

ANNUAL WORK PLAN FROM APRIL 1991 TO OCTOBER 1992 --- Plan --- Accomplishment ANNEX 2

Japanese Fiscal Year	1991				1992		
Calendar Year	1991				1992		
ITEM	4 (1/4)	6	7 (2/4)	9 10 (3/4)	12 1 (4/4)	3 4 (1/4)	6 7 (2/4)
Japanese side							
1. Dispatch of Japanese Experts							
a) Long-Term Experts							
1- Chief Adviser							
2- Measurement Standards							
b) Short-Term Experts							
1- D.C. & R.C.							
2- Power and Energy Primary Standards							
3- A.C. Equipment and Repair Works							
4- Repair of Electronic Measuring Instruments							
5- Power and Energy Primary Standards and A.C. Equipment							
6- A.C. and Power							
7- R.F. Calibration							
8- R.F. Repair							
2. Acceptance of Syrian Counterpart personnel in Japan							
1. R.F. Calibration							
2. A.C. and Power							
3. Research							
4. R.F. Repair							

NOTES: This schedule is subject to condition that necessary budget will be acquired for the implementation of the Project  
 This scope of technical cooperation is subject to change within the scope of the provision given in the Record of Discussions.



**ANNEX (3)**

**MAIN NSCL ACHIEVEMENTS AND ACTIVITIES DURING 1990-1991**



Main NSCL Achievements  
and  
Activities during 1990 - 1991

N . S . C . L

JULY 1991

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## I- Preface :

NSCL's project started in October 1987 as a five year project-type cooperation. It is now in the final implementation stage .

The provision , implementation and use of necessary equipment and machinery during the last four years were executed as scheduled . The dispatch of (14) Japanese experts and training of (16) Syrian counterpart personnel in Japan, was also similiary executed ..

NSCL's activities began in March 1989 immediately after the provision of the first batch. The total number of calibrated instruments is approximatly /4300/ , and the total number of repaired instruments approximates /1400/.

Those instruments belong to about thirty different institutions , organizations , private companies , etc.

On the other hand NSCL initiated some original development activities , namely :

- Two prototypes of saturated standard cells.
- A prototype of a decade resistor.
- A prototype of a water triple point container.
- Four fixed value standard resistors .

The first results obtained are very encouraging.

In addition all necessary care and measurements are taken to preserve and maintain our "National Standards" which are technically in good condition .

In general the instruments and machinery provided are used in optimal conditions and are giving appreciated means of measurements to our staff .

## II- NSCL's organization and management

NSCL's organization is shown in figure (1). SSRC's General Director and Deputy Director General are directly involved in supervising NSCL's management committee. This committee is composed of the Director of NSCL as chairman and includes in its membership some representatives of SSRC and NSCL .

On the other hand , the Planning Board is composed of Japanese experts ( team leader and long term expert) , director of NSCL , technical manager and section chiefs.

The Planning Board meets weekly to determine NSCL's working priorities and needs and performs the evaluation of the activities of the preceding week .

NSCL is composed of six sections:

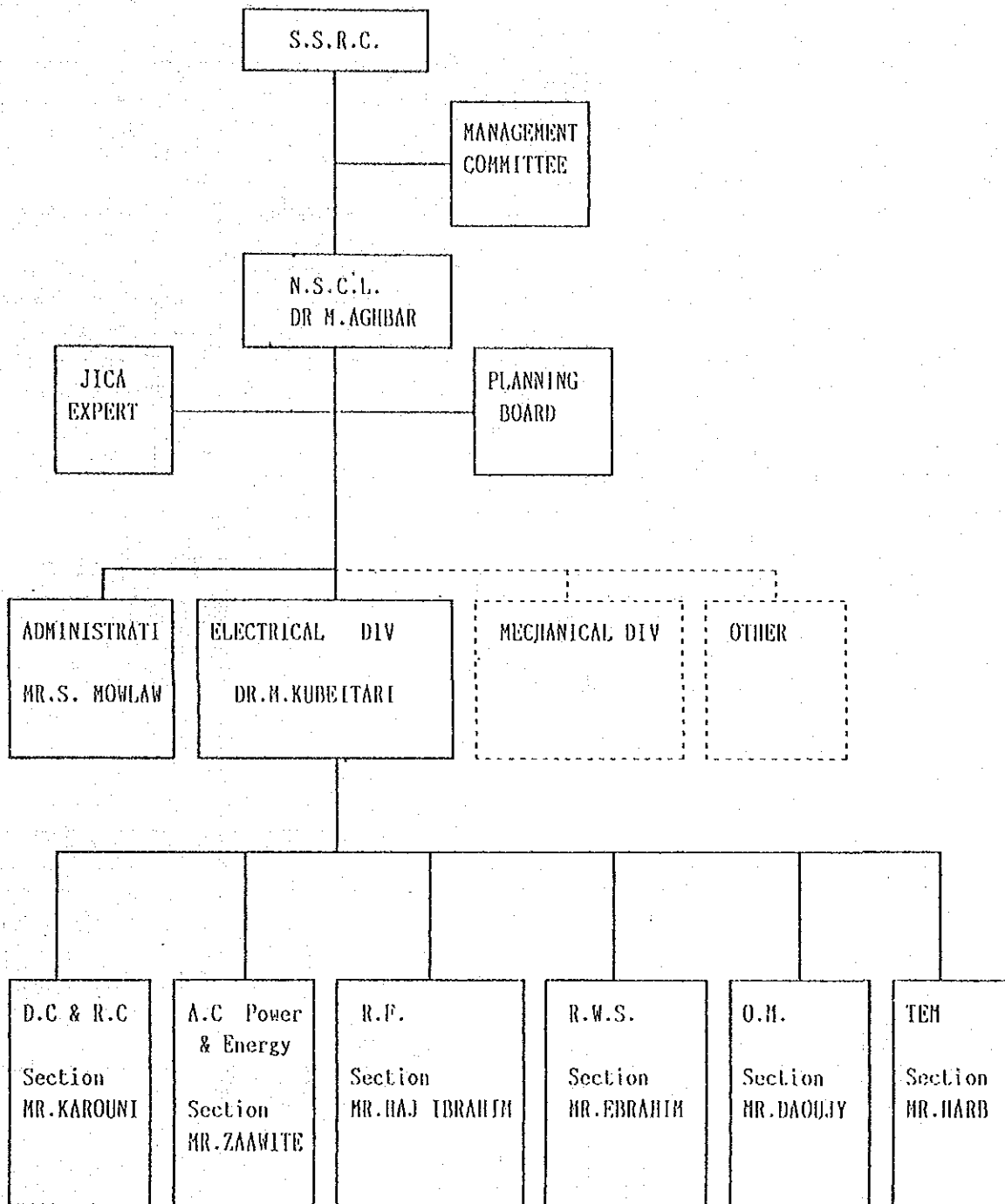
- Direct Current (DC) section
- Alternating Current (AC) section
- Radio Frequency (RF) section
- Temperature (Tem) section
- Repair work-shop (R.W.S)
- Office machine work-shop (O.M)

The office machine work-shop performs maintenance and repair of SSRC's office machines (photocopy machines typewriters, calculators) .It was introduced in January 1991.

Every section chief is controlling the realization of his own annual program and managing the flow in/out of instruments to be repaired and/or calibrated .

Table (1) shows the names of NSCL's employees as well as their actual work (function).





Figure(1)  
NSCL ORGANIZATION

### NSCL STAFF

Name	Age	Univ. Inst.	Main Subject (Career)	Present work
Dr. M. Aghbar	38	CNAM (Paris)	Metrology, Systems	Director
Dr. M. Kubeitari	34	Strasbourg, CNAH (Paris)	Instrumentation, Measurement Metrology, Systems	Technical manager
Mr. M. Nokary	45	Belgrade Univ.	Electrical Eng, Construction Dept.	Member of Management Committee
Mr. M. Zaawite	37	Damascus, Cairo	Electronic Eng, Calibration, QC	Sec. ch. (AC, PR)
Mr. M. Jouma	32	Damascus Inst.	Electronic,	AC
Mr. k. Barakat	25	Damascus Inst.	Electronic,	AC & PR
Mr. M. H. Ibrahim	33	Damascus Univ.	Electronic Eng.	Sec. ch. (RF)
Mr. S. Hassan	35	Damascus Inst.	Electronic,	RF
Mr. M. Kashour	34	Damascus Inst.	Electronic.	RF
Mr. M. Z. Sweid	22	Damascus Inst.	Electronic!	RF
Mr. B. Makkih	25	Damascus Univ.	Electronic Eng.	RF
Mr. B. A. Adas	25	Damascus Univ.	Electronic Eng.	RF TEMP
Mr. A. Karouni	40	Damascus Inst.	Electronic, Test & Calib. Dept.	Sec. ch. (DC & RC)
Mr. I. Salhani	27	Damascus Inst.	Electronic.	DC
Mr. W. Saadi	27	Damascus Inst.	Electronic,	DC
Mr. M. Hafiri	25	Damascus Inst.	Electronic,	DC
Mr. M. Harb	31	Damascus Univ.	Electronic, Solar system	Sec. ch. (Temp)
Mr. S. Akrami	24	Damascus Inst.	Mechanical Air- Condi.	Ten & Store
Mr. R. Ebrahim	31	Aleppo Univ.	Electronic, Test Equip.	Sec. ch. (Rep)
Mr. N. Elias	31	Damascus Inst.	Electronic.	Repair
Mr. K. Saadi	25	Damascus Inst.	Electronic.	Repair
Mr. G. Sharani	27	Damascus Inst.	Electronic.	Repair

Name	Age	Univ.Inst.	Main Subject(Career)	Present work
Mr.S.Sahade	25	Damascus Univ.	Electric Eng.	Repair
Mr.S.Rayan	27	Damascus Inst.	Electrical.	Repair
Mr.I.Kanaan	22	Damascus Inst.	Electronic.	Repair
Mr.H.Boustati	23	Damascus Univ.	Electronic Eng.	Repair
Mr.S.Amro	29	Damascus Univ.	Electronic Eng.	Repair
Mr.N.Harba	26	Lattaqia Univ.	Electronic Eng.	Repair
Mr.A.Daoujy	25	Damascus Univ.	Mechanical Eng.	OM
Mr.A.M.Hedar	32	Damascus Inst.	Fine Mechanic.	OM
Mr.S.Refai	21	Damascus Inst.	Informatics.	OM
Mr.M.S.Hawlani	47	Cairo Univ.	Bachelor of Commerce and Financial Science.	Administration
Mr.A.H.Saada	30	Damascus Inst.	Electric.	Store Keeper
Mr.M.Al-Sabek	36	Damascus Inst.	Commerce.	Administration
Mrs.S.Shalati	34	Damascus Inst.	=	Secretary
Miss.R.Safadi	25	Damascus Inst.	Accountancy.	Library
Mr.A.Zeitoun	45			Administration
Mr.H.Suliman	21			Reception
Mr.S.Zaidan	21			Canteen
Mr.B.Azalden	35			Driver
Mr.B.A.Shanab	32			Driver

### III- Budget of NSCL

The financial subvention attributed to NSCL during the fiscal year 1990 (01.01.1990 to 31.12.1990) as well as our current budget (01.01.1991 to 31.12.1991) are show in table (2).

	Description	In (S.P.) 1990	In (S.P.) 1991
1-	Wages & salaries	2 432 244	2 600 000
2-	Administrative fees	212 704	250 000
3-	Air conditioning system for repair work-shops, (technical furniture)	1 500 000	1 000 000
4-	Water , electricity and telecommunication	215 020	230 000
5-	Heating	121 332	130 000
6-	Spare parts and material	102 037	600 000
7-	Furniture	168 962	190 000
	Total :	4 752 299	5 000 000

Table (2): Budget of NSCL

The planned budget , as given in the " record of discussion 1990" , was approximately four million Syrian pounds.

It is worth saying that the air conditioning system installed in the repair work-shop cost more than scheduled.

Regarding spare parts , we could not buy alarger stock(the Syrian market does not have available convenient components or devices) .

### IV - NSCL's internal regulation :

The main purpose of NSCL's internal regulation is to clarify the rules and the methods applied in NSCL to maintain " Syrian National Standards " , to control NSCL's activities and jobs .

It describes mainly the following items :

- I- NSCL's organization
- II- Control regulation of NSCL's standards and measuring instruments.
- III-Property control of NSCL's equipments.

Paragraph (I) describes the function of NSCL's divisions and gives the range and the accuracy of measurements conducted in the different sections .

Paragraph (II) explains the registration , classification and the traceability system of NSCL standards .

It also describes the calibration, procedure contents, NSCL primary and secondary standards , Annual Plan, historical card , calibration card and result sheets .

It includes also the requirement for daily operation for AC,DC & Temp standards.

*V - Property control :*  
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The standards and measuring instruments which compose the primary, secondary, tertiary , transfer standards , calibration systems and auxiliary devices are coded and labeled according to the classification system described in attachment (1) .

*VI- Annual work plan (1990 -1991 )*  
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The annual work plan shown in table (3) was elaborated last year, included in the Record of Discussions . It is fully realized. Only time delay was observed due to the international circumstances .

ANNUAL WORK PLAN ( FROM APRIL 1990 TO MARCH 1991 )

CALENDAR YEAR	1990							1991				
	JAPANESE FISCAL YEAR							1991				
ITEM	4	5	6	7	2/4	9	10	4	12	3	4	7
(Transfer of Technology )												
1. Operation of Calibration System												
2. Maintenance of Measuring Standards.												
3. Repair of Measuring Instruments.												
4. Control Of Measuring Instruments												
( Transfer Of Technology )												
<u>Syrian side</u>												
1. Maintenance of Facilities												
2. Allocation of Counterpart Personnel												
3. Preparation of AI Forms for Dispatch of Japanese Experts.												
4. Preparation of A2-J Forms for training Counterpart Personnel in Japan.												

ANNUAL WORK PLAN ( FROM APRIL, 1990 TO 1991 )

CALENDAR YEAR		1990				1991									
JAPANESE FISCAL YEAR		1990				1991									
ITEM		4	7	7	2/4	9	10	*	12	1	4/4	3	4	4	7
Japanese side															
1. Dispatch of Japanese Experts															
a) Long-Term Experts.															
1- Chief Adviser															
2- Measurement Standards															
b) Short-Term Experts															
1- DC. RC															
2- AC. Repair															
2. Acceptance of Syrian Counterpart Personnel in Japan.															
1- Electric Power & Energy															
2- Repair															
3- RE															
3. Provision of Equipment & Machinery.															
1- DC(Primary)															
2- RC(Primary)															
3- AC(Primary)															

Note : This plan is subject to condition that necessary budget will be acquired for the implementation of the project.

This plan is subject to change with in the scope of the record of discussions.

Indeed NSCL received :

DC Primary Equipment }  
RC Primary Equipment } Third batch  
AC Primary Equipment }  
  
Personal computer and peripherals.  
  
Transportation car  
  
Power and energy Standards and }  
related measuring systems. } Fourth batch  
Transfer standards }  
Small mechanical work-shop }

Books  
Spare parts , for NSCL's faulty instruments

*VII - NSCL's technical documents*  
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Table (4) shows the number of technical documents (producers , result sheets etc..) prepared or under preparation by NSCL's sections .

Indeed calibration works are carried according to specified procedures. The measured values are filled in certain processing sheets which facilitates the calculation of the final results. Those results are kept in specific result sheets. Certificates , when requested by our customers , contain also the appropriate result sheet.

Historical cards , such as the ones in attachment (2) , are used to study the behaviour of our National Standards , transfer standards , reference standards and related instruments .

The transfer card, table (5) , is attached to any instrument to be calibrated or repaired in order to obtain necessary information related to time or location . It is indispensable for the calculation of the cost we are planning to request our customer to pay for services rendered.



NUMBER OF TECHNICAL DOCUMENTS  
PREPARED OR UNDER PREPARATION  
AS OF 14-07-1991

DOCUMENTS UNDER PREPARATION												
LAB	AC		DC		TEM		RF		REP		OSC	
CAL/ADJ PROCEDURE	a	b	a	b	a	b	a	b	a	b	a	b
	7	0	10	12	0	0	-	-	6	-	-	-
FORMAT OF RESULT SHEET	0	0	8	1	0	0	0	0	0	0	0	0

DOCUMENTS ALREADY PREPARED																		
LAB	AC			DC			TEM			RF			REP			OSC		
CAL/ADJ PROCEDURE	a	b	c	a	b	c	a	b	c	a	b	c	a	b	c	a	b	c
E	10	2	3	16	3	1	9	1	2	12	5	11	0	-	-	-	-	-
RESULT SHEET	10	6	76	28	16	103	10	3	6	21	6	53	13	-	72	2	-	-

- a- Number of technical documents for the instruments belonging to each mentioned lab in NSCL.
- b- Number of technical document for the instruments concerning the other labs in NSCL.
- c- Number of technical documents for the instruments belonging to the other company

Table (4)  
Technical documents

N . S . C . L							
DESC:.....				TYPE.....			
MANUF:.....				S/NO:.....			
REG. NO:.....				CUSTOMER.....			
STORE:							
LOC	ENTR DATE	SIGN	CAL DATE	SIGN	TIME (H)		
					CH	CL	REP

Table(5)

N . S . C . L TRANSFER CARD

VIII - NSCL's activities :

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In order to fulfill our goals , we have to work in several axes , namely : marketing and advertising , leveling up, routine works in addition to preservation of our "National Standards".

It is worth saying that we do our best to realize the flow chart indicated in figure (2) when a routine work (repair, adjustment, calibration) is required.

The following sub-paragraphs describe our main activities :

VIII-1- National Standards preservation:

National Standards Preservation is one of the most important task we have to accomplish . Actually, every section is conducting periodical measurement, in order to study the stability , change and behaviour of those standards . Historical cards are filled to centralize all information related to such standards.

The pursuit of the annual working plan assure reliability and traceability of our measurements regarding our " National Standards" .

For the time being our National Standards are technically considered in satisfactory condition.

VIII-2- Practice of trouble -shooting adjustment and calibration.

The number of monthly repaired instruments is shown in the figure (3) . The total number , as of 30-06-1991 , is 1368 :

10 belonging to NSCL  
451 Belonging to SSRC  
908 Belonging to out side organizations

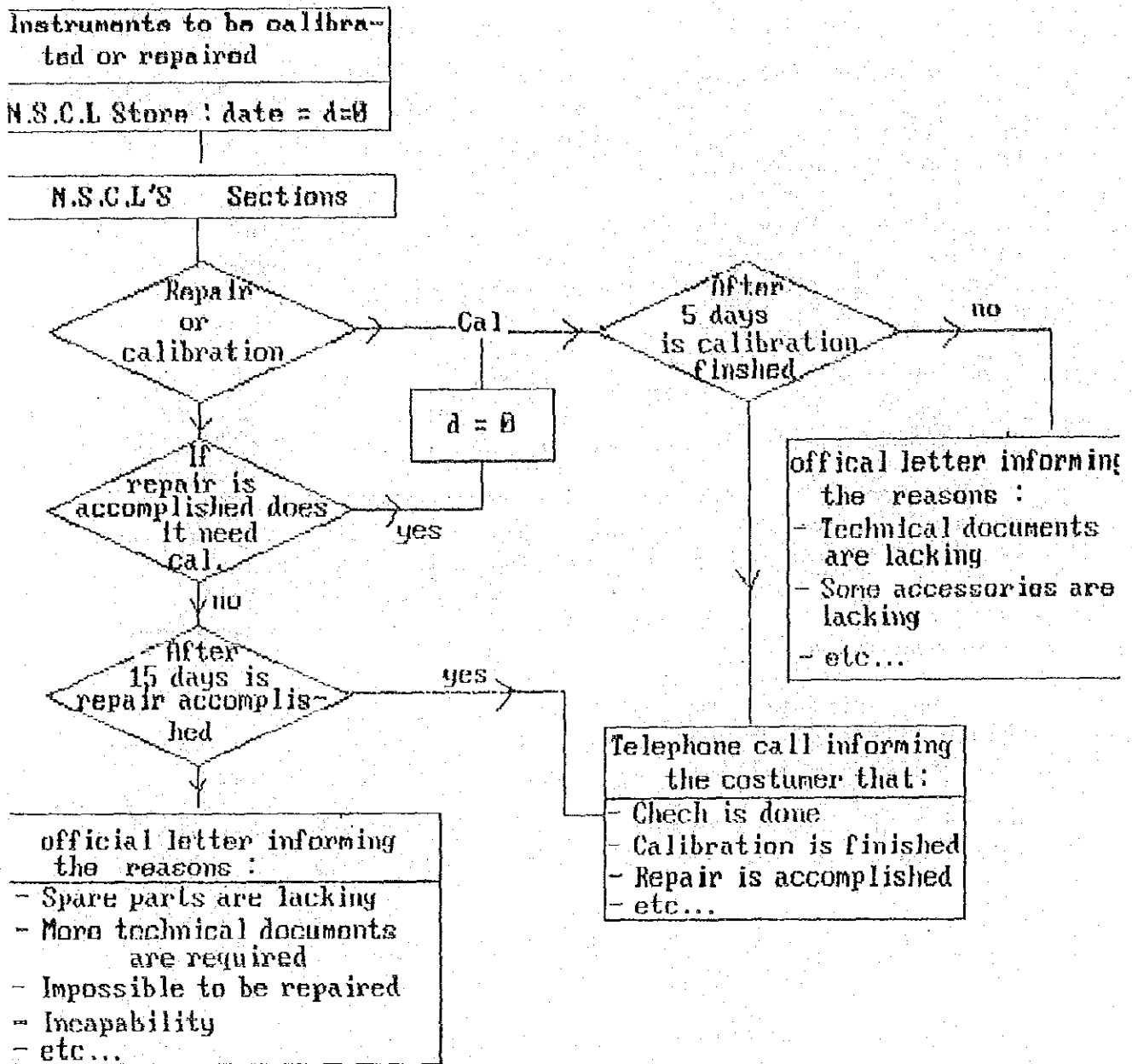
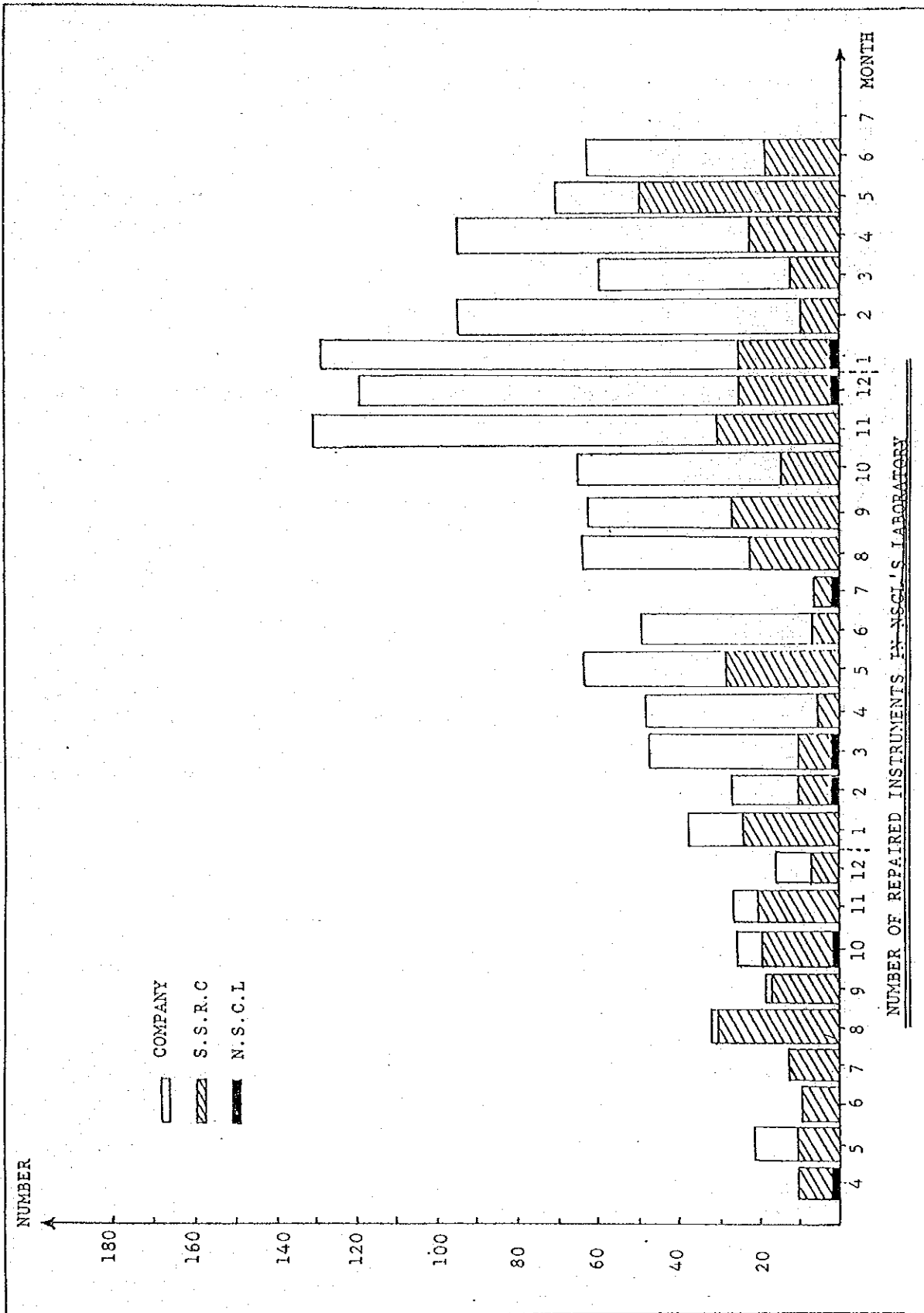


Figure (2)

Flow chart of Events Related to Instruments to be Repaired or Calibrated



Last year , as by 31-01-1990 , the total number of repaired instruments was 239:

5 belonging to NSCL  
140 belonging to SSRC  
94 Belonging to external organization

We failed in repairing about 20% of instruments submitted due to our shortage in :

Spare parts  
Service manuals  
Extension boards

The number of monthly calibrated instruments is shown in the figure (5).The total number as of 30-06-1991 is 4220 :

1336 belonging to NSCL  
919 belonging to SSRC  
1965 belonging to external organizations

Last year , as of 30.01.1990 , the total number of calibrated instruments was 1042 :

536 belonging to NSCL  
394 belonging to SSRC  
112 belonging to external organizations

It is worth nothing that 60% of calibrated instruments (excluding NSCL's ) were adjusted .

#### VIII-3- Lectures:

Table (6) gives information related to lectures held at NSCL during the period (3-1990 to 7-1990).

Many of them are given ( in English or Arabic) by confirmed engineers or technicians to sensitize NSCL staff about new techniques or methods used in Metrology.

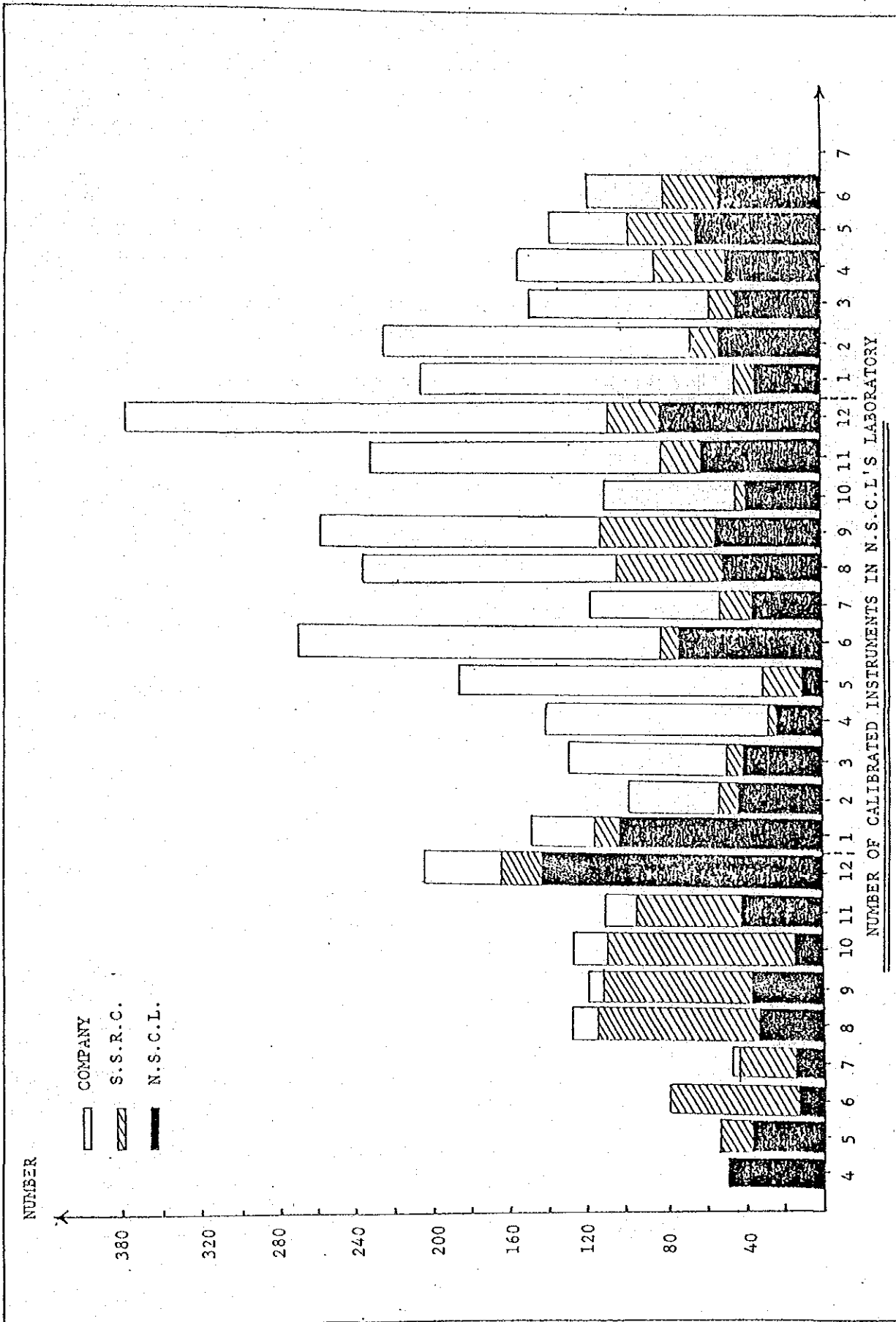


Table (6) : LECTURES HELD AT NSCL

3-1990 to 7-1190

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DATE	LECTURER	TITLE	LANGUAGE
14-3-1990	Mr.M.Harb	Programming the RAM function of XY-poltter2000	A
2-5-1990	Mr.A.Karouni	The procedure of using the DATA BOOK , and how to find the equivalents of a device	A
20-5-1990	Mr.B.A.Adas	Filters	A
23-5-1990	Mr.A.Karouni	Soldering and assembly of electronic components	A
29-5-1990	Mr.Noguchi	Traceability	E
30-5-1990	Mr.S.Akrami	Air-Condition system and maintenance	E
3-6-1990	Mr.M.Hafiri	Logic circuits	A
11-6-1990	Mr.M.Aghbar	New representations of Volt & Ohm.	E
17-6-1990	Mr.A.Karouni	The procedure of using the DATA BOOK , and how to find the equivalents of a divisor (repeated).	A
27-6-1990	Mr.S.Amro	Resonance circuits	A
29-7-1990	Mr.T.Haji	Fundamentals of oscilloscope and oscilloscope basic system diagram.	A
5-8-1990	Mr.Abu.Adass	Applications about the main logic gates	A



7-8-1990	Mr.K.Barakat	Methods of testing some conductors.	A
11-8-1990	Mr.K.Saadi	Non active elements(resistors, capacitors , inductors) how to measure and read.	A
18-8-1990	Mr.A.Karouni	Stabilized DC power supply	A
21-8-1990	Mr.W.Saadi	Low voltage measurements the use of the ratio box Yew 2747	E
26-8-1990	Mr.S.Hasan	Pulse signal and pulse generation circuits	A
19-9-1990	Mr.G.Abed	Legal metrology and the career of metrology.	A
24-9-1990	Mr.E.Kanaan	Operational amplifactor	A
13-10-1990	Mr.A.Karouni	Precise DC voltage measurements .	E
20-10-1990	Mr.S.Hasan	Principles of radio frequency and mismatching.	A
23-10-1990	Mr.M.Z.Swed	Flip flops and counters	A
2-12-1990	Mr.G.Shaarani	Field effect transistors	A
11-5-1991	Mr.N.Harba	Sine wave oscillators	A
28-5-1991	Mr.M.Aghbar	NSCL	A
28-5-1991	Mr.Aghbar	How to express the final result of measurements	A
16-6-1991	Mr.E.Salhani	The interference, grounding shielding and the other technics used to reduce noise	A
18-6-1991	Mr.A.H.Sada	Safety procedures during work "Industrial Security"	A

We began exchange of information with some Syrian companies and organizations (General Company for Cables Industry, Industrial Testing and Research Center) where M.M.Aghbar introduced NSCL.

Also , Mr.G.Al Abed from ITRC gave a lecture at NSCL about legal Metrology.

The other lectures (mainly in Arabic ) are to open possibility of technical discussion as well as to give our staff the chance to communicate.

The future program of internal lectures will depend entirely on the realization of " Third Country Training Program" .

#### VIII-4- Teaching & Guidance of Visitors:

NSCL is participating in teaching at the High Institute for Applied Sciences and Technology (HIAST) as well as in the Intermediate Institute of Technology.

One hundred fifty five visitors toured NSCL during the period (2-1990 to 7-1991), of whom sixty eight were Syrian.

We are planning to have an open house, after the full installation of power and energy laboratory.

#### VIII-5- Original Research and Development Activities :

NSCL began research work and in-house development of several standards :

- Saturated standard cell.
- Standard resistors
- Decade resistors
- Water triple point container

##### - Making Saturated Standard Cells:

The first prototype of saturated standard cell, made using tungsten lead, has an average of emf = 1.018450 V at ambient temperature ( 23±1) C.

The second prototype of saturated standard cell is already made using platinum lead. We are going to watch the cell's stability after immersing it in a temperature control oil bath.

##### - A new series of decade resistors:

A new series of decade resistors (based on design proposed during CPEM88) are made and the design of which is based on a minimum number of resistance elements connected

series and having nominal values  $R$ ,  $2R$  and  $3R$ , where  $R$  is the nominal value of resistance per step. It consists of 5 resistance elements having the nominal values :

$$R_1=R, R_2=3R, R_3=3R, R_4=2R, R_5=R$$

Where  $R$  is the nominal value of every step of the decade. The resistance elements are connected in series, the dial switch of this decade resistor consists of 22 contact studs which are divided into two equal sets. For each set of studs there is an isolated brush which transfers any contact of the set to a common contact connected to the output terminal. The two brushes, which are isolated electrically to a common moving arm. The turning of this arm by one step in the clock wise direction increases the setting of the decade resistor by  $R$ . The output resistance of this decade is variable in 10 equal steps.

The first prototype of a new series of decade resistors were made by using high stability metal film resistors, and it consists of 4 decades :

X 10 ohm , 100 ohm , 1 k ohm and 10k ohm.

- Standard Resistors 1 k ohm , 10 k ohm and 100 k ohm.

Standard Resistors were made by, using high stability thin film resistors manufactured by Alpha Electronic LTD and Vishay Company, and the values of these resistors are 1 k000 and 10k000 and 100k00 ohm. Each of these standard resistors consists of four resistors connected serial-parallel between the two potential terminals(P.T.). The current terminals (C.T.) are connected to the (P.T) by using a copper plate. The zero resistance value between (C.T.) and ( ) was = 0.5m ohm. In the near future, we are going to observe their stability. We are expecting to get 10ppm/year stability

- Triple point water container :

The prototype was manufactured at SSRC using glass ( Pyrex, Duran Co. ) . The measurements were conducted using our system of measurement (uncertainty + 0.02C ) . The prototype showed very good stability but the value we measured was : 0.05 C .

We have to continue measurements in order to detect exactly the reason of this shift .

IX - Japanese experts & training in Japan :

It is an opportune occasion to say that this project would not have achieved its current level had it not been for the very precious help of the Japanese experts and the fruitful training NSCL's staff received in Japanese institutions, laboratories and companies.

The table here-after gives the names and functions of Japanese experts as well as Syrian counter-parts, involved in realizing the annual work plan (1990-1991) :

Name	Function	Period	Counterpart
Mr.S.Hatakeyama	Long term expert	11.6.91 to 10.92	Mr.M.Kubeitari
Mr.M.Inoue	Short term expert	11.6.91 to 11.10.1991	Mr.A.Karouni
Miss Ch.Yamanochi	Team leader	11.7.1991 to 10.92	Mr.M.Aghbar

On the other hand, four persons were trained in Japan.

Mr.M.Haj Ibrahim  
Mr. R.Ibrahim  
Mr.K.Barakat  
Mr.M.Hafiri.

They received individually satisfactory knowledge and practice in different specific fields. Their training period was from 26.03.1991 to 30.6.1991.

As mentioned in the tentative schedule, here-after, two Japanese experts are to be dispatched during 1992.

We will highly appreciate the possibility of dispatching three experts in the following fields :

- RF
- AC & PR
- Repair

On the other hand , NSCL's planning board proposes the scheduled training to be in the following fields :

- RF
- AC & PR
- Repair
- DC.

*X - Third country training program (TCTP) :*  
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NSCL's management committee with the approval of SSRC is very eager to realize TCTP during 1992 , before the end of this project , for several reasons:

- It will surely demonstrate the capability of NSCL to Syria 's neighboring countries .

- It will open the possibility to NSCL to participate in regional cooperation in the field of Metrology .

- It will oblige NSCL's staff to prepare themselves for such practice .

- NSCL could repeat the same course to raise the level of Syrian staff from different organizations or private sectors.

NSCL's planning board meeting No.(69) discussed this matter and found the following proposal optimal .

Title : A Regional Training Course in Electrical Metrology.

number of trainees : 21 trainees.

external lecturers : 2-4 lecturers.(to cover general subjects during at most 4 days) .

duration : 18 working days ( 14 practical + 4 days general)

Proposed dates : (1-22) September from ( 9 AM to 4 PM)  
Friday : Holiday.

XI - Proposals :

JICA has implemented hundreds of projects all over the world. Many of those projects relate to common fields. We think it would be beneficial if the associated institution organs communicate and find ways to exchange knowledge and services.

The fields which are of great interest for NSCL are :

Metrology  
Testing  
Electronic training center

- The National Electrical Standards in our region have never been compactively evaluated. We think it will be of very great impact if NSCL organize such an evaluation especially for (voltage & resistance reference standards).

- The first project concerning NSCL will terminate before the end of 1992. We believe it is worth preparing general description of NSCL to appear in a scientific journal published in Japan or elsewhere.

- We are very much willing to receive the supervision, help of experts, and transfer of technology which could result from a collaboration between one Japanese laboratory (ETL, JEMIC, or other) and NSCL to study and develop :

New type standard cells  
Solid state voltage reference  
Thin film multijunction thermal converter  
Electronic household single-phase watt-hour meter

- We have received a lot of knowledge and know-how from Japanese experts but we need to continue expanding our capability with Japanese expert support.

Hence we believe it would be very beneficial for NSCL's staff if exchanges of staff with (JEMIC, JMI, ETL) could take place.

- In Syria almost all foreign companies do not possess service centers . Hence NSCL could have a joint collaboration with some Japanese companies to play the role of this center (repair & calibration of electronic measuring instruments).

- One of the biggest problems we face is spare parts . SSRC will highly appreciate and cooperate with any foreign company to implement in NSCL an electronic store or any other mechanism facilitating the provision of spare-parts whenever needed.

- In June 1992 ,in France , there is a Conference on Precise Electromagnetic Measurements CPEM'92 . It deals with standards , related measurements and laboratories .It will be very beneficial if two of NSCL's staff can attend this conference.

- We are trying to take care of SSRC's office machines specially photocopy-machines . This kind of service could be enlarged for outside companies . But , actually our staff are not skilled in such work and do not have the required technical documents . We would very much appreciate it if JICA could accept one trainee in this field .

#### XII - NSCL's future Prospectives :

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NSCL's staff , with SSRC's approval and support, will employ exert all efforts :

- To preserve and maintain our National Standards; the question on how to maintain traceability should be answered as soon as possible. The list of our "Transfer Standards" is given in attachement (3) . They have to be periodically calibrated in Japan or elsewhere.

- To set-up a training course for Syrian staff , TCTP will provide us with the necessary framework to repeat it at least once a year.

- To find suitable solutions for spare parts . JICA's support will facilitate enormously to put the solution in concrete form.



- To emphasize research and development activities . The advice of Dr.Yamanochi (team leader) will be of very great importance . Also, the acceptance of a Syrian researcher in ETL or JEMIC will considerably facilitate the realization of our works.

- To establish mechanical & optical division . NSCL has actually electrical & electronic divisions , maintaining the National Standards of :

- Some basic units : electrical unit (A)  
temperature: (K)

- Some derived units: Frequency unit (Hz)  
voltage unit (V)  
resistance unit (ohm)  
capacitance unit (F) etc ...

Concerning the other basic units (meter, kilogram , candela , mole , second ) , no Syrian organization is keeping them .

Attachement (4) gives "NSCL's requirements for Mechanical & Optical Standards " .

- To emphasize our need for some additional equipment (given in attachement (5) per order of priority) .



Attachment (1) : The system used to execute Property Control.



The system used to execute property control:

V-1- The standards and measuring instruments which compose the primary, secondary, tertiary, transfer standards, calibration systems and auxiliary devices are coded and labeled according to the classification system described in attachment (1).

Every standard, measuring instrument, device or component has a property control number, which contains 10/digits. These digits have been divided into four parts such as:

Main group - group - sub group - part number  
XX XX XX XXXX

V-2- The main group digits refer to the class of device function, for example the standard and measuring instruments are designated by :

88-XX-XX-XXXX

V-3- The group digits refer to the main function of the standards measuring instruments, such as :

88-00-xx-xxxx standards  
88-01-xx-xxxx DC voltage and current  
88-02-xx-xxxx AC voltage and current  
88-03-xx-xxxx comparators  
88-04-xx-xxxx bridges and R,C,L, boxes  
88-05-xx-xxxx generators and synthesizers  
88-06-xx-xxxx analyzers  
88-07-xx-xxxx temperature devices and thermometers  
88-08-xx-xxxx digital and analog meters  
88-09-xx-xxxx recorder and printers  
88-10-xx-xxxx oscilloscopes  
88-11-xx-xxxx converters  
88-12-xx-xxxx attenuators

V-4- The sub-group digits refer to the description of the standard or the measuring instruments, such as :

88-00-00-xxxx saturated standard cell  
88-00-10-xxxx double wall-sealed, 4-terminal st'd resistor  
Acc + 20 ppm  
88-00-31-xxxx dry-nitrogen standard capacitor  
88-00-41-xxxx AC/DC thermal transfer standard

88-00-50-xxxx Rubidium frequency standard  
88-01-14-xxxx DC voltage/current standard  
88-02-01-xxxx AC voltage/current standard  
88-03-00-xxxx direct current comparators bridge  
88-04-04-xxxx decade resistance box.

V-5- The part number digits refer to the type, value and accuracy of the standards or measuring instruments, such as :

88-00-12-0001 yew2792, 1 ohm st'd resist, 150ppm  
88-00-15-0000 yew2793, 1M ohm, st'd resist, +100ppm  
88-00-11-0003 yew2794, 100 ohm, st'd resist, +20ppm  
88-07-02-0000 yew2455, digital thermometer.

V-6- The electrical and electronic components have the property control number which also consists of /10/digits, divided into four parts as mentioned before .

Three main groups (89-90-91) are reserved for them, for example:

semiconductors and active components are designated by the main group number 89 and 90 .

V-7- Again the group digits refer to the kind of the device (component), such as :

89-00 to 19-xx-xxxx for diode  
89-20 to 44-xx-xxxx for transistors  
89-45 to 54-xx-xxxx for thyristors  
89-55 to 74-xx-xxxx for linear Ics.  
89-75 to 91-xx-xxxx for digital Ics.  
89-92 to 99-xx-xxxx for interface Ics.  
89-00 to 09-xx-xxxx for interface Ics.  
90-00 to 09-xx-xxxx for interface Ics,  
90-10 to 14-xx-xxxx for memory Ics.  
90-18 to 24-xx-xxxx for microcomparator Ics.

V-8- The sub-group digits refer to the description of the device such as :

89-02-01-xxxx germanium diodes, VRRM =5-200V, I<sub>o</sub> =>100 mA  
89-30-04-xxxx Si-PNP-Low power TR. V<sub>CEO</sub> > 50V  
89-57-10-xxxx OP-Amp, single-chopper-stabilized, I<sub>B</sub> >10 pA  
89-82-05-xxxx D-type flip-flops, 1-Bit, ECL.  
89-84-53-xxxx Gates, AND-OR-Invert, 2-2 IIP, CMOS.