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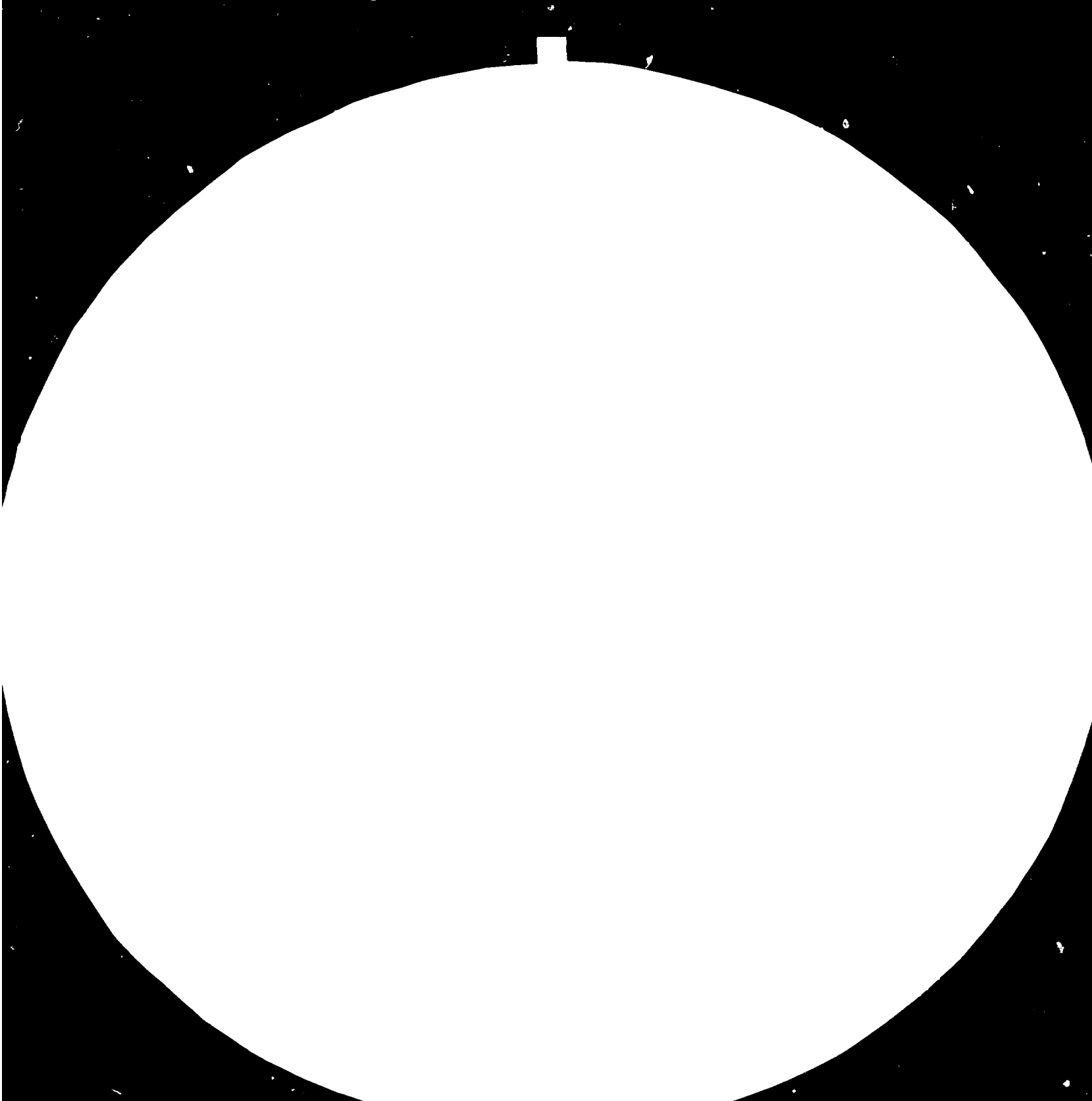

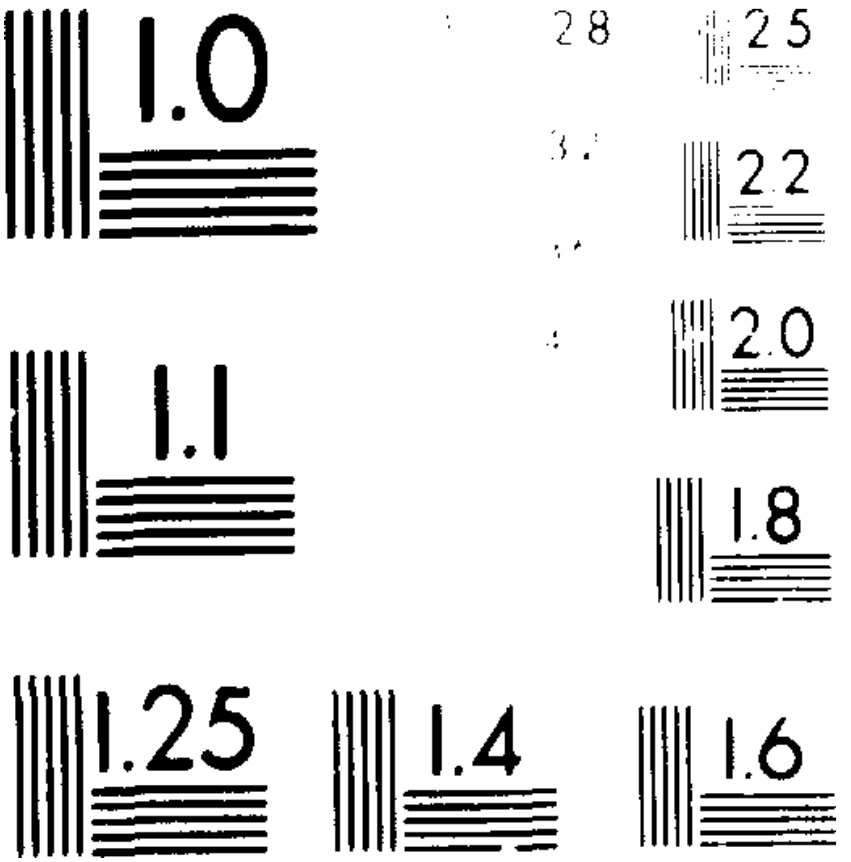

RESTRICTED

1 June 1984
English

Ethiopia.

NATIONAL QUALITY CONTROL
AND TESTING CENTRE .

13864

DP/ETH/79/003
ETHIOPIA

Final Report

Prepared for the Government of Ethiopia
by the United Nations Industrial Development Organization,
executing agency for the United Nations Development Programme

Based on the work of Dr.K.S.Stephens
Chief Technical Adviser and Expert on Quality Control
and Certification Marking Schemes

United Nations Industrial Development Organization
Vienna

This report has not been cleared with the United Nations Industrial Development Organization which does not, therefore, necessarily share the views presented.

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I. Objectives and Logic of Project

The development objective of the project, as given in the project document is as follows:

"To introduce standardization and quality control in the Ethiopian economy, both in the primary and secondary sectors, with a view to improving the quality of goods produced for the home and export markets, to enhancing industrial growth and to promoting a shift from the export of raw materials to that of semi-finished and finished products."

The establishment of a National Quality Control and Testing Centre under the auspices of the Ethiopian Standards Institution -- with adjunct functions of (1) preparing and promulgating national standards, (2) implementing, promoting and enforcing standards via quality certification programmes, (3) promoting, teaching and providing direct consultation on quality control principles and techniques, (4) developing and implementing programmes of weights and measures, including industrial and scientific metrology -- is seen as a necessary logical step contributing to the above development objective.

The lack of standards and adequate specifications at the procurement, in-process, final product and marketing stages is seen as a serious deficiency in the present industrial situation in Ethiopia. Furthermore, improving the quality of goods produced for the home and export markets is seen as an outcome of implementing proper attitudes, techniques and principles of quality control. Such a result will come from promoting, teaching and direct industrial consultation of quality control methodology which places emphasis on identifying and solving problems of scrap, waste, repair and rework, excessive absenteeism, low productivity, inadequate maintenance of equipment and instruments, inadequate market analysis, etc.

II. Activities Carried Out, Outputs Produced, and Related Problems

Over the course of the project the main activities have included (1) the design and construction of the new facilities for the Ethiopian Standards Institution, including an office complex, conference centre, two major laboratory buildings, workshop and stores building, metrology centre building, and employees' cafeteria and services building, (2) the requisitioning, ordering and procurement of equipment for the laboratories, workshop and office buildings (3) the installation, operation and training thereof of the equipment components and related tests and the development of test programmes for utilization of the equipment and identification of future needs, (4) training of ESI staff on overseas fellowships in related disciplines for the development of testing officers, (5) local training of ESI staff on the topics of certification and Quality Control, (6) training of a large corps of industrial personnel in quality control principles and techniques, including practical factory assignments, in-factory

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consultation and reporting, with ESI staff participation, and (7) general administration of the project.

The outputs generated by these activities and related results, where applicable, achieved therefrom are discussed below for each of the listed activities. Related problems are included to serve as a basis for future evaluation and correction of the system, wherever this can be achieved.

A. Design and Construction of ESI Compound

At this reporting date the various buildings, including construction furnishings, are nearing completion. The compound represents a significant undertaking for the provision of an infrastructure for further industrial development in Ethiopia. With adequate staffing and further provision of equipment, the compound offers possibilities of being utilized on a regional African basis as well.

Project start-up and full completion have been adversely affected by the extremely slow pace of construction, however. While started in 1979, construction on the compound is still not complete at this writing, some five years later. The project was scheduled for start-up in April 1979. However, the initial CTA began his assignment in October 1980, even then much too early for good project effectiveness -- especially since no training or industrial consultation activities were carried out for the first two years.

B. Requisitioning, Ordering and Procurement of Equipment

Initially, five sets of requisitions were issued from the project as follows,

1. Of 1980-11-06 for two project vehicles.
2. Of 1981-02-02 for 76 items of equipment.
3. Of 1981-04-15 and 21 for 40 items of equipment.
4. Of 1981-05-11 for 67 items of equipment.
5. Of 1981-07-09 for 171 items of glassware and related laboratory supplies based on a locally issued and executed subcontract.

Further to these the remaining requests have been handled mostly on a correspondence basis between the present CTA and PAC - UNIDO. Requisition 83/1 covering a duplicator, programmable calculator and audio/visual equipment was initiated by UNIDO HQ's on 1983-03-30. Additionally, requisition 83/2 covering an electronic scanner for stencil reproduction was also initiated by UNIDO HQ's on the same date. A further requisition, 83/3, was initiated by the CTA for accessories for the analytical chemistry lab on 1983-11-01.

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A list of equipment by lab discipline is given in Annex A, including name/description, date received, purchase order under which it was procured (for reference), item number (for reference to requisitions and purchase orders), requisition number, and any remarks. The list includes items of equipment cancelled from the original equipment list -- which goes back to a 1978 report by A.J.Scarr on contract number 77/08, project DP/ETH/75/010.

As can be seen in Annex A (date received column), most of the equipment has been received at the project. Notable exceptions, at time writing, include the variable speed precision lathe (delayed due to bankruptcy of original supplier -- but shipping papers show its arrival in Assab in April 1984 -- now awaiting clearance and transport to Addis Ababa and ESI), and the chemicals and gases needed for the chemical labs (excessive ordering delays).

Most of the equipment has been installed in the respective labs, workshop and office building. See discussion of section IIC below.

Like the building compound, this set of equipment represents a significant beginning in the establishment of a national test capability and a National Quality Control and Testing Centre. It permits the Ethiopian Standards Institution to assume a very significant role in servicing the industrial, technical and scientific needs of the nation. With further strengthening of personnel (in numbers and technical capability/ qualifications) and equipment (see discussion under section IIC), the test labs can serve Ethiopia and, perhaps, other parts of Africa.

However, as for the building construction, procurement of equipment has been adversely effected by a number of problems, including (1) cost overruns in comparison to initial budgets; (2) lack of adequate coordination in the field as well as at UNIDO HQ's, resulting in over - cancelation of equipment units beyond the budgetary constraints and resultant delays in re-ordering and receipt as well as budget losses ; (3) poor supply performance by suppliers and lack of an adequate level of expediting of orders. Examples include (a) the heat treatment plant, ordered on 4 January 1982 on P.O. 15-1-N1406 for delivery before end of April 1982 -- not received in the field until 2 September 1983, and then with extensive damage to the furnace requiring total replacement, now excessively delayed; (b) the bandsaw, ordered on 31 December 1981 for delivery before end of February 1982 -- not received in the field until 27 May 1983; (c) the IBM Electronic Composer ordered on 28 October 1981 for delivery before end of February 1982 -- not received in the field until 3 March 1983 and the fonts not until 29 December 1983; (4) ordering delays and errors. The most significant of the delays at the latter stage of the project include the chemicals with final information provided in correspondence from the field dated 1983-12-09, while the order was not placed until 1984-03-29. Additionally, invoicing was not until 1984-04-24 and shipment not until 1984-05-23 -- the ultimate result being that the chemicals will undoubtedly not be available prior to the close-out of the Polytechna consultant's assignment for set-up of the chemical labs ! An example of ordering error are the signal generators ordered on P.O.'s 15-1-N1042 and 15-1-N1234 (SG 503) and subsequently corrected by P.O.15-3-D1095, but at additional cost to the

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project; (5) incomplete specifications for ordering. Serious examples include (a) the abrasion machine on P.O.15-1-N1348 for testing rubber or vinyl tiles when the intent was to test concerete tiles, (b) supply of an oscilloscope on P.O.15-1-N1042 without the plug-in units to make it functional, (c) supply of the generators on P.O.'s 15-1-N1042 and 15-1-N1234 without the power modules to make them functional. These problems are seen to arise from an inadequate communication between the field and UNIDO HQ's (PAC) with respect to supplier brochures, quotations, etc. On occasion, a purchase order will be issued with reference only to a certain quotation by a supplier -- without a copy of the quotation being supplied to the field; (6) delays and damages in shipping both internationally and by the local authorities as well as losses and inadequate servicing of losses by the local authorities, especially MTSC. Extreme examples include, (a) damage to the furnace part of the heat treatment plant on P.O.15-1-N1406, (b) failure to unload the tensile testing machine on P.O.15-2-N0584 on arrival at Assab on November of 1982 with return to the UK and subsequent re-shipment with arrival at Assab on 13 June 1983 with further failure to clear the unit resulting in delivery to the project site (ESI) in May 1984, (c) loss of case 4 of 5 of the pipe testing machine on P.O.15-2-N1226 with dimensions of 4.5 metres x 1 metre x 1 metre with mass of 2000 kgs. and subsequent failure to issue short landed certificate to facilitate insurance claim; (7) poor customer servicing by some suppliers, notably on the pipe testing machine on P.O. 15-2-N1226 and the heat treatment plant on P.O.15-1-N1406, but also with respect to incomplete & inconsistent supply as for example the toolroom surface grinder delivered without the main drive belt and electric motors requiring different over connection on the same machine to a consistent local voltage supply.

C. Installation, Operation, Training for Equipment and Tests

The main portion of this activity was programmed in the project document on a subcontract basis. The subcontract was awarded to Polytechna of Czechoslovakia on 15 October 1981 (much too early for project readiness and effectiveness). After many delays in scheduling of the consultants to begin their work (including incurring a US $ 10,000 penalty to the project) this activity began with the arrival of the Polytechna team leader to Addis Ababa on 19 January 1984 and the remaining six consultants on 2 February 1984.

As of this writing, the majority of equipment units have been installed initially, with identification of breakages, shortages, incompleteness, etc. communicated to UNIDO HQ's (IIB and PAC) and many replacement parts and necessary accessories already received. Counterpart staff from ESI have been assigned to work with the consultants for on-the-job training on the equipment units. In some cases (notably in textile & leather, electrical, and analytical chemistry) only one counterpart is actively working with the respective consultants. Actual operation of the equipment for tests on specific products has not, at this juncture, progressed to a satisfactory level. Neither has the development of test programmes for the immediate and future work of ESI progressed adequately. It is unfortunate that this report must be written prior to the completion of the consultants' work. Subsequent reports from the consultants and

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consultants' team are expected to reflect completion of test programmes and test operation -- as well as associated technical assistance programmes with specific factories.

The respective reports from the consultants are also expected to reflect the needs for additional equipment for the ESI labs and the National Quality Control and Testing Centre, beyond those initially conceived in the original equipment list for the project. Such data and information will serve as input to ESI for procurement with national budget funds and/or for further UNIDO/UNDP assistance to ESI.

Problems associated with this work include (1) continued delays in construction and furnishing of the labs and workshop including supply of electricity and water, (2) breakages, shortages, incompleteness of some equipment units and the lack of some accessories and supplies (see discussion above in section IIB, especially with respect to chemicals, gases, electrical components, precision lathe, damaged furnace for heat treatment plant, missing case for pipe testing machine, etc.), (3) a minimum and inadequate number of counterpart staff to assist and to learn from the consultants.

An additional area of equipment, not falling under the subcontract consultants, is that of office and training equipment procured under the project to improve the capability of ESI to produce standards, prepare training materials and to conduct meetings and training programmes. These items are also shown in Annex A and include: a duplicator; a stencil scanner; a type composer; a programmable calculator; audio/visual equipment such as overhead projector, 35 mm slide projector, 16 mm sound film projector, a radio/cassette player; portable screen, easel whiteboard and pads, and accessories; statistical training devices such as a quincunx, sampling beads and chips, etc; slide and cassette presentations on quality control subjects; and literature on quality control for ESI's library.

With respect to these items; the duplicator and scanner have been integrated well into the reproduction department of ESI with servicing and training provided by the local agent; the composer has not yet been utilized for setting type for standards or other documents -- contacts have been established with the local IBM agent with procurement of reference & instruction manuals but training offered by IBM is at an exorbitant price -- additionally, contacts with the Government job classification function have failed to establish an adequate grade and salary for operation of the composer; the programmable calculator will be utilized by the labs and distributed to supplement similar units which have come as accessories to some of the test equipment; the audio/visual equipment has been set up in an audio/visual room in the office building and responsibility assigned to an ESI staff member -- some of the components have been used in the recent training/workshop programme (see IIF below) and some have already been borrowed for use by other organizations for seminars (quality control seminar conducted by the National Leather & Shoe Corporation); the statistical devices have also been used in the latest workshop with ESI staff participation, as have the slide and cassette presentations; the literature has been integrated within the ESI library system.

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D. Overseas Training Fellowships for ESI Staff.

Related biannual project progress reports have detailed the fellowships provided by the project and should be consulted for additional details. (In particular, Forms F for Nov. 82 thru June 83 and July 83 thru Dec. 83). At this writing five overseas fellowships have been completed, one presently underway, and four planned for implementation. The five completed programmes have been in the areas of: Testing of building materials (2), testing of electrical products, testing of food and agricultural products and maintenance and servicing of mechanical equipment. The fellowship presently underway is in the area of testing of food and agricultural products. The fellowships being planned are in the areas of textile and leather testing, and spectrophotometry & chromatography (3).

Only one candidate has been selected for the latter three (3) fellowships. As this is an extremely complicated and sensitive science, it is especially urgent that ESI appoint additional candidates to fill these fellowship positions, for eventual work on this equipment.

Some problems have been associated with the overseas fellowships — apparently with the trainers and trainees. These include language barriers, organization of programmes, conscienciousness of participants, etc. The entire intent of the project document has not been fulfilled with respect to fellowships -- since twelve fellowships were initially programmed.

E. Local Training of ESI Staff in Certification and Quality Control.

Again, related project progress reports detail programmes conducted on this activity. (In particular, Form I-2 for Nov. 82 thru June 83). These include programmes of two weeks on Certification Marking Schemes and Standardization in Nov. 82 and of four weeks on Quality Control and Sampling in Dec. 82. Additionally, ESI staff participated in the various training/consulting workshops on Quality Control for industrial personnel (See II F below), however, the participation was extremely limited with only four staff participating in the first programme in Addis Ababa, only one staff member in each of the programmes in Asmara and Dire Dawa, and only two staff members in the programme in Wonjii. A larger group (some eight) participated in the second Addis Ababa workshop -- including handling of some lecture sessions.

Additionally, Saturday morning working/discussion sessions on Certification were conducted during the month of March 1984 for ESI staff from the technical division (with responsibility for Certification and Quality Control). This included a detailed examination and discussion of existing regulations and documents pertaining to Certification, suggestions for improving and expanding the existing Certification programme, and procedures of Certification utilized in other countries.

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Problems associated with further development of the Certification programme in Ethiopia include (1) the lack of a sufficient number of national standards, (2) the lack of attention to quality in the market place, (3) the lack of legal support for Certification -- with several examples of actual judgments in legal cases favoring the manufacturers and (4) a limited number of ESI staff devoting attention to Certification and now divided between functions such as testing officers, quality control trainers and consultants, etc.

F. Industrial Training/Consulting Programmes in Quality Control.

For the enhancement of linkages between ESI and industrial personnel for cooperation on matters of quality and quality control -- as well as direct training of a large number of industrial staff, a series of training/consulting programmes were planned and conducted in Addis Ababa and other industrial centres in Ethiopia over the period from January 1983 through May 1984. Five programmes were conducted as follows:

Addis Ababa	, January 17 - February 25, 1983
Asmara	, March 21 - April 15, 1983
Dire Dawa	, May 16 - May 31, 1983
Wonjii	, August 8 - August 12, 1983 (Some follow-up over May 21-24, 1984)
Addis Ababa	, April 23 - May 18, 1984.

The first four of these programmes as well as the general principles, obervations, conclusions and recommendations are covered by a major project technical report of 21 November 1983. This report, and in particular, its recommendations, must be viewed as an important part of this final report and will not be repeated here.

The fifth programme (second in Addis Ababa) involved 75 industrial participants from some 51 factories and/or corporations. To complement the earlier technical report, the list of participants is given in Annex B and the factory visit schedule is given in Annex C of this report. The additional experience from this fifth programme serves to place even further emphasis on the recommendations of the earlier technical report (section IV on pages 38-46).

G. General Administration of the Project

Details of this activity need not be enumerated, though they form an important part of project execution and management.

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III. Achievement of Immediate Objectives

The project document lists some six immediate objectives which in turn should contribute to meeting the development objective of the project. Each is listed in the following sections with related comments.

A. "To establish within the organizational structure of the Ethiopian Standards Institution (ESI), a National Quality Control and Testing Centre, to set up and fully equip testing laboratories in the following product areas:

- mechanical and building materials
- chemical products
- electrical products
- textile and leather products
- agricultural and food products;"

This objective, with the possible exception of the term" fully equip", will be met by the project by its completion in mid-July when the sub-contractor's consultants complete their assignments. An assessment at this time would indicate that the original budget and the original equipment list were not, by any means, adequate enough to "fully equip" such laboratories. This will be borne out more fully by the reports of the consultants and the consultants team. However, in the development process, the laboratories and supporting equipment will serve to establish a significant testing capability in Ethiopia. Certain areas, even falling within the original equipment list, will not be fully developed -- as indicated under sections IIB and C -- for the various reasons stated thereunder. Furthermore, such laboratories almost always need continued development and expansion to serve industrial development. This will require a national budget and may well be aided further by additional multi-lateral UN assistance under a second phase of the project.

The electrical labs (lacking actual testing equipment), the textile and leather labs (which suffered large cuts in related equipment in the early stages of the project) and microbiological labs (not included in the project design) will require further work, in particular.

B. "To develop procedures for testing materials, products and commodities, with respect to their various properties and quality, in order to give effect to and enforce adopted Ethiopian Standards;"

As discussed in section IIC, as of this writing, this objective (related activity) has not progressed to a satisfactory level. Emphasis has been placed on this requirement for the remaining time of the Consultants' assignments with their respective counterparts' assistance. This objective must be assessed in mid July

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C. "To carry out research as regards physical and mechnical characteristics, of products and materials, their chemical compositions, durability, safety and other requirements, of relevance to the elaboration of Ethiopian Standards;"

This objective presumes the installation and operation of the test equipment and must be viewed as a future activity (objective) of the labs under direction of the counterpart staff, with possible assistance by international staff under a second phase of UN support. However, some limited work in this area may result from technical assistance programmes with specific factories carried out by some of the Polytechna consultants and their respective counterparts. It also should be assessed in mid July.

D. "To establish the necessary linkages with domestic industry with a view to securing its active co-operation in implementing the standardization and certification scheme;

Some extensive discussion related to this objective is detailed under section IIF above and the referenced technical report showing significant progress in this area. The Ethiopian Standards Institution has only to continue this effort to maintain close liaison with domestic industry.

E. "To strengthen the Standards Mark Certification Scheme operated by the ESI through the establishment of certification systems for products for which Ethiopian Standards have been issued;"

Again, comments on this objective are detailed in section IIE above and on pages 43-45 of the earlier technical report. Beyond the training given to ESI staff, the working discussions, and the promotion of Certification among industrial personnel participating in the training/consulting workshops, no significant improvement in the Certification programme has taken place during the tenure of the project.

F. "To train national staff in all aspects of quality-control and in the operation of a standardization scheme.

This objective (activity) is also discussed in sections IIE and F above and includes the overseas fellowships of section IID and the on-the-job training of section IIC. However, in view of the keen interest in Quality Control shown by the Ministry of Industry, the respective Corporations and individual factories, as reflected by their participation in the training/consulting workshops and establishment of quality control departments, there is an urgent need in Ethiopia for a number of nationals to become well versed and experienced in the methodology of Quality Control, beyond that possible from the limited programmes of training conducted during this project. More extensive training of several qualified and enthusiastic personnel should be carried out by Government sponsorship, bi-lateral or further multi-lateral aid.

IV. Utilization of Project Results

The main thrust of the project, as the title suggests, has been the

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establishment of the National Quality Control and Testing Centre, which includes the respective laboratories as well as expanded programmes of training, and consultation with industry. For proper and adequate utilization of these results, some very significant developments are required of ESI and Government, in general. These involve the establishment and active implementation of programmes and related infrastructure for utilizing test capability and quality control (in its broadest sense). This includes the following, which also serve as recommendations of this report:

1. Practical, sensible programmes of quality control in all factories, including study and control of waste, scrap, excessive losses of manpower, energy, materials, downtime and deterioration of machinery and equipment at all major process steps. It also includes test and control programmes vital to support efficiency and lower cost of production at each major process operation; including transportation, storage and delivery. It further includes massive training efforts at in-plant, sector or corporation, and ministry levels; all with ESI involvement.

2. Establishment, promotion and implementation of specifications and related quality requirements and the infrastructure for checking of requirements are being met among all Government departments and agencies dealing with the promotion and sale of Ethiopian products on the international market. An export inspection programme utilizing the test capability of the National Quality Control and Testing Centre is a strong recommendation.

3. The same as 2, above with respect to all Government departments and agencies dealing with the purchase of materials, parts, commodities and products from abroad for importation to Ethiopia. Establishment of an import inspection programme utilizing the coordinated test capability of factories and ESI (NQC & TC) is another strong recommendation.

4. Effective integration of the Ethiopian Standards Institution into the industrial, technical and scientific infrastructure of the nation. This includes defining the role and services to be performed by ESI for full utilization (and enhancement) of its capabilities. It includes the re-establishment of the standards preparation and promulgation functions -- with full industrial and commercial support. It includes improvement and expansion of the Quality Certification programme along the lines of instruction under this project with proper and adequate legal, industrial and commercial support. It includes adequate staffing of ESI (in numbers and technical competence with commensurate grades and salaries) for the present three major departments of (1) Standards and Specifications, (2) Certification and Quality Control, and (3) National Testing Centre and the future major department of (4) National Metrology Centre. It includes the establishment of an industrial testing service, a technical assistance programme and an applied research programme to assist the areas of 1, 2 and 3 above. It includes the

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establishment of the National Metrology Centre including weights and measures (legal metrology), industrial metrology (measurement and calibration) and scientific metrology (custodian of physical standards of measurement), with UNIDO/UNDP assistance commencing in 1985.

V. Further Recommendations

As referenced earlier in this report, the previous Technical Report of 21 November 1983 must be taken as a significant and integral part of the reporting process under this project. It contains significant comments and recommendations relating to specific factories, as detailed within, and a major section, "IV. OBSERVATIONS, CONCLUSIONS AND RECOMMENDATIONS" on pages 38-46, with significant general recommendations.

The last section of this report, IV. Utilization of Project Results, lists four developments required of ESI and Government, in general, to implement if project results are to be fully utilized. These are very strong and urgent recommendations of this project terminal report, some of which are paraphased from the earlier referenced Technical report.

Some further recommendations follow:

1. With the investment of 6.8 million birr by Government in a significant new compound for the Ethiopian Standards Institution and the investment of US $ 1.5 million in UNIDO/UNDP technical assistance in equipment, expertise, and fellowship training under the present project and the further contemplated investment of US $ 1.1 million in UNIDO/UNDP technical assistance in the National Metrology Centre Project, the Ethiopian Standards Institution should be integrated more fully into the industrial, technical, scientific, commercial and legal sectors of the Ethiopian society. A consideration is to raise the level of organization to that of a commission with direct responsibility to and coordination by the Council of Ministers. But organization alone is not necessarily sufficient. As listed under section IV above, sufficient functions must be established to fully utilize the Institution.

2. A manpower planning and analysis exercise should be undertaken with respect to the staffing of the Ethiopian Standards Institution. The Institution is now equipped with a large number of sophisticated devices in multiple scientific disciplines and housed in an excellent set of laboratories. With the development of these laboratories under the present UN project, a major new department, that of Testing Labs, has been added to the organization of ESI. The present level of 25 technically trained staff is grossly inadequate to fill three major departments. Hence, the number of staff must be increased -- and the technical and scientific capability and qualifications of staff should be elevated by the recruitment process as well as by further training of existing staff. Many countries with laboratories and facilities similar to those now resident with ESI employ personnel

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at Masters and PhD degree training levels. This must be given very serious consideration and implementation by ESI and the Ethiopian Government.

3. In view of 2. above, ESI with full support of Govrnment should seek and utilize all available programmes of training to elevate the capability of staff. A number of bi-lateral training programmes, in specific disciplines useful to ESI, are available and not currently being utilized. Additionally, other programmes of multi-lateral aid should be used. Furthermore, the situation demands even more accelerated training which may require national sponsorship and funding.

4. In contemplation of a set of extensive recommendations in the way of additional test equipment and modifications to the test laboratories of ESI by the team of Polytechna Consultants, an adequate and commensurate national budget for operation of ESI must be given serious consideration for approval and implementation.

5. Further to 3. above, following an in-depth evaluation of the present project, and with recognition of the great potential, contribution, and task which can be assigned to and implemented by ESI, consideration of further technical assistance by UNIDO/UNDP to ESI should be given in the way of a second phase of the present project on a National Quality Control and Testing Centre. This should be considered by UNIDO, UNDP and Government for inclusion in the next country programme over 1987-1989, and possibly earlier. The assistance may include (1) a further equipment component, (2) further expertise in testing disciplines, and in Certification and Quality Control (including export and import inspection programmes and in-factory consultation), (3) further training fellowships (in testing disciplines as well as in-depth quality control methodology). Further UN aid, however, should be made contingent upon satisfactory implementation of recommendations 1, and 2. above.

	Lab & Equipment	Rec'd.
No.	Building Materials and Mechanical Testing	
1	Static Universal Testing Machine	-
2	Hydraulically Operated Universal Testing Machine	1982-07-01
3	Impact Testing Machine	"
4	Hardness Testing Machine	"
5	Compression Machine	"
6	Aggregate Impact Value Apparatus	-
7	Furnace	1982-05-12
8	Compacting Factor Apparatus	-
9	Vibro Consistometer	1983-01-14
10	Air Entrainment Meter	1981-11-14
11	Mixer (ELE 34-351)	1982-07-01
12	Weighing Machine (50kg/20g)	1981-11-13
13	Weighing Machine (25kg/1g)	"
14	Top Pan Balance (Model SM 1600 from Santer)	1981-10-23
15	Test Sieves	1981-11-14
16	Sieve Shaker	1982-05-12
17	Vibrating Table (EL 34-622)	"
18	Curing Tank	1981-11-14
19	Moisture Conditioning Oven (OVR-200-010)	[illegible]

Annex A

P.O.No.	Item No.	Re n. No.	Remark
-	1	81/1, 02-02	Cancelled by cable 554
15-1-N1387	1	81/1, 04-15	
"	2	81/1, 04-15	
"	3	81/1, 04-15	
15-1-N1226	2	81/1, 02-02	Broken spare parts ordered on N1226A and received on 1984-05-10
15-1-N1344	4	81/2, 04-15	Cancelled from N1344
15-1-N0948	(3)	81/2, 02-02	
15-1-N1344	5	81/2, 04-15	Cancelled from N1344
15-1-N1033	4	81/2, 02-02	Shortlanded originally, but recevered locally
15-1-N0578	5	81/2, 02-02	
15-1-N1146	6	81/3, 02-02	
15-1-N0722	7	81/3, 02-02	
"	8(2A)	81/3, 02-02	Includes Set of Weights
15-1-N0707	9	81/3, 02-02	Includes spares
15-1-N0578	10	81/4, 02-02	10.1 - 10.24
15-1-N0948	(11)	81/4, 02-02	
"	(12)	81/5, 02-02	
15-1-N0578	13	81/5, 02-02	Stand & 3 lower racks
[illegible]N1223	76	81/27, C[illegible]-02	

No.	Lab & Equipment	Rec'd.	P.O.No.	Item No.	Reqn. No.	Remark
20	Los Angeles Abrasion Machine	1982-05-12	15-1-N0961	14	81/5, 02-02	
21	Rigdens Apparatus	1981-11-14	15-1-N0578	15	81/6, 02-02	Accessories 15.2-[redacted]-15.5
22	Vicat Apparatus	"	"	16	81/6, 02-02	Accessories 16.2-16.4
23	Le chatlier Water Bath	1982-05-12	15-1-N0948	17, 17A, 17B	81/6, 02-02	Accessories ordered as per letter of 1984-03-07 para 1.20. & letter of 1984-05-29
24	Heat of Hydration Apparatus (ELE 38-460/01)	1983-01-18	15-2-N0572	7	81/3, 04-15	Previously on 15-1-N1344
25	Penetrometer (ELE 46-530)	1982-07-01	15-1-N1146	18	81/7, 02-02	
26	Ductilometer	1982-09-16	15-1-N1239	8	81/4, 04-15	Includes 18.2-18.5
27	Loss on Heating Oven (ELE 46-410/01)	1982-07-01	15-1-N1237	9	81/4, 04-15	Includes 9.2-9.5 Thermometer ordered as per letters of 1984-03-07 and 1984-05-29
28	Cleveland Flash Cup Apparatus	1982-08-17	15-1-N1387	10	81/5, 04-15	
29	Sieving Extractor (ELE 45-025/01)	1982-07-01	15-1-N1237	11	81/5, 04-15	Includes 11.2-11.14
30	Binder Recovery Apparatus	-	15-1-N1344	12	81/6, 04-15	Cancelled from N1344
31	Bench Mounted Mixer (ELE 45-460)	1982-07-01	15-1-N1146	19	81/7, 02-02	With acessories
32	Pipe Testing Machine	1983-10-05	15-2-N1344 15-2-N1226	13	81/6, 04-15	Cancelled from N1344 Re-ordered from Bode per cable ACC 82604. Case 4 of 5 short landed. Extremely poor customer servicing by supplier for requested drawings & instructions.
33	Flow Table (ELE-38-600)	1982-07-01	15-1-N1237	14	81/7, 04-15	Includes 14.2-14.6
34	Abrasion Machine (Model 6102, Bode)	1982-07-01	15-1-N1348	20	81/7, 02-02	
35	Jolting Apparatus (Vibrating Machine)	1982-05-12	15-1-N0948	21, 21A	81/8, 02-02	
36	Mortar Mixer (ELE 23-620/1)	"	15-1-N0948	22	81/8, 02-02	

No.	Lab & Equipment	Rec'd.	P.O.No.
	Items Not on Reference List:		
37	Drying Oven (MOT 5090E, Bode)	1982-08-17	15-1-N1387
38	Tamping Bar - Model 8424	1983-02-22	15-2-N0591
39	Tamping Bar - Model 8425	1983-02-22	15-2-N0591
40	High Pressure Autoclave	1983-02-03	15-2-N0600
41	Length Comparator	1983-02-03	15-2-N0600
42	Test Bar Holder	1983-02-03	"
43	Prism Mold (Test Bar Mold on Reqn.)	1983-02-03	"
44	Flexure Mold	1983-02-03	"
45	Feed Hopper (Upper Mold on Reqn.)	1983-02-03	"
46	Stripping Device - Mold Releaser	1983-02-03	
47	Flexure Tension Machine	1983-02-03	"
	II. Textile and Leather Products		
1	X-Type Viscometer	-	15-1-N1407
2	Yarn Hairness Meter	1983-04-12	15-2-N0583
3	Textiles Yarn Tachometer	-	15-1-N1407
4	Fineness and Maturity Tester	1983-04-12	15-2-N0583
5	Rubbing Colour Fastness Tester	1983-02-22	15-2-N0600
6	Cyclic Bending Tester (Folding Strength Tester)	1983-04-09	15-2-N0591
7	Yarn Friction Tester	1983-02-22	15-2-N0591
8	Cotton Fineness Meter	-	15-1-N1408
9	Comb Sorter	1983-04-12	15-2-N0583
10	Nep Counting Templates	1983-02-03	15-2-N0600
11	Crimp Tester	1983-04-12	15-2-N0583

Item No.	Regn. No.	Remark
6	81/3, 04-15	
17	81/9, 05-11	Previously on N1408
18	81/9, 05-11	" " "
8	81/4, 05-11	Previously on N1407
9	81/5, 05-11	
10	81/6, 05-11	
11	81/6, 05-11	
12	81/6, 05-11	
13	(81/7),05-11	
14	81/8, 05-11	
16	81/8, 05-11	
19	81/10,05-11	Cancelled from N1407 by cable AOC 32848
20	81/10,05-11	Previously on N1491
21	81/11,05-11	Cancelled from N1407
22	81/11,05-11	Previously on N1491
23	81/12,05-11	Previously on N1407
24	81/12,05-11	Previously on N1408
25	81/13,05-11	" " "
26	81/13,05-11	Cancelled from N1408 by Cable 554, 1982-05-14
27	81/14,05-11	Previously on N1491
28	81/14,05-11	Previously on N1407
29	81/14,05-11	Previously on N1491

No.	Lab & Equipment	Rec'd.	P.O.No.	Item No.	Reqn. No.	Remarks
12	Stifness Tester	1983-04-12	15-2-N0583	30	81/15,05-11	Previously on N1491
13	Pressley Tester	-	15-1-N1408	31	81/15,05-11	Cancelled from N1408
14	Fibre Length Machine	1982-12-17	15-2-N0584	32	81/15,05-11	Machine supplied with 5 mm scale instead of 2 mm scale and otherwise without batch counter. See related cable correspondence.
15	Stereoscopic Microscope	-	15-1-N1399	33	81/16,05-11	Cancelled from N1399 by cable AOC 32848 (See Item 26, N1341&15-3-N0286)
16	Moisture Testing Oven	1982-12-17	15-2-N0584	34	81/16,05-11	
17	Moisture Monitor	1983-02-03	15-2-N0600	35	81/17,05-11	Previously on N1407
18	Roving Reel	1982-12-17	15-2-N0584	36	81/17,05-11	
19	Yarn Examining Machine	1982-12-17	15-2-N0584	37	81/18,05-11	
20	Twist Tester	1982-12-17	15-2-N0584	38	81/18,05-11	
21	Quadrant Twist Tester	-	?	39	81/19,05-11	The only thing found in project file on this item is inclusion on a list of "items cancelled" under envelope C, P.O.1408, but the item is not shown on 15-1-N1408. Assumed never ordered?
22	Universal Strength Tester	1984-05-03	15-2-N0584	40	81/19,05-11	Crate 7/7 containing this item was not delivered with others on 1982-12-17. Item discovered in UK and reshipped arriving Assab on 1983-06-13.
23	Fastran Count Balance	1983-02-22	15-2-N0591	41	81/20,05-11	Previously on N1408
24	Wear and Abrasion Tester	-	?	42	81/20,05-11	Same remark as above for item No. 39
25	Wash Wheel	1982-12-17	15-2-N0584	43	81/21,05-11	
26	Light Fastness Tester	1982-12-17	15-2-N0584	44	81/21,05-11	

No.	Lab & Equipment	Rec'd.	P.O.No.
27	Colour Matching Cabinet	1982-12-17	15-2-N0584
28	Wrap Reel	"	"
29	Three Bath Dyeing Machine	-	15-1-N1397
30	Wrap Tension Meter	-	15-1-N1408
31	Balance	1982-11-25	15-2-N0592
32	Thermohygraph	1983-02-22	15-2-N0591
33	Air Permeability Tester	1983-04-12	15-2-N0583
34	Thickness Gauge	1983-04-12	15-2-N0583
35	Pilling Tester	1982-12-17	15-2-N0584
36	Finish Rub Fastness Tester	1983-04-12	15-2-N0590
37	Lastometer	1983-04-12	15-2-N0590
38	Swag Tester	-	15-1-N1490
39	Upper Leather water proofness Tester	-	15-1-N1490
40	Impact Scuff Tester	-	15-1-N1490
41	Viewing Box	-	15-1-N1490
42	Wrinkleometer	-	15-1-N1490
43	Permeability/Absorption Apparatus	-	15-1-N1490
44	Upper Leather Flexing Machine	1983-04-12	15-2-N0590
45	Finish Heat Resistance Tester	-	15-1-N1490
46	Leather Shrinkage Temperature Determination	1983-04-12	15-2-N0590
47	Botton Leather Water Penetration Machine	-	15-1-N1407
48	Soling Materials Abrasion Machine	1983-04-12	15-2-N0590
49	Bottom Leather Grain Crack Tester	1983-04-12	15-2-N0590

Item No.	Reqn. No.	Remarks
45	81/22,05-11	
46	81/22,05-11	
47	81/22,05-11	Cancelled from N1397
48	81/23,05-11	Cancelled from N1408
49	81/23,05-11	Previously on N1398
50	(81/24,05-11	Previously on N1408
51	(81/24,05-11	Previously on N1491
52	81/25,05-11	" " "
53	81/25,05-11	Previously on N1492
54	81/26,05-11	Previously on N1490
55	81/26,05-11	Previously on N1490
56	81/27,05-11	Cancelled from N1490
57	81/27,05-11	Cancelled from N1490
58	81/27,05-11	" " "
59	81/28,05-11	" " "
60	81/28,05-11	" " "
61	81/29,05-11	" " "
62	81/29,05-11	Previously on N1490
63	81/30,05-11	Cancelled from N1490
64	81/30,05-11	Previously on N1490
65	81/30,05-11	Cancelled from N1407
66	81/31,05-11	Previously on N1413
67	81/31,05-11	Previously on N1413

No.	Lab & Equipment	Rec'd.	P.O.No.	Item No.	Reqn. No.	Remarks
50	Miscellaneous Equipment	-	-	-	-	No ordering information
	III. Electrical Products					
1	Universal Test Instrument for Elec. Domestic Appl.	1982-07-17	15-1-N1160	55	81/20,02-02	
2	D.C. Micro Ammeter	1982-07-17	"	56	81/20,02-02	Changed to Pointer Galvanometer, M14805-A220 per cables AOC 11946 and MISC 257
3	Multimeter	1982-09-15	15-1-N1160	57	81/21,02-02	Needs battery replacements. See AOC 21803 and MISC 251.
4	DC Micro Voltammeter	1982-06-16	15-1-N1235	15	81/7, 04-21	
5	Clip on Voltammeter	1982-07-17	15-1-N1160	58	81/21,02-02	
6	Clip on Wattmeter	1982-07-17	15-1-N1160	59	81/21,02-02	
7	Clip on power Factor Meter	1982-06-10	15-1-N1131	60	81/22,02-02	Includes 60.1-60.2
8	Insulation Tester with Magneto Generator	1982-09-15	15-1-N1160	61	81/22,02-02	
9	Insulation Tester for Battery Operation	1982-06-16	15-1-N1235	16	81/7, 04-21	Model M05025-A113-A1
10	Power Measuring Set	1982-07-17	15-1-N1160	62	81/22,02-02	
11	Transformer Ratio Tester	1982-07-01	15-1-N1226	63	81/23,02-02	
12	R.L.C. Measuring Bridge	1982-07-17	15-1-N1160	64	81/23,02-02	
13	High Voltage Testing Unit	1982-06-10	15-1-N1131	65	81/23,02-02	Includes 65.1-65.11
14	Digital Timer	1982-06-16	15-1-N1235	17	81/8, 04-21	
15	Lightmeter	1982-06-04	15-1-N1028	66	81/24,02-02	
16	AC/DC Breakdown, Leakage & Ionisation Tester	1982-06-04	15-1-N1028	67	81/24,02-02	
17	a. Low & High Voltage Probe	( )	15-1-N1028A			Ordered on 19 March 1984
17	Calibration Generator	1982-08-18	15-1-N1234	18	81/8, 04-21	
18	Time Mark Generator	1982-08-18	15-1-N1234	19	81/8, 04-21	
19	Signal Generator(250 KHz to 250 MHz)	1982-11-19	15-1-N1042	68/20	81/24,02-02	Rec'd. in duplicate SG 503

No.	Lab & Equipment	Rec'd.	P.O.No.
20	Signal Generator (245 MHz to 1050 MHz)	1984-05-04	15-3-D1095
21	Dual Beam Oscilloscope	1982-11-19	15-1-N1042
22	DC stablized Power Supply	1982-07-17	15-1-N1160
	IV. Chemical Products		
1	Automatic Adiabatic Bomb Calorimeter	1982-11-16	15-1-N1320
2	Ballistic Bomb Calorimeter	-	15-1-N1341
3	Centrifuge (Model CDF-400)	1982-07-17	15-1-N1160
4	Linear Scale Colorimeter	-	15-1-N1223
5	Muffle Furnace	1983-01-10	15-1-N1223
6	Incubator	1983-01-10	15-1-N1223
7	Kjeldahl Equipment	1983-01-10	15-1-N1223
8	Oven (Fan Convection Model OVH-200-110D)	1982-08-17	15-1-N1027
9	Humidity Oven	-	15-1-N1341
10	Refrigerator	1983-07-28	15-1-N1341 15-3-N0285
11	Low Temperature Cabinet (Specifications changed to Deep Freezer to -22°C)		

Item No.	Reqn. No.	Remarks
20	81/9, 04-21	SG 504 not ordered originally. See letter of 1982-12-31 Exchange of one SG503 for one SG504 completed by order 15-3-D1095. Units, however, do not include power modules for functional operation. See memo of 1984-05-05.
69	81/24,02-02	Unit does not include plug-in modules for functional operation. See memo of 1984-05-05
70	81/25,02-02	Not on original list
21	81/9, 04-21	Includes 21a-p
22	81/10,04-21	Cancelled from N1341 by Cable AOC 32848
23	81/8, 02-02	Parts required for operation as per letter of 1984-03-07 para. 4.2.
24	81/9, 02-02	Cancelled from N1223 . See letter of 12 July 1982.
25	81/9, 02-02	
26	81/9, 02-02	
27	81/10,02-02	
28	81/10,02-02	
23	81/10,04-21	Cancelled from N1341 See letter of Sept. 1 (Aug. 1), 1982
24	81/10,04-21	N1341 Cancelled but this item re-ordered - See memo of 1982-11-24
25	81/9, 04-2	

	Lab & Equipment	Received	Location
			15-3-N0285
12	Flask Shaker	1982-08-17	15-1-N1027
13	Water Still	1982-08-17	15-1-N1027
14	Analytical Balance(80g,0.01mg) R52	1981-10-23	15-1-N0705
15	Analytical Balance (160g, 0.1mg) R41	1981-10-23	15-1-N0705
16	Top Pan Balance (200g, 0.001g) 31TD	1981-10-23	15-1-N0705
17	Top Pan Balance (1500g, 0.01g)	-	?
18	Microscope	1983-01-10	15-1-N1223
19	Stereoscopic Microscope	1983-07-28	15-1-N1341 15-3-N0286
20	Glassware (and other Lab. items)	1982-11-01	15-1-N1325
	(Heating Elements for Steam Bath No 1031	1983-06-06	15-3-N0240
21	Warburg Bath	-	15-1-N1341
22	Freeze Drying Apparatus	1982-11-16	15-1-N1320
23	Gas Analyser	1982-06-16	15-1-N1236
24			

Item No.	Record No	Remarks
		item reordered. See letter of Dec. 21, 1982
29	81/10,02-02	
30	81/10,02-02	Accessories ordered on P.O. 15-3-NO[illegible]0, received on 1983-08-01
31	81/11,02-02	
32	81/11,02-02	
33	81/11,02-02	
34	81/11,02-02	No ordering information on this item. Same item requested as item 49 on 81/23,05-11 for textile; also as item 9 on 81/3, 02-02 for Building Mat. & Mech. Testing.
35	81/12,02-02	
26	81/11,04-21	N1341 cancelled but this item reordered. See memo of 1982-11-24. Slides & cover glasses ordered on NO286A on 1984-04-06. Not yet received.
1 thru 17	81/1-81/43 07-09	60 items from Gallenkamp on N1325 with item nos. listed. Other items from F.G.Bode on N1326 with no list of items -- See letter of 1982-12-10
137		
27	81/12,04-21	Cancelled from N1341
28	81/12,04-21	Includes 28(a)-(b)
29	81/13,04-21	Includes 29A, 29B. Brokon parts ordered on N1[illegible] on 1984-04-05. Not yet received

No.	Lab & Equipment	Rec'd.	P.O.No.	Item No.	Reqn. No.	Remarks
24	Automatic Melting, Boiling and Drop Point Apparatus	1983-02-17	15-1-N1341 15-2-N0600 Amendement B	30	81/13,04-21	N1341 cancelled but this item re-ordered. See memo of 1982-11-24 and letter of July 16, 1982
25	Moisture Balance	1982-04-12	15-1-N1238	31	81/13,04-21	Includes 31A Pan Liner
26	Hydraulic Press	-	15-1-N1341	32	81/14,04-21	Cancelled from N1341
27	Refractometer (Medel RFA-400)	1982-07-12	15-1-N1160	36	81/12,02-02	
28	Titration Outfit	-	15-1-N1223	37	81/13,02-02	Cancelled from N1223 by Cable AOC 37124. See also letter of 12 July 1982.
29	Viscometer bath	1982-09-16	15-1-N1224	38	81/13,02-02	Includes Accessories
30	Atomic Absorption Spectrophotometer	1983-02-08	15-1-N1011	39	81/14,02-02	
30a	Hollow Cathode Lamps (29 total)	1983-03-07	15-3-N0223	39a		
31	Visible Spectrophotometer	1982-02-22	15-1-N0962	40	81/14,02-02	Includes Accessories
32	Ultraviolet Spectrophotometer	1982-09-16	15-1-N1225	33	81/15, 04-21	Includes Accessories
33	Infrared Spectrophotometer	1982-09-16	15-1-N1225	34	81/15,04-21	Includes Accessories
34	Gas Chromatograph	1982-09-16	15-1-N1225	35	81/15,04-21	Tungsten Halogen Lamps ordered on 15-1-N1225C on 1984-03-28. Other items requested per letters of 1984-03-07 and 1984-05-29.
35	Liquid Chromatograph	1982-09-16	15-1-N1225	36	81/16,04-21	
36	ph Meter	1982-07-17	15-1-N1134	41	81/15,02-02	Essential parts ordered on 15-1-N1134A on 1984-04-05. Not yet received.
37	Hydrogen Generator, Packed Columens & other accessories	1984-02-15	15-3-D1162	-	83/3, 11-01	Spares for Hydrogen Generator ordered per letters of 1984-03-07 and 1984-05-29.

No.	Lab & Equipment	Rec'd.	P.O.No.	Item No.	Reqn. No.	Remarks
	V. Petroleum Products (A2-27)					
1	Automatic Standard Distillation Apparatus	-	15-1-N1341	37	81/16,04-21	Assumed cancelled from N1341;
2	Determination of Sulphur Content	1983-01-10	15-1-N1223	42	81/15,02-02	Broken valve knobs and screws ordered from Gallenkamp and received. Other parts requested per letter of 1984-03-07, para 5.1
3	Determination of Vapour Pressure	1982-07-17	15-1-N1160	43	81/16,02-02	
4	Determination of Existent Gum in Fuels	1983-01-10	15-1-N1223	44	81/16,02-02	Sensing probes ordered as per letter of 1984-03-07 para 5.3
5	Determination of Corrosiveness of Copper	1983-09-02	15-1-N1341 15-3-N0331	38	81/17,04-21	N1341 cancelled, but this item re-order with Karl Kalb per letter of Sept. 1 (Aug. 1) 1982.
	a. Seal for Test Bomb & Cu strip		15-3-N0331A	38A		
6	Oxidation Stability Test	1983-01-10	15-1-N1223	45	81/16,02-02	
7	Determination of Flash Point	1982-07-17	15-1-N1134	46	81/17,02-02	Includes 46A, 46B
8	Determination of Water and Sediment	1983-01-10	15-1-N1223	47	81/17,02-02	
9	Determination of Kinematic Visc.	1983-01-10	15-1-N1223	48	81/18,02-02	
10	Determination of Carbon Residue	1982-02-27	15-1-N1032	49	81/18,02-02	
11	Determination of Penetration	1983-01-10	15-1-N1223	50	81/18,02-02	
12	Saybolt Viscometer	1982-08-17	15-1-N1387	39	81/17,04-21	
13	Colour Comparator	1982-08-17	15-1-N1027	51	81/19,02-02	Includes Accessories
14	Cloud and Pour Point Baths	1982-08-17	15-1-N1027	52	81/19,02-02	" "
15	Abel Apparatus	1983-01-10	15-1-N1223	53	81/19,02-02	
16	Smoke Point Lamp	1982-07-17	15-1-N1160	54	81/20,02-02	

No.	Lab & Equipment	Rec'd.	P.O.No.
	VI. Maintenance & Servicing (A2-30)		
1	Milling, Drilling & Boring Machine	1982-06-16	15-1-N1308
2	Variable Speed Precicion Lathe	( )	15-3-N0289 15-4-D0234
3	Surface Grinder	1983-08-30	15-1-N1494 15-3-N0381
4	Universal Cylindrical Grinder	-	15-1-N1494
5	Heat Treatment Plant	1983-09-02	15-1-N1406
6	Bandsaw	1983-05-27	15-1-N1396
7	Miscellaneous Equipment	-	-
8	Miscellaneous Small Tools	-	-
	VII. Miscellaneous Equipment (A2-32)		
1	Fork Lift Truck	1983-01-18	15-1-N1345
a	Additional Stationery Charger	1983-11-18	15-1-N1345C
b	Spare Parts	( )	15-1-N1345D

Item No.	Reqn. No.	Remarks
40	81/18,04-21	
1	81/1, 05-11	Reqn. labeled (81/32). Not supplied on N0289 due to supplier bankruptcy. Reordered on 15-4-D0234. Shipping papers received on 1984-04-10 -- awaiting receipt
2	81/1, 04-11	Reqn. labeled (81/32) P.O.15-1-N1494 cancelled and item reordered on 15-3-N0381. Received without main drive belt(now procured)and with inconsistent voltage requirements on various motors.
3	81/2, 05-11	Cancelled from N1494
4	81/2, 05-11	Furnace portion severely damaged -- under Iloyd's survey -- extremely poor customer servicing from supplier & principal -- parts not available in time for repair -- missing details of drawings and instructions complete replacement must be claimed & procured.
5	81/3, 05-11	Saw blodes ordered as per letters of 1984-03-14 and 1984-05-29.
-	-	No ordering information. Assume to be provided by ESI, Government funds
-	-	"
74 74A (Many &)	81/26,02-02	Original delivery missing the stationery charger with no shortlanded certificate provided due to confusion over small carton of battery servicing supplies.

No.	Lab & Equipment	Rec'd	P.O.No.
	c. Forks	( )	15-1-N1345E
	d. Fork Fitting Parts	( )	15-1-N1345F
	e. Transformer	( )	15-1-N1345G
	f. Bolt & Washer	( )	15-1-N1345H
2	Duplicator	1984-03-10	15-3-D1215
3	Offset Platemaker	-	-
4	Compressor	1982-06-15	15-1-N1029
	Items not on Origianl List		
5	IBM Electronic "selectric" Composer	1983-03-03	15-1-N0970
6	Additional Fonts for IBM Composer	1983-12-29	15-1-N0970
7	Gestetner Scanner Model 1593	1983-10-27	15-3-D0730
8	3M Model 213 Overhead Projector	1984-01-27	15-3-D1131
9	Portable Projection Screen, Flip chart Easel(Whiteboard), paper Pads & Pens	1984-03-10	15-3-D1216
10	16 mm Sound Projector, Elmo Model 16AA	1984-01-25	15-3-D1217
11	Cassette Player/Recorder, Sharp Model GF5454	1984-01-27	15-3-D1270
12	Kodak Carousel 35 mm Slide Projector, SAV 2000	1984-02-15	15-3-D1271
13	TI59 Programmable Calculator, and PC 100 Print/Security Cradle	1984-04-04	15-3-D1361
14	Fittings for LPG and Compressed air	1984-04-04	15-4-D0200
15	Gases (Nitrogen, acelylene, Nitrous Oxide, Oxygen, Carbon Dioxide, Helium and [illegible]) with	( )	15-4-D0220

Item No.	Reqn. No.	Remarks
		Spare parts, forks & accessories and transformer for new stationery charger subsequently ordered. Shipping papers on 1b and 1c received on 1984-03-21 -- awaiting receipt.
6	81/3, 05-11 81/3, 03-30	Originally cancelled, but reordered
7	81/4, 05-11	Item cancelled
75	81/27,02-02	
72	81/26,02-02	
73	81/26,02-02	
-	83/2, 03-30	Additional style, filters and copyholders also ordered & received on 1984-04-09
-	83/1, 03-30	Includes accessories
-	83/1, 03-30	
-	83/1, 03-30	Spare lamps ordered on 15-3-D1217A
-	83/1, 03-30	
-	83/1, 03-30	Includes accessories
-	83/1, 03-30	Includes accessories
-	Correspondence	
1 to 7A	"	Needs expediting.

No.	Lab & Equipment	Rec'd.	P.O.No.	Item No.	Reqn. No.	Remarks
	cylinders & regulators					
16	Mobil 629 gear oil and Velocite 3	( )	15-4-D0345	2 & 4	correspondence	Needs expediting
17	Chemicals (Some 205 items)	( )	15-4-D0346	-	"	Needs expediting
18	Spare Lamp & Roll Transparency attached for Beseler Overhead projector	1984-03-22	Correspondence	-		Cost of $ 67.30 from Field Expenditures.
19	Halogen Lamps (6pcs) & Slide magazines (6pcs) for Cabin 35mm Projector	1983-10-15	"	-		Cost of $ 81.12 from Field Expenditures.
20	Quincunx & Case, Sampling Bowl and Chip Box-Statistical Demo Devices	1984-02-15	"	-		Cost of $ 959.72 from Field Expenditures.
21	Quality Control Books & Literature	1983-05-11	"	-		Cost of $ 1006.10 from Field Expenditures
22	Audio/Visual Slides (35 mm) and Cassette Tapes on Quality Control (4 sets)	1982-12-03 & 1983-03-03	"			Cost of $ 490.00 from Field Expenditures

Annex B

Ethiopian Standards Institution
Training - Consulting Workshop
on Quality Control

List of Companies & Participants

No.	Company	Name of Participant	Company Position/title/
1	Kolfe Household Utitities Fac.	Ato Solomon Gualu	A/G. Manager
2	" " " "	" Gebregziaber G/Michael	Head of Tech. Department
3	Ethiopian Metal tools Fac.	" Moges Haileselassie	A/G. Manager
4	" Paper Converting	" Mekbeb Solomon	Plant Manager
5	" Printing Corp.	" Afework Dawit	Senior Economist
6	Artistic Printing Press	" Habtemariam Tadesse	Production Manager
7	Ethiopian Printing Corp.	" Michael Sheik Kedir	Mechanical Engineer
8	Addis Abeba Cement Factory	" Tsadik Adem	Technical Supervisor
9	" " " "	" Samuel Awalom	Chief of Laboratory
10	" " " "	" Negussie Zewdineh	Production Forman
11	" " " "	" Rega Beyene	Plant Mechanic Forman
12	" " " "	" Befekadu Getu	Chief of Elec. Department
13	Addis Tyre Co. S.C	" Feseha Reda	Production Div. Head
14	Kokebe Flour Mills	" Getiye Wordofa	Traini Techniologist
15	Food Corporation	" Alemu Bezabeh	Food Technologist
16	Nazrawi Kiba Nuge Oil Fac.	"" Tadesse Berhe	Technical Head
17	Anbessa Flour Mills	" Tamirat Shitta	" Production Head
18	Bahrdar Textile Mills	" Mengistu Tessema	" & Production M.
19	" " "	" Andualem Zewde	Asst. Weaving Dept. Head
20	Unifibre Factory	" Amenu Terefe	Quality Controller
21	" "	" Kudama Bedada	Production Manager
22	Ethiopian Fibre Factory	" Hiruy Mekonnen	Head of Quality Control
23	Gulile Garment Factory	W/t Genet Kininer	Mechanic
24	Progress Cotton Factory	Ato Teffera Abegaz	Head of Production Planner & Quality Control
25	General Textile & Garment Fac.	" Biadgligne G/Selassie	Production Manager
26	Ethiopian Thread Factory	" Teffera Tekle	Tech. & Production M.
27	Akaki Textile Mills	" Teshome Worku	Chemist
28	National Tobacco & Maches Corp.	" Lakew Gebeyehou	Head of Agri. Service
29	" " " "	" Haileluel Pawlos	Maintenance Section Head
30	" " " "	" Teckalign Legesse	Head of Laboratory
31	Ethiopian Sugaf Corporation	" Assegid Yimenu	Processing & Quality Control Advisor
32	" " "	" Girma Tesfa	Technical Advisor
33	Wonji/Shoa Sugar Estate	" Legesse Gulty	Deputy Operations Manager
34	Metehara Sugar Estate	" Mekonnen Tesfaye	Chief of Sections
35	Ethiopian Sugar Corporation	" Bayable Kiros	Manager, Agr. Operation Div.
36	" Crown Cork & Can Manufacturing Ind.	" Abebe Kurabachew	Asst. Quality Control
37	Ethiopian Wood Work Corp.	" Meseret Dileba	Mechanical Eng.
38	Ethio Brick Factory	" Wondifraw Kebede	Production Foreman
39	Ceramicael Brick Factory	" H/Mariam H/Giorgis	Plant Supervisor
40	Etho Plastic Factory	" Twelde G/Michael	Quality Controller

No.	Company	Name of Participant	Company Position/title/
41	Ethiopian Building Material Corp.	Ato Iyob Tesfu	Maintenance Div. Head
42	National Leather & Shoe Corp.	W/t Netseha Sequar	Leather Production Sec. Head
43	" " " "	Ato Abiye Asefa	Quality Control Chief
44	" " " "	" Beferdu Bekele	Hide & Skins Supervisor
45	Ethiopian Pickling & Tanning	W/t Endalech Bekele	Quality Control Chief
46	" " "	" [illegible]	[illegible]
47	" Tannery	Ato Mulualem Asresse	Chemist (Lab.)
48	" "	" Kebede Amedie	Head of Sele. Packing & Expedaiting
49	Rubber and Canvas Shoe Fac.	" Ayele Milikei	Lab. Chief
50	" " " " "	" Amha Zelele	Section Supervisor
51	Anbessa Shoe Factory	" Alemu Mamo	Quality Control Head
52	Tikur Abbaye Shoe Factory	" Fikre Lamete	" " "
53	" " " "	" Solomon W/Michael	Coordinator
54	Addis Tannery	" Semehenge Menberu	Quality Control Head
55	" "	" Webshet Wonji	Production Head
56	Awash Tannery	" Solomon Mebratu	Chemist
57	" "	" Sisai Wolteji	Production Forman
58	" "	" Addisu Abdisa	" "
59	Modjo Tannery	" Assegede Sebsebe	Production Head
60	" "	" Hailu Argaw	A/Manager
61	" "	" Abadi Kiros	Chemist
62	Cemental Sede Unit	" Abubaker Hashim	Technical Manager
63	" " "	" Tesfaye W/Mariam	Chemist
64	ETHARSO	" Zerihun Berhe	Laboratory Personnel
65	Wanza Wood Works	" Bekemma Diro	Chief of Planning
66	Warka Furniture Plant	" Kassahun Tarekegn	Asst. Prod. & Technical Service Department
67	National Distillaries Liquors Factory	" Abiel Debesu	Chemist
68	Ethiopian Paper & Pulp Fac.	" Alemu Asefa	Chemist
69	" " " "	" Tekle Aray	Production Head
70	Ethio Japanese Syntetic Tex. Scs.	" Abebe Tsegie	OWPCR Unite Chief
71	United Oil Mills	W/t Medhanet Alamerew	Quality Control Head
72	Cemental Factory	Ato Assefa Tekle Himanot	Plant Supervisor
73	Bernardini Factory	" Berhanu Demissie	" "
74	Awash Wine Factory Lideta Branch	W/t Haymanot W/Tsadik	Biologist
75	Abaye Meske Soft Drinks Fac.	" Zemnu Erget Zekios	Chemists

Annex C

Factory Visit Schedule

Training - Consulting Workshop on Quality Control

Addis Ababa - April 23 - May 18, 1984

Wednesday May 2	am (8:30 - 9:30)	1. National Metal Corporation (I; 1,2,3) Kolfe Household Utilities Factory * Ethiopian Metal Tools Factory Ethiopian Crown Cork & Can Mfg. Sobola, Veselay, Alemayehu, T/Haimanot
		2. Ethiopian Food Corporation (IV; 1, 3) Kokeb Flour Mills * Anbessa Flour Mills Hroncek, Robel, Aklile
	pm (1:15 - 1:45)	1. Ethiopian Printing Corp. (II; 1, 2, 3) Ethiopian Paper Converting * Artistic Printing Press Ethiopian Printing Press Stephens, Semegne, Bezabeh
		2. Ethiopian Food Corporation(II; 2,4) * United Oil Mills Hroncek, Barnaky, Robel, Aklile
Thursday May 3	am	1. Ethiopian Building Material Corporation (III, 1,4, 5, 6) * Addis Abeba Cement Factory Cemental Factory Bernardini Factory Cemental Sede Unit Stephens, Vesely, Semegne, Alemayhu
		2. National Textile Corporation (V; 2, 3) Unifibre Factory * Ethiopian Fibre Factory Zboril, Ezra, Kefile

.../

pm

1. National Textile Corporation (V; 4, 6)
   • Galile Garment Factory
   General Textile & Garment Factory
   Zboril, Ezra, Kefile

Friday
May 4 — am

1. Ethiopian Beverage Corporation (XI; 1, 2)
   National Distillery Liquors &
   Awash Wine Factory
   Hroneek, Robel, Aklile, Fetlework

2. Ethiopian Wood Corporation (X; 1, 2, 3)
   ETHARSO
   Wanza Wood Works
   • Warka Furniture Factory
   Sobola, Semegne, Alemayehu, Vesely

pm

1. Ethiopian Beverage Corporation (XI; 3)
   • Abay Mesk Soft Drinks Factory
   Hroncek, Robel, Aklile, Fetlework

2. National Leather & Shoe Corporation (XIII; 3)
   • Rubber & Canvas Shoe Factory
   & Addis Tyre Co. (VII)
   Stephens, Zboril, Ezra, Kefile

Monday
May 7 — am

1. National Leather & Shoe Corporation (XIII; 4, 5,6)
   Anbessa Shoe Factory
   • Tikure Abay Shoe Factory
   Addis Tannery
   Zboril, Ezra, Kefile

pm

1. National Chemicals Corp. (XII; 1)
   • Ethio - Plastic Factory
   Stephens, Gabris, Barnaky, Aklile, Mesai

Tuesday
May 8 — am

1. National Tobacco & Matches Corp. (VIII;1)
   • Tobacco Factory (Addis)
   Stephens, Hroncek, Robel, Aklile

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Wednesday May 9	am	*1.	Ethio Japan Synthetic Factory (VI) Stephens, Zboril, Ezra, Kefile
		2.	Ethiopian Building Material Corp. (III; 2,3) Ethio Brick Factory
		*	Ceramicalli Brick Factory
			Vesely, Semegne, Alemeyahu, Wolansa)
	pm	1.	National Leather & Shoe Corp. (XIII; 1, 2, 6, 7, 8)
			Ethiopian Pickling & Tanning
		*	Ethiopian Tannery
			Addis Tannery
			Awash Tannery
			Modjo Tannery
			Stephens, Zboril, Ezra, Kefle
Thursday	am	1.	National Textile Corporation (V; 5, 8) Progress Cotton Factory
		*	Akaki Textile Mills
			Zboril, Ezra, Kefele
	pm	1.	National Textile Corporation (V; 7)
		*	Ethiopian Thread Factory
			Zboril, Ezra, Kefle
	(am - pm)		Nazrawi Kiba Nuge Oil Factory Hroncek, Barnoky, Robel, Aklile
Monday - Thursday May 21-24			Ethiopian Sugar Corporation(IX) Wonji/Shoa Sugar Estate Methara Sugar Estate Hroncek, Robel, Fetlework