第9表　体　　積

(A) SIRIM側の要求機器	(B) SIRIM既存機器	(C) 日本側の計画機器案	(D) 調整案
(i) Standard Prover Tanks, 2,000 ℓ and 5,000 ℓ	1 Standard Flasks 1 ℓ, 5 ℓ, 10 ℓ	(1) Standard Flasks 1 ℓ, 5 ℓ, 10 ℓ	既存 1
(ii) Master Flow Meter of Various Types and Flow Rates for Water, Petroleum, Light Oil and Heavy Oil	2 Double Glove Standard Burette 200 mℓ	(2) Standard Burettes 100 mℓ, 200 mℓ	〃 2, 3
	3 Single Glove Standard Burette 100 mℓ	(3) Volume Standard Testing Apparatus	〃 4
(iii) Master Gas Meter of Various Ranges	4 Volume Standard Testing Apparatus	(4) Others (Thermometers, Vessel Table, etc.)	〃 5
(iv) LPG Standard Hygrometer	5 Others (Thermometer, Vessel Table, Glassware Stand, etc.)	(5) Balance 300 g ∿ 1 mg (PRECISA)	体積標準用として
(V) Viscometer of Various Ranges	6 Standard Tank 50 ℓ	(6) Standard Tank 50 ℓ	既存 6
(vi) Standard Gas Prover	7 〃 〃 3 kℓ	(7) 〃 500 ℓ	
(vii) Constant Temperature baths	8 Constant Temperature Bath	(8) 〃 3 kℓ	既存 7
	9 Viscometer	(9) 〃 10 kℓ	
	10 Hydrometer	(10) Master Oil Meter (with Pump, Air Separator, Strainer and Wagon)	
	11 Liquid Flow meter 1" 27∿117 ℓ/m	(11) Liquid Flow Meter 27 ∿ 117 ℓ/m	既存 11
	12 〃 2" 100∿500 ℓ/m	(12) 〃 100 ∿ 500 ℓ/m	〃 12
	13 〃 4" 450∿2,500 ℓ/m	(13) 〃 450 ∿ 2,500 ℓ/m	〃 13
		(14) Viscometer	9
		(15) Hydrometer	〃 10
		(16) Constant Temperature Bath	〃 8
		(17) Standard Gas Prover 150 ℓ	
		(18) Standard Gas Meter (Wet Type) 2 ℓ/rev.	
		(19) 〃 10 ℓ/rev.	
		(20) 〃 33.3 ℓ/rev.	
		(21) Blowers and Others	

第9－Ⅰ図　体　積

$$\text{Volume} = \frac{\text{Mass}}{\text{Density}}$$

液体

Water Distiller ——— Pure Water

衡量法

Balances
Weights
Thermometer
etc.

Standard Burettes → Volume Measures
Messcylinders
Flasks

Burettes
Pipetes

Standard Flasks → Standard Tanks (small)

Standard Tanks (small) → Standard Tanks (large) → Standard Liquid Meter → Liquid Meter

Standard Tanks (small)

比較法

Thermometers
Viscometers
Hydrometers
Pressure Gauges

第9－Ⅱ図　体　積

気体

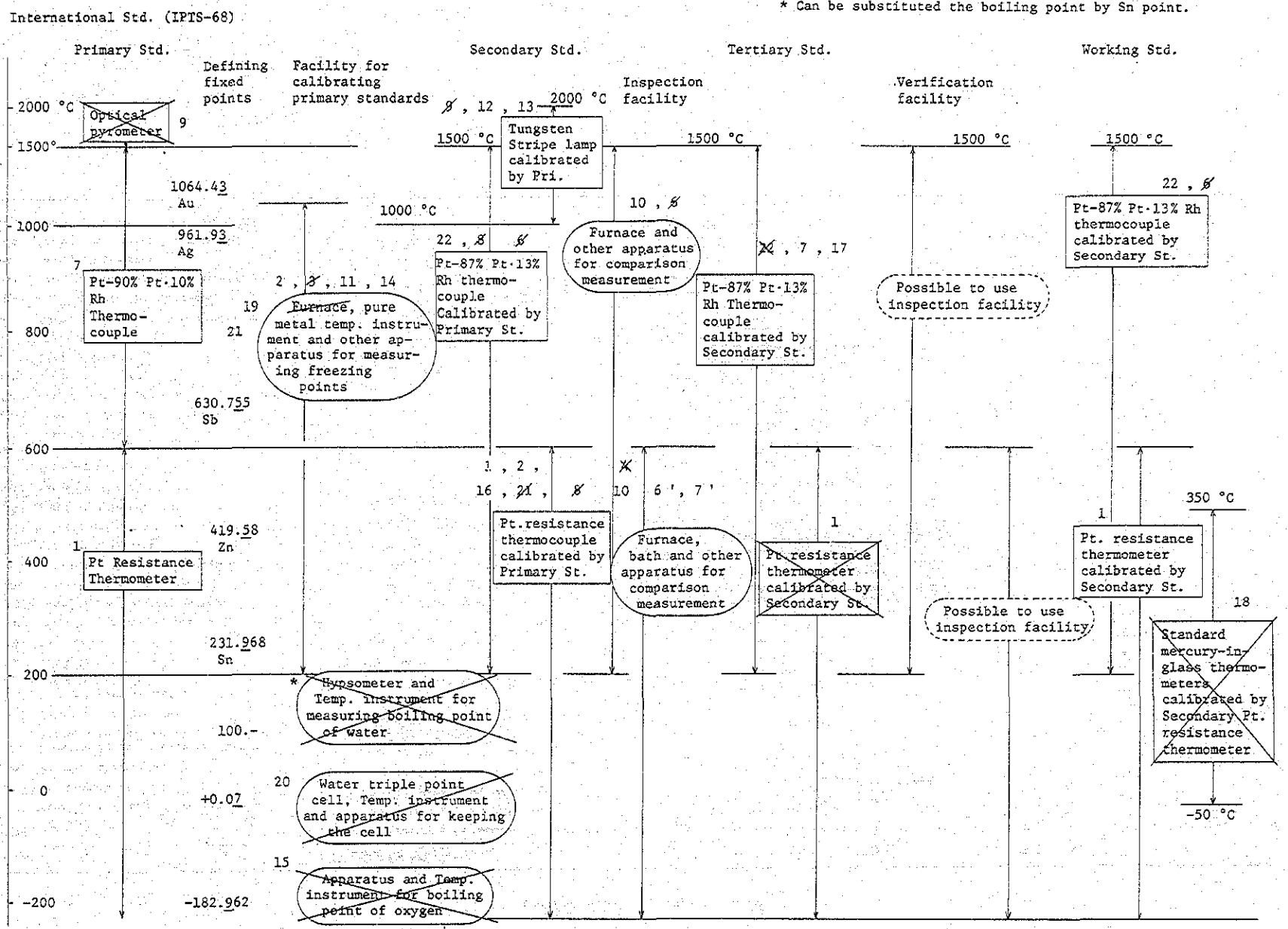
Volume of Standard Gas Prover ← Length Gauges

10^{-3}	Standard Gas Prover	Blower Thermometer Manometer
2×10^{-3}	Standard Gas Meter (Wet Type)	
4×10^{-3}	Gas Meter (Wet Type)	*Oil for Wet Type Gas Meter*
10^{2}	Gas Meter (Dry Type)	

第１０表　温　　度

(A) SIRIM側の要求機器	(B) SIRIMの既存機器	(C) 日本側の計画機器案	(D) 調整案
Temperature Laboratory	1 Pt. resist. thermometer (Leads & Northrup)	1 3 Pt, Resist. Thermometers for Primary and Secondary	(B) for Primary China for Second
(i) Fixed points temperature furnaces	2 Standard resistor, YEW, 100 Ω	2 5 Standard Resistors, YEW, 0.01 Ω, 0.1 Ω, 1 Ω, 10 Ω, 100 Ω	0.01 Ω, 0.1 Ω, 1 Ω, 10 Ω, without 100 Ω
(ii) Low temperature bath	3 Decade resis. box, G. R.	3	既存
(iii) Portable thermometer	4 Digital Voltmeter, Data pres.	4	不急
(iv) High precision temperature thermometer bridge with null detector	5 Mercury-in-glass thermometer -50 ∿ 600°, 0.01 °K, 40 pieces	5 High precision bridge with null detector	
(v) Potentiometer facility	6 Water bath	6	既存
(vi) Platinum versus platinum 10 % rhodium thermocouple	7 Oil bath	7 2 Pt-90 % Pt-10 % Rh thermocouples One for Primary St. and the other for Secondary St.	
(vii) Standard cells	8 〃 (Silicon)	8	既存
(viii) DC standard voltage supply	9 Salt bath	9	不急
(ix) Precision optical pyrometer	10 Pen Recorder, 1 μV, YEW	10 High temp. furnace for calibration of thermocouples by comparison in the range 200 °C to 1500 °C	
(x) Very high temperature furnace	11 Electric furnace	11 Pure metals having 99.9999 % purity for fixed point	
(xi) Precision power supplies	12 Ragicom Thermocouple	12 4 Tungsten filament lamps for optical thermometry 2 vacuum type for range 700 ∿ 1500 °C 2 gas-filled type for range 1500 ∿ 2000 °C	
(xii) Pure metal fixed points standards	13 Ice-making-machine	13 *Power supply for the lamps*	
(xiii) Black body furnace	14 Triple-point facility	14 Vacuum measuring system	
(xiv) Optical micro pyrometer	15 Oven (40 ∿ 140 °)	15	不急
(xv) Tungsten filament lamp	16 Bonbay for N_2 gas	16 2 Platinum resistance thermometers below 0 °C	
(xvi) Vacuum measuring system		17 Metal sheathed thermocouples 10 K type and 10 T type having diameter 3.2 ϕ and length 70 cm	
(xvii) Vacuum pumping system		18	既存
(xviii) Constant temperature room for optical micro pyrometer		19 Accessories for measuring fixed points (crucibles, alumina tules for thermocouple, etc.)	
(xix) Precision Constant current supply		20	既存
(xx) Oxygen point apparatus		21	既存
(xxi) Tungsten filament		22 2 Pt-87 % Pt-13 % Rh thermocouples	
(xxii) Lamp comparator			
(xxiii) Cryostat			
(xxiv) Platinum resistance thermometer below 0 °C			
(xxv) High precision potensiometer			
(xxvi) Constant temperature fluidised bath			
(xxvii) Dew-pt. Hygrometer			
(xxviii) Thermocouple wires & accessories			
(xxix) Low-temperature bath (0 ∿ -200 °C)			

第１０図　温　　度


International Std. (IPTS-68)
* Can be substituted the boiling point by Sn point.
Primary Std.
Secondary Std.
Tertiary Std.
Working Std.
Defining fixed points
Facility for calibrating primary standards
Inspection facility
Verification facility
2000 °C
1500°
1000
800
600
400
200
0
-200
Optical pyrometer
9
1064.43 Au
961.93 Ag
630.755 Sb
419.58 Zn
231.968 Sn
100.-
+0.07
-182.962
1500 °C
1000 °C
2000 °C
Tungsten Stripe lamp calibrated by Pri.
Pt-90% Pt-10% Rh Thermo-couple
Pt Resistance Thermometer
Furnace, pure metal temp. instrument and other apparatus for measuring freezing points
Pt-87% Pt-13% Rh thermo-couple Calibrated by Primary St.
Furnace and other apparatus for comparison measurement
Pt-87% Pt-13% Rh Thermo-couple calibrated by Secondary St.
Possible to use inspection facility
Pt-87% Pt-13% Rh thermocouple calibrated by Secondary St.
Pt.resistance thermocouple calibrated by Primary St.
Furnace, bath and other apparatus for comparison measurement
Pt. resistance thermometer calibrated by Secondary St.
Possible to use inspection facility
Pt. resistance thermometer calibrated by Secondary St.
350 °C
Standard mercury-in-glass thermo-meters calibrated by Secondary Pt. resistance thermometer
-50 °C
Hypsometer and Temp. instrument for measuring boiling point of water
Water triple point cell, Temp. instrument and apparatus for keeping the cell
Apparatus and Temp. instrument for boiling point of oxygen

第１１表　電　　気

(A) SIRIM側要求機器	(B) SIRIM側既存機器	(C) 日本側計画機器案	(D) 調整案
(i) Precision standard resistors of various ranges	1. A set of Fluke Calibration System	1) Std. R 0.001 Ω ∿ 10 MΩ 17 pc	同左
(ii) Precision standard capacitors of various ranges	(a) DC Voltage Standard	2) Hamon transfer Std. 1 ∿ 100 Ω	
(iii) Standard inductance of various ranges	(b) Null Detector	3) High R Std. 10^{9} ∿10^{12} Ω 6 pc	
(iv) Reference Standard cells	(c) Kelvin Varley Voltage Divider	4) MΩ Bridge (if available, ∿ 10^{14} Ω)	
(v) Constant temperature oil baths of various types	(d) Lead Compensator	5) Tera Ω meter (if desired)	
(vi) Inductance measuring system	(e) Reference Divider	6) Std. C. 10 PF ∿ 0.1 μF 10 pc	
(vii) High resistance measuring capacity facilities (Mega Ohm Bridge)	(f) Thermal transfer Standard	7) Oil bath (for R comparison) 27±0.01 °C	
(viii) Watt meter calibration systems	2. 2 set of 6 standard sells	8) LCR digital meter	
(ix) Power factor measuring equipment	3. 1 set of Standard Resistor (1, 10, 100, 1 K, 100 K, 1 M ohm)	9) L Std. 10 mH ∿ 1 H 6 pc	
(x) Standard watt meter of various ranges	4. 1 unit Potentiometer	10) Universal bridge (if desired)	
(xi) D.C.C Potentiometer	5. 1 DC Standard	11) Standard W meter	
(xii) Cesium Beam Frequency Standard	6. 1 unit AC/DC Calibration Standard	12) W calibration system or digital W meter	
(xiii) Frequency standard	7. 1 unit Volt Box	13) Digital PF meter	
(xiv) VLF/LF receiver	8. 1 unit Wheatstone Bridge	14) Digital high C meter (if desired)	
(xv) Frequency difference meter	9. 1 unit AC Reference Standard	15) Thermal transfer standard (V.I.), 8 pc	
(xvi) Frequency dividers	10. 1 set Precision Resistance Measuring System	16) Universal counter	
(xvii) Vernier phase comparator	11. 1 set AC Calibrator		
(xviii) Frequency synthesiser	12. 1 System Capacitance Measuring Assembly		
(xix) Attenuator calibrator	13. 1 unit Voltage Divider		
(xx) Frequency counter	14. 1 unit RMS Differential Voltmeter		
(xxi) Precision Universal Bridge	15. 1 unit AC/DC Differential Voltmeter		
(xxii) Hamon Transfer standards	16. 1 unit DC Precision Current Supply		
	17. 1 unit Current Shunt		
	18. 1 unit Current Transformer		
	19. 1 unit Digital Voltmeter		
	20. 1 unit Galvanometer and Nonovolt amplifier		

(6) 最終取りまとめ会議

本調査団は、７月２９日マレイシア側と事前調査最終取りまとめ会議を行い、今後の可能な協力振りつき協議した。その概要は以下の通りである。

出 席 者

マレイシア側

- Abdullah bin Mohd Yusof（ＳＩＲＩＭ所長）
- Mohammad bin Anas（ＳＩＲＩＭ総務部長）
- Lim Ho Pheng（ＳＩＲＩＭ標準部長）
- Lam Teug Chee（ＳＩＲＩＭ標準部次長）
- On Chin Giap（ＳＩＲＩＭ計量部門長）
- Amminuddin bin Has hin（ＥＰＵ）
- Yunus bin Tohir（ＭＳＴＥ）
- Ooi Diang Ling（ＭＴＩ）

日 本 側

- 青柳一等書記官（在マ日本大使館）
- 阿部ＪＩＣＡＫＬ事務所長
- 岩崎団長外団員４名

① ＳＩＲＩＭ所長より関係者担当官に経過説明があった。

② 岩崎団長は、企業調査結果及びＳＩＲＩＭの調査並びに討議結果を踏まえ、今後のマレイシアの計量研究開発における次の重点目標等につき報告及び提案を行った。

ⓐ 人材養成

ⓑ 検定技術者の育成

ⓒ 検定料の問題

ⓓ 検定箇数の増加

ⓔ 計量思想の普及（セミナー開催等のＰＲ）

③ 貿易産業省担当官は、新計量法の施行責任者の立場からＳＩＲＩＭの計量研究開発の緊急性及び重要性を強調し、更に１９８２年１月よりメートル法に移行することからも、早期協力を要請した。

④ ＳＩＲＩＭ側より、ⓐ現有庁舎で早期に技術協力を開始し、新庁舎完成後更に協力をグレードアップしたい旨、ⓑ計量研究所の機能として貿易産業者の計量検定所の機器及び民間企業の計量機器の校正を行うために、研究所に必要機器を備え付けたい旨、ⓒ移動検定車を備え出張検定を行いたい旨、それぞれ協力要請があった。

⑤ 調査団が事前に用意したTalking Paper（参考資料５参照）に基づき、今後の協力のわく組み（スケジュール、日本側及びマレイシア側双方の分担事項等）について、質疑

を行った。質疑は、Talking Prperの各項毎に、マレイシアのGeneral Circular を参照しつつ行い、特にＥＰＵ担当官の同意を得て、マレイシア側の理解を確認した。

⑥ 最後にＳＩＲＩＭ所長より再度、実施協議チームの早期（遅くとも年内）派遣につき要望する旨発言があり、岩崎団長は要望を日本側政府関係機関及びＪＩＣＡ本部に伝える旨回答した。

V　本プロジェクトの今後の進め方に対する提言

1　本プロジェクトの妥当性

事前調査の結果、本プロジェクトの妥当性は、以下のように考えられる。

① マレイシア企業の多くは、計測機器の検定設備の不足、計量技術の未熟のため、外国企業からの計量サービスを受けているのが現状であり、国家標準機関の整備は急務であり、工業界の要望も強い。

② マレイシアにおいては１９８２年１月１日を期して強制的にメートル法に切り換えることに法的措置がとられており、国立標準機関の整備とメートル系計量機器の整備は、緊急に必要である。

③ 現在のＳＩＲＩＭ計量部門の設備と能力では現在の工業界からの要望にも充分応えることはできない。更に、今後の工業界の進展に伴う校正精度及び校正依頼数の増加を考慮すると、ＳＩＲＩＭ計量部門の設備充実及び人的能力の向上が是非必要である。

④ マレイシア側は数年前に既述のように国立計量研究所開発プロジェクトを立案し、財政措置と相まつてその実現期に入つている。本プロジェクトに対する建物、人材等の裏付けも予定通り着実に進められてきている。

したがつて、本プロジェクトの必要性、有効性は充分存在し、我が国にとつて本プロジェクトへの協力は時期的にも最適である。また、本プロジェクトに対するマレイシア側の取り組みも信頼できるものがある。

2　本プロジェクトの日本側計画案

(1)　プロジェクトの目的

ＳＩＲＩＭに「計量研究所」を設立し、マレイシアのメートル化プログラムを達成し、マレイシアに於ける計量の正確性を保証することにより、マレイシア産業の近代化に寄与することを目的とする。

(2)　プロジェクトの実施機関

① 日　本　側

国際協力事業団（ＪＩＣＡ）

② マレイシア側

標準工業研究所（ＳＩＲＩＭ）

(3)　プロジェクトの基本構想

前述の目的を達成するために、「ＳＩＲＩＭ計量研究所」は、以下の活動を行う。

① 各種標準器及び測定器の調達・整備・維持。

② 標準供給システムの確立。

③ 政府及び民間企業への計量サービスの提供。

④ 政府機関及び民間企業への技術相談及び技術研修の提供。

(4) 協力の範囲

① 期　　間

１９８２年～１９８５年の４年間とする。

② 分野　協力する計測量はＳＩＲＩＭ１９８０年案に則り、長さ、質量、体積、温度、電気の５量とする。（１９８１年案には、圧力、硬度等の分野が追加されているが、今後検討すべき課題であり、これらについては、実施協議チーム派遣までに調整が必要である。）

③ 専門家派遣

長期専門家を２～３名、短期専門家を各年２～３名派遣して、技術者の教育訓練等を行う。具体的には、

ⓐ 標準供給システムの確立と定期的校正の必要性の教示。

ⓑ 技能者用マニュアルの作成。トレーサビリティ制度の確立。

ⓒ モデル校正の定期的実施。

ⓓ 機器の有効利用の徹底。

ⓔ セミナーの開催。（各種標準の現状、国際標準、トレーサビリティと計量管理、誤差と精度、データ処理等）

④ 機械供与

ⓐ 所要機材は、ＳＩＲＩＭ要請案、日本側必要機材案、ＳＩＲＩＭの既存機材等を考慮の上、各々の量毎に前記第７～１１表の(D)欄に調整案を示してある。これらの総計価格を第１２表に示す。これについては、今回ＳＩＲＩＭ側から新分野の追加要請があったため、機材総価格において、日本案と大きな差があるため、実施協議チーム派遣前に調整が必要である。

第１２表　供与機器（案）価格

		ＳＩＲＩＭ側案	日本評価案（千円）	
1	Mass Lab.	800,000	318,165	
2	Pressare, Force and Hardness lab.	800,000		1981年度追加分野
3	Length and Engineering Metrology Lab.	1,500,000	36,070	Engineeringについてはある程度Mass等でCoverできる。
4	Volume Lab.	500,000	21,630	
5	Eloctrioal Lab.	2,200,000	53,480	
6	Temperature Lab.	700,000	26,230	
Total		6,500,000M$	移動検定車13000 その他10,000 198,570	

１Ｍ$≒１００円

⑥ 前記機材には、マレイシア側との討議、及び計量の現状から、巡回指導及び計測器の所在場所検査が必要であることが判明したので、検定用自動車と搭載計量機器が含まれている。

⑤ 研修員受け入れ

毎年3～4名受け入れる。今回の調整により、ＳＩＲＩＭ技術者の技術の未熟さが明らかになったため、現地での専門家の教育訓練に加えて、日本での研修も重視することが必要である。

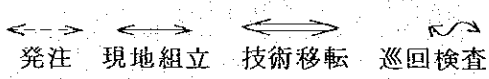
(5) 年度別実施計画（第１３表参照）

① ＳＩＲＩＭ側の強い要望と必要性から、１９８２年度は工業計測（長さ）、オイルメータ校正法（体積）、電気基礎標準器の校正法を主とする。

② 質量及び電気はかなりの機材が揃っており、技術不足の点が問題であるため、これらの短期専門家の派遣と、研修員の日本における研修を初年度に行う。

③ 温度、ガスの計測法は最終年度とする。

第１３表 年度別実施計画案



指導分野	年度計画			
	１９８２	１９８３	１９８４	１９８５
長さ（Leugih）				
L－1 直尺検査（1級直尺も含む）	←→	←→	⇔	
L－2 巻尺 〃 （基準巻尺 〃 ）	←→	←→	⇔	
L－3 標準尺（1m、1㎜）のみ	←→	←→	⇔	
L－4 万能測長機（1m、２００㎜）	←→	⇔	⇔	
L－5 形状測定（あつさ、真円度等）			←→	←→⇔
L－6 角度測定			←→	←→⇔
L－7 巡回検査・指導		∿	∿	∿
質量（Mass）				
M－1 質量原器（1Kg、10^{-7}）1ケ		←→	←→	⇔
M－2 分銅の校正		⇔		
M－3 天秤 〃		⇔		
M－4 一般はかり		⇔	⇔	

指導分野	年度計画			
	1982	1983	1984	1985
M－5　電子はかり				
M－6　巡回検査・指導				
体積（Volume）				
V－1　油の計測				
V－2　ガスの計測				
V－3　巡回検査・指導				
◎検定自動車と機器				
◎コピー機械　他				
温度（Temperature）				
T－1　温度標準用一般設備				
T－2　低温槽（－200℃）				
T－3　電気炉（＋2000℃）				
T－4　光高温計測定				
T－5　巡回検査・指導				
電気（Electrucy）				
E－1　抵抗標準と校正				
E－2　電圧標準と校正				
E－3　高抵抗標準と校正				
E－4　高電圧標準（～1KV）と校正				
E－5　直流指示計器の校正				
E－6　交流電流電圧標準と交流指示計器の校正				
E－7　電力標準と電力計の校正				
E－8　周時計、位相計の校正				
E－9　容量標準と校正				
E－10　インダクタンス標準と校正				
E－11　データ処理技術、IRシステムの確立				
E－12　巡回指導・検査				

参　考　資　料

1. SIRIMプロジェクト要請（１９７８）
2. 同　（１９８０）
3. 同　（１９８１）
4. QUESTIONAIRE
5. TAIKING PAPER
6. TENTATIVE IMPLEMENTATION SCHEDUAL
7. GENERAL CIRCULAR

1. 〈ＳＩＲＩＭプロジェクト要請（１９７８）〉

B R I E F

PROJECT: DEVELOPMENT OF A NATIONAL METROLOGY LABORATORY IN SIRIM

PREPARED BY: STANDARDS AND INDUSTRIAL RESEARCH INSTITUTE OF MALAYSIA,
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DATE: NOVEMBER, 1978

DEVELOPMENT OF A NATIONAL METROLOGY LABORATORY IN SIRIM

1. OBJECTIVE

1.1 The object of this paper is to seek government approval, funds and technical assistance to develop a National Metrology Laboratory in SIRIM. In this, Japan and New Zealand have indicated their keeness to cooperate.

2. BACKGROUND

Metrology is the science of measurement and it covers activities including

(i) development and maintenance of physical proto-type standards, up to the highest order of accuracy and precision;

(ii) calibrations and international traceability.

2.2 The importance of metrology in national development is apparent from the fact that measurements are an essential factor in almost if not all industrial and socio-economic activities. The more sophisticated and industrialised the community becomes, the greater is its needs for measurements of increasing complexity and accuracy. Metrology provides the instrumentation and technology for all such measurements.

2.3 The concept of a Metrology Laboratory started in 1972 in the former Standards Institution of Malaysia when it was felt that there was a need to cater for the requirements of the government and industry. However, this was then not undertaken as a project and because of difficulties arising thereof particularly the shortage of funds and expertise, progress has been very slow.

3. JUSTIFICATION

3.1 It is a recognised fact that good metrology facility promotes and stimulates the growth of new industries particularly those which rely on the ready availability of measurement resource and means of reference to high accuracy and precision. In early 1978, a survey was conducted on the metrological needs of the electrical and electronic industries in

the country. The survey reveals that there is an urgent need for a National Metrology Laboratory so that the manufacturers' laboratories which are generally not well equipped and cannot perform the more elaborate or sophisticated calibration work can refer to the National Metrology Laboratory for measurements, calibration and particularly traceability.

3.2 Another survey was conducted by postal questionnaire among the selected and representative industries to assess their needs for metrological services in the area of temperature, length, mass, volume, measurements and calibrations. The survey shows that the majority of the industries require accurate calibration services in the various fields mentioned above. Because of the lack of metrological facilities, a number of establishments in the industries surveyed are relying on calibration services in foreign countries such as Singapore or their parent companies overseas.

3.3 The lack of metrology services is a great inconvenience to the industry and could adversely affect the quality of their products and practices. If this is allowed to continue for a long time industrial efficiency would be affected in some way or other.

3.4 With the implementation of the metrication programme, SIRIM being the Custodian of Weights and Measures will be required to provide comprehensive calibration services to the government and its agencies for the changeover from the imperial and local system of weights and measures to the metric system. At the same time, the enforcement of the Weights and Measures Act 1972 will place a heavy demand on metrology calibration services. Therefore, it is important that a competent metrology laboratory be speedily established to fulfil the objective of the industry and the nation in this area.

3.5 International trade usually demands adherence to international standards of measurement. This can most readily be achieved by having a National Metrology Laboratory equipped with suitable metrology equipment of international measurement accuracy to check and calibrate equipment used in the industry.

3.6 The time has come for Malaysia to establish a National Metrology Laboratory and this is recommended to be a special project under the current and future Malaysia Plans.

4. SCOPE

4.1 The scope of the Metrology Laboratory are:-

(1) To provide calibration and measurement services for the industry and the government with accuracy and precision traceable to international standards of high order. This need for accurate measurements increase with the complexity of the industrial technology.

(2) To meet the objectives of the Weights and Measures Act, 1972 and enable SIRIM to fulfil its role and discharge its function as the national Custodian of Weights and Measures under the above Act.

(3) To provide services to industry and the government in terms of repair, maintenance, adaptation and design of general, scientific and industrial measuring instruments.

(4) To promote the establishment of instrumentation industries in Malaysia.

(5) To undertake development and research and to affect the transfer of technology so obtained from such development and research or otherwise for the benefit of our manufacturing and other economic sectors.

5. FUNCTION

5.1 The functions may be summarized as follows:-

(1) To maintain basic units (primary, secondary, tertiary and working units) of measurements involving the procurement and custody of national prototypes of all standards.

(2) To maintain traceability of national prototypes to international units.

(3) To provide measurement and related expertise to the industry and government.

(4) To provide and support the establishment of secondary level laboratories which offer calibration services to industry.

(5) To conduct research and development in metrology including instrumentation technology for industrial and scientific purposes and offer consulting services and training facilities in this field.

(6) To cooperate with other national and international bodies concerned with metrology.

(7) Legal Metrology:

To advise and assist the Minister having charge of Weights and Measures Act, on all technical aspects of legal metrology in particular on laws and regulations for measurements measuring instruments, their patterns, specifications and uses.

6. PROJECT ACTIVITY

6.1 The National Metrology Laboratory project is proposed to be developed in 3 phases:

(i) Phase 1 - till 1980

(ii) Phase 2 - 1980 - 1985

(iii) Phase 3 - 1985 - 1990

In Phase 1, from the current date to 1980, greater emphasis will be given towards developing weights and measures covering the areas of mass, volume, length, temperature and electrical standards. In this phase, attention will be given to the full implementation of the Weights and Measures Act, and its associated Regulations, and to provide services for industry and government by the provision of the basic Reference Standards for scientific, trade and commercial requirements. It is not intended at this juncture to aim our Motrology development towards contributing in the areas of research and development, as this phase will cater basically for Malaysia's outstanding requirements and immediate needs to provide the basic intra-structure for Reference Standards.

In Phase 2, from 1980 to 1985, it is envisaged that the metrology programme would incorporate a plan towards greater accuracy in measurements and calibration and should cover a wider scope as well as to provide services for a more sophisticated industry. It is in this phase that some inroads will be initiated in the areas of research and development to contribute towards the field of metrology.

In Phase 3, from 1985 to 1990, it is anticipated that the metrology facilities and services available in Malaysia would be fully operational to provide industry and scientific research with a range of comprehensive facilities traceable to international standards. This Laboratory shall in this phase also have the ability to contribute towards research and development.

6.2 The development of the National Metrology Laboratory will involve the development of the following laboratories:

(i) Mass Laboratory

(ii) Length Laboratory

(iii) Volume Laboratory

(iv) Electrical Laboratory

(v) Temperature Laboratory

(vi) Optics, Acoustic and Radiation Laboratory.

A brief outline of each of the above laboratories is as in Appendix A. Appendix B is a list of metrology equipment that is presently available in SIRIM.

7. FUNDS REQUIRED

7.1 The total estimated sum needed is $5M.

7.2 The following is the estimated breakdown of the funds required under each phase:

(i)	Phase 1 - till 1980	- $1.0M
(ii)	Phase 2 - 1980 - 1985	- $4.0M
(iii)	Phase 3 - 1985 - 1990	- to be decided based on the industrial development of Malaysia.

8. CONCLUSION

A National Metrology Laboratory is essential and government approval is sought for funds and technical assistance to enable this project to be undertaken successfully.

1. MASS LABORATORY

The Mass Laboratory is to provide calibration facilities up to an accuracy of 1 in 107. The range covered shall be up to 1000 kg. A non-magnetic stainless steel primary standard of 1 kg with an accuracy of 1 in 10^8 is required and this will be declared as the Malaysian Primary Standard Weight. Various supporting facilities such as precision balances will be needed.

Calibration facilities for pressure, force and hardness shall also be provided. The range covered will be up to 3 x 10^{6N} (300 ton-force) for force measurement and 50MPa (500 kgf/cm^2) for pressure measurement. The accuracy required for this measurement will be 0.05 per cent.

2. LENGTH LABORATORY

The Length Laboratory is to provide calibration facilities up to an accuracy of 1 in 10^6. For this purpose, a 58% nickel steel motor bar with an accuracy of 1 in 10^6 will be declared as the Malaysian Primary Standard Meter Bar. Associated length comparators will be purchased for this purpose. Dimensional and engineering metrology calibrating facilities shall also be provided. In the layer part of Phase 2, Malaysia shall study into the adoption of Krypton 86 standard as our national standard for length and increasing the accuracy to 1 in 10^7.

3. VOLUME LABORATORY

In the case of Volume Laboratory, it will cater for the measurements of volume especially for the petroleum industries in providing standard flow meters of various types. Calibration facilities for density, viscosity and their quantities will be established.

4. ELECTRICAL LABORATORY

The Electrical Laboratory aims to provide an accuracy of 5 parts per million. The parameters involved are the voltage, circuit, capacitance, resistance and inductance. There is a pressing need for this laboratory to be set up due to the development in the electrical

and electronic industries.

5. TEMPERATURE LABORATORY

Temperature measurement basic to all metrological measurements are also very necessary. The temperature laboratory shall aim at accuracies of 1 in 10^5 and shall cover the range in the initial stage from -20°C to 1200°C.

6. OPTICS, ACOUSTICS AND RADIATION LABORATORY

The measurements of optics, acoustics and radiation are important although the needs at present is not so pressing. It is anticipated that this laboratory will be set up at the end of Phase 2.

EQUIPMENT PRESENTLY AVAILABLE IN THE METROLOGY LABORATORY OF SIRIM

A. SIRIM EQUIPMENT

1. Primary Metric Gauge Blocks
2. Secondary Metric Gauge Blocks
3. Tertiary Metric Gauge Blocks
4. 1 meter Secondary Standard Scale
5. 1 meter Tertiary Standard Scale
6. Constant Temperature Water Bath
7. Metric Standard Capacity Measures
8. Metric Standard Burettes
9. Metric Standard Pipette
10. Metric Milk Measures
11. Petrol Checkpump Measures
12. 1 set of Secondary Standard Weight from 1 mg to 20 kg
13. 1 kg Working Balance
14. Glass Still
15. Precision Mercury In Glass Thermometer
16. Constant Temperature Oil Bath
17. Standard Volt Box of 50 ppm
18. 6 Dial High Precision Guarded Wheatstone Bridge, 50 ppm
19. Constant Temperature Primary Standard Cell, 2 ppm
20. 100 ohm D.C. Resistant Standard, 5 ppm
21. 100,000 ohm D.C. Resistant Standard, 5 ppm
22. D.C. Voltage and Ratio Calibration System, 10 ppm
23. Oscilloscope Capacitor
24. Zenith 3 phase Watthour Meter Calibrator

Total Estimated Cost: M$0.3

B. EQUIPMENT BELONGING TO NRLM, JAPAN

1. Precision 3 kg Balance
2. Precision 200 g Balance
3. Direct Reading Balance, Capacity 1200 g
4. Two Arm Balance, Capacity 20 kg
5. Platform Scale, Capacity 1000 kg
6. 1 set of Standard Weights from 1 mg to 1 kg
7. 1 set of Standard Weights from 1 mg to 2 kg
8. 2 sets of Standard Weights from 1 mg to 200 g
9. 3 sets of Standard Weights from 1 mg to 500 mg
10. 2 pieces of Cylindrical Weight of 10 kg each
11. 50 pieces of Rectangular Weight of 20 kg each
12. 5 pieces of Standard Weights of 2 kg each
13. Thermistor Thermometer

2. 〈ＳＩＲＩＭプロジェクト要請（１９８０）〉

TITLE OF PROJECT

DEVELOPMENT OF A NATIONAL METROLOGY LABORATORY IN SIRIM

PREPARED BY: STANDARDS AND INDUSTRIAL RESEARCH INSTITUTE
OF MALAYSIA
P.O. BOX 35, SHAH ALAM,
SELANGOR, MALAYSIA

DATE: JUNE 1980

DEVELOPMENT OF A NATIONAL METROLOGY LABORATORY IN SIRIM

1. BACKGROUND

Metrology is a science of measurement and accurate measurements are essential to all industries. Metrology provides instrumentation and technology for all measurements in the industry. Thus metrology forms a basic infrastructure for the development of industry.

Measurements and calibration services to the industries were initiated in Malaysia in 1972. This was initially carried out in a modest scale. In 1974 a joint technical corporation programme was started between SIRIM and the National Research Laboratory of Metrology, Japan (NRLM). This was under the sponsorship of the Institute for Transfer of Technology (ITIT), Ministry of International Trade and Industry Japan. This ITIT project was extended to 1981. The main objective of this project was to transfer metrology technology in the form of technical cooperation between SIRIM and NRLM. SIRIM at the same time was developing metrology services under her Third Malaysia Plan.

With the Government's programme for industrial development the demand for metrology increased tremendously. This is more so with the strict enforcement of the Weights and Measures Act, 1972 and with the appointment of SIRIM as the Custodian of weights and Measures. Thus SIRIM proposes to develop a national metrology laboratory to cater for these needs.

The main objective of this programme are:-

(i) To provide calibration and measurement services to the industry and the government with accuracy and precision traceable to international standards of higher order. This need for accurate measurements increases with the complexity of the industrial technology.

(ii) To meet the objectives of the Weights and Measures Act, 1972 and enable SIRIM to fulfil its role and discharge its function as the National Custodian of Weights and Measures.

(iii) To promote the establishment of instrumentation industries in Malaysia.

(iv) To undertake research and development.

2. PROJECT DESCRIPTION

The development of a national metrology laboratory will involve additional specialise buildings and precision measuring equipment. Attention is drawn to the fact that this proposed national metrology laboratory will not aim at ultimate precision like that of Japan, United Kingdom or U.S.A. but rather on the precision based on the needs of industry in a developing country. The precision aimed for is 1 in 10^7 compared with 1 in 10^9 in developed countries.

The breakdown of these needs are as follows:-

(i)	Specialise Laboratory Building	= $M1.5
(ii)	Precision Measuring Equipment	= $M4.5
	Total:	$M6.0

To achieve the objectives, a national metrology laboratory which will function as follows need to be developed:-

(i) To maintain basic units (primary, secondary, tertiary and working units) of measurements involving the procurement and custody of national prototypes of all standards.

(ii) To maintain traceability of national prototypes to international units.

(iii) To provide measurement and related expertise to the industry and government.

(iv) To provide and support the establishment of secondary level laboratories which offer calibration services to industry.

(v) To conduct research and development in metrology including instrumentation technology for industrial and scientific purposes and offer consulting services and training facilities in this field.

(vi) To co-operate with other national and international bodies concerned with metrology.

3. COSTS ESTIMATES

The estimated year by year development expenditure for the planned period is proposed to be as follows:-

YEAR	$'000					
	1981	1982	1983	1984	1985	TOTAL
Building	50	1,000	450	-	-	1,500
Equipment	800	800	900	1M	1M	4.5M
TOTAL:	850	1,800	1,350	1M	1M	6M

A contigency sum of 0.5M for price variation is necessary.

(i) Specialise Building

The laboratory buildings presently in SIRIM are unsuitable to house the high precision equipment under this programme. A specialise laboratory in addition to the present laboratory requiring constant temperature and humidity shall be needed.

The space requirement is estimated to be 10,000 sq. ft. at the cost of $150 per sq. ft. The total cost required for building is $1.5M. This programme is targeted to be completed in 1983 in time for the arrival of the precision equipment ordered in 1982.

These 10,000 sq. ft. new laboratory shall house the high precision primary standards and their comparators. It shall comprise of the following laboratories:-

(a)	Length primary standards and comparators	- 2000 sq. ft.
(b)	Mass primary standards and comparators	- 2000 sq. ft.
(c)	Engineering metrology primary standards and comparators	- 4000 sq. ft.
(d)	Electrical metrology	- 2000 sq. ft.

(ii) Precision and Metrology Equipment

The details of the equipment totalling $M4.5 are contained in the Project Paper "National Metrology Laboratory in SIRIM". Most of the precision equipment had to be purchased overseas and it will take an average period of 18 months between placing of order and delivery.

Attention is drawn to the fact that the equipment cost in the paper "National Metrology Laboratory in SIRIM" is estimated in 1979 and there will be price variations. Therefore, contigencies to cater for these variations will be necessary.

4. MANPOWER IMPLICATIONS

The development of the national metrology laboratory will involve the development of the following laboratories:-

(i) Mass laboratory

(ii) Length laboratory

(iii) Volume laboratory

(iv) Electrical laboratory

(v) Temperature laboratory

(vi) Miscellaneous laboratory

The development of these laboratories will be carried out in two phases.

(i) Phase 1 1981 - 1985

(ii) Phase 2 1985 - 1990

Thus, the manpower required will be faced accordingly.

The estimated manpower required is as in the Table below:

Description	Existing staff in 1980	1981	1982	1983	1984	1985
Research Officer	7	8	12	16	19	21
Assistant R.O.	4	4	5	6	7	7
Laboratory Technician	8	10	12	15	16	17
Total:	19	22	29	37	42	45

5. BENEFITS AND JUSTIFICATIONS

The benefits and justifications are as follows:-

(i) The "National Metrology Laboratory" although benefits the industrial sector contributes directly towards national industrial development. The availability of this basic infrastructure will promote and encourage the growth of industry. It will make it possible for industries which require high technology and precision measurements to be established.

(ii) This programme helps industrial growth and thus indirectly in the generation of employment.
It is anticipated that the increased awareness and need for quality products and precision instrument would lead to the proliferation of industries both in numbers and product groups.

6. FOREIGN ASSISTANCE REQUIREMENTS

Feasibility studies has already been completed with the assistance of experts from NRLM Japan, NPL United Kingdom and PEL New Zealand.

This project shall require experts from established overseas organisations. The financing country shall be required to look into providing the following technology transfer in terms of exchange of scientists, attachment of experts and training of staff.

Work Programme for the two Japanese Experts in the field of Metrology (JICA Project)

The experts shall be required mainly to carry out feasibility studies and to assist SIRIM on the development of Metrology.

1. Feasibility Studies

The feasibility studies for the development of Metrology laboratory to meet the calibration and measurement needs of the Government and industries in Malaysia shall over the following areas:-

(1) length measurement
(2) mass measurement
(3) volume measurement
(4) force, pressure and hardness measurement
(5) industrial/engineering metrology measurement
(6) time and frequency measurement
(7) radio frequency measurement
(8) inductance and capacitance measurement
(9) electrical power measurement
(10) other electrical measurements

2. Consultancy

The experts shall assist SIRIM in the following areas:-

(1) Purchase of equipment mentioned above

(2) Design and construction of new laboratories

(3) Design and fabrication of calibration equipment which are not readily available in the market

(4) Calibration and traceability programme

(5) Maintenance of physical standards to the highest accuracy

(6) Training of SIRIM officers in the fields mentioned above

It is recommended that two experts be required, one in industrial/ engineering metrology and the other in electrical metrology. The experts shall make proposal and recommendation on the above in the form of a comprehensive report.

3. 〈ＳＩＲＩＭプロジェクト要請（１９８１）〉

METROLOGY UNIT, SIRIM

A. TITLE OF PROJECT

Development of a National Metrology Laboratory in SIRIM

B. BACKGROUND

Metrology is a science of measurement and accurate measurements are essential to all industries. Metrology provides instrumentation and technology for all measurements in the industry. Thus metrology forms a basic infrastructure for the development of industry.

Measurements and calibration services to the industries were initiated in Malaysia in 1972. This was initially carried out in a modest scale. In 1974 a joint technical corporation programme was started between SIRIM and National Research Laboratory of Metrology, Japan (NRLM). This was under the sponsorship of the Institute for Transfer of Technology (ITIT), Ministry of International Trade and Industries Japan. This ITIT project was extended to 1981.
The main objective of this project was to transfer metrology technology in the form of technical cooperation between SIRIM and NRLM.
SIRIM at the same time was developing metrology services under the Third Malaysia Plan.

With the Government's programme for industrial development the demand for metrology increased tremendously. This is more so with the strict enforcement of the Weights and Measures Act, 1972 and with the appointment of SIRIM as the Custodian of Weights and Measures. Thus SIRIM proposes to develop a national metrology laboratory to cater for these needs.

The main objective of this programme are:-

(i) To provide calibration and measurement services to the industry and the government with accuracy and precision traceable to international standards of higher order. This need for accurate measurements increases with the complexity of the industrial technology.

(ii) To meet the objectives of the Weights and Measures Act, 1972 and enable SIRIM to fulfil its role and discharge its function as the National Custodian of Weights and Measures.

(iii) To promote the establishment of instrumentation industries in Malaysia.

(iv) To undertake research and development.

C. PROJECT DESCRIPTION

The development of a national metrology laboratory will involve additional specialise buildings and precision measuring equipment. Attention is drawn to the fact that this proposed national metrology *laboratory will not aim at ultimate precision like that of Japan*, United Kingdom or U.S.A. but rather on the precision based on the needs of industry in a developing country. The precision aimed for is 1 in 10 compared with 1 in 10^9 in developed countries.

The breakdown of these needs are as follows:-

(i) Specialise Laboratory Building = $M1.5

(ii) Precision Measuring Equipment = $M6.5

Total: $M8.0

To achieve the objectives a national metrology laboratory which will function as follows need to be developed:-

(i) to maintain basic units (primary, secondary, tertiary and working units) of measurements involving the procurement and custody of national prototypes of all standards.

(ii) to maintain traceability of national prototypes to international units.

(iii) to provide measurement and related expertise to the industry and government.

(iv) to provide and support the establishment of secondary level laboratories which offer calibration services

to industry.

(v) to conduct research and development in metrology including instrumentation technology for industrial and scientific purposes and offer consulting services and training facilities in this field.

(vi) to cooperate with other national and international bodies concerned with metrology.

D. COSTS ESTIMATES

The estimated year by year development expenditure for the planned period is proposed to be as follows:-

YEAR	$'000					
	1981	1982	1983	1984	1985	TOTAL
Building	50	1,000	450	-	-	1,500
Equipment	500	1.5M	2M	1.5M	1M	6.5M
TOTAL:	550	2.5M	2.45M	1.5M	1M	8M

A contigency sum of 0.5M for price variation is necessary.

E. MANPOWER IMPLICATION

The development of the national metrology laboratory will involve the development of the following laboratories:-

(i) Mass laboratory
(ii) Length laboratory
(iii) Volume laboratory
(iv) Electrical laboratory
(v) Temperature laboratory
(vi) Miscellaneous laboratory

The development of these laboratories will be carried out in two phases.

(i) Phase 1 1981 - 1985
(ii) Phase 2 1985 - 1990

Thus, the manpower required will be faced accordingly.

The estimated manpower required is as in the Table below:-

Description	1981	1982	1983	1984	1985
Research Officer	8	12	16	19	21
Assistant R.O.	4	6	6	7	7
Laboratory Technician	12	15	15	16	17
Total:	24	33	37	42	45

F. BENE FITS AND JUSTIFICATION

The benefits and justifications are as follows:-

(i) The 'National Metrology Laboratory' essentially benefits the industrial sector will contribute directly towards national industrial development. The availability of this basic infrastructure will result in promoting and encouraging the growth of industry. It will make it possible for industries which require high technology and traceable precision measurements to be established. This will lead to the increased of exports due to international acceptability of the products.

(ii) This programme helps industrial growth and thus indirectly in the generation of employment. It is anticipated that the increased awareness and need for quality products and precision instrument would lead to the proliferation of industries both in members and product groups.

G. FOREIGN ASSISTANCE REQUIREMENTS

The assistance required can be grouped as follows:-

(i) Expertise

Experts in the various specialised fields of Metrology needed. It is proposed that 1 expert in electrical metrology & 1 in non-electrical metrology will be req. each year.

(ii) Equipment

Appendix A attached.

(iii) Training

Attachment practical training in the various specialised fields of Metrology for SIRIM Officers. It is proposed that each year 2 officers be attached to the appr. lab. for a period of 3 months.

APPENDIX A

The following precision equipment and standards shall be required:

(a) Mass laboratory

(i) Precision 1 kg standard mass accuracy of 1 in 10^8

(ii) 1 kg remote control precision balance of 10^{-7}

(iii) 25 g precision microbalance accuracy of 10^{-7}

(iv) Precision 50 kg balance accuracy of 10^{-5}

(v) Precision 250 g balance accuracy of 10^7

(vi) Vibration free tables

Estimated cost: $M800,000.00

(b) Force, Pressure and Hardness Laboratories

(i) Deadweight pressure gauge tester, various ranges

(ii) Precision mercury manometer, various ranges

(iii) Precision vacuum gauges

(iv) Standard providing device

(v) Standard load cells

(vi) Deadweight machines

(vii) Standard hardness tester, Vicker, Rockwell and Brinell types

(viii) Universal force calibrating machines

Estimated cost: $M800,000.00

(c) Length and Engineering Metrology Laboratory

(i) 1 m length comparator, accuracy of about 1 micron

(ii) Precision angle testing equipment and instruments

(iii) Standard steel tapes, 5 m and 10 m

(iv) Projector with accessories and photographic attachment

(v) Surface finish, measuring and recording equipment

(vi) Forms and straightness measuring and recording equipment

(vii) Co-ordinate measuring machines

(viii) Interferometer for wave length standard

(ix) Granite surface plate

Estimated cost: $M1.5 Million

(d) Volume Laboratory

(i) Standard Prover tanks - 2,000 and 5,000 litres

(ii) Master flow meter of various types and flowrate for water, petroleum, light oil and heavy oil

(iii) Master gas meter of various ranges

(iv) LPG standard hygrometer

(v) Viscometer of various ranges

(vi) Standard gas prover

(vii) Standard constant temperature baths

Estimated cost: $M500,000.00

(e) Electrical Laboratory

(i) Precision standard resistors of various ranges

(ii) Precision standard capacitors of various ranges

(iii) Standard inductance of various ranges

(iv) Reference Standard cells

(v) Constant temperature oil baths of various types

(vi) Inductance measuring system

(vii) High resistance measuring capacity facilities (Mega Ohm Bridge)

(viii) Watt meter calibration systems

(ix) Power factor measuring equipment

(x) Standard watt meter of various ranges

(xi) D.C.C. Potentiometer

(xii) Cesium Beam Frequency Standard

(xiii) Frequency standard

(xiv) VLF/LF receiver

(xv) Frequency difference meter

(xvi) Frequency dividers

(xvii) Vernier phase comparator

(xviii) Frequency synthesizer

(xix) Attenuator calibrator

(xx) Frequency counter

(xxi) Precision Universal Bridge

(xxii) Hamon Transfer standards

Estimated cost: $M2.2 Million

(f) Temperature Laboratory

(i) Fixed points temperature furnaces

(ii) Low temperature bath of various ranges

(iii) Portable thermometer, either resistance or quartz types

(iv) High precision temperature thermometer bridge with null detector

(v) Potentiometer facility

(vi) Platinum versus platinum 10% rhodium thermocouple

(vii) Standard cells

(viii) DC standard voltage supply

(ix) Precision automatic optical pyrometer

(x) Very high temperature furnace X-Y recorder

(xi) Precision power supplies

(xii) Pure metal fixed points standards

(xiii) Black body furnace

(xiv) Optical micro pyrometer

(xv) Tungsten filament lamp

(xvi) Vacuum measuring system

(xvii) Vacuum pumping system

(xviii) Constant temperature room for optical micro pyrometer

(xix) Precision Constant current supply

(xx) Oxygen point apparatus

(xxi) Tungsten filament

(xxii) Lamp comparator

(xxiii) Cryogenerators

(xxiv) Platinum resistance thermometer below 0°C

Estimated cost: $M700,000.00

Summary of Total Estimated Cost for Equipment

1	Mass Lab.	800,000
2	Pressure, Force and Hardness Lab.	800,000
3	Length and Engineering Metrology Lab.	1,500,000
4	Volume Lab.	500,000
5	Electrical Lab.	2,200,000
6	Temperature Lab.	700,000
	Total:	6,500,000

4. 〈 QUESTIONNARE 〉

July, 1981

QUESTIONNARE

From

Preliminary Survey Team on the Establishment of
National Metrology Laboratory of Standards and
Industrial Research Institute of Malaysia

To _____

_____

_____

Please answer the following questions and state the problems that you are facing and that you might face in the near future.

I) METROLOGY IN GENERAL

1) Main Products in Your Company

1 What kinds of products are made now and will be expected to be made in the near future ?

2 How much accuracy are necessary for your products ?

Name of main products	Details			
	Dimension of parts		Necessary Accuracy for parts	Other Information
	Biggest size	Smallest size		
[Example: Wheel for a bicycle	1200 mm	10 mm	about 0.1 mm	]
A) Present a) b) c) d)				
B) Future a) b)				

2) Measuring Units System

3 Which measuring units system is employed in your company, Imperial -, Metric - or another Units Systems ?

4 How many shares are provided now in each Units System ?

Measuring units system	Share of each Units	Comments if any
Imperial units	%	
Metric units	%	
Another units	%	
(Local units in your country	%	
Other units	%	
	%	

3) Condition of Circumstance

5 What are the required standard temperature, humidity and other special condition of circumstance in your company ?

Temperature	°C or °F
Humidity	% Relative Humidity
Atmospheric pressure	m bar, mmHb, p/in^2

II) STANDARDIZATION OF PRODUCTS

6 How are the industrial standards and the recommendations of ISO, IEC, OIML and the Malaysia Standards (MS) applied to your products ?

7 Does your company have your own special standard specification for the products ?

Adopted standard specification	Ratio of the products to total number
products by ISO standards	/
" IEC Recommendation	/
" OIML "	/
" MS	/
" Your Own Special Standards	/
" Other standards	/

8 What kinds of test are made for your products to guarantee the quality ? (For instance, total inspection, Sampling inspection, quality control, type test for environment, endurance or reliability, etc.)

Kinds of test	Name of products	Details
Total inspection		
Sampling "		
Quality Control		
Type test for environment		
" endurance		
" reliability		

III) MEASURING INSTRUMENTS

9 What kind of measuring instruments (measuring standards and apparatus) are equipped in your company ?

Name of instruments	Kinds	Specification			
		Capacity	Accuracy	Maker	Others
(Example: Dial gauge	Length	10 mm	10 μm	Mitsutoyo Co. (Japan)	Digital Stand

10 Are your measuring instruments enough for the activities of your company in view of kinds, capacity, accuracy, etc. ?

11 What kinds and types of standards and apparatus are necessary for your activities in the near future if not enough ?

Name of Instruments	Kind of measuring quantity	Specification of the Instrument			
		Capacity	Accuracy	Maker	Others
(Example: Standard thermometer	Temperature	200∿600°C	1 div: 1°C	Chino Co. (Japan)	Digital)
A) Present					
B) Future					

1) Maintenance of Instruments

12 How often are the instruments utilized in your company ?

13 How is your instruments maintained ? (For instance, are the calibration of the standards or the inspection of the apparatus done periodically by yourself, SIRIM, another company or an organization of the other country ?)

Name of Instruments	Frequency in use	Calibration, Inspection in				Periodic Inspection		Others
	times/day, month	Your company	SIRIM	Another company	Another country	Period	Accuracy	
(Example: Standard Weight (1kg)	3/day		SIRIM			1 year	1 mg	

2) Knowledge and Experience

14 Are your knowledge and experience sufficient for your activities ? What kinds of knowledge and experience for measuring objects are interested in ?

Knowledge	Experience
(Example: Measurement of Oil	Oil meter, Volume measurement

3) Problems

15 What kind of problems to be solved do you have in the field of metrology and instrumentation ?

Problem	Details
Example: No good for controlling the length of the product	The length of the product is measured by using calliper
a)	
b)	
c)	
d)	

5. 〈 TALKING PAPER 〉

July, 1981

Prepared by the Japanese Team

TALKING PAPER

To: The Authorities concerned of the Government of Malaysia

From: The Preliminary Survey Team sent by the Japan International Cooperation Agency

Project: Technical Cooperation on the establishment of The National Metrology Laboratory of Malaysia

I. Objectives of the Preliminary Survey Team

In response to the project proposal of Government of Malaysia dated July, third, 1979, the Government of Japan has decided to make a preliminary study on the possible Japanese Technical Cooperation to be extended to this project.

The Team is organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA"), which is an Agency of the Japanese Government for executing technical cooperation.

The Team aims at (1) identifying the outline of the project proposal, (2) clarifying the problems to be solved, if any, and (3) formulating an appropriate master plan for Japan's cooperation not only through mutual discussion and exchange of views with the authorities concerned of the Government of Malaysia, but also through fact-finding investigation for the relevant industries.

II. Information Required for Implementing the Project

The information required by the Preliminary Survey Team is categorized in three groups:

A: on the Administrative Set-up
B: on the Background of the Project
C: on the Project itself

A and B may be furnished by the Malaysian side, while C will be the major topics for discussion between the Japanese Team and the Malaysian side. Detailed items of each group of information

are described as follows:

A. Information on the Administrative Set-up

1. Name and functions of the organization in charge of budgeting, in addition to the followings;

   (1) National budget in the past several years,

   (2) Budget of Ministries and Agencies concerned in the past several years,

   (3) Budget system;
   - Kind of budget
   - Procedure and time of budget compilation
   - Time of budget approval and its actual disbursement

2. Name and activities of the Ministry of the Government of Malaysia which is responsible for administrating the implementation of the project.

3. Name and activities of the implementing agency directly responsible for planning and implementation of the project, in addition to the followings;

   (1) Kind and performance of equipment and machinery installed at present in each metrological field.

   (2) Number and experience of present staff employed in each metrological field.

   (3) Present capability of calioration services conducted in each metrological field to private and public sectors.

   (4) Contents of present certification system employed in private and public sectors in accordance with law in force and its future plan.

   (5) Present and past activities conducted for the dissemination of metrological concept to private and public sectors.

   (6) Content of local services carried out so far.

4. Name and activities of organizations related to the implementation and operation of the project.

B. Information on the Background of the Project

1. Outline of the Weights and Measures Act

2. Outline of the metrification programme and its importance in the Third Malaysian Plan.

C. Information on the Project Itself

1. Objectives of the project

2. Importance of the project

3. Outline of the project

(1) Name of organization to be established;

(2) Functions and activities of the above organizations and institutes;

(3) Necessary machinery and equipment to be installed;

(4) Staffing plan for such department as administration, technical guidance, training and R & D:

(5) Construction Plan for necessary building.

4. Any problems involved in the project.

5. Extent, content and timing of the foreign cooperation required.

6. Availability and time schedule of local budgetary allocation.

7. Effects of the project, if implemented.

8. Present or previous experience of similar projects both in public and private sectors.

III. Responsibility of the Governments (In case of the implementation of the project)

The Government of Japan and the Government of Malaysia share the following responsibilities in implementing the project.

A. The Government of Japan

Through JICA, the Government of Japan will cooperate with the Government of the Malaysia in implementing the project.

The cooperation will take the following four sections;

1. To conduct the implementation study which aims to make up concrete action program for implementation.

2. To assign Japanese Experts who will assist the implementation of the project in specialized fields.

3. To supply equipment, machinery and materials required for the project.

4. To receive counterpart personnel in Japan for training and/or observational study.

B. The Government of Malaysia

The Government of Malaysia will take the primary responsibility for implementing the project. The following eleven specific responsibilities are also to be borne by the Malaysian side at its own expenses.

1. To provide land and buildings as well as incidental facilities.

2. To supply or replace equipment, machinery and materials which are not provided by the Japanese side.

3. In respect to the equipment, machinery and any other materials supplied by the Japanese side, to bear expenses for transportation within Malaysia as well as for installation, operation and maintenance there of in the operation of the project.

4. To bear all running expenses necessary for the implementation of the project.

5. To appoint technical and administrative staff required for operating the project.

6. To provide the Japanese experts with privileges, exemptions and benefits which are no less favorable than those granted to the experts of the third countries under similar circumstances.

7. To issue Residence Permits to the Japanese experts and

their families.

8. To provide accommodations for the Japanese experts and their families.

9. To provide transportation facilities and travel allowance for the Japanese experts in the course of their duties.

10. To exempt custom duties, internal taxes and any other charges, if any, imposed on equipment, machinery and any other materials which are provided by the Japanese side.

11. To undertake to indemnify the experts in respect of damages awarded against them for actions performed in the course of their official duties.

IV. Sequence of Japan's Technical Cooperation

Japan's technical cooperation is provided in the following order:

Preparatory Stage:
(1) Preliminary Survey Team
(2) Implementation Survey Team
(Signing of Record of Discussions)

Implementation Stage:
(1) Assignment of Japanese Experts
(2) Provision of Equipment, Machinery and Materials
(3) Receiving of Counterpart Personnel to Japan for Training and/or Observational Study in Japan
(4) Evaluation Team

Self-reliance Stage: Fully self-reliant operation of the project by the Malaysian side

6. 〈 TENTATIVE IMPLEMENTATION SCHEDUAL 〉

July 1981

Tentative Implementation Plan of the Project (Draft)

1. Objective of the Project

The objective of the project is to establish the National Metrology Laboratory in SIRIM, which aims at meeting the needs of the metrification programme and at the same time the requirement for metrology in Malaysia, thereby to contribute to the development of the industry of Malaysia.

2. The Implementing Organization of the Project

(1) Japanese side

Japan International Cooperation Agency (JICA)

(2) Malaysian side

Standards and Industrial Research Institute of Malaysia (SIRIM)

3. Basic Plan of the Project

(1) The main functions and activities of the National Metrology Laboratory.

i. To procure and maintain the national basic standards (primary, secondary, tertiary and working units) of weights and measures such as mass, length, volume, electricity and temperature.

ii. To establish the standards supplying system.

iii. To provide consulting services and training facilities to the Government and Industry.

iv. To support the establishment of secondary level laboratories which offer calibration services to the industry.

v. To conduct research and development in metrology including instrumentation technology for the industrial and scientific purposes.

(2) Organization and Staffing Plan of the National Metrology Laboratory in SIRIM.
(To be finalized after completing this Preliminary Survey)

4. The Draft Implementation Plan (cf. Tentative Schedule of Implementation (Draft))

(1) Responsibility of the Government of Japan

i. Dispatch of Japanese Experts

(i) To assign three long-term Japanese experts in the fields of metrology on mass, length, volume, electricity, temperature and their related machinery.

(ii) To assign two short-term Japanese experts.

ii. Acceptance of Malaysian Counterpart Personnel

To train four Malaysian counterpart personnel per year.

iii. Provision of Machinery and Equipment

To provide machinery and equipment necessary for the implementation of the project.

(2) Responsibility of the Government of Malaysia

The following responsibilities will be taken by the Malaysian side at its own expenses:

i. To provide land and building as well as incidental facilities.

ii. To supply machinery and equipment which are not provided by the Japanese side.

iii. Others (refer to the Talking paper)

5. Terms of Technical Cooperation

For four years from the date of signing of the Record of Discussions.

Tentative Schedule of Implementation (Draft)

		1981	1982	1983	1984	1985
Fiscal Year		January	January	January	January	January
Japanese Fiscal Year		April	April	April	April	April
Dispatch of Survey Team	Preliminary Survey Team	↔				
	Implementation Survey Team		↔			
	Consultation Team			↔		
	Technical Guidance Team				↔	
	Evaluation Team					↔
Dispatch of Japanese Experts	Long-term Expert				3 person ↔	
	Short-term Expert		2 person ↔	2 person ↔	2 person ↔	2 person ↔
Acceptance of Counterpart Personnel			↔	↔	↔	↔
Provision of Machinery & Equipment (Japanese Side)			↔	↔	↔	↔
Responsibilities of Malaysia	Buildings		Construction ↔	↔		
	Machinery & Equipment		Installation of Basic Machinery & Equipment ↔	↔	↔	↔

7. <GENERAL CIRCULAR NO.1 OF 1979>

(Sulit BPE 40/100/9 Vol. III.)

KERAJAAN SERI PADUKA BAGINDA

MALAYSIA

GENERAL CIRCULAR NO. 1 OF 1979

TERMS AND CONDITIONS FOR FOREIGN EXPERTS SERVING IN MALAYSIA

I. Introduction

The purpose of this Circular is to revise the existing terms and conditions provided to foreign experts in Malaysia. This revision is necessary in the light of experience gained in the past years and to effect general improvements in the administration of technical assistance programmes as a whole. This Circular will thus supersede General Circular No. 1 of 1969.

2. The provisions of this Circular will come into effect as from 1st January, 1979 and will be applicable to experts recruited and assigned to Malaysia after this date. Experts assigned to State Governments, Public Authorities and other Agencies such as Malaysian Industrial Development Authority, Federal Agricultural Marketing Authority, Malaysian Industrial Development Finance Limited, University of Malaya etc. will be governed by the provisions of this Circular. The payment of allowances and other remuneration to experts so assigned will be the responsibility of the respective agencies.

II. Definition and Categories of Technical Assistance Experts or Projects

3. In general, the term 'expert' in this Circular refers to suitably qualified and experienced personnel provided under the Colombo Plan and other bilateral programmes to carry out specific assignments requested by the Malaysian Government. The terms of this Circular will not be applicable to those experts for which separate agreements between the Malaysian Government and other Countries/ Agencies concerned have already been entered into e.g. the United Nations Development Programme and other United Nations Specialised Agencies, the Ford Foundation, the International Executive Service Corps. etc.

4. Three board categories of technical assistance experts/projects are distinguished and covered by this Circular. These are:

(a) provision of a long-term expert defined as an expert whose period of assignment in Malaysia is not less than six months;

(b) provision of a short-term expert defined as an expert whose period of assignment is less than six months;

(c) provision of consulting services and surveys involving a single or a team of experts with final responsibility resting on the chosen consulting firm or appropriate body.

III. Allowances and Other Privileges of Experts

A. LONG-TERM EXPERTS

5. The allowances and other privileges provided to long-term experts serving in Malaysia are as follows:

(1) Installation Grant

A lump sum installation grant will be paid to meet the initial settling-in cost of the expert for the first 14 days of his arrival in Malaysia. Thereafter the expert will be paid housing and subsistence allowances as specified in (2) below with payment for the month following the first 14 days being calculated on a pro rate basis. The rates of installation grant are as follows--

Single (or unaccompanied by wife)	$ 780
Married and accompanied by wife	$1,100
Married and accompanied by wife and one or two children not exceeding 18 years of age	$1,500
Married and accompanied by wife and more than two children not exceeding 18 years of age	$1,900

The installation grant is a once-for-all payment appropriate to the expert's circumstances at the time of arrival and no other claims can be made following the arrival of his family or when an expert returns from overseas leave on extension of his assignment.

(2) Housing and Subsistence Allowances

The Malaysian Government will not be responsible for providing the expert with accommodation. However, at the request of the expert, the Agency to which the expert is assigned will assist him in finding suitable private accommodation for rental. In lieu of housing the expert will be paid the appropriate rates of housing allowances as set out below.

An expert assigned to Sabah or Sarawak may be given accommodation provided there are available unoccupied Government quarters. In such a case no housing allowance will be paid to the expert nor will he be charged the normal government rental on the quarters. The expert will, however, be responsible for payment of water, electricity and other charges incurred while in occupation of such premises.

Subject to the above paragraphs the rates of housing and subsistence allowances payable to an expert depending on his family status are set out as follows--

	Allowances for		
	Housing	Subsistence	Total per month
Single (or unaccompanied by wife)	$500	$300	$ 800
Married and accompanied by wife	550	500	1,050
Married and accompanied by wife and one or two children not exceeding 18 years of age	650	650	1,300
Married and accompanied by wife and more than two children not exceeding 18 years of age	650	750	1,400

NOTE:

(i) At the request of the donor Government/Agency, the housing and subsistence allowances may be combined and considered as a single allowance.

(ii) The housing allowance is viewed as a subsidy and payment will be effected through the donor Government/Agency.

(iii) For the purpose of payment of subsistence allowance, an expert who is married without children and is not accompanied by his wife will be deemed as if he is single.

(iv) Where both husband and wife are assigned as experts they will be paid housing and subsistence allowances as for an expert accompanied by wife plus an additional sum of $300 per month.

(v) Changes in the family circumstances of an expert should be reported immediately to the Head of Department concerned to permit adjustments to be made in respect of the expert's entitlement to allowances under this category. In cases of doubt the Department will refer the matter to the Economic Planning Unit (E.P.U.) for a decision which will be final.

(3) Mileage and Other Allowances While on Duty

Mileage allowances will be paid at the normal rates for journeys performed on official duties in accordance with the existing regulations governing transport and travelling claims in the State/Public Authority to which the expert is assigned. No claim is permitted for travelling between house and office. An expert who does not own or use a personal car for official duties will be reimbursed for the cost of actual transportation used and in conformity with existing rules applicable to Government officers. An expert on duty tour away from his Headquarters is eligible for a Day Allowance/Subsistence Allowance in the same way as Government Group A officers. The payment is governed by the relevant regulations currently in force and at the rates applicable in Peninsular Malaysia, Sabah and Sarawak and of the Authority to which he is assigned.

For purpose of calculating an expert's claim for mileage and other allowances while on duty, an expert's salary will be deemed to be within the range of either $1,006 - $1,804 or $1,805 - $2,865 depending on the salary of his Malaysian counterpart in the State/Agency to which the expert is assigned.

(4) Conveyance Advance

An expert is eligible to apply for a loan for the purchase of a motor car. The terms for the granting of this loan are as follows--

(i) the loan is granted only once in the whole tenure of the expert

including all extensions of his assignment;

(ii) the amount of loan applied for should not exceed the value of the vehicle to be purchased subject to a maximum amount of $7,000. The terms of the loan will be in accordance with existing regulations enforced in each of the States of Malaysia or as amended from time to time. If a second hand car is purchased a valuation certificate on the car must be attached with the application;

(iii) the loan is to be repaid in monthly instalments and to be settled in full before the expert departs from Malaysia. At the time of making the application for the loan the expert is requested to submit his proposal for the repayment of the loan;

(iv) during the period of the loan the expert is requested to ensure that the car is adequately convered by insurance and he is not permitted to seel or transfer his motor car without the prior permission of the Government;

(v) provision of sureties for the loan is not required but the Head of Department to which the expert is assigned should ensure that the Registration Card of the car is stamped with the words "Ownership Claimed by the Government" until the full loan has been repaid.

Application for motor car loan should be made in the usual forms and clearly identified with the words "EXPERT" for submission to and approval by the Secretary General to the Ministry/Head of Department/State/Public Authority concerned which will also ensure that the various conditions set out above have been and will be satisfactorily met.

(5) Local Leave

Local leave at the rate of 25 days a year will be granted to an expert. However, an expert assigned to an educational institution will not be eligible for leave other than the normal school or college terminal holidays or with the prior permission of the authorities concerned. Such leave may be accumulated throughout the expert's tour of duty in Malaysia and may also be taken outside Malaysia. All local leave shall be taken within the period of the expert's assignment in Malaysia and

an expert will not be permitted to accumulate his leave immediately prior to the completion of his assignment thereby in effect bringing forward his date of departure from Malaysia.

The Head of Department to which the expert is assigned or the officer designated by him is the approving authority for such leave and application for leave must be made in the usual form.

(6) Medical Attention

During his assignment in Malaysia, an expert and his family will be eligible for free medical and dental attention at Government hospitals. A letter of identity for this purpose will be issued to an expert seeking medical attention or dental attention.

No reimbursement will be made by the Government if the expert or his family elects to be treated by private practitioners. If admitted at a Government hospital the expert will be required to pay ward charges as laid down in Government regulations applicable to his Malaysian counterpart in the State/Department/Public Authority where the expert is assigned.

For purpose of determining class of ward, an expert's salary will be deemed to be within the range of either $1,006 - $1,804 or $1,805 - 2,865 depending on the salary of his Malaysian counterpart in the State/Department/Public Authority to which the expert is assigned. If an expert requests to be admitted to a higher class of ward than that to which he is eligible, he will be billed accordingly as is laid down in government regulations. Head of Departments must ensure that the appropriate hospital bills incurred by an expert are promptly settled.

(7) Exemption from Income Tax

An expert is exempted from Malaysian income tax on his official emoluments in respect of the period of assignment in Malaysia. An expert filling a cadre-post will be required to pay taxes on the local portion of the salary paid to him.

(8) Exemption from Customs Duty/Excise Duty and Sales Tax

(a) Subject to the conditions enumerated in sub-paragraph (d), an expert will be exempted from the payment of customs duty/excise

duty and sales tax in respect of bona fide personal effects and essential basic household equipment brought into or purchased in Malaysia for his own use or the use of his dependents provided that such personal effects and equipment are brought into Malaysia or purchased locally within the period of six months from the date of his arrival in Malaysia. For the purpose of facilitating customs clearance of the said personal effects and equipment a list thereof must be presented to the Head of Department to which the expert is assigned;

(b) In addition and also subject to the conditions in sub-paragraph (d), an expert is exempted from the payment of ad valorem registration fee and customs duty/excise duty and sales tax in respect of one motor car only brought into Malaysia or purchased locally in Malaysia, provided that --

(i) such imported motor car has been used by the expert concerned in his country of origin or the country of last posting, or

(ii) the motor car is purchased locally within the period of six months from the date of his arrival in Malaysia.

(c) Any expert desiring to make purchases of duty free locally manufactured/assembled items must in the first instances apply for the approval of the customs through the Head of Department. Such purchases are only permitted if orders are placed with the manufactures and delivery made from bonded warehouses. These purchases are allowed only in the first six months of the expert's stay in the country;

(d) The exemptions in sub-paragraphs (a), (b) and (c) are given subject to the following conditions--

(i) the aforesaid exemptions are given only once irrespective of whether the expert's assignment in Malaysia is extended beyond the original period of his assignment;

(ii) each expert is confined to only one unit or set or a reasonable number of any bona fide personal effects to be imported or purchased locally;

(iii) the personal effects and household equipment for which the

aforesaid exemptions are given, if imported, should be from the country of origin or the country of last posting or acquired from any other country while on transit to Malaysia;

(iv) the personal effects and household equipment or motor car in respect of which the aforesaid exemptions are given will be cleared by and delivered from the Customs upon presentation there to of a Certificate of Exemption prepared and duly signed by the Head of Department to which the expert is assigned;

(v) the Head of Department to which the expert is assigned shall maintain a complete record of all the personal effects, household equipment and motor car so cleared and shall make such records available upon request for inspection by the Customs or other appropriate Government authority;

(vi) any personal effects or household equipment or motor car in respect of which the aforesaid exemptions are given, if disposed of in Malaysia during or at the end of the period of an expert's assignment in Malaysia shall be subject to the normal customs duty or other charges at the rate in force on the date the exemption was given and on the value at the time of disposal.

B. SHORT-TERM EXPERT

6. A short-term expert will be paid an all-inclusive per diem allowance of $70 per day. He is not entitled to the allowances and privileges stated in paragraph 5, items (1), (2) and (4). He is however eligible to the facilities provided under paragraph 5, items (3), (5), (6), (7) and (8).

7. The despatch of an expert or mission by the donor Country/Agency to evaluate any project or request will not be considered as falling within the scope of this Circular and therefore no payment of allowances or other privileges will be made to such expert besides the normal reception and other arrangements for his programme of visits, discussions, etc.

C. CONSULTING SERVICES AND SURVEYS

8. Consulting services normally involve the provision of a team of experts from the donor Government, other bodies and firms for the purpose of carrying out feasibility, management and specific projects. The fee for such services will be paid by the donor Government/Agency and that individual experts provided under this arrangement will not therefore be eligible to any other allowances from the Government.

9. The Government will, however, provide the Consultants with local facilities including reasonable transport, office accommodation which are necessary in carrying out the assignment. All reports and materials obtained in the course of their assignment remain the property of the Government which has absolute discretion as to their use or disposal.

IV. Equipment Associated with Provision of Experts and Services

10. All equipment brought into Malaysia associated with the assignment of the expert and consulting services will be exempted from customs and other duties. The Head of the Department/Authority concerned will ensure that such equipment is speedily cleared at the port of discharge. A Certificate for Exemption from customs duty under this category, to facilitate customs clearnace, is to be issued by the Head of Department/Public Authority concerned and copies of such Certificates are to be extended to the Treasury, Customs and E.P.U. A condition of this exemption is that the equipment is not to be resold in Malaysia but may be re-exported or left behind as a gift to the Government/Public Authority.

V. General

11. An expert is not immune from the laws and regulations prevailing in Malaysia including communication regarding classified matters/documents. In the exercise of his duties he is required to give due regard to these laws. In the event of any legal action arising from the performance of his official duties he will be entitled to legal assistance in the same manner as a Government officer.

12. The Government of Malaysia will have the right after due consultation with the donor Government/Agency to request the recall of any expert whose work or conduct is unsatisfactory.

13. The terms of this Circular are subject to review from time to time in accordance with policy and regulations and they may be modified, amended or terminated by the Government.

TAN SRI DATO' ABDULLAH BIN AYUB,
Chief Secretary to the Government,
Malaysia

ECONOMIC PLANNING UNIT,
PRIME MINISTER'S DEPARTMENT,
KUALA LUMPUR,

31st July, 1979

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JAPATAN GETAK KEBAJAAN, KUALA LUMPUR

68083-27-7-79.

(Sulit UPE. 40/100/9 Vol. III.)

KERAJAAN SERI PADUKA BAGINDA

MALAYSIA

AMENDMENT TO GENERAL CIRCULAR NO. 1 OF 1979

TERMS AND CONDITIONS FOR FOREIGN EXPERTS SERVING IN MALAYSIA

The following amendments are to be incorporated in General Circular No. 1 of 1979 of 31st July, 1979 and effective from 1st January, 1979:

(i) Delete "ad valorem registration fee and" in paragraph 5 (8)(b).

(ii) Paragraph 5 (8) (d)(vi) now reads as follows--

"the goods of which the aforesaid exemptions are given cannot be sold or otherwise disposed of within a period of 3 months from the date of import of 6 months from the date of (local) purchase, provided that in thecase of a motor vehicle if sold or otherwise disposed of shall be subject to the normal duties as the rate in force on the date the exemption was given and on the value at the time of disposal".

(iii) Last sentence of paragraph 6 now reads as follows--

"He is, however, eligible to the facilities provided under paragraph 5, items (3), (5), (6), (7), (8) (a) and (8) (b) (i) subject to item (8) (d)".

TAN SRI DATO' ABDULLAH BIN AYUB,
Chief Secretary to the Government,
Malaysia

ECONOMIC PLANNING UNIT,
PRIME MINISTER'S DEPARTMENT,
KUALA LUMPUR.

1st November, 1979

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JABATAN PERCETAKAN NEGARA, KUALA LUMPUR

68702-27-11-79

JICA