.2	0	6	0.1	0
UTW	0		0	0		0	4	0.1	0	0		0
FSCU	715	20.5	715	143	3.5	143	0		0	0		0
PAT	0		0	3	0.1	0	0		0	4	0.1	0
BAT	0		0	1	0.0	0	0		0	0		0
FRPD	21	0.6	21	0		0	0		0	0		0
RI	8	0.2	0	0		0	0		0	0		0
TTM	8	0.2	0	0		0	0		0	0		0
FEKNU	0		0	0		0	0		0	49	1.1	49
FEKU	0		0	0		0	0		0	8	0.2	8
FEKLU	0		0	0		0	0		0	33	0.8	33
GPO	0		0	0		0	0		0	3	0.1	0
Grand Total	3,487	100	2,197	4,141	100	2,593	4,952	100	2,383	4,362	100	1,744

Source: TISI

Attached Table 4

Statistics of TISI Activities in Industrial Standardization

Item	1983	1984	1985	1986	1987
1. Standard published	461	519	580	636	701
1.1 Product standards	407	463	519	566	626
(1) Voluntary	392	445	495	540	597
(2) Compulsory	15	18	24	26	29
1.2 Other standards	54	56	61	70	75
2. Number of product standards applied	182	200	216	260	321
2.1 Voluntary	167	182	192	234	292
2.2 Compulsory	15	18	24	26	29
3. Number of product Standards certified	112	126	150	164	220
3.1 Voluntary	97	108	131	141	192
3.2 Compulsory	15	18	19	23	28
4. Number of applications for certification	3,680	3,858	4,179	4,386	3,457
4.1 Voluntary standards	452	477	597	792	961
4.2 Compulsory standards	3,228	3,381	3,582	3,594	2,496
5. Number of factories licensed	1,904	2,071	2,232	2,352	2,702
5.1 Voluntary standards	255	299	380	429	693
5.2 Compulsory standards	1,649	1,772	1,852	1,923	2,009
6. Number of licenses issued	3,783	4,271	4,531	4,774	5,658
6.1 Voluntary standards	557	758	921	922	1,595
6.2 Compulsory standards	3,226	3,513	3,610	3,852	4,063
7. Number of factory inspections performed	5,657	5,491	5,955	6,219	6,579
7.1 For licensing	1,998	1,428	1,388	1,738	1,711
(1) Voluntary standards	465	367	591	1,043	1,200
(2) Compulsory standards	1,533	1,061	797	695	511
7.2 For following up	3,585	3,991	4,483	4,359	4,740
(1) Voluntary standards	801	920	1,049	1,236	1,445
(2) Compulsory standards	2,784	3,071	3,434	3,123	3,295
7.3 For product registration	74	72	84	122	128
8. Number of market inspections performed	6,276	7,817	10,114	11,807	10,297
9. Number of samples tested	4,574	4,106	5,219	5,023	6,215
9.1 For standards development	861	975	1,422	1,112	2,570
9.2 For licensing	1,582	1,137	1,482	2,099	1,876
(1) Voluntary standards	707	565	773	1,648	1,553
(2) Compulsory standards	875	572	709	451	323
9.3 For following up	2,073	1,910	2,236	1,726	1,723
(1) Voluntary standards	574	472	451	449	440
(2) Compulsory standards	1,499	1,438	1,785	1,277	1,283
9.4 For product registration	58	84	79	86	46
10. Number of product registered	148	77	95	108	156
11. Number of factories registered	217	112	173	207	256

Source: TISI

Attached Table 5

Accredited Testing Laboratories

I. Government Bodies

1.	Ministry of Agriculture and Cooperatives	
	1.1 Department of Agriculture	DOA
	1.2 Department of Livestock Development	DLD
	1.3 Land Development Department	LDD
	1.4 The Royal Forestry Department	RFD
	1.5 The Royal Irrigation Department	RI
2.	Ministry of Commerce	
	2.1 Department of Commercial Registration (Fuel Oil Division)	FOD
3.	Ministry of Communications	
	3.1 The Department of Highway	DHW
4.	Ministry of Defence	
	4.1 Aeronautical Engineering	AE
	4.2 Chemical Department	ACD
	4.3 Naval Dockyard Department	NDD
	4.4 Naval Science Department	NSD
	4.5 Quartermaster General's Department	QGD
5.	Ministry of Education	
	5.1 The Institute of Technology and Vocational Education (Thewet Compus)	TC
	5.2 The Institute of Technology and Vocational Education (Uthen Thawai Campus)	UTW
6.	Ministry of Finance	
	6.1 The Excise Department	TED
7.	Ministry of Industry	
	7.1 Department of Industrial Promotion	DIP

7.2 Department of Mineral Resources	DMR
7.3 Office of the Can and Sugar Board	OCSB
8. Ministry of Interior	
8.1 Public Works Department	PWD
9. Ministry of Public Health	
9.1 Department of Medical sciences	DMS
10. Ministry of Science, Technology and Energy	
10.1 Department of Science Service	DSS
10.2 Office of Atomic Energy for Peace	OAEP
10.3 Office of the National Environment Board	ONEB
10.4 The National Energy Administration	NEA
11. Ministry of University Affairs	
11.1 Chulalongkorn University	
(1) Faculty of Dentistry	DCU
(2) Faculty of Engineering	FECU
(3) Faculty of Science	FSCU
(4) The Scientific and Technological Research Equipment Centre	CCU
11.2 Kasetsart University	
(1) Faculty of Agriculture	FAKU
(2) Faculty of Engineering	FEKU
(3) Faculty of Forestry	FFKU
(4) Institute of Food Research and Product Development	FRPD
(5) Kasetsart University Research and Development Institute (Agriculture Machinery Centre)	CKU
11.3 King Mongkut's Institute of Technology (North Bangkok Campus)	
(1) Faculty of Engineering	FEKNU
11.4 King Mongkut's Institute of Technology (Thonburi Campus)	
(1) Faculty of Engineering	FEKTU
11.5 Mashidol University	
(1) Faculty of Science	FSMU

11.6 Prince of Songkhla University

(1) Faculty of Engineering — FEPU

II. Private Sector

1. The Badminton Association of Thailand — BAT

III. State Enterprises

1. Ministry of Communications
   - 1.1 The Telephone Organization of Thailand — TOT

2. Ministry of defence
   - 2.1 The Preserved Food Organization — PFO
   - 2.2 The Tanning Organization — TTO

3. Ministry of Finance
   - 3.1 Thailand Tobacco Monopoly — TTM

4. Ministry of Industry
   - 4.1 Petroleum Authority of Thailand — PAT

5. Ministry of Interior
   - 5.1 The Metropolitan Electricity Authority — MEA
   - 5.2 The Metropolitan Water Works Authority — MWA
   - 5.3 The Provincial Electricity Authority — PEA

6. Ministry of Public Health
   - 6.1 The Government Pharmaceutical Organization — GPO

7. Ministry of Science, Technology and Energy
   - 7.1 Thailand Institute of Scientific and Technological Research — TISTR

8. Office of the Prime Minister
   - 8.1 The Electrical Generation Authority of Thailand — EGAT

Attached Table 6

List of Test Equipment (TISI)

1. Certification Division

No.	Name of equipment	Q'ty	Production date
1	Balance, analytical*	1	1985
2	Balance, analytical	1	1985
3	Digestion tester	1	1982
4	Furnace, muffle	1	1982
5	Furnace, muffle	1	1982
6	Hot plate	2	1986
7	Moisture tester	2	1984
8	Oven	1	1982

2. Standardization Division

No.	Name of equipment	Q'ty	Production date
1	Abrasive tester	1	1983
2	Arc light exposure & weathering machine	1	1984
3	Balance	1	1982
4	Balance: analytical	1	1982
5	Balance: mechanical	1	1984
6	Bath: shaker	1	1984
7	Bending testing machine	1	1983
8	Bicycle frames tester	1	1982
9	Blender	1	1982
10	Board: control	1	1983
11	Centrifuge	1	1982
12	Chamber: temperature & humidity	1	1984
13	Cleaner: ultrasonic	1	1983
14	Coating thickness gauge	1	1984
15	Coating thickness gauge	1	1984

cont.

No.	Name of equipment	Q'ty	Production date
16	Colorimeter	1	1985
17	Comparator: pocket	1	1983
18	Counter: magnetic	1	1983
19	Distillation apparatus	1	1983
20	Finger: std. test finger	1	1983
21	Furnace	1	1981
22	Heating mantle	2	1982
23	Hot plate	1	1982
24	Hydraulic testing machine	1	1982
25	Indicator: dial	1	1983
26	Insulator tester	1	1983
27	Ion analyzer	1	1982
29	Multimeter	1	1983
20	Nitrogen & protein analyzer: Kjeldahl	1	1984
30	Oscilloscope	1	1983
31	Oven: universal	1	1981
32	Regulator: slide	1	1983
33	Shaker: test sieve	1	1984
34	Shock absorbtion tester	1	1982
35	Spectrometer	1	1982
36	Thermometer: digital	1	1983
37	Thickness indicator: ultrasonic	1	1983
38	Transformer: high voltage	1	1983
39	Universal Testing Machine: 30 KN	1	1986
40	Water bath	1	1981
41	Wattmeter	1	1983

Attached Table 7

List of Test Equipment (TISTR)

No.	Name of equipment	Q'ty	Production date
1	Ammeter: AC	2	1979
2	Carbon-sulphur analyzer	1	20 yr
3	Compression tester: 300 tons	1	1967
4	Conductivity meter	1	4 yr
5	Control chamber: temp & humid	1	1980
6	Counter: electronic	1	1975
7	Fat extractor	1	20 yr
8	Fibre extractor	1	20 yr
9	Flash point apparatus	1	7 yr
10	Frequency meter	1	1974
11	Furnace	2	1980, 1981
12	Furnace: annealing	1	1975
13	Generator: square wave	1	1970
14	Glucose analyzer	1	4 yr
15	Hardness tester: Brinell	1	1980
16	Hardness tester: Rockwell	1	1978
17	Hardness tester: Rockwell, superficial	1	1967
18	Hardness tester: Shore	1	1978
19	Hardness tester: Vickers	1	1967
20	Hydrostatic tester: volumatic expan.	1	1980
21	Impact tester	1	1967
22	Insulator conductivity tester	1	1970
23	Insulator tester	1	1979
24	Integranting sphere	1	1979
25	Light stability testing apparatus	1	1986
26	Mercury analyzer	1	10 yr
27	Multimeter: VOM	1	1969
28	Multimeter: digital	1	1986
29	Multimeter: digital	2	1979, 1980
30	NIR grain analyzer	1	5 yr

cont.

No.	Name of equipment	Q'ty	Production date
31	Oil bath	1	1983
32	Oscilloscope	3	1975
33	Oven	1	1978
34	pH-meter	1	15 yr
35	Photometer: Lux meter	1	1976
36	Power factor meter	1	1976
37	Rack	3	1985, 1986
38	Rack	4	1979, 1985
39	Recorder: temperature	2	1979, 1981
40	Scanner: TLC	1	3 yr
41	Signal generator	1	1982
42	Spectrophotometer: atomic absorption	1	20 yr
43	Testing app.: distorsion of vision	1	1985
44	Testing app.: optical deviation	1	1986
45	Thermometer: surface	1	1976
46	Titrator: Karl Fisher	1	4 yr
47	Universal testing machine: 50 tons	1	1967
48	Universal testing machine: 630 kN	1	1986
49	Viscometer	1	20 yr
50	Voltage regulator: AC auto	1	1979
51	Voltage regulator: AC auto	2	1984
52	Voltage stabilizer: DC	1	1979
53	Voltmeter: AC	2	1979
54	Voltmeter: AC	2	1979
55	Voltmeter: DC	1	1976
56	Wattmeter	1	1976
57	Wattmeter: AC	2	1979

Attached Table 8

List of Metrological Equipment

1. DC Calibration Facilities of TISTR

Equipment	Manufacturer & Model	Description	Quantity
Standard Cell	YEW 2748	1.018V	1
Standard Cell	EPPLEY, 121	Transportable	1
Electronic Standard Cell	CROPICO	1V 1.018V	1
Potentiometer	L&N, 7556	Six Dial	1
Voltage Calibrator	Fluke, 343 A	10, 100, 1000V	1
Voltage/Current Calibrator	YEW, 2850	1200V, 36A	1
Standard Volt Ratio Box	YEW, 2746	1500V	1
Ref. Voltage Divider	Fluke, 750 A	1100V	1
Volt Ratio Box	YEW, 2744	1500V	1
Standard Current Shunt	YEW	2A	1
Differential Voltmeter	Fuke, 887 AB	1 - 1000V	1
Constant Current Supply	YEW, 2854	Max. 100 mA	1
Galvanometer	YEW, 2709	Electronic	1
Standard Resistor	L&N, -	1	1
	L&N, 4020-B	1	2
	YEW, 2781	1	1
	L&N, 4025-B	10	2
	ETL, -	100	1
	L&N, 4030-B	100	2
	YEW, 2972	1000	1
	L&N, 4035-B	1000	2
	YEW, 2972	10000	1
	YEW, 2972	1000000	1
Direct Reading Ratio Set	L&N, 4398	Six Dial	1
Wheatston Bridge	YEW, 2768	Five Dial	1
Kelvin Double Bridge	YEW, 2752	Five Figures	1
Decade Resistor	YEW, 2793-03	Man 100 MΩ	3
Digital Multimeter	-01	Man 1 KΩ	1
Digital Multimeter	Fluke 8505A		1
Voltage Divider	YEW, 2805		1
Lead Compensator	Fluke 720A	1000V	1
Null Detector	721A		1
Null Detector	845AB		1
Standard Voltage Divider	750A	1100V	1
DC. V/A Calibrator	382A		1
DC Voltage Calibrator	335A	1000V	1
Digital Multimeter	7740A		1

2. AC Calibration Facilities of TISTR

Equipment	Manufacturer & Model	Description	Quantity
Thermal Transfer Standard	ETL	10V 100 V 5 mA 10 mA	2 2 2 7
Thermal Transfer Standard	Fluke 540B	1 - 1000 V	1
Standard Watt Converter	YEW 2885		1
Voltage/Current Calibrator	YEW W858		2
Standard AC Shunt	Fluke A40	0.01 A 0.1 A 1 A 10 A	1 1 1 1
Standard Capacitor	GR - 1404	1000 PF	3
Standard Capacitor	Towa	0.1 μF	2
Standard Inductor	GR 1482-B	100 μH 10 μH 1 H	1 2 1
Capacitance Bridge	GR 1615-A		1
Inductance Bridge	GR 1632-A		1
AC Calibrator	Fluke 5200		1
Transconductance Amplifier	Fluke 5220 A	(AC/PC) 20 A	1
Meter Calibrator	Fluke 5100B		1

3. Fundamental Temperature Standards of TISTR

Standard	Temperature Range, °C	Quantity
Reference Standard Thermocouple	400 to 1200	2
Reference Standard Resistance Thermometer	0 to 600	2
Secondary Standard Thermocouple	400 to 1200	2
Secondary Standard Resistance Thermometer	0 to 600	2
Tungsten Strip Lamp	800 to 2500	5

4. Basic Equipment for Maintaining Tempeature Standards

Equipment	Quantity
Lead & Northrup Potentiometer Type-K4	1
AC Bridge, Automatic Systems Laboratory	1
Cell for Triple Point of Water	1
Fixed Point Furnace for Tin	1
Fixed Point Furnace for Zinc	1
Fixed Point Furnace for Silver	1
Melting Point Furnace for Gold	1
Ice Point Chamber	1
Water Bath	2
Oil Bath	2
Salt Bath	1
Comparison Furnace	1

5. Basic Equipment for Photometric Standards

Equipment	Description	Quantity
Photometric Sphere	ø 1.50 m	1
Photometric Bench	3.5 m	1
Standard Photoreceiver		1
Voltage Regulator	DC, ± 0.01%	1
Voltage Regulator	AC, ± 0.3%	1
Monochrometer	0 - 999 mm ± 0.5 mm	1

6. Fundamental Standards in Photometry

Equipment	Quantity
Primary Standard Incandescent Lamp for Luminous Flux	3
Primary Standard Incandescent Lamp for Luminous Intensity	2
Secondary Standard Incandescent Lamp for Luminous Flux	3
Secondary Standard Incandescent Lamp for Luminous Intensity	3
Secondary Standard Fluorescent Lamp (white light)	3
Secondary Standard Fluorescent Lamp (day light)	3

7. Mechanical Metrology in TISTR Equipment for Measurement of Length

Equipment	Description
1. Gauge Block	05 - 100 (40 pcs) Set * 1 class 0
2. Micrometer	0 - 100 mm/.001 0 - 25 mm/.01 × 2 0 - 25 mm/0.1 × 2
3. Height Gauge	0 - 1000 mm/.01, .001" 0 - 600 mm/.0.1
4. Vernier Caliper	0 - 200 mm/0.2 × 3 0 - 200 mm/0.5 × 5 0 - 150 mm/0.2 × 1 0 - 150 mm/0.5 × 3 0 - 150 mm/0.1, .0005"
5. Dial Indicator .001	0 - 1 mm × 1 0 - 5 mm × 2
6. Dial Indicator .001	0 - 10 mm × 2 0 - 30 mm × 2
7. Optical Parallet Set	25 mm (4 pcs)
8. Coating Thickness Meter	0 - .100 mm 0.050 - .500 mm
9. Projector	

8. Equipment for Measurement of Mass & Its Derived Units

Equipment	Description
1. Mass Sets	100 g - 1 kg (5 pcs) set #1 10 mg - 100 g (19 pcs) set #2 100 g - 1 kg (6 pcs) set #1 10 mg - 100 g (19 pcs) set #2
2. Balances	
Hand-Operated Balance	1000 g/0.5 mg
Balance	15 kg/5 g
Balance	60 kg/50 g
Electronic Balance	7000 g/0.1 g
Analytical Balance	100 g/0.1 mg
Electronic Balance	5000 g/0.01 g
Spring Balance	500 g/10 g
Spring Balance	50 g/0.5 g
3. Force	
Proving Rings (Tension & Compression)	5 ton
Proving Rings	50 ton
Proving Rings	10 ton
Galvanized Forge Steel Weight	1 kgf × 25
Chrome Steel Weight	2 kg, 1 kg, 10 g
Painted Steel Weight	20 g × 5
4. Pressure	
Deadweight Pressure Tester (Oil)	10 - 8000 psi
Deadweight Pressure Tester (Oil)	5 - 3000 psi
S & D Test Gauge (Oil)	100 - 1000 psi
Aneroid Barometer, Fortin Barometer	1000 - 1500 mbar

ANNEX I

I-1 MEMBER OF THE TEAM

I-1-1 Member of Joint Team (the Preliminary Study Team for Grant Aid, the Contact Team for Technical Cooperation, December 16 ~ December 25, 1987)

1.	Mr. Yoshitaka HANADA	Team Leader	Depurty Director, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affiars
2.	Mr. Juro CHIKARAISHI	Project Coordinator	Second Basic Design Study Division Grant Aid Planning and Survey Dept. Japan International Cooperation Agency
3.	Mr. Toshitsugu UESAWA	Technical Cooperation Policy	Technical Cooperation Division, Economic Cooperation Bureau, Ministry of Foreign Affairs
4.	Mr. Shigetaka SEKI	Technical Cooperation Programme	Deputy Director, International Standards Office, Agency of Industrial Science and Technology, Ministry of International Trade and Industry
5.	Mr. Kanji KAKINUMA	Standardization Equipment	Director, Japanese Standards Association
6.	Mr. Tadao SHIGA	Coordinator	Technical Cooperation Division, Minig and Industrial Development Cooperation Dept., Japan International Cooperation Agency

I-1-2 Basic Design Study Team (March 29 ~ April 19, 1988)

1.	Mr. Kiyoshi ISAKA	Leader	Head Second Basic Design Study Division, Grant Aid Planning and Survey Dept. Japan International Cooperation Agency
2.	Mr. Takenori YAJIMA	*Metrology Administration*	*Depty Director* Environmental Measurement Section, Weights and Measures Office, Machinery and Information Industries Bureau, General Div., Ministry of International Trade and Industry
3.	Mr. Shigetaka SEKI	Industrial Standardization	Deputy Director International Standards Office, Agency of Industrial Science and Technology, Ministry of International Trade and Industry
4.	Mr. Akio NUMAKURA	Project Manager, Architect	Yamashita Architects and Engineers, Inc.
5.	Mr. Takanori TANAKA	Architect	- do -
6.	Mr. Seishi ASAKURA	Engineer	- do -
7.	Mr. Shoji OHNO	Quantity Surveyor	- do -
8.	Mr. Ryuichi SASAKI	Equipment Planning	Japan Machinery and Metals Inspection Institute
9.	Mr. Kanji KAKINUMA	Standardization Equipment	- do -
10.	Mr. Shuichi WATANABE	Metrology Equipment	- do -
11.	Mr. Kunio SAKURAI	Testing Equipment	- do -
12.	Mr. Yawara TOMIYAMA	Certifying Equipment	- do -

I-1-3 **Basic Design Study Team**
(Explanation of Draft Final Report July 10 ~ July 16, 1988)

1.	Mr. Shigetaka SEKI	Leader	Deputy Director International Standards Office, Agency of Industrial Science and Technology, Ministry of International Trade and Industry
2.	Mr. Juro CHIKARAISHI	Project Coordinator	Second Basic Design Study Division Grant Aid Planning and Survey Dept. Japan International Cooperation Agency
4.	Mr. Akio NUMAKURA	Project Manager, Architect	Yamashita Architects and Engineers, Inc.
6.	Mr. Seishi ASAKURA	Engineer	- do -
8.	Mr. Ryuichi SASAKI	Equipment Planning	Japan Machinery and Metals Inspection Institute
9.	Mr. Kanji KAKINUMA	Standardization Equipment	- do -

I-2 SURVEY SCHEDULE

I-2-1 Preliminary Study for Grant Aid and Contact for Technical Cooperation (December 16 ~ December 25, 1987)

	Date	Schedule and Remarks
1	Dec. 16 (Wed)	Lv. Tokyo Av. Bangkok
2	17 (thu)	Meeting on the survey at JICA office Courtesy call on the Embassy of Japan Courtesy call on the Ministry of Commerce
3	18 (Fri)	Meeting with DTEC, TISI AND TISTR (joint meeting at DTEC) Meeting with TISI
4	19 (Sat)	Survey of the proposed counstruction site
5	20 (Sun)	Review of collected data
6	21 (Mon)	Meeting with TISI Meeting with TISTR
7	22 (Tue)	Meeting with TISI and TISTR (joint meeting at TISI)
8	23 (Wed)	Signing of Minutes of Meeting
9	24 (Thu)	Report to the Embassy of Japan and JICA Office Lv. Bangkok (the Preliminary Team for Grant Aid)
10	25 (Fri)	Lv. Bangkok Av. Tokyo

I-2-2 Basic Design Study (March 29 ~ April 19, 1988)

	Date	Schedule and Remarks
1	March 29 (Tue)	Lv. Tokyo (Messrs. Isaka, Yajima, Seki, Numakura, Tanaka, Asakura, Ohno, Sasaki, Kakinuma, Watanabe, Sakurai, Tomiyama) Av. Bangkok
2	30 (Wed)	Meeting with TISI and TISTR (Joint meeting, Explanation on Inception Report) Courtesy call on JICA Office
3	31 (Thu)	Submission and explanation of Questionnaires to TISI and TISTR Survey of the proposed construction site Meeting with Office of Bangpoo Industrial Estate (infrastructure)
4	April 1 (Fri)	Meeting with TISI and TISTR Survey of existing facilities (TISI, TISTR) Group meeting within the Team Survey of local construction situation
5	2 (Sat)	Survey of the proposed construction site
6	3 (Sun)	Group meeting within the Team Review of collected data Survey of local construction situation
7	4 (Mon)	Meeting with TISI and TISTR Survey of local construction situation
8	5 (Tue)	Meeting with TISI and TISTR Discussion with TISTR on Technical Cooperation Survey of local construction situtation Group meeting within the Team
9	6 (Wed)	Review of collected data
10	7 (Thu)	Meeting with TISI and TISTR Meeting with TISI and TISTR (Discussion on Draft of Minutes of Discussions) Survey of local construction situation
11	8 (Fri)	Group meeting within the Team Signing of Minutes of Discussions Report to Embassy of Japan and JICA Office Survey of local construction situation
12	9 (Sat)	Group meeting within the Team Survey of local construction situation Lv. Bangkok (Mr. Seki) Av. Tokyo
13	10 (Sun)	Lv. Bangkok (Messrs. Isaka, Yajima) Av. Tokyo Survey of local construction situation

	Date	Schedule and Remarks
14	April 11 (Mon)	Meeting with TISI and TISTR Survey of infrastructure Confirmation of boring at the site
15	12 (Tue)	Meeting with TISI Survey of local construction situation
16	13 (Wed)	Review of collected data Group meeting within the Team
17	14 (Thu)	Meeting with TISTR Survey of infrastructure Group meeting within the Team Review of collected data
18	15 (Fri)	Survey of existing buildings Meeting with TISI and TISTR
19	16 (Sat)	Meeting with TISI Collection of infrastructure data Survey of local construction situation
20	17 (Sun)	Group meeting within the Team Survey of local construction situation Review of collected data
21	18 (Mon)	Meeting with TISI and TISTR (Joint meeting) Report to Embassy of Japan and JICA Office
22	19 (Tue)	Lv. Bangkok (Messrs. Numakura, Tanaka, Askaura, Ohno, Sasaki, Watanabe, Kakinuma, Sakurai, Tomiyama) Av. Tokyo

I-2-3 Basic Design Study (Expalanation of Draft Final Report July 10 ~ July 16, 1988)

	Date	Schedule and Remarks
1	July 10 (Sun)	Lv. Tokyo (Messrs. Seki, Numakura, Asakura, Sasaki, Kakinuma) Av. Bangkok
2	11 (Mon)	Meeting with TISI and TISTR (Joint meeting, Explanatoin on Draft Final Report) Courtesy call on Embassy of Japan and JICA Office
3	12 (Tue)	Survey of the proposed construction site Meeting with TISTR
4	13 (Wed)	Meeting with TISI and TISTR Group meeting within the Team
5	14 (Thu)	Meeting with TISI and TISTR (Joint meeting, Discussion on Draft of Minutes of Discussion)
6	15 (Fri)	Meeting with TISI Report to JICA Office and Embassy of Japan Signing of Minutes of Discussions
7	16 (Sat)	Lv. Bangkok (Messrs. Seki, Numakura, Asakura, Sasaki, Kakinuma)

I-3 MEMBER OF THE THAI COUNTERPARTS

TISI (Thai Industrial Standards Institute, Ministry of Industry)

Mr. Visith NOIPHAN	Secretary General
Mr. Thien MEKANONTCHAI	Deputy Secretary General
Ms. Phani Na RANGSI	Senior Expert
Ms. Kanya SINSAKUL	Director, Standardization Division
Ms. Sasithorn SUNTHRARAK	Director, Technical & Foreign Relation Division
Mr. Patibhan ARIYADEJ	Senior Standardization Officer
Mr. Thammachai CHAOPREECHA	Engineer

TISTR (Thailand Institute of Scientific & Technological Research, Ministry of Science, Technology and Energy)

Dr. Smith KAMPEMPOOL	Governor
Mr. Siri NANDHASRI	Director, Testing & Standards Centre
Ms. Pranee NANDHASRI	Director, Biochemistry Laboratory
Mr. Surapol VATANAWONG	Director, Electrical and Electronic Standards Laboratory
Mr. Chumnong HAYAKIJKOSOL	Director, Analytical Chemistry
Mr. Preecha DISATHEN	Chief, Photometric & Thermometric Standards Laboratory
Mr. Thanit THONGTAN	Chief, Mechanical Engineering Laboratory
Mr. Sura NOIPHAN	Chief, Photometric & Thermometric Standards Laboratory

IEAT (Industrial Estate Authority of Thailand)

Mr. Sukhum KOSAISAEVEE	Division Director, Construction Division

TIDC (Thailand Industrial Real Estate Development Co., Ltd.)

Mr. Vivat JIRATIKARNSAKUL	Construction Manager
Mr. Vanchai VIMUKTAYON	Consultant

MEA (Metropolitan Electricity Authority)

Mr. Bovorn JURAMONGKOL	Chief, Short Range Planngin Section, Klong Toey Office
Mr. Watchara DANKUL	Deputy Chief, Estimate Section, Samut Prakarn Office

I-4 MINUTES

I-4-1 Minutes of Meeting (Preliminary Study for Grant Aid and Contact for Technical Cooperation)

MINUTES OF MEETING OF JAPANESE GRANT AID AND TECHNICAL COOPERATION

FOR THE DEVELOPMENT OF

INDUSTRIAL STANDARDIZATION, TESTING, AND METROLOGY

IN THE KINGDOM OF THAILAND

The Japanese Joint Team organized by the Japan International Cooperation Agency, consisting of the Preliminary Study Team for Grant Aid and the Contact Team for Technical Cooperation headed by Mr. Yoshitaka Hanada, Deputy Director, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs visited the Kingdom of Thailand from December 16th to December 24th for the purpose of discussing the Japanese grant aid and technical cooperation to Thai Industrial Standards Institute (TISI) and Thailand Institute of Scientific and Technological Research (TISTR) for the development of industrial standardization, testing, and metrology in the Kingdom of Thailand.

During its stay in Thailand, the Team exchanged views and had a series of discussions with TISI, TISTR, Department of Technical and Economic Cooperation, and authorities concerned.

As a result of discussions, the Thai side agreed to submit a revised project document to the Government of Japan which covers both TISI and TISTR projects, originally requested separately, as one project for Japanese grant aid and technical cooperation, and both parties mutually agreed to report to their respective Governments the understanding concerning the matters referred to in the documents attached herewith.

Bangkok, December 23rd, 1987.

Mr. Yoshitaka HANADA
Leader of the Preliminary Study Team
for Grant Aid and the Contact Team
for Technical Cooperation
The Japan International Cooperation
Agency

Mr. Visith NOIPHAN
Secretary General
Thai Industrial Standards Institute

Dr. Smith KAMPEMPOOL
Governor
Thailand Institute of Scientific
and Technological Research

THE ATTACHED DOCUMENT I

Grant Aid

1. Objective of the Project

The objective of the Project is to construct necessary facilities and to provide necessary equipment to implement development programmes of industrial standardization, testing, and metrology in the Kingdom of Thailand.

2. Responsible and Coordinating Ministries

2.1 Ministry of Industry

2.2 Ministry of Science, Technology and Energy

3. Executing and Implementing Agencies

3.1 Thai Industrial Standards Institute, Ministry of Industry

3.2 Thailand Institute of Scientific and Technological Research, Ministry of Science, Technology and Energy

4. Project Site

4.1 The proposed site of the Project is located at Bangpoo Industrial Estate, Km.34 Sukhumvit Road, Samutprakarn Province, and is shown in Annex 1.

4.2 To ensure an effective result of the construction of the buildings, the back filling for site improvement and other necessary measures should be undertaken by the Thai side at least 6 months prior to the start of the construction.

5. The Major Requested Items for the Project

The outline of the facilities and major equipment is as follows.

5.1 Building

5.1.1 The Industrial Standardization, Testing and Training Centre

5.1.2 The Industrial Metrology Testing Service Centre

5.2 Equipment

5.2.1 TISI

Equipment of basic and urgent need for the use of formulating national industrial standards and implementing certification (testing and quality control).

Fields

5.2.1.1 Industrial standardization

5.2.1.2 Testing

(1) Material and mechanical properties

(2) Electrical and electronics

(3) Chemical

5.2.1.3 Common equipment for the fields mentioned above

5.2.2 TISTR

Equipment of basic and urgent need for the use of national metrology (excluding commercial metrology) and testing for industrial research and development.

Fields

5.2.2.1 Metrology

(1) Mass, Length

(2) Force, Pressure

(3) Volume, Flow

(4) Photometry, Radiation

(5) Acoustic, Vibration

(6) Electrical, Electronics

(7) Temperature

5.2.2.2 Testing

(1) Material and mechanical properties

(2) Electrical and electronics

(3) Chemical and biochemistry

5.2.2.3 Common equipment for the fields mentioned above

6. Grant Aid Programme

6.1 The Thai side has understood the system of the Japanese Grant Aid and the necessity of consulting services of a Japanese consultant firm for the implementation of the Project.

6.2 The Government of Thailand will undertake to ensure the necessary budget and personnel for the proper and effective operation and maintenance of facilities and equipment provided under the Grant Aid.

6.3 The Team will convey to the Government of Japan the desire of the Government of Thailand that the former would take necessary measures to cooperate in implementing the Project and to provide necessary facilities and equipment under the Japanese Grant Aid Programme.

6.4 The Thai side understood that the necessary measures will be taken by the Government of Thailand on condition that the Grant Aid by the Government of Japan would be extended to the Project.

THE ATTACHED DOCUMENT II-1

Technical Cooperation to TISI

1. Name of the Project:
   Project-Type Technical Cooperation on the Industrial Standardization, Testing and Training Centre in the Kingdom of Thailand.

2. Objective and Scope of the Project:
   The objective of the Project is to transfer appropriate technology to the Thai counterparts in the field of industrial standardization and testing.

3. Project Implementation Agency:
   Thai Industrial Standards Institute (TISI), Ministry of Industry.

4. Duration of the Project:
   The duration of the Japanese Technical Cooperation would be five (5) years from the date of signing of the Record of Discussions (R/D).

5. Project Site:
   The Industrial Standardization, Testing and Training Centre is as shown in the ATTACHED DOCUMENT I (Clause 4).

6. Experts and Counterparts:
   In compliance with the request from the Thai side, Japan would dispatch experts and accept counterparts according to the plan to be agreed by both sides.
   For this purpose, the Team stated that following discussions carried out between both sides on this occasion, the Preliminary Survey and the Implementation Survey would be conducted in F/Y 1987 and in F/Y 1988 respectively.

7. Allocation of Manpower and Operational Costs by the Thai Side:
   7.1 The Team stressed that sufficient allocation of manpower and operational costs for the effective implementation of the Project is required to be well assured by the Thai side.
   7.2 Related to the above, the Thai side explained that they would make efforts to secure necessary manpower and operational budget.

THE ATTACHED DOCUMENT II-2

Technical Cooperation to TISTR

1. Name of the Project:
   Technical Cooperation on the Industrial Metrology Testing Service Centre in the Kingdom of Thailand.

2. Objective and Scope of the Project:
   The objective of the Project is to transfer appropriate technology to the Thai counterparts in the field of metrology and testing so as to enable them to operate the Centre.

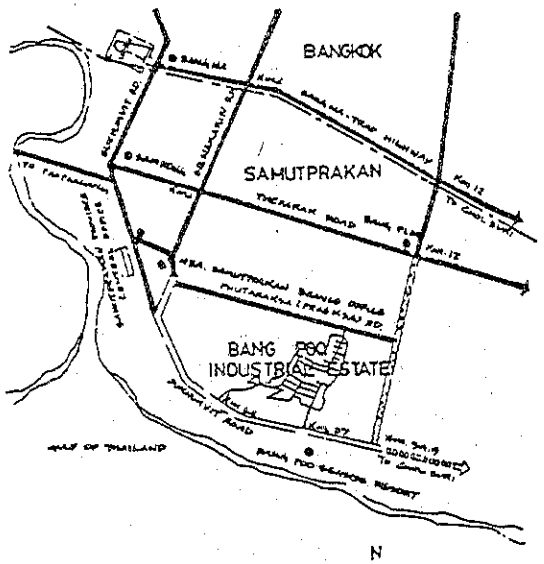
3. Project Implementation Agency:
   Thailand Institute of Scientific and Technological Research (TISTR), Ministry of Science, Technology and Energy.

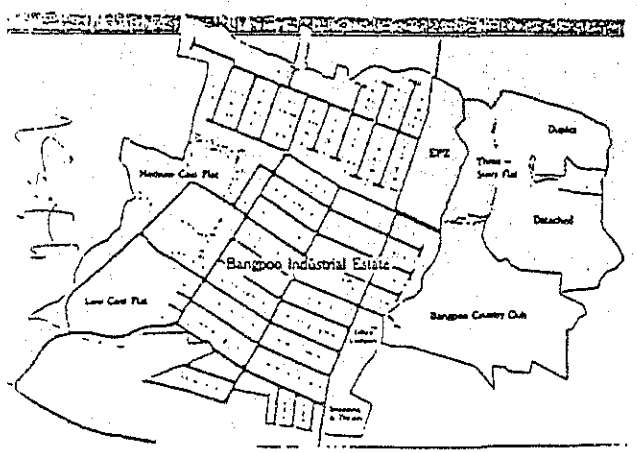
4. Duration of the Project:
   The duration of the Japanese Technical Cooperation by dispatch programme of experts and acceptance programme of counterparts under JICA scheme would be three (3) years.

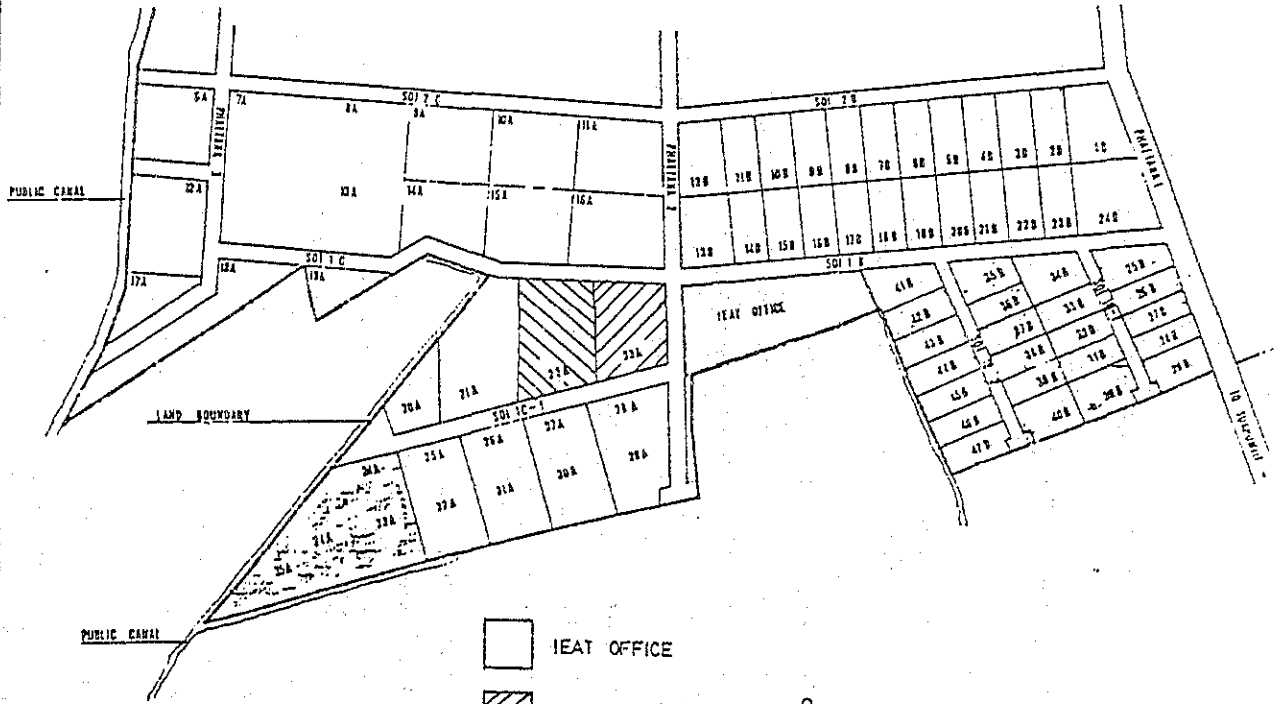
5. Project Site:
   The Industrial Metrology Testing Service Centre is as shown in the ATTACHED DOCUMENT I (Clause 4).

6. Experts and Counterparts:
   Dispatch of Japanese experts and acceptance of counterparts, in compliance with specific requests of the Thai side, would be conducted.
   At sometime, considering the progress of construction of building and installation of equipment provided under the Japanese Grant Aid scheme, a mission would be sent for further discussions on this matter, if necessary.

7. Allocation of Manpower and Operational Costs by the Thai Side:
   7.1 The Team stressed that sufficient allocation of manpower and operational costs for the effective implementation of the Project is required to be well assured by the Thai side.
   7.2 Related to the above, the Thai side explained that they would make efforts to secure necessary manpower and operational budget.







IEAT OFFICE

TISI SITE (17552 m^2)

TISTR SITE (24068 m^2)

BANGPOO INDUSTRIAL AREAS

ANNEX 1

AN-16

MINUTES OF DISCUSSIONS

ON THE PROJECT FOR CONSTRUCTING

THE INDUSTRIAL STANDARDIZATION, TESTING AND TRAINING CENTRE

AND

THE INDUSTRIAL METROLOGY TESTING SERVICE CENTRE

In response to the request of the Government of the Kingdom of Thailand, the Government of Japan decided to conduct a basic design study on the project for constructing the Industrial Standardization, Testing and Training Centre and the Industrial Metrology Testing Service Centre (hereinafter referred to as "the Project"), and the Japan International Cooperation Agency (hereinafter referred to as JICA) sent to Thailand a study team headed by Mr. Kiyoshi Isaka, Head of the Second Basic Design Study Division, Grant Aid Planning and Survey Department, JICA from March 29 to April 19, 1988.

The team had a series of discussions on the Project with the officials concerned of the Government of Thailand and conducted a field survey in the Bangpoo Industrial Estate.

As a result of the study, both parties agreed to recommend to their respective Governments that the major points of understanding reached between them attached herewith, be examined towards the realization of the Project.

Bangkok, April 8, 1988

Kiyoshi Isaka

Mr. Kiyoshi Isaka
Leader
Basic Design Study Team
Japan International
Cooperation Agency

Mr. Visith Noiphan
Secretary General
Thai Industrial Standards
Institute

Smith Kampempool

Dr. Smith Kampempool
Governor
Thailand Institute of Scientific
and Technological Research

ATTACHEMENT

1. The Project Title

The Project for Constructing the Industrial Standardization, Testing and Training Centre and the Industrial Metrology Testing Service Centre.

2. The Objectives of the Project

The objectives of the Project are to construct the Industrial Standardization, Testing and Training Centre and the Industrial Metrology Testing Service Centre and to provide both Centres with necessary equipment.

3. The Responsible and Coordinating Ministries

3.1 Ministry of Industry

3.2 Ministry of Science, Technology and Energy

4. The Executing and Implementing Agencies

4.1 Thai Industrial Standards Institute of Ministry of Industry

4.2 Thailand Institute of Scientific and Technological Research of Ministry of Science, Technology and Energy

5. The Project Site

The Project site is located at the Bangpoo Industrial Estate, km.34 Sukhumvit Road, Samutprakarn Province, and is shown in Annex 1.

6. The Major Items Requested for the Project

The major items requested for each Centre are listed in Annex 2.

7. Grant Aid Programme

7.1 The Thai side has understood the system of Japan's Grant Aid Programme and the principle for use of Japanese consulting firm(s) and contractor(s) for the implementation of the Project.

7.2 The Study Team will convey to the Government of Japan the desire of the Thai Government that the former takes

necessary measures to cooperate in implementing the Project and provides necessary facilities and equipment under the Japan's Grant Aid Programme.

7.3 The Government of Thailand will take necessary measures as listed in Annex 3 on condition that the Grant Aid by the Government of Japan would be extended to the Project.

8. Technical Cooperation

The Thai side has requested the following technical cooperation from the Government of Japan and the Team will recommend to the Government that it be extended for smooth and effective operation of both Centres.

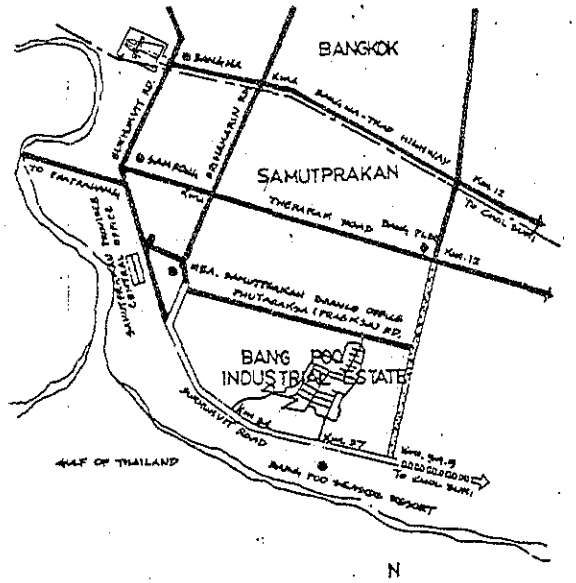
8.1 Industrial Standardization, Testing and Training Centre

Project-type technical cooperation

(The details shall be discussed separately with the Technical Cooperation Mission dispatched by JICA)

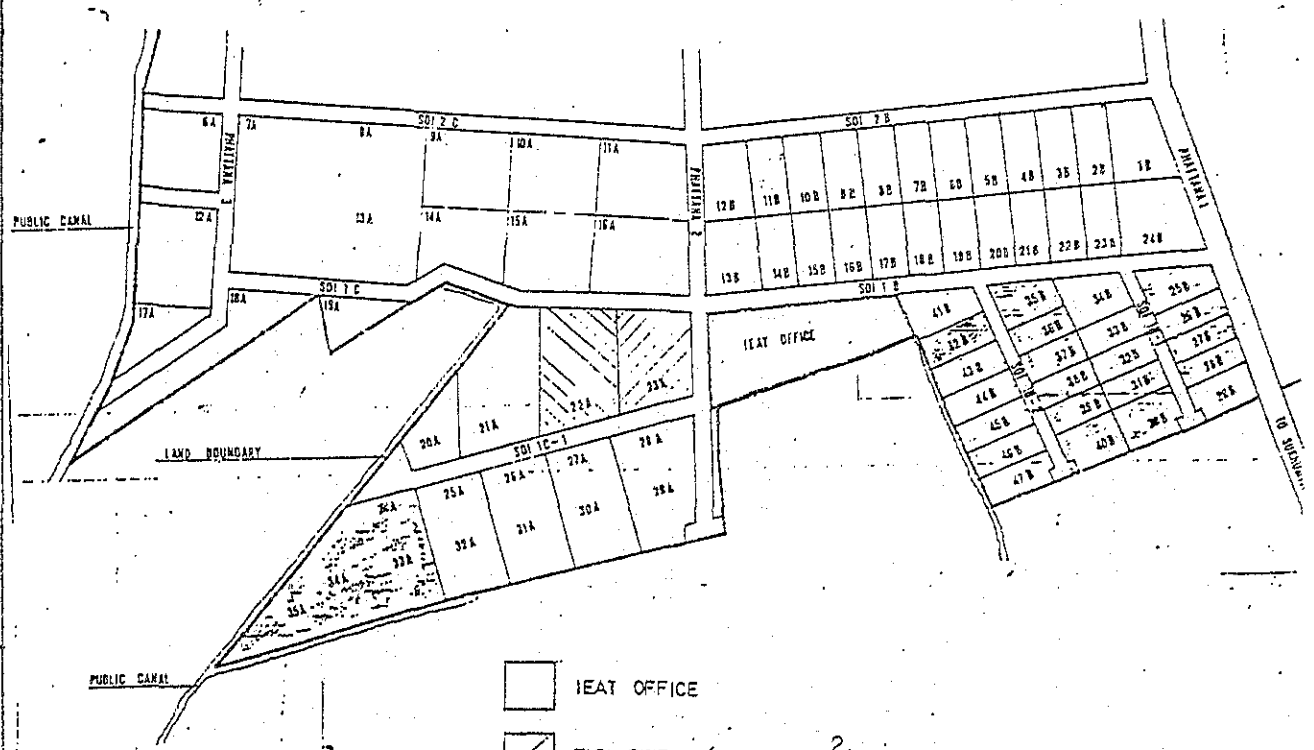
8.2 Industrial Metrology Testing Service Centre

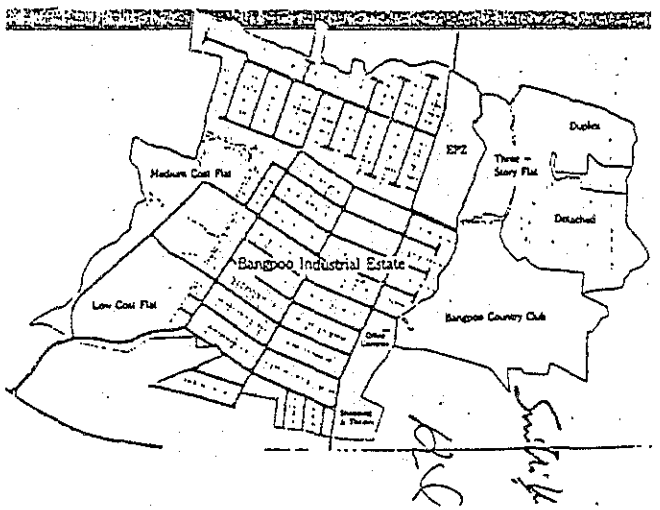
The Team received a proposal of the request from the Thailand Institute of Scientific and Technological Research for technical cooperation from the Government of Japan.



LOCATION MAP

AN-20





IEAT OFFICE

23A TISI SITE (17552 m^2)

22A TISTR SITE (24068 m^2)

N

BANGPOO INDUSTRIAL AREAS

ANNEX 1

ANNEX 2

THE MAJOR ITEMS REQUESTED FOR THE PROJECT

1. INDUSTRIAL STANDARDIZATION, TESTING AND TRAINING CENTRE

1.1 Building and Facilities

1.1.1 Laboratories

(1) Electrical and Electronics Testing

(2) Chemical and Biochemical Testing

(3) Mechanical and Material Testing

(4) Environmental Testing

1.1.2 Rooms for seminar and conference

1.1.3 Office rooms

1.1.4 Library, etc.

1.2 Equipment

1.2.1 Laboratory equipment for product testing in the following fields :

(1) Electrical and electronics

(2) Chemical and biochemical

(3) Mechanical engineering

(4) Material testing

(5) Others

1.2.2 Training aid equipment

1.2.3 Vehicles, etc.

2. INDUSTRIAL METROLOGY TESTING SERVICE CENTRE

2.1 Building and Facilities

2.1.1 Standard laboratories

2.1.2 Testing laboratories

2.1.3 Rooms for siminar and conference

2.1.4 Office rooms

2.1.5 Library, etc.

2.2 Equipment

2.2.1 Standard laboratory equipment

(1) Length

(2) Mass

(3) Volume

(4) Force

(5) Pressure

(6) Temperature

(7) Electrical

(8) Acoustic

(9) Photometric

(10) Others

2.2.2 Testing laboratory equipment for industrial R&D

(1) Mechanical (including NDT)

(2) Electrical

(3) Electronics

(4) Chemical

(5) Biochemical

(6) Others

2.2.3 Training aid equipment

2.2.4 Vehicles, etc.

ANNEX 3

UNDERTAKINGS BY THE GOVERNMENT OF THAILAND

1. To secure the site for the project.
2. To clear, level and reclaim the site prior to the commencement of the construction.
3. To undertake incidental out-door works such as gardening, fencing and making gates in and around the site.
4. To construct access roads to the site prior to the commencement of the construction.
5. To provide facilities for distribution of electricity, water supply, telephone, drainage, and other incidental facilities to the site.
6. To bear commissions to the Japanese foreign exchange bank for the banking services based on the Banking Arrangement.
7. To ensure the necessary budget and personnel for the proper and effective operation and maintenance of the facilities and the equipment provided under the Grant Aid.
8. To ensure prompt unloadings, tax exemption, customs clearance at the port of disembarkation in Thailand and prompt internal transportation of the materials and the equipment provided under the Grant Aid.
9. To exempt Japanese nationals involved in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in Thailand with respect to supply of the equipment and services under the verified contracts.
10. To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contracts such facilities as may be necessary for their entry into Thailand and stay therein for the execution of the Project.

11. To maintain and use the facilities constructed and the equipment purchased under the Grant Aid properly, efficiently and effectively.
12. To bear all the expenses other than those to be borne by the Grant, necessary for the construction of the facilities as well as for the transportation and installation of the equipment.

MINUTES OF DISCUSSIONS

OF

THE BASIC DESIGN STUDY ON THE PROJECT FOR CONSTRUCTING
THE INDUSTRIAL STANDARDIZATION, TESTING AND TRAINING CENTRE
AND
THE INDUSTRIAL METROLOGY TESTING SERVICE CENTRE
IN THE KINGDOM OF THAILAND

In response to the request by the Government of the Kingdom of Thailand, the Government of Japan decided to conduct a basic design study on the Project for Constructing the Industrial Standardization, Testing and Training Centre and the Industrial Metrology Testing Service Centre (hereinafter referred to as "the Project"), and the Japan International Cooperation Agency (JICA) sent the Basic Design Study Team headed by Mr.Kiyoshi ISAKA, Head of the Second Basic Design Study Division, Grant Aid Planning and Survey Department, JICA from March 29 to April 19, 1988.

As a result of the study, JICA prepared a Draft Final Report and dispatched a team headed by Mr. Shigetaka SEKI, Deputy Director of International Standards Office, Agency of Industrial Science & Technology, Ministry of International Trade and Industry to explain and discuss it with the relevant officials of the Government of Thailand from July 10 to 16, 1988.

Both parties had a series of discussions on the Draft Final Report and have agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

Bangkok, July 15, 1988.

Mr. Shigetaka Seki
Leader of the Draft Final Report Team
Japan International Cooperation Agency

Mr. Visith Noiphan
Secretary General
Thai Industrial Standards Institute

Dr. Smith Kampempool
Governor
Thailand Institute of Scientific and Technological Research

ATTACHMENT

1. The Thai side agreed in principle on the basic design proposed in the Draft Final Report with a request to alter building design slightly as shown in Annex.

2. The Thai side has understood Japan's grant aid system and reconfirmed that necessary measures be taken by the Thai side which are manifested in the Annex 3 of the Minutes of Discussions on the Project signed on April 8, 1988, on condition that the grant aid by the Government of Japan be extended to the Project.

3. The Thai side ensured that the necessary budget for the effective operation and maintenance of the Centres in line with the adequate number of the Thai personnel.

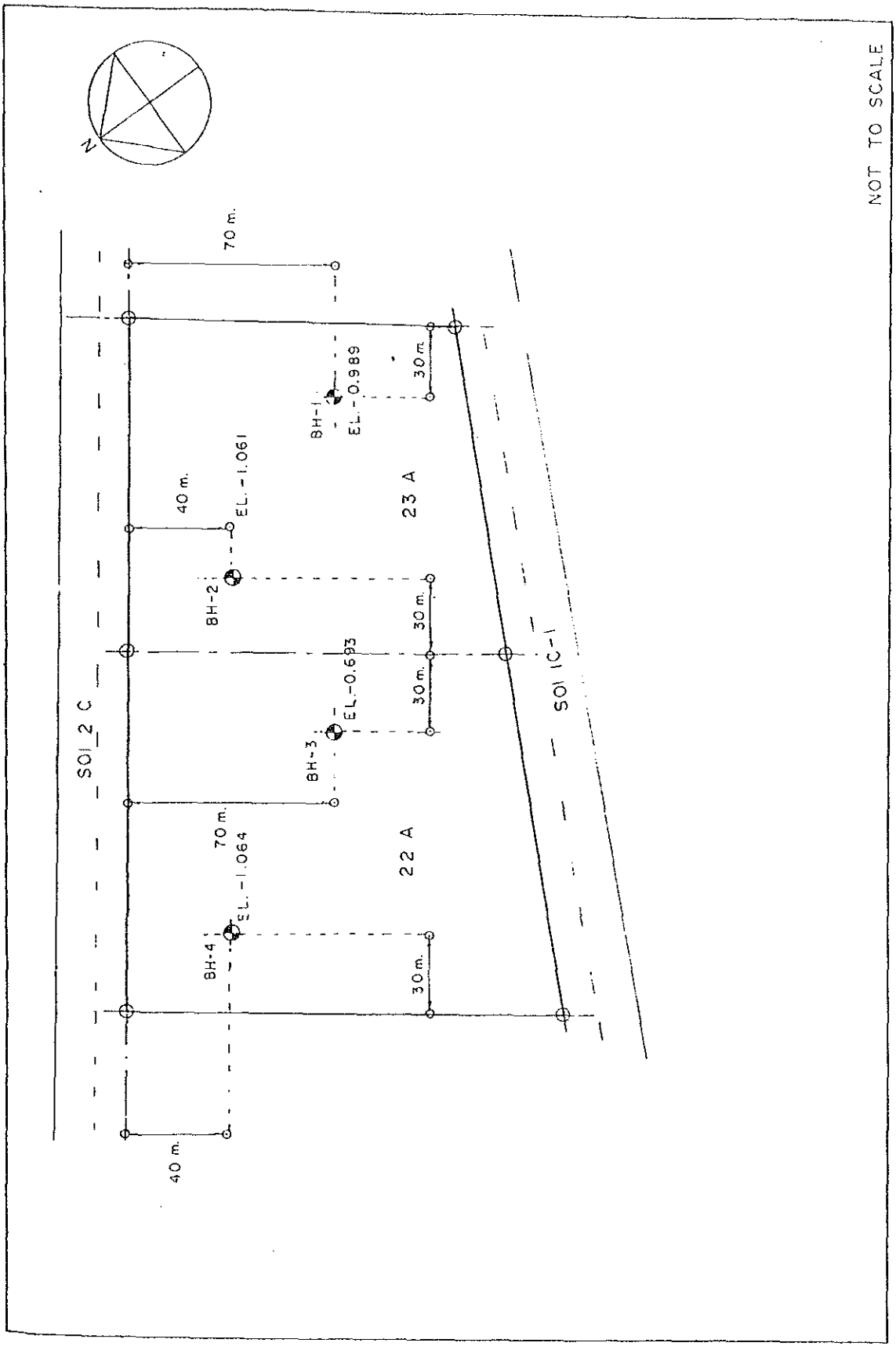
4. The Final Report (14 copies in English) will be submitted to the Thai side within the middle of August, 1988.

ANNEX

The Thai side requested that the eaves of the Industrial Standardization, Testing and Training Centre building be extended to the east end of the building (four spans) to shade direct sunlight into the entrance hall.

ANNEX II

II-1 BORING TEST DATA



LOCATION OF BOREHOLES

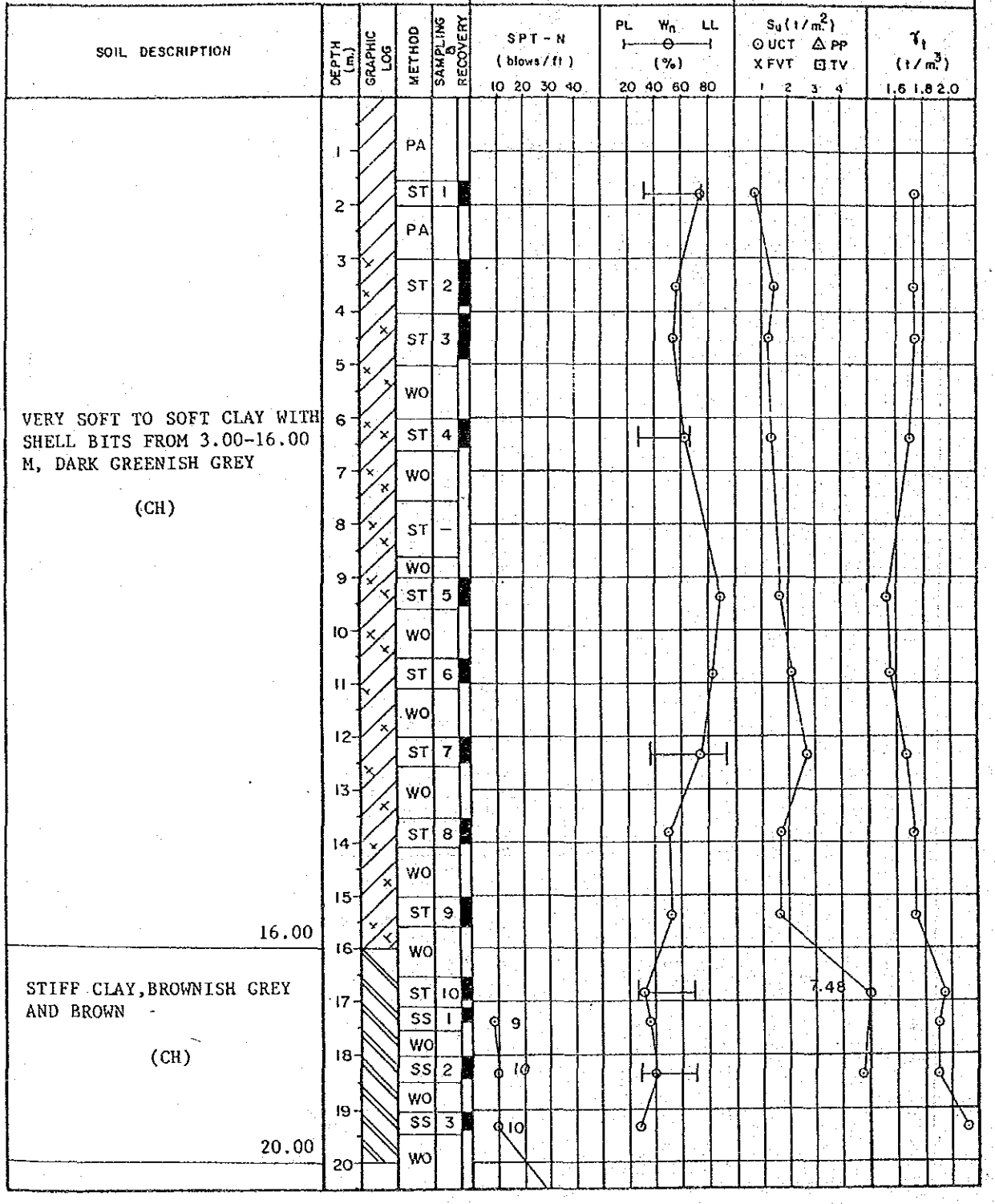
K. ENGINEERING CONSULTANTS CO., LTD.

BORING LOG

PROJECT: TESTING AND MEASUREMENT CENTER
LOCATION: BANG POO, SAMUT PRAKAN

BORING NO. BH-1
DEPTH (m.) 35.45
COORD.

GROUND ELEV.(m.) -0.989
OBSERVED WL (m.) -1.60
DATE STARTED 11/4/88
DATE FINISHED 13/4/88



K. ENGINEERING CONSULTANTS CO., LTD.

BORING LOG

PROJECT: TESTING AND MEASUREMENT CENTER
LOCATION: BANG POO, SAMUT PRAKAN

BORING NO. BH-1 (CONT.)
DEPTH (m.) 35.45
COORD.

GROUND ELEV.(m.) -0.989
OBSERVED WL (m.) -1.60
DATE STARTED 11/4/88
DATE FINISHED 13/4/88

SOIL DESCRIPTION		DEPTH (m.)	METHOD	SAMPLING & RECOVERY	SPT-N (blows/ft)	PL W_n LL (%)	S_u (t/m²) UCT PP FVT TV	γ_t (t/m³)
STIFF CLAY (CH)	20.00	20	WO					
VERY STIFF CLAY, WITH SHELL BITS, BROWN (CL)	21.00		SS	4	28			
		21	WO					
HARD SANDY CLAY, BROWN (CL)	22.30		SS	5	33			
		22	WO					
			SS	6	43			
		23	WO					
			SS	7	38			
		24	WO					
			SS	8	44			
		25	WO					
			SS	9	38			
DENSE TO VERY DENSE SILTY FINE SAND, BROWN (SM)	30.20	26	WO					
			SS	10	48			
		27	WO					
			SS	11	34			
		28	WO					
			SS	12	52			
		29	WO					
			SS	13	50			
		30	WO					
			SS	14	27			
		31	WO					
			SS	15	31			
		32	WO					
			SS	16	31			
VERY STIFF TO HARD CLAY, BROWNISH GREY, BROWN AND LI-GREY (CH)	35.45	33	WO					
			SS	17	29			
		34	WO					
			SS	18	29			
		35	WO					
			SS	19	29			
END OF BORING								

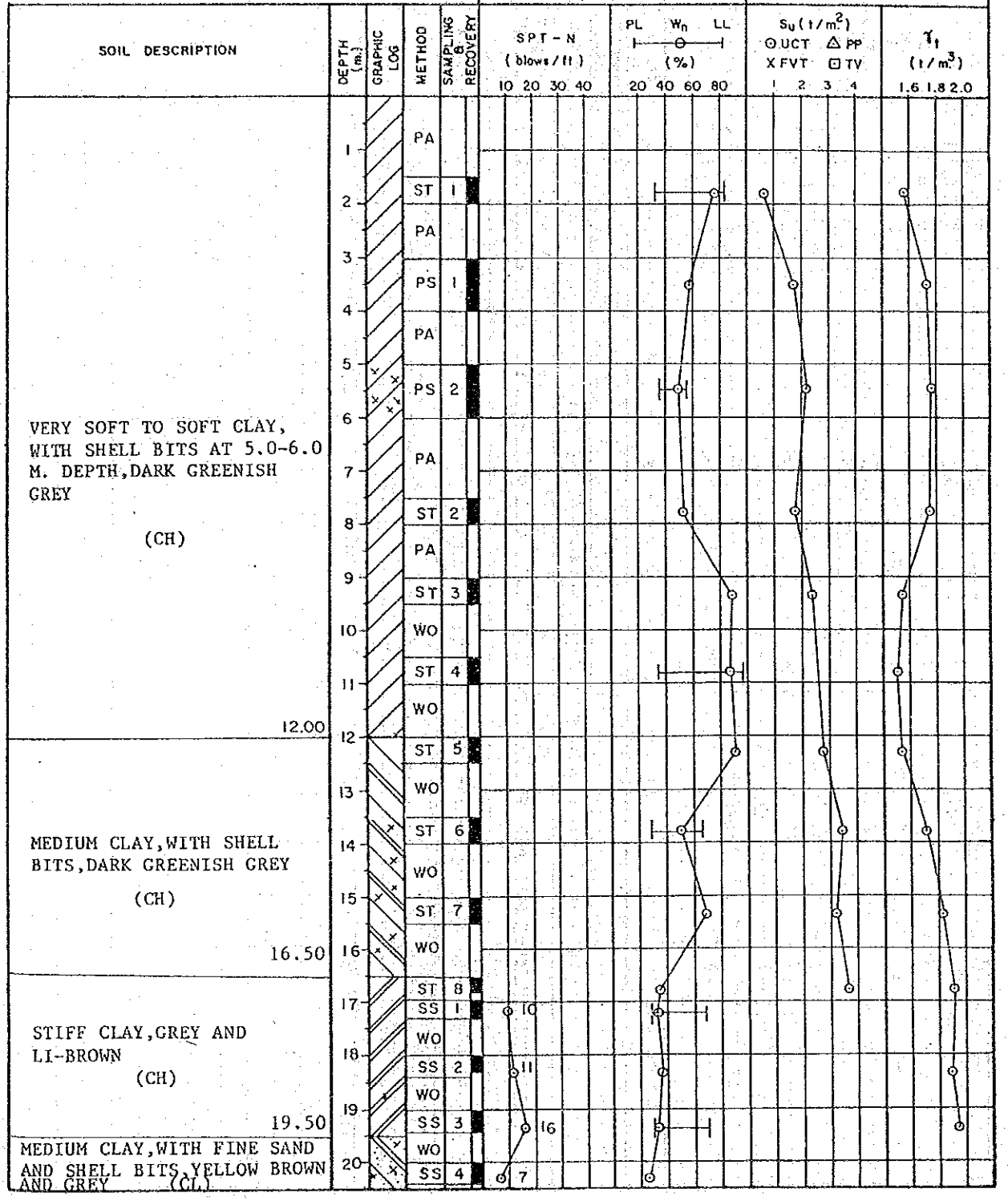
K. ENGINEERING CONSULTANTS CO., LTD.

BORING LOG

PROJECT TESTING AND MEASUREMENT CENTER
LOCATION BANG POO, SAMUT PRAKAN

BORING NO. BH-2
DEPTH (m.) 35.45
COORD.

GROUND ELEV.(m.) -1.061
OBSERVED WL (m.) -1.30
DATE STARTED 9/4/88
DATE FINISHED 10/4/88



K. ENGINEERING CONSULTANTS CO., LTD.

BORING LOG

PROJECT: TESTING AND MEASUREMENT CENTER
LOCATION: BANG POO, SAMUT PRAKAN

BORING NO.: BH-2 (CONT.)
DEPTH (m.): 35.45
COORD.:

GROUND ELEV.(m.): -1.061
OBSERVED WL (m.): -1.30
DATE STARTED: 9/4/88
DATE FINISHED: 10/4/88

SOIL DESCRIPTION	DEPTH (m.)	METHOD	SAMPLING & RECOVERY	SPT-N (blows/ft)
MEDIUM CLAY, WITH FINE SAND AND SHELL BITS, YELLOWISH BROWN AND GREY (CL) 21.00	21	WO		
		SS	5	26
	22	WO		
		SS	6	31
	23	WO		
		SS	7	22
	24	WO		
		SS	8	21
	25	WO		
		SS	9	28
	26	WO		
		SS	10	23
	27	WO		
		SS	11	27
	28	WO		
VERY STIFF TO HARD CLAY, WITH FINE SAND AT 25.0-30.0 M. DEPTH, GREY, DARK BROWN AND YELLOW (CL, CH)		SS	12	25
	29	WO		
		SS	13	27
	30	WO		
		SS	14	25
	31	WO		
		SS	15	38
	32	WO		
		SS	16	25
	33	WO		
		SS	17	26
	34	WO		
		SS	18	23
	35	WO		
35.45		SS	19	27
END OF BORING	36			

PL, W_n, LL (%): 20 40 60 80
S_u (t/m^2): ○ UCT △ PP × FVT □ TV; 5 10 15 20
γ_t (t/m^3): 1.6 1.8 2.0

K. ENGINEERING CONSULTANTS CO., LTD.

BORING LOG

PROJECT TESTING AND MEASUREMENT CENTER
LOCATION BANG POO, SAMUT PRAKAN

BORING NO. BH-3
DEPTH (m.) 35.45
COORD.

GROUND ELEV.(m.) -0.693
OBSERVED WL (m.) -0.80
DATE STARTED 9/4/88
DATE FINISHED 11/4/88

SOIL DESCRIPTION	DEPTH (m.)	METHOD	SAMPLING & RECOVERY	SPT-N (blows/ft) 10 20 30 40	PL Wn LL (%) 20 40 60 80	Su (t/m²) ○UCT △PP ×FVT □TV : 2 3 4	γt (t/m³) 1.6 1.8 2.0
VERY SOFT TO SOFT CLAY WITH SHELL BITS AT 9.00-14.00 M DEPTH, DARK GREENISH GREY (CH)	1	PA					
	2	ST	1				
	3	PA					
	4	ST	2				
	5	PA					
	6	ST	3				
	7	WO					
	8	ST	4				
	9	WO					
	10	ST	5				
	11	WO					
	12	ST	6				
12.00		WO					
MEDIUM CLAY, DARK GREENISH GREY (CH)	13	ST	7				
	14	WO					
	15	ST	8				
	16	WO					
	17	ST	9				
17.50		WO					
STIFF TO VERY STIFF CLAY, GREY, LI-GREY AND LI-BROWN (CH)	18	ST	10				
	19	SS	1	14			
		WO					
	20	SS	2	18			
		WO				6.86	
		SS	3	16		8.70	

K. ENGINEERING CONSULTANTS CO., LTD.

BORING LOG

PROJECT: TESTING AND MEASUREMENT CENTER
LOCATION: BANG POO, SAMUT PRAKAN

BORING NO.: BH-3 (CONT.)
DEPTH (m.): 35.0
COORD.:

GROUND ELEV.(m.): -0.693
OBSERVED WL (m.): -0.80
DATE STARTED: 9/4/88
DATE FINISHED: 11/4/88

SOIL DESCRIPTION	DEPTH (m.)	METHOD	SAMPLING & RECOVERY	SPT - N (blows/ft)	PL W_n LL (%)	S_u (t/m²)	γ_t (t/m³)
VERY STIFF CLAY WITH SAND AND SHELL BITS, LI-GREY AND YELLOW (CL) 21.00	21	SS 3		16			
		WO					
		SS 4		34			
HARD CLAY, BROWN AND GREY (CL, CH) 22.50	22	WO					
		SS 5		34			
	23	WC					
		SS 6		26			
	24	WO					
		SS 7		20			
	25	WO					
		SS 8		18			
	26	WO					
		SS 9		23			
	27	WO					
		SS 10		20			
	28	WO					
VERY STIFF CLAY, GREY, BROWN AND YELLOW (CH)		SS 11		22			
	29	WO					
		SS 12		25			
	30	WO					
		SS 13		23			
	31	WO					
		SS 14		24			
	32	WO					
		SS 15		19			
	33	WO					
		SS 16		23			
	34	WO					
		SS 17		20			
	35	WO					
35.45		SS 18		22			
END OF BORING							

K. ENGINEERING CONSULTANTS CO., LTD.

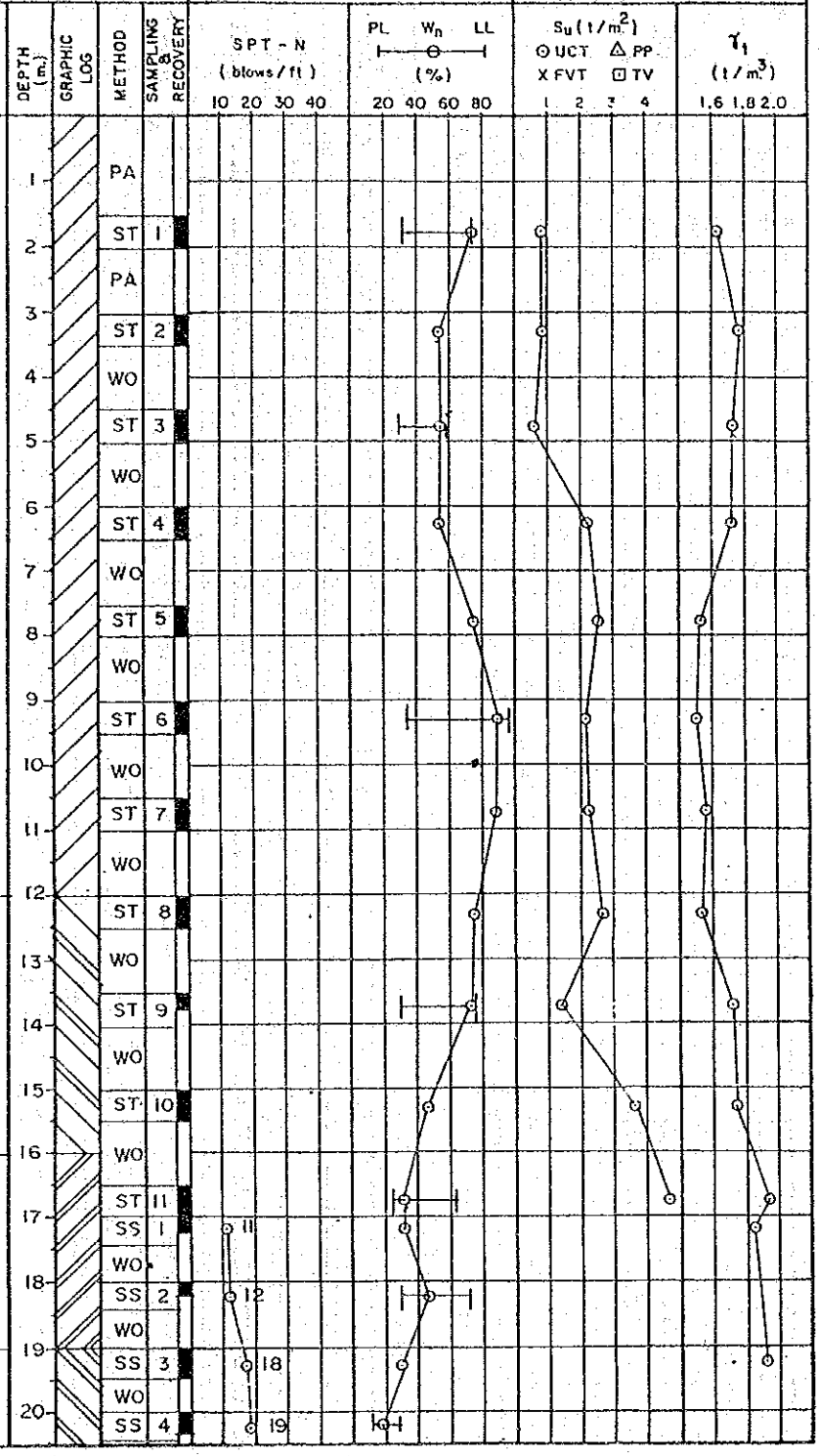
BORING LOG

PROJECT: TESTING AND MEASUREMENT CENTER
LOCATION: BANG POO, SAMUT PRAKAN

BORING NO.: BH-4
DEPTH (m.): 35.45
COORD.:

GROUND ELEV.(m.): -1.064
OBSERVED WL (m.): -1.20
DATE STARTED: 12/4/88
DATE FINISHED: 14/4/88

SOIL DESCRIPTION	DEPTH (m.)
VERY SOFT TO SOFT CLAY, DARK GREENISH GREY (CH)	12.00
MEDIUM CLAY, DARK, GREENISH GREY (CH)	16.00
STIFF CLAY, GREY AND YELLOW (CH)	19.00
VERY STIFF CLAY, GREY AND YELLOW (CH)	



K. ENGINEERING CONSULTANTS CO., LTD.

BORING LOG

PROJECT TESTING AND MEASUREMENT CENTER
LOCATION BANG POO, SAMUT PRAKAN

BORING NO. BH-4 (CONT.)
DEPTH (m.) 35.45
COORD.

GROUND ELEV.(m.) -1.064
OBSERVED WL (m.) -1.20
DATE STARTED 12/4/88
DATE FINISHED 14/4/88

SOIL DESCRIPTION	DEPTH (m.)	METHOD	SAMPLING & RECOVERY	SPT-N (blows/ft)	PL W_n LL (%)	S_u (t/m²) ⊙UCT △PP XFVT ⊡TV	γ_t (t/m³)
VERY STIFF TO HARD CLAY, LI-GREY, LI-BROWN, BROWNISH GREY AND BROWN (CH, CL)	21	SS	4	19			
		WO					
		SS	5	30			
	22	WO					
		SS	6	31			
		WO					
	23	SS	7	23			
		WO					
	24	SS	8	19			
		WO					
	25	SS	9	20			
		WO					
	26	SS	10	21			
		WO					
	27	SS	11	25			
		WO					
	28	SS	12	26			
		WO					
	29	SS	13	25			
		WO					
	30	SS	14	27			
		WO					
	31	SS	15	23			
		WO					
	32	SS	16	34			
		WO					
	33	SS	17	39			
		WO					
	34	SS	18	29			
		WO					
35.45	35	SS	19	28			
END OF BORING