

FINAL REPORT

Telecommunications Management
Training Project

November 1978

SUBMITTED

BY

GTE INTERNATIONAL SYSTEMS CORPORATION

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Section 1
INTRODUCTION

1.1 SUMMARY

This final report includes the Contractor's activities during the contract period required in Appendix A Section 6.2 as amended of the contract dated January 24, 1974 between the Republic of Liberia and GTE International Systems Corporation. This report covers the period beginning February 25, 1974 through August 24, 1978 and includes Quarterly Report No. 18 and Monthly Report No. 54.

This final report is a statement of the Contractor's overall program effort as the detailed contract activities have been described in the contractually due monthly, quarterly, and annual reports. Therefore, this final report:

- Summarizes overall management effort,
- Describes solution and scope of effort for future logistic problems,
- Offers direction for current and on-going customer profit,
- Suggests cultivating personnel and hardware implementation for greater efficiency of operation.

1.2 OBJECTIVE

The contract objective was "to provide training and direction to the Liberian Managers in all phases of established departmental procedures and to recommend the development of and guide the implementation of new procedures ... directed towards the objective of training a technically and managerially proficient organization capable of operating a financially viable national and international telecommunications system in the shortest possible time." During the entire contract period, monthly, quarterly and annual reports were issued which support GTE-ISC performance to this objective.

Section 2 of this report summarized GTE-ISC services provided to the Liberian Telecommunications Corporation (LTC) under this contract. Section 3 delineates those areas of LTC management and training with their respective impact on contract completion. Section 4 describes the scope of LTC financial and services objectives. Procedures and methods used to bill and collect from customers are described in Section 5. Section 6 relates the future objectives for LTC along with an assessment of the scope of effort required for implementing these future plans.

The scope and results of the Cycle I and Cycle II Technical Training done under the contract are described in Section 7. Section 8 provides detailed recommendations relative to areas and disciplines which require continued and or new training in order to implement LTC's future objectives.

Section 2

PERSONNEL TRAINING AND PERFORMANCE

2.1 SCOPE

The Telecommunications Management Training contract between the Republic of Liberia and GTE International Systems Corporation (GTE-ISC) was entered into on January 24, 1974. The period of performance for this contract was established at thirty-six (36) months beginning February 25, 1974 and ending February 24, 1977. During this period of performance, GTE-ISC was to provide two hundred three (203) man-months of professional labor. Section 3 and 7 contain Training detail.

2.2 AMENDED LABOR SCHEDULES

During the period of performance and with mutual agreement between the parties to the contract the man-month schedule for certain work requirements was changed, the Training Supervisor labor projection of 36 months was cutback to 20.5 months and a new position of Plant Maintenance Manager was established. The changes were made to more closely accommodate the actual training requirements of Liberia Telecommunications corporation (LTC) and the changed schedule is shown in Table 2-1.

The contract was amended to provide an additional 72 man-months beginning February 25, 1977 and ending August 24, 1978. The Amendment #3 continued the services of General Manager Controller, Commercial Manager and Plant Maintenance Manager. The final schedule is shown in Table 2-2.

The firm fixed price of this contract became \$1,701,340.00 in United States dollars.

TABLE 2-1. REVISED SCHEDULE OF PROFESSIONAL LABOR

<u>Position</u>	<u>Original Projected Labor Man-Months</u>	<u>Revised Projected Labor Man-Months</u>	<u>Revised Man-Months Plus or Minus</u>
General Manager	36	36	0
Controller	36	36	0
Commercial Manager	36	36	0
Training Supervisor (Radar)	36	20.5	15.5
Training Instructor A (Switching)	18	16	-2
Training Instructor B (Microwave)	23	21	-2
Accounting Instructor	12	18	-6
Data System Analyst	6	6	0
Plant Maintenance Manager	<u>0</u>	<u>13.5</u>	+13.5
Total	203	203.0	

TABLE 2-2. AMENDED PROFESSIONAL LABOR SCHEDULE

<u>Position</u>	<u>Start Date</u>	<u>Assignment Completed</u>	<u>Date of Completion</u>	<u>Total Man-Months</u>
General Manager	2/25/74			54
Controller	2/25/74			54
Commercial Manager	2/25/74			54
Plant Maintenance Manager	1/12/76			31.5
Training Instructor "A"	2/25/74	Yes	6/75	16
Accounting Instructor	5/31/74	Yes	11/75	18
Data System Analyst	5/23/75	Yes	11/75	6
Training Supervisor	4/30/74	Yes	1/75	20.5
Training Instructor "B"	6/2/74	Yes	2/76	21

2.3 U.S. AID PROJECT

The Coastal Microwave System is operational. Formal acceptance of the system was delayed pending resolution of certain discrepancies. The one year operation and maintenance by the contractor has commenced.

The Construction of the Outside Plant Expansion project has been completed. The cutover and wrecking portion of the project has not been completed and progress is very slow. The incomplete cutover is the most critical adverse condition facing the LTC. The complete utilization of these new facilities for new and improved service cannot occur until cutover is achieved. Existing services will continue to deteriorate until this vital project is concluded.

The financial future of the Corporation is being jeopardized because new service installations are delayed. This delay will have an adverse effect on revenues and cause a long-term problem. LTC growth will be impeded. GTE-ISC recommends that additional emphasis be placed upon this cutover project in the form of obtaining at least two more expatriate cable splicers who would be assigned exclusively to cutover activities.

The up-country Outside Plant material has been provided by the contractor. At this time it appears that utilization of the material will not commence until mid-1979.

The M.F. and H.F. equipment has been delivered. An installation schedule is apparently being developed. Telephones and station connection material has also been delivered. Special vehicles were delivered and are being used.

Substantial effort has been made to assist executive management in coordination of the USAID Project.

Section 3

SUMMARY OF LTC MANAGEMENT AND TRAINING

3.1 INTRODUCTION

Management skills development for LTC began during a GTE-ISC project dating back to February of 1972. This 1972 contract provided a base to use in the beginning of this current program. The LTC management was challenged during this contract to:

- maneuver personnel through in-country aspects such as traditions, manners and customers
- train in-country personnel to operate and maintain modern, sophisticated telecommunications equipment
- respond to Liberian government requirements
- evaluate criteria for expansion of service.

Accomplishment of these tasks must be measured against the in-country logistic and culture attributes which provide specific areas of difficulty or challenge.

3.2 MANAGEMENT DEVELOPMENT

3.2.1 Background

Management guidance has maintained operation of the LTC while experiencing the numerous difficulties associated with growth of service and expansion of facilities. The top management of LTC has demonstrated the necessary foresight to take the initiative in the development of plans and procedures to meet these challenges.

3.2.2 Manager Performance

Most manager level positions are filled with capable personnel who are working to their level of competency and making significant contribution to manage the LTC. However, two areas of concern are the management of the Commercial department and the Engineering and Construction area. In the Commercial department there is no manager at present and the assistant managers have not reached a level of pro-

iciency where they could be eligible for the position. The other area of concern is in the Engineering and Construction department, where the present manager has not developed the necessary attributes for the job. Recommendations for corrective action appear in Section 6 of this report.

Assistant managers and engineering level personnel are showing capable management skills. Several of these employees have been hired within the last two years.

3.2.3 Supervision Performance

Unfortunately, the weakest link in the chain of management positions is in the first line supervisory level. Performance is generally poor, and in some sections unacceptable. The LTC must take positive action to correct this situation. In some cases it may mean discharge - in others, demotion and/or transfer. In other cases, individual improvement can be brought about via more training, closer supervision, and motivation.

Our management of the LTC has produced the development of numerous practices and procedures and effected their implementation. While the majority of practices and procedures were in operation, the desired results were achieved. However, many of these were dropped as soon as our attention was diverted to other areas requiring correction. In some cases, we repeatedly re-implemented the same practice and procedures, then later when an audit was performed we found they had again been dropped. Such failures are the result of inadequate control by first line supervisors. Accordingly, some modifications had to be made in order to achieve at least minimum results to maintain a specific operation.

The total management of the LTC by all concerned has been most difficult during this last year of the project due to the massive expansion project. The human resources of the Corporation have been strained and taxed to the utmost while accomplishing the seemingly impossible task of maintaining telecommunications service. Organizational plans were in process at the completion of this contract. GTE-ISC has attached the proposed organization chart to this report as an addendum.

3.2.4 Technical Performance

Technical management has spent a substantial effort to train various technicians. In addition to GTE-ISC, other organizations such as AOSI, FEI, LM Ericsson, Ollevetti and Fujetsu also contributed to this technical training. The main objective of the training was to prepare individuals in realizing a self-reliant LTC operation which ultimately could be operated in-country by in-country personnel. This objective is being realized at present although some individual performers do not measure up to the amount of training received.

However, the Contractor does believe that training has not been sufficient in the Traffic Operations and Outside Plant Engineering areas. These areas of training would have to be expanded under a new contract as conclusion of the current contract has been met with all the contractually required training completed. An on-going contract is further recommended to assure LTC a managerially and technically proficient operation.

Section 4

LTC FINANCIAL PROCEDURES AND METHODS

4.1 GENERAL

Under the terms of this contract, the GTE-ISC Controller-Trainer was made responsible for all operational accounting, budget and treasury functions of the Liberian Telecommunications Corporation. In addition, the Controller was charged with the job of long-range financial planning as well as training the LTC accounting staff. Local goals were established to help improve the credibility of the financial records, upgrade the proficiency of Accounting employees and control and expenditures of the Corporation. Most of the goals were met and the desired results achieved. A synopsis of the goals are shown in Table 4-1.

The financial condition and resources of the Corporation will be in a delicate balance through 1978. The 1978 budget reflects a planned \$799,000 profit before interest expense. This will ultimately result in an operating loss for the year due to the high interest expense. This loss is in large measure due to the expansion projects.

Expansion Projects totaling \$25 million have been lumped into a two and one-half year span, although the twenty-year plan details these same projects to be spread out over a longer period of time. Had the Corporation not undertaken such a large expansion project, the financial position would be healthier at this time.

4.2 ACCOUNTING GOALS

The Controller-Trainer was assisted by an Accounting Instructor for the period beginning June 1, 1974 through November 15, 1975. The Accounting Instructor's time was divided between training the staff of Liberians and ensuring that the financial books and records of the Corporation were maintained properly and accurately. The goals are listed in Table 4-1.

TABLE 4-1. LTC COST ACCOUNTING GOALS

Item	Goal	Date Completed
1.	Complete change over from current manual to computerized billing system including accounts receivables register and associated reports.	October 1975
2.	Establish chart of accounts system including work orders, time reporting, material control and accumulation, and establishment of labor and overhead rates.	January 1975
3.	Develop audit programs and schedules.	May 1975
4.	Improve accuracy and timeliness of statistical reporting through computerization.	Note 1
5.	Improve accounting operations through computerization and simplification.	Note 1
6.	Enlarge scope of budgeting system to encompass capital additions and retirements.	October 1974
7.	Prepare and publish corporate system and procedures manual covering accounting applications.	July 1978
8.	Review all international carrier agreements for possible renegotiation.	Note 2
9.	Analyze rates for telex, telegram and telephone for possible rate increases.	August 1974

NOTES:

1. Due to the low volume of data, it was decided that these applications were not necessary and in addition financially prohibitive.
2. The negotiation of new international carrier agreements is the responsibility of the Managing Director. However, as stated in our monthly progress report for February 1976, GTE-ISC would give any assistance that is required.

4.3 CUSTOMER BILLING REVENUES

During the term of this management training contract, the customer billing procedures have undergone several modifications and have presently been revised to reflect the new six digit telephone numbers.

The billing of telex and telegrams have not shown much improvement due to the lack of computer programming facilities. A copy of each telegram toll ticket is attached to the customer's bill to provide back-up detail for the toll charges. All International telex billing is processed by RCA and Italcable. These computer listings are received each month and manually checked and dollar rates extended for all established messages. A copy of the computer run showing the telex number, location called, date and number of minutes of usage are listed on the computer run.

During the month of June 1975, a GTE Systems Analyst reviewed the completed Computer billing system. This examination revealed that the programs were not as comprehensive as first indicated. It was also discovered that the system was far from being complete. During the months of July and August several new programs were written and others rewritten. The July 1975 billing was run for the first time through the Computer and the results were good.

At the request of the managing Director and with the Board of Directors approval, basic telephone rates were revised effective January 1, 1976. The old and new rates are as follows:

<u>RESIDENTIAL</u>	<u>OLD</u>	<u>NEW</u>
Business	\$ 9.00	\$ 2.00
Government	15.00	4.00
Meter rate	.04/unit	.07/unit

The old meter rate was applied to monthly units exceeding 100, whereas the new rates apply to all units. These rates were developed based on a review of meter usage and the mix of various types of services provided. It is felt that there will be an increase of billed local telephone revenue as a result of this change.

it then became apparent that LTC was again in need of additional rate relief as the 1978 budget projected a cash and earnings deficit. The need for a rate increase was further supported by the Cooper and Lybrand audit for the year 1976 as dated July 12, 1977. They recommended that basic charges be increased and they also suggested that the telephone usage unit cost of 7 cents be increased, possibly even doubled.

While it was quite obvious that rate relief was necessary, Management felt that the rates proposed were beyond the financial capability of the average Liberian. Listed below are the projected new rates that would have increased the Corporation's revenue by an estimated 1.1 million U.S. dollars.

<u>RESIDENTIAL</u>	<u>EXISTING</u>	<u>PROPOSED</u>
Business	\$ 2.00	\$ 5.00
Government	4.00	25.00
Business Trunks	21.00	40.00
Meter Rate	.07/Unit	.14/Unit

In August 1977, meetings were held with both the Computer Services Bureau and Computer Services, Inc. The reason LTC was investigating the possibility of obtaining computer services from another source was that the Corporation was experiencing difficulty in processing the monthly telephone bills through the services of LEC (Liberia Electric Corporation).

A decision was made in January 1978 to change the monthly bill processing from LEC to Computer Services Bureau and the change was made effective with the February billing. Under the new agreement, Computer Services Bureau would charge the same rate per month as was previously paid to LEC and in addition would change the necessary programs so the new 6 digit telephone numbers would be implemented for the May 1978 billing at no extra cost to LTC. The savings for LTC on this single change amounted to an estimated \$7,000.00.

Now that LTC has a qualified computer company to handle their monthly telephone billing, the necessary ground work must be laid for the addition of the telex and telegram billing, and thus LTC can eliminate many of the errors and much of the delay inherent in the existing manual system.

4.4 PAYROLL

The Payroll department has undergone little change over the last four years. The basic information is the same, job codes within each department and accounting distribution are reflected on the payroll listing, the computer calculates all taxes, deductions, and net pay. After auditing and last minute corrections, the checks are printed. In addition, all check stubs reflect current month earnings and deductions as well as year-to-date information.

LEC has been preparing each payroll, but now that the telephone billing has been changed to Computer Services Bureau, some savings could be realized by changing the payroll processing and this should be given consideration.

One major change was made with respect to the processing of checks to the local banks for payments of LPA's. The two larger banks, International Trust Company and Bank of Liberia received only one check monthly instead of each employee's check. This method saves considerable time for LTC and the banks as employee's can pick up their own checks at the paymaster's office thus, saving considerable time for the LTC employees. This should prove to be a factor in increasing productivity.

Payroll change reports have not been processed according to procedures because month after month PCR's are processed late, lost or incorrectly prepared. The Paymaster has been instructed to change only wages or records when a completed and approved PCR is received. The problem is caused by a lack of effective supervision in the Personnel Department. Recommendations for correction have been made in another section of this final report.

4.5 DISBURSEMENTS

Various procedures have been developed and implemented in the method of disbursement over the past four years. These procedures were put into operation to ensure financial control on vendor checks and invoices and using all accounting controls.

The Purchasing Department is responsible for preparing applications for letter of credit on foreign purchases.

The Accounting Department has charge of distribution of all vendor's checks and bank drafts. All checks and bank drafts are signed by the vendor or a person authorized to received these checks and drafts.

To eliminate the possibility of any duplicate payments, all vouchers prepared must be accompanied by two copies of an approved purchase order; the first is a blue copy that is later filed by purchase order number, the second (green copy) is filed with the vouchers, both copies are marked with the voucher number used for payment of the invoice. Filing of the voucher is done each month by voucher number along with a second copy placed in file by alphabetical order for cross reference.

All checks are typed for better legibility and a business like appearance. All purchase orders are filled when paid, and those awaiting payment are held in numerical order for easy review and access when invoices are received for payment.

At the end of each month, a Journal Entry is prepared by the Disbursement Accountant showing all the details on the distribution sheets.

4.6 INTERNATIONAL SETTLEMENTS AND STATISTICS

More detailed settlement ledgers have been set up due to the vital information that is needed in reconciliation of overseas carriers and the monthly Journal entry is prepared from these ledgers. When necessary, estimates are used then revised when actual data is received.

Negotiation for all new international carrier agreements is the responsibility of the Managing Director. However, as stated in our monthly progress report for February, 1976 GTE would give any assistance that is required.

4.7 CAPITAL PROJECTS

LTC has undertaken a most aggressive and demanding expansion project. An estimated 25 million U.S. dollars will be spent for outside plant central office facilities, microwave facilities, buildings, engineering and management services. During the course of the last four years some of these projects have met numerous delays. It is quite apparent that such a demanding variety of projects has placed a tremendous burden on the Corporation, not only in the financial area but also in the area of human resources.

4.8 FORWARD VIEW

To meet the demanding requirements of LTC, the Accounting staff must be upgraded. This can be done in part through the hiring of college graduates or equivalently experienced personnel and placing them in the Department. With the new facilities and equipment just coming into operation, and international subscriber dialing (ISD) (to be completed by December or January of next year) plus the conversion of all manual billing to computer billing, the Department will need aggressive, professional, accountants overseeing these new LTC requirements.

A Plant Accounting Section should be established to record the plant assets. Once detailed records have been established, the section must provide strict controls to ensure adequate maintenance of records. This will be a major undertaking, requiring expatriate assistance. It is recommended that the project begin this year because of the major plant additions occurring.

From a financial standpoint, it is imperative that installation of new and additional services be completed soon to enable LTC to commence receiving the revenues generated. The original 1979 revenue projections assumed that a substantial increase in revenues would occur as a result of the thousands of new and additional services being revenue producing by late 1978. If these revenues were delayed, it would create an adverse impact on the Corporation's ability to obtain funding for supplemental expansion projects.

Section 5

COMMERCIAL DEPARTMENT

5.1 CONTRACTUAL OBJECTIVES AND PROGRESS

The contract objective to continue and follow-up existing procedures on treatment and collections of customer accounts for telephone, telegram and telex service has been accomplished. A continuing process of reviews and, where necessary, revision of the procedures which were in existence at the start of this contract in 1974 have assured responsive management. In some instances these existing procedures have been supplemented by new forms and/or procedures.

For instance, the wording of the delinquency notice was revised and new forms printed to provide three separate steps in the delinquent notification procedure. In addition to the printed notices sent to the customer, LTC began using radio and newspaper announcements in 1977 when the bills were mailed. These revisions in addition to the change from manual billing to computer billing in 1975 have been effective in increasing the collections from an average of \$155,000 per month to an average, in the last quarter, of approximately \$400,000 not including Government accounts. The responsibility for collection and servicing Government accounts was assigned to the newly created position of Government Accounts Manager in January 1978. Collection of Outstation accounts was assigned to the Commercial Assistant, but due to the fact that these are still on manual billing and are widely scattered across the country, collections have been irregular and some losses have occurred. Procedures were revised and methods of transmitting the reports and money to Monrovia changed several times. Although improvement was noted, as soon as Management attention was diverted to other areas, the Outstation collections again declined. It will require continued supervisory and management attention in this area to gain a consistency in collection. Conversion of these accounts to computer billing would be a great aid in collection and supervision for the Outstations.

Telex and telegram billing is still manual and will remain a problem until computerized. The telex billing is dependent on receiving printouts from the International Carriers which are from one to two months in arrears. Our manual billing process then delays them so that by the time the bills are issued, large balances can be accumulated. Treatment of Telex accounts has been effective when applied consistently indicating that continuing Supervision and Management attention is required.

5.2 CUSTOMER COMPLAINTS AND ADJUSTMENTS

The procedures for handling complaints and requests for adjustments have been revised several times in the four and one-half years of this contract. These have been in conjunction with revisions in our billing and ticketing forms. After the initial changes to computer billing, requests for adjustments and/or complaints about billing were much easier to resolve. Most of the complaints have now been reduced to disputes as to timing of calls and calls charged to the wrong number. The settling of disputes on timing of calls has been greatly aided by the installation of automatic computer timing of all calls on our outgoing New York and Rome circuits. Most calls charged to wrong numbers have been traced back to human error either by the operator or sometimes in computer keypunch. Some recent billing disputes have been caused by meter error, either mechanical or in reading. These are usually settled quickly after investigation.

The adjustment voucher procedure was revised in July 1978 to provide greater Management control requiring the signature of both the Assistant Manager and Manager on all adjustments over \$100. This revision became fully effective as of August 1978. The adjustment voucher was reviewed and minor changes made to have them printed in multicopy, prenumbered format. These new forms will not be available until September 1978, but should provide greater Management control and assure that adjustments are properly prepared and transmitted to Accounting on a timely basis. This should reduce the customer complaints of not receiving the credits due them on a timely basis.

Continued Management and Supervisory attention to this area is a prime requirement, as this is an area of potential loss of revenue if improperly administered.

5.3 CASHIERING PROCEDURES

Auditing and checking of all phases of receipting, balancing and banking of customer payments and other LTC receipts by cashiering personnel was accomplished by periodic audits both by the Commercial Manager and the Internal Auditor as well as the annual audit by the outside auditors. When deviations from the established procedures were found they were corrected immediately. After the change to computer billing, both the stub of the bill and a cashier's official receipt were stamped "Paid" and the stub returned to the customer. A later deviation from this procedure where the bill stub was used as the customer's only receipt led to misappropriation of some cash payments. When this was discovered, disciplinary action was taken and the regular procedure reinstated. Periodic spot checks since that time have revealed no other problems with the present procedures.

Each cashier turns over all money and receipts to the Chief Cashier daily. The Chief Cashier then checks each entry and prepares a bank deposit which is then deposited on a daily basis Monday through Friday. All monies and receipt books are kept in a safe when not in the cashier's position. Receipt books are issued to each individual cashier by the Commercial Manager. The old ones are turned in and audited. Receipt books for the Outstations are issued to the Plant Department Outstation Supervisor who in turn issues them to the Outstation Supervisors. The receipt numbers of each book are recorded in the master receipt log book and each is signed for as it is issued. All used receipt books are sent to the Internal Auditor after the Commercial department has finished checking them.

Transmission of cash from some of the Outstations is still a continuing problem due to the lack of a regular messenger service or scheduled visits by authorized personnel. A schedule has been established for visits to the various Outstations by the Assistant

Commercial Manager, particularly those with no regular banking facilities, however, this is a time consuming process. The monthly reports and receipts are brought to Monrovia by the Station Supervisor from some of the stations close to Monrovia.

This cashiering section of the Commercial department must have continued Management attention to prevent loss of revenues to the LTC.

5.4 SERVICE ORDER PROCEDURE

A complete service order procedure was developed and implemented using mimeographed forms for an interim testing period. These were revised periodically as required by changes in procedure or billing. The most recent version has been in use for over one year and appears to serve the needs of all departments. It has been revised into a format to be printed in multicopy NCR forms that will be prenumbered for control purposes. This format has been approved by all of the affected department Managers.

5.5 CUSTOMER REQUESTS FOR SERVICE

Procedures and forms were developed for customer applications for service. These procedures underwent several changes. At the present time there are separate forms for telephone and Telex service and a third one for transfer service. These have been used in mimeographed form for the last 18 months and appear to serve the basic needs. In July of 1978 these three forms were combined into one form which can be printed in prenumbered multicopy NCR format thus eliminating the confusion caused by three different forms and providing a means for control to prevent loss of applications during processing.

The procedures for processing these applications appear to be working at this time but may require future revision to accommodate the new Plant records and Service Center operation. The main problem in handling and processing these applications is the lack of street addresses thus necessitating a field visit to determine the exact location and the nearest terminal. As the new plant is placed in service and more complete plant records are developed, it may be possible to eliminate many of these field visits. At the present time we have approximately 3,000 orders on hold for service. These are

awaiting completion of the cutover to the new plant and completion of the central office expansion projects. These hold orders will have to be screened for duplicates and most will require fielding before the actual start of new installations.

5.6 TELEPHONE NUMBER ASSIGNMENTS

The actual assignment of telephone numbers is presently done by the Commercial Manager due to the extreme shortage of numbers and facilities. It is anticipated that supply and demand will level out after the initial surge of new installation is completed. When this occurs, the assignment procedure can revert to the Service Center where it should be. However, as long as demand exceeds the supply of numbers in any exchange, the control must remain with the Manager. Number assignment sheets have been developed and are being used for the new telephone numbers in each exchange as they become available for service.

5.7 MARKETING AND SALES

There is a tremendous potential market in Liberia for sales of various types of customer equipment. The marketing efforts have been limited due to the lack of facilities and telephone numbers for new customers. As this situation is overcome by the Plant expansion program, the only limitations will be the ability to obtain, install and maintain the various equipment.

The position of Marketing and Sales Coordinator was filled and marketing procedures developed during this contract. A work order procedure was started in December of 1977 to help identify costs and provide the basic information to determine the profitability of providing PABX's and other special customers equipment. The imposition in July of 1978, of a duty charge of 45% on this type of equipment created an adverse impact on marketing. An investigation should begin to determine if there are alternate types of equipment that could serve our customer needs at a lower cost or at about the same level as before the duty was imposed.

If the marketing and sales effort is to be increased, the LTC must supplement their technical staff to provide the necessary support for special equipment. The present sales are taxing the manpower resources of the PABX Department. Increased marketing could provide a source of additional revenue to the company, however, the rate should be adjusted to enable the LTC profitably provide the required maintenance.

5.8 FAULT REPORTS

Forms and procedures were developed to obtain as much information as possible from the customer regarding fault reports. The greatest problem was the lack of adequate addresses for accurate location. This problem will be somewhat alleviated as we cut over to the new outside plant and the plant records become more complete and accurate.

The procedures for handling trouble reports within the Commercial department were developed and are working well at this time. A problem exists in the inability to adequately dispatch the trouble reports for outside customers due to lack of manpower in the outside plant forces. The majority of the outside forces are dedicated to the cutover to the new plant and until that is complete this will remain a problem.

The reorganization of the KK Room into a plant service center will increase the efficiency to repair faults and provide more accurate feed-back to management. The continuation of expatriate help in this area is essential in order to assure continued development of this concept.

5.9 DIRECTORIES

Directories have been compiled and published on an annual basis through 1977. Publication for the 1978 Directory was postponed pending completion of the expansion program and the changover from five to six digits. Due to the delay in completion of these projects and the requirement for a new issue for the OAU in 1979, the next Directory issue date is February of 1979. High Speed Printing of London will compile and publish the Directory again this year. The schedule is as follows:

<u>Date</u>	<u>Task</u>
9/1/78	Start of advertising campaign
10/15/78	End of sales campaign
11/1/78	Proofs to LTC
11/15/78	Return final changes to High Speed Printing
2/1/79	Receipt of Directories
3/1/79	Complete distribution of Directories

5.10 DIRECTORY ADVERTISING

Directory advertising has been included in each Directory with an increase each year. LTC received approximately \$10,000 additional revenue from advertising for the 1977 Directory. The 1979 issue can easily double that amount assuming the new installations are complete by publication time.

5.11 CONSULTANT POSITION

The Commercial Manager-Trainer serves as a consultant to the personnel manager and has been available to the Personnel Manager whenever requested.

5.12 FUTURE OF COMMERCIAL DEPARTMENT

The work load of the Commercial Department is just entering its busiest phase. As the assignment and cutover tempo increases and the new installations start, the available personnel will be taxed to their maximum ability. The need for continued management attention and if possible expatriate help will be greater in the next year than ever before. The lack of an experienced Commercial Manager will be a great detriment in the next few months. All of the procedures that have been developed during this contract must have continued supervisory attention and direction to remain effective. Continued training must be provided, particularly at the first line supervisory level. Nearly all of the Assistant Managers and Supervisors are relatively new in their positions and will require continued guidance and instruction.

SECTION 6

PLANT MAINTENANCE MANAGER

SUMMARY

During the first few months after the Plant Maintenance Manager arrived, meetings were held with technicians from FEC-ITT, LM Ericsson and LTC Supervisors from the Telex, Construction, Station Installation and Repair, PABX, Diesel, Microwave and Switching Sections to review existing maintenance procedures. Concluding the reviews, it was decided that all efforts should be concentrated initially, on establishing a comprehensive maintenance program for Outside Plant maintenance. Upon completion of the development and implementation of maintenance procedures for the Outside Plant groups, concentration was then directed at either developing and implementing new procedures or reviewing and reimplementing existing procedures.

Procedures, essential to providing 24 hours of maintenance coverage during the Presidential visit to various parts of the country, were also developed and implemented. Prior to this, maintenance coverage was nonexistent. With the activation of the Earth Station, recommendations to adequately staff the traffic (overseas) section with additional operators to handle the increase in traffic volume was submitted and approved for implementation.

A vehicle utilization plan designed to effectively mobilize all maintenance personnel was developed, approved and implemented. Follow-up meetings with supervisors were held to review maintenance procedures and to ensure that there was complete understanding by all personnel. It was also stressed that once equipment is installed, particular emphasis must be placed on maintenance to ensure that reliable and uninterrupted service is provided at all times. Table 6-1 describes how the maintenance objectives of this contract were met.

TABLE 6-1. MAINTENANCE OBJECTIVES AND PROGRESS

Item No.	Objectives	Contract Results/Recommendation
1.	Overall maintenance of the existing system including the international high frequency radio, microwave, telex, outside plant diesel and station equipment, and the coordination with the LME switching expert who will be responsible for the maintenance, proper functioning and performance of the LME public switching exchange.	This objective requires constant monitoring and shall be continued by the LTC Plant Manager or the designate.
2.	Ensure that maintenance procedure manuals are developed and applied in the performance of routine maintenance on all types of equipment.	Maintenance procedures developed by the FEC Maintenance technicians were reviewed and approved for implementation by the LTC Plant Managers. With the installation and activation of Microwave systems (including diesel engines) by the Americans and Japanese and switching equipment installation by LM Ericsson, it is now the Contractor's responsibility to provide maintenance manuals and procedures for their respective systems. Telex maintenance procedures previously developed are also outdated due to the conversion to Olivetti machines. Training on the proper maintenance of the machines was conducted by a representative of the Olivetti Company in Liberia. Repair procedures, for the Station Installation/Repair group developed by GTE-ISC and ITT were reviewed with all station personnel to ensure complete understanding.
3.	Plan and direct the establishment of a permanent maintenance organization, prescriber maintenance methods and procedure and ensure there observance.	Plans for the establishment of a permanent maintenance organization have been submitted to the Managing Director via the General Manager.
4.	Undertake spot checks and inspection of work performed by both expatriate and Liberian repairmen.	This objective requires constant monitoring and should be continued by the LTC Plant Manager or the designater.

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TABLE 6-1. MAINTENANCE OBJECTIVES AND PROGRESS (continued)

Item No.	Objectives	Contract Results/Recommendation
5.	Evaluate the qualifications and performance of the maintenance personnel, forward documented evaluation to the Executive Officer via the GTE General Manager.	Evaluations of the maintenance personnel have been forwarded to the General Manager.
6.	Recommend the establishment and staffing of maintenance centers and workshops as may be needed to reduce the system downtime and improve reliability of service.	Plans for the establishment and staffing of maintenance centers were developed with the General Manager and submitted to the Managing Director via the General Manager.
7.	Analyze the performance, technical quality and reliability of the various systems and circuits and take appropriate steps to upgrade and improve the quality of technical service.	With the installation of new Microwave systems, and the addition and expansion of the switching equipment throughout the country of Liberia all systems should meet all manufacturer's specifications thereby eliminating up-grading requirements.
8.	Establish and maintain inventory control for equipment, spare parts, test equipment, vehicles for maintenance and ensure the availability of adequate parts. Test equipment and logistics supporting services needed to maintain quality service.	Practices and procedures for the effective operation of the Storeroom were developed and implemented in 1965 by RCA. During 1972-1974 GTE-ISC again developed and implemented procedures. In 1976 GTE-ISC did further work on the development and implementation of procedures. Although these procedures were finalized, there was a lack of desire on the part of the personnel to follow them. The responsibility of the Storeroom and Warehouse are now under the supervision of the Assistant Manager of Procurement and Inventory Control who reports to the Commercial Manager.

6-3

SECTION 7

FORMAL TECHNICAL TRAINING

7.1 CYCLE I TECHNICAL TRAINING

Cycle I of the Technical Training Program commenced on August 20, 1973 under a previous training contract with the purpose of providing technical training in three areas of telephony; Crossbar Switching, H.F. Radio and LOS Microwave. A total of 54,926 classroom training hours were expended to produce nine Crossbar, 6 Radio and 12 Microwave Technicians. The following paragraphs provide a synopsis of activity and performance of the classes in Cycle I.

CYCLE I

CLASS: PREREQUISITE

<u>Classroom hours</u>	<u>Subject</u>
3,535	Math for Telecommunications
7,420	AC-DC Theory
6,790	Electronic Fundamentals
8,120	Review
1,050	HF Radio Techniques
<u>1,400</u>	Microwave Techniques
29,365	Total

The Crossbar Switching class commenced on October 22, 1973 with 9 students and was completed on August 9, 1974. During the course of instruction, a total of 10,525 classroom hours were expended with an overall classroom average of 80.3%

CLASS: CROSSBAR SWITCHING

<u>Classroom hours</u>	<u>Subject</u>	<u>Number of Technicians</u>
6,300	ARF 102 Circuit and Print Reading	9
2,405	Relay and Switch Adjustment	
945	Routine Procedures	
<u>875</u>	Power Equipment	—
10,525	Total	9

On July 8, 1974 the Microwave class was started with 14 students and was concluded by 12 students on January 4, 1975. During the course of instruction, a total of 9,596 classroom hours were expended with an overall class average of 73.8%.

CLASS: MICROWAVE

<u>Classroom hours</u>	<u>Subject</u>	<u>Number of Technicians</u>
980	Basic CO and TTY Operation	12
1,392	CW20/MM24 Baseband and Alarms	
2,765	CW20/MM24 Theory of Operation	
1,715	CW20/MM24 Line-up and Main- tenance	
1,260	Multiplexing Techniques	
<u>1,484</u>	Ericsson Multiplex	—
9,596	Total	12

The HF Radio class began on July 8, 1974 with 6 students and was completed by the 6 students on January 24, 1975. A total of 5,440 classroom hours were expended during the course of instruction with an overall class average of 70.6%.

CLASS: HF RADIO

<u>Classroom hours</u>	<u>Subject</u>	<u>Number of Technicians</u>
1,008	Receiver Theory	6
1,050	Receiver Maintenance	
1,050	Transmitter Theory	
1,176	Transmitter Maintenance	
756	SSB Theory of Operation and Maintenance	
<u>5,440</u>	Total	<u>6</u>

7.2 CYCLE II TECHNICAL TRAINING

Cycle II of the Technical Training Program began on July 15, 1974 with 9 students and the same purpose and goals of the previous Cycle. A total of 20,097 classroom training hours were expended to produce 3 Crossbar, 4 Microwave, and 3 Radio Technicians. The following paragraphs provide a synopsis of the activity and performance of the classes in Cycle II.

CYCLE II

CLASS: PREREQUISITE

<u>Classroom hours</u>	<u>Subject</u>
1,757	Math for Telecommunications
2,170	AC-DC Theory
2,261	Electronic Fundamentals
490	Antennas
469	HF Radio Techniques
<u>490</u>	Microwave Techniques
7,637	Total

The Crossbar Switching class commenced on September 16, 1974 with 5 students and was completed with 3 students on June 20, 1975. During the course of instruction, a total of 4,060 classroom hours were expended with an overall class average of 75.7%.

CLASS: CROSSBAR SWITCHING

<u>Classroom hours</u>	<u>Subject</u>	<u>Number of Technicians</u>
2,905	ARF 102 Circuit and Print Reading	3
315	Relay and Switch Adjustment	
560	Routine Procedures	
<u>280</u>	Power Equipment	—
4,060	Total	

On March 10, 1975 the Microwave class was started with 4 students and was concluded on October 24, 1975. During the course of instruction, a total of 4,200 classroom hours were expended with an overall class average of 80.0%.

CLASS: MICROWAVE

<u>Classroom hours</u>	<u>Subject</u>	<u>Number of Technicians</u>
252	Basic Co and TTY Operation	4
140	LTC Microwave Network	
1,232	MM24 Theory of Operation and Maintenance	
532	Troubleshooting Techniques	
1,232	CW20 Theory of Operation and Maintenance	
230	Multiplexing Techniques	
<u>532</u>	Ericsson Multiples	—
4,200	Total	4

The HF Radio Class commenced on March 17, 1975 with 3 students and was concluded on January 9, 1976. A total of 4,200 classroom hours were expended with an overall class average of 63.6%.

CLASS: HF RADIO

<u>Classroom hours</u>	<u>Subject</u>	<u>Number of Technicians</u>
819	Receiver Theory	3
819	Receiver Maintenance	
1,134	AM/SSB Transmitter Theory	
483	AM/SSB Transmitter Maintenance	
<u>945</u>	Transistor Application and Maintenance	<u> </u>
4,200	Total	3

7.3 TELETYPE MAINTENANCE

A Teletype Maintenance class commenced on October 27, 1975 with 7 students and was completed by 5 students on February 27, 1976. During the course of instruction, a total of 3,338 classroom hours were expended as follows:

CLASS: TELETYPE MAINTENANCE

<u>Classroom hours</u>	<u>Subject</u>	<u>Number of Technicians</u>
2,100	Teletype Prerequisites	5
<u>1,288</u>	Teletype Theory	<u> </u>
3,388	Total	5

During GTE-ISC administration and instruction of the technical training program, the following number of LTC employees were trained in the indicated specialties:

<u>Specialty</u>	<u>Trained Employees</u>
Crossbar Switching	12
Microwave	16
HF Radio	9
Teletype Maintenance	<u>5</u>
Total	42

Section 8

FUTURE OBJECTIVES

As the LTC continues to expand, its technical and managerial demands on human resources will increase. In addition, present performance in some procedural aspects of certain areas require improvement to maintain the operation. Therefore, we make the following recommendations:

8.1 PERSONNEL MANAGEMENT

Recruitment of the most capable individuals with high potential for management and technical positions is essential. The selection must be based upon a criteria that will ensure that the most qualified candidate is selected. It would be appropriate to have a list of candidates available at all times. A salary structure should be responsive to make a sufficiently competitive work environment to attract and retain capable personnel. Guidance and counseling must be readily available to those in need of adjustment help. The performance of all employees assigned to the Personnel Department should be reviewed so that an obviously unsatisfactory condition can be corrected. Prompt issuance of the various reports and other documents originating in that department is a necessity.

8.2 PLANNING

A management reorganization has been proposed which when implemented, will provide a management concept to enable the LTC to perform most of its own planning. Financial and technical planning must be an on-going exercise that will provide the basis, with sufficient "lead" time, for future expansion programs. If the LTC is to meet the challenge of growth, it is mandatory that adequate planning take place now. An outside plant feasibility study should begin soon, to ensure that adequate facilities are available for current and future needs.

8.3 TECHNICAL TRAINING

Training of technicians in all areas of the operation must be a perpetual effort. We recommend that basic initial training be made available in-country. In the more complex crafts such as microwave,

subsequent formal training can be obtained abroad. Retraining or review courses can occur in-country via experts from abroad. Considerable training can be achieved via on-the-job training, administered by experts, which we feel is the most effective type of training for the majority of jobs. Some technical training is required for supervisors so as to keep them knowledgeable of new products and materials.

8.4 MANAGEMENT TRAINING

There is a requirement for formal training of selected individuals who have demonstrated the ability or potential to either progress or who need additional clarification of management concepts. However, most of the routine management training can be accomplished by on-the-job training administered by an expert and supplemented by courses available in-country. The latter is a basic requirement for nearly all supervisors. All management employees need a review of management philosophies administered in a classroom environment. It is imperative that each level of management understands which overall management approach is being applied and that it is the approved method of management in the Corporation. We recommend that particular emphasis be placed upon basic management training for first line supervisors. The GTE-ISC management training has primarily been applied at manager level via the "counterpart" concept with a secondary effort directed towards subordinate management positions. There must be an on-going program of management training to not only provide for the current needs of improving performance but to ensure an adequate staff of capable ready replacement individuals and to have available a source from which candidates for promotion can be selected.

We also recommend that such training include a thorough review of principles of motivation and control, by effective and consistent use of recognition and where appropriate, discipline.

We recommend the team approach style of management be used consistently. All levels of management could be better motivated if they could develop a feeling of active participation in the affairs of LTC. Consultation with subordinates, even when the answer is known, can be the necessary catalyst to start a manager or supervisor on the road to self-motivation.

The LTC has progressed to the point where management must place more emphasis on the delegation of responsibility combined with an equal amount of accountability and authority.

8.5 EXPATRIATE SERVICES

Our recommendations concerning continuing expatriate assistance in specific areas are:

1. Outside Plant Engineering and Construction Manager
2. Outside Plant Engineer
3. Controller
4. Commercial Manager
5. Central Office Maintenance Supervisor/Technician (2)
6. PABX maintenance and installation supervisor/technician
7. Telex maintenance and installation supervisor/technician
8. Outside plant cable splicer/lineman technicians (5)
9. Service Center Supervisor
10. Management consultant/trainer
11. I-R Supervisor/Technician/Trainer
12. Traffic Administration/Operation/Studies
13. Plant Accounting Supervisor
14. Rate Expert.

At this time, it is most difficult to determine the duration of expatriate assistance in a specific area.

Some areas, such as the rate expert may be of only a few months duration while others, such as the outside plant engineering and construction manager may be needed for a period of years. The pace of development towards self-reliance will be determined by the dedication of the LTC staff.

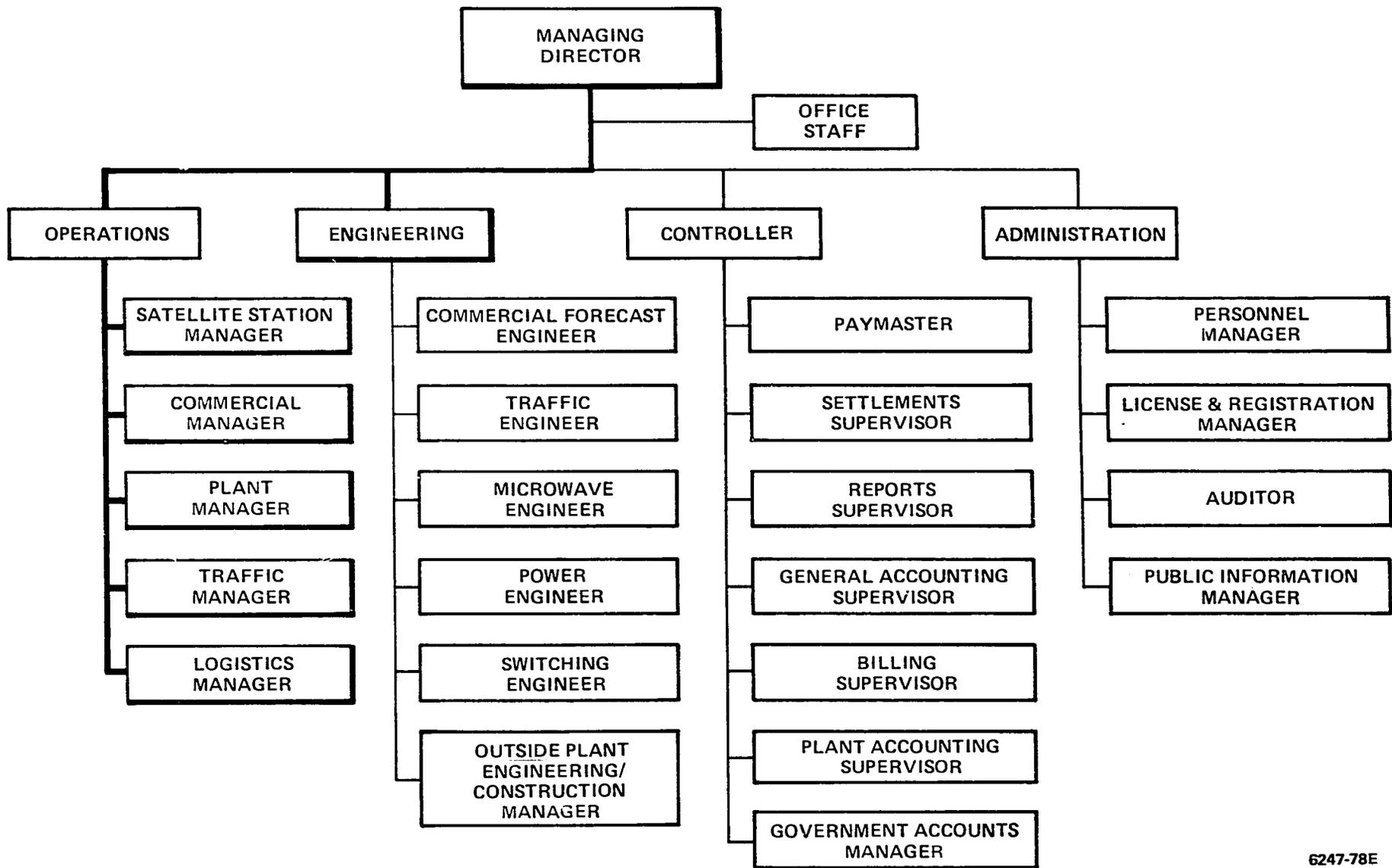
ADDENDUM

Proposed Organization

for

Liberian Telecommunication Corporation

A-1



ENGINEERING

OFFICE
STAFF

COMMERCIAL FORECAST
ENGINEER

TRAFFIC
ENGINEER

MICROWAVE
ENGINEER

POWER
ENGINEER

SWITCHING
ENGINEER

OUTSIDE PLANT
ENGINEERING/
CONSTRUCTION
MANAGER

FIELD
ENGINEER

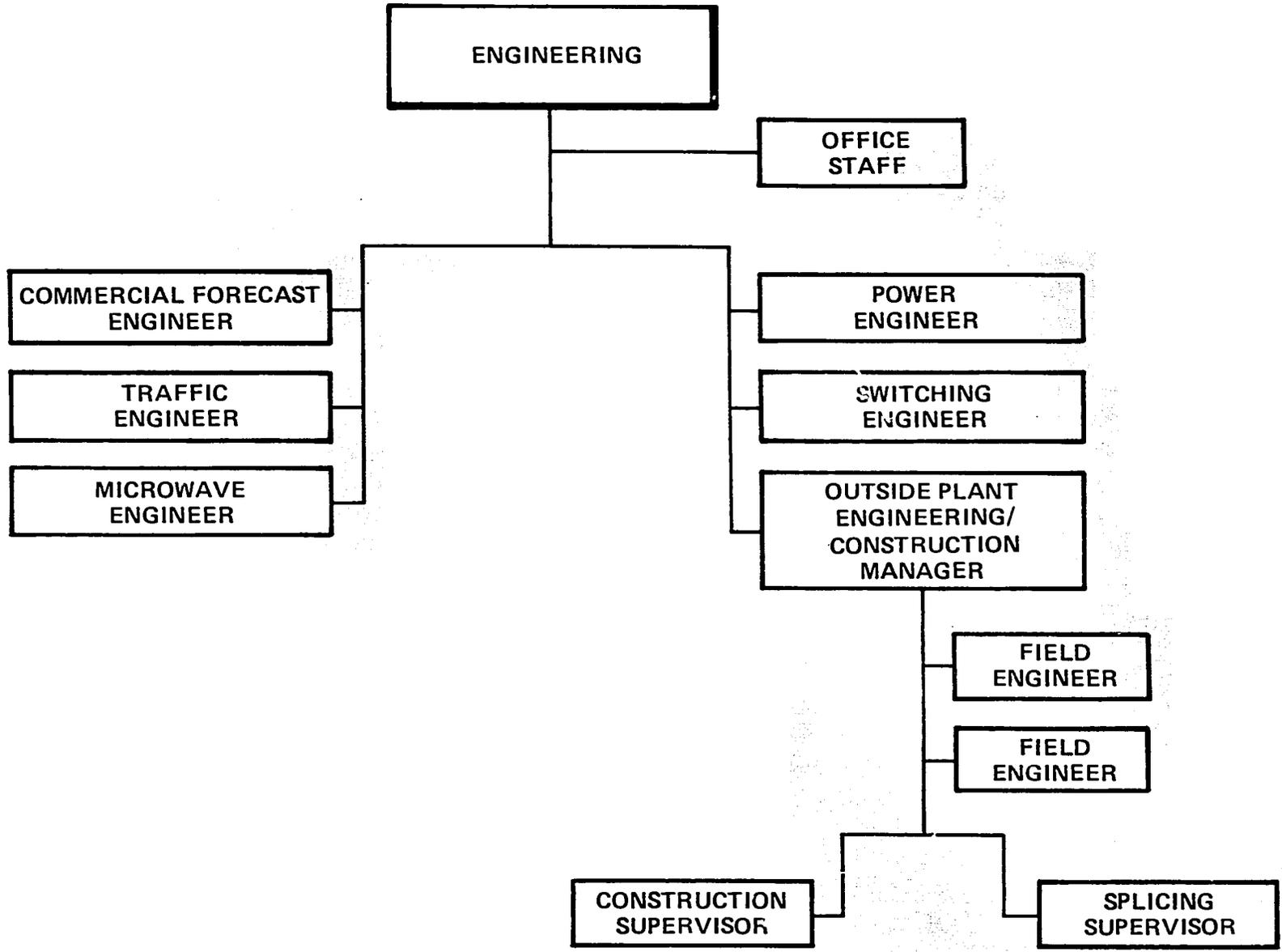
FIELD
ENGINEER

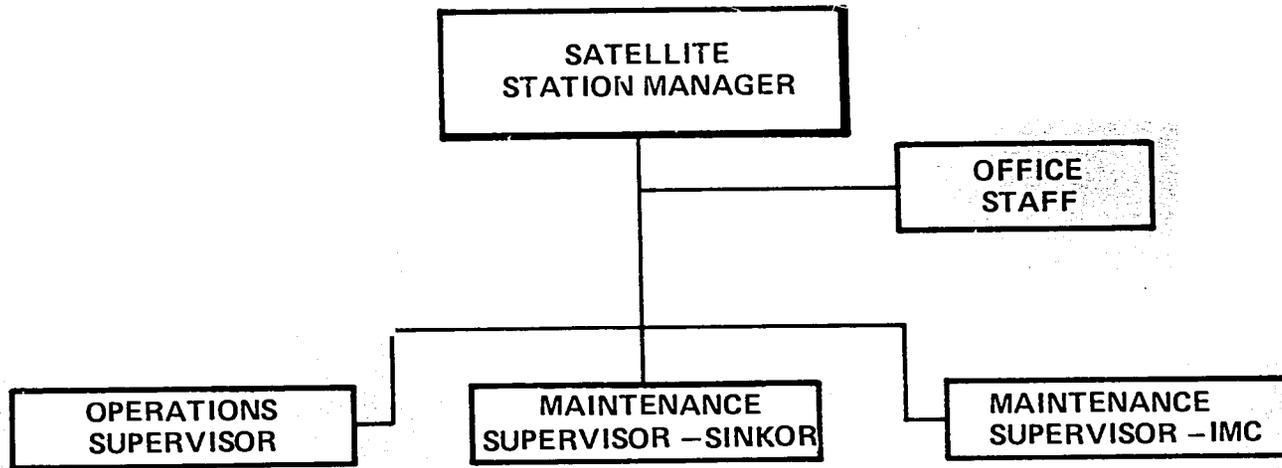
CONSTRUCTION
SUPERVISOR

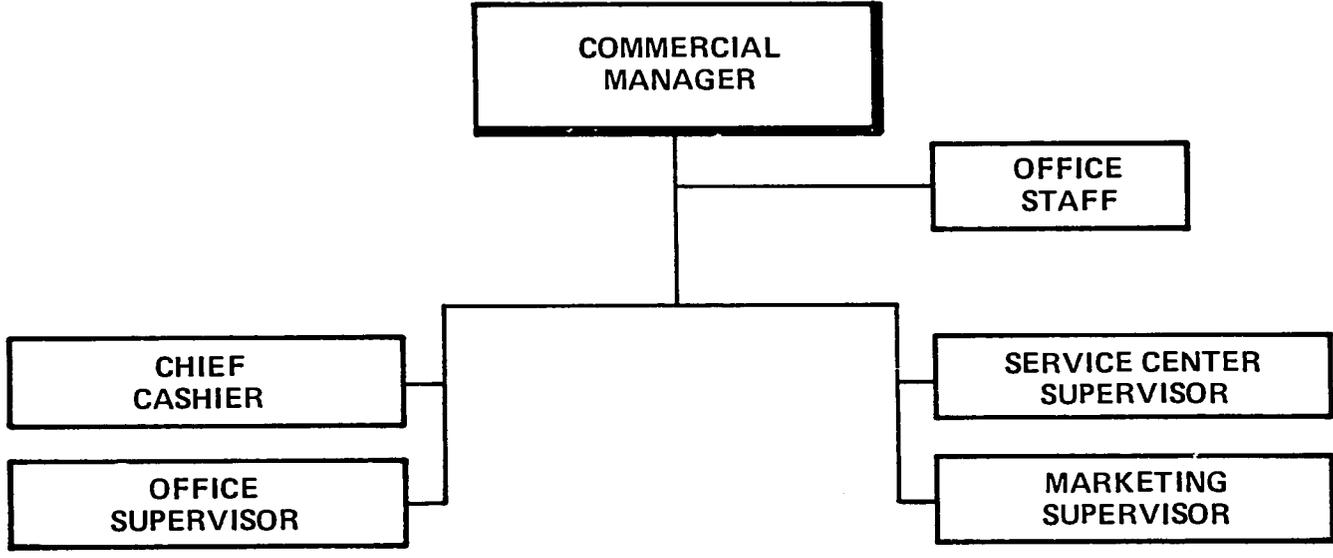
SPLICING
SUPERVISOR

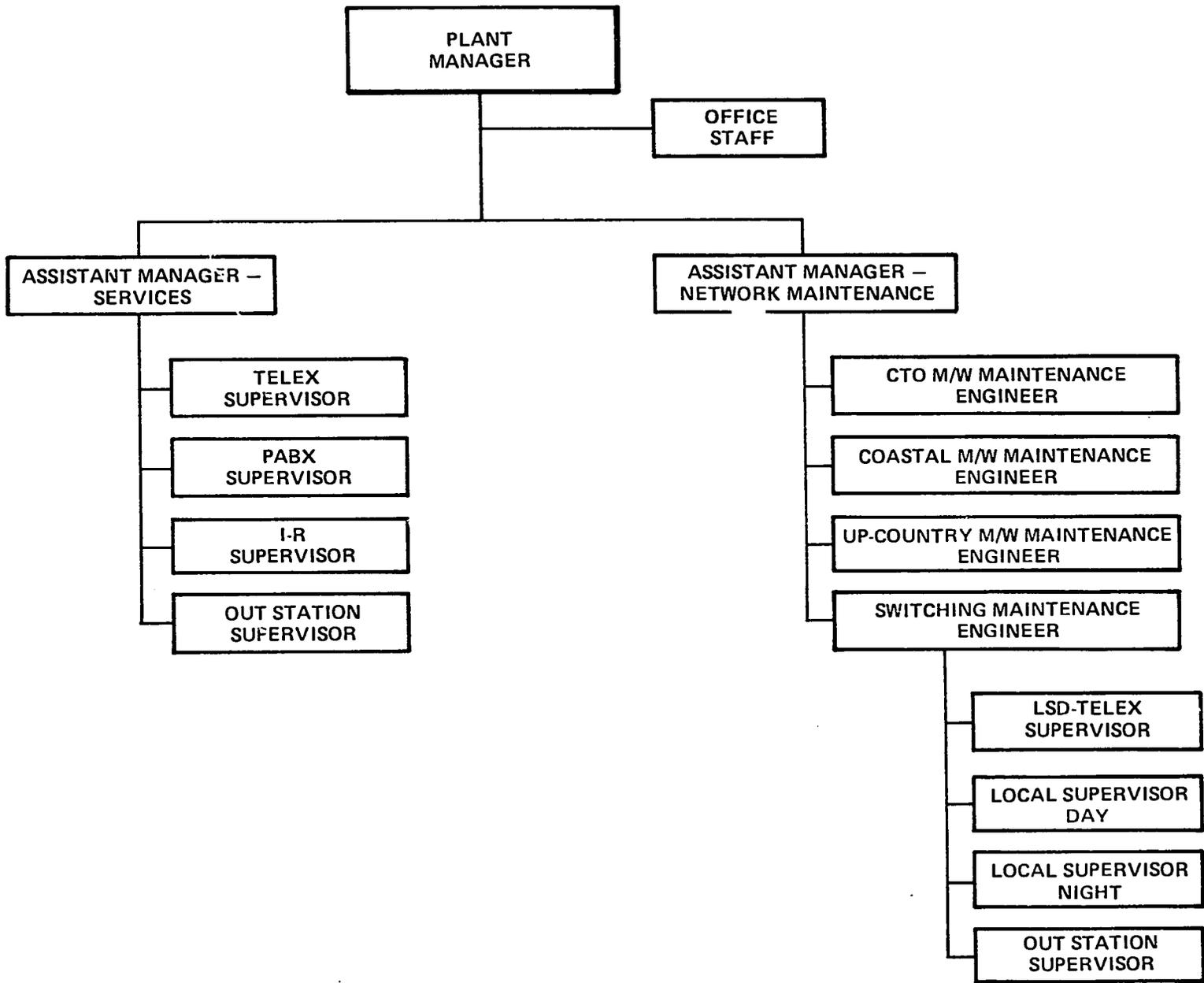
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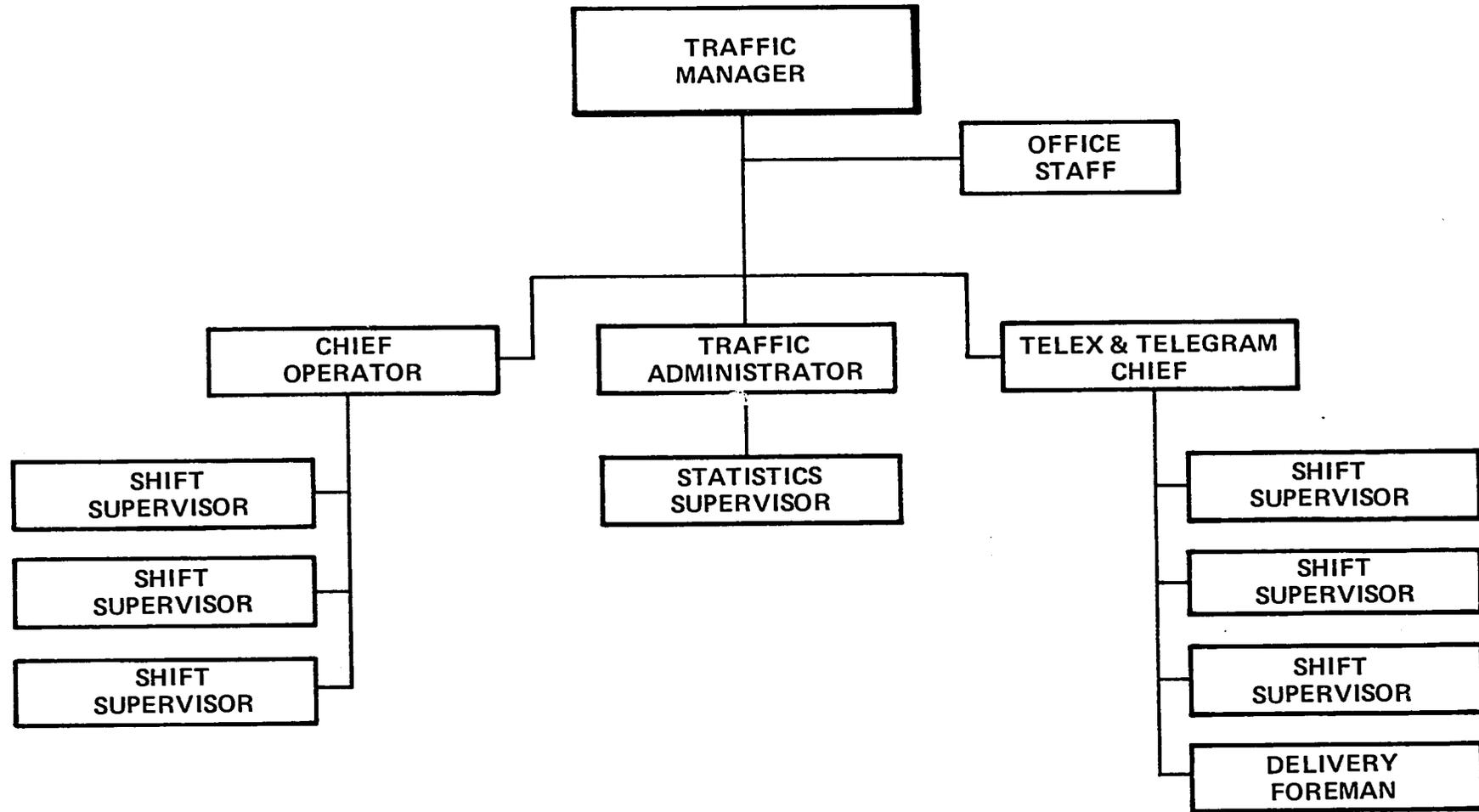


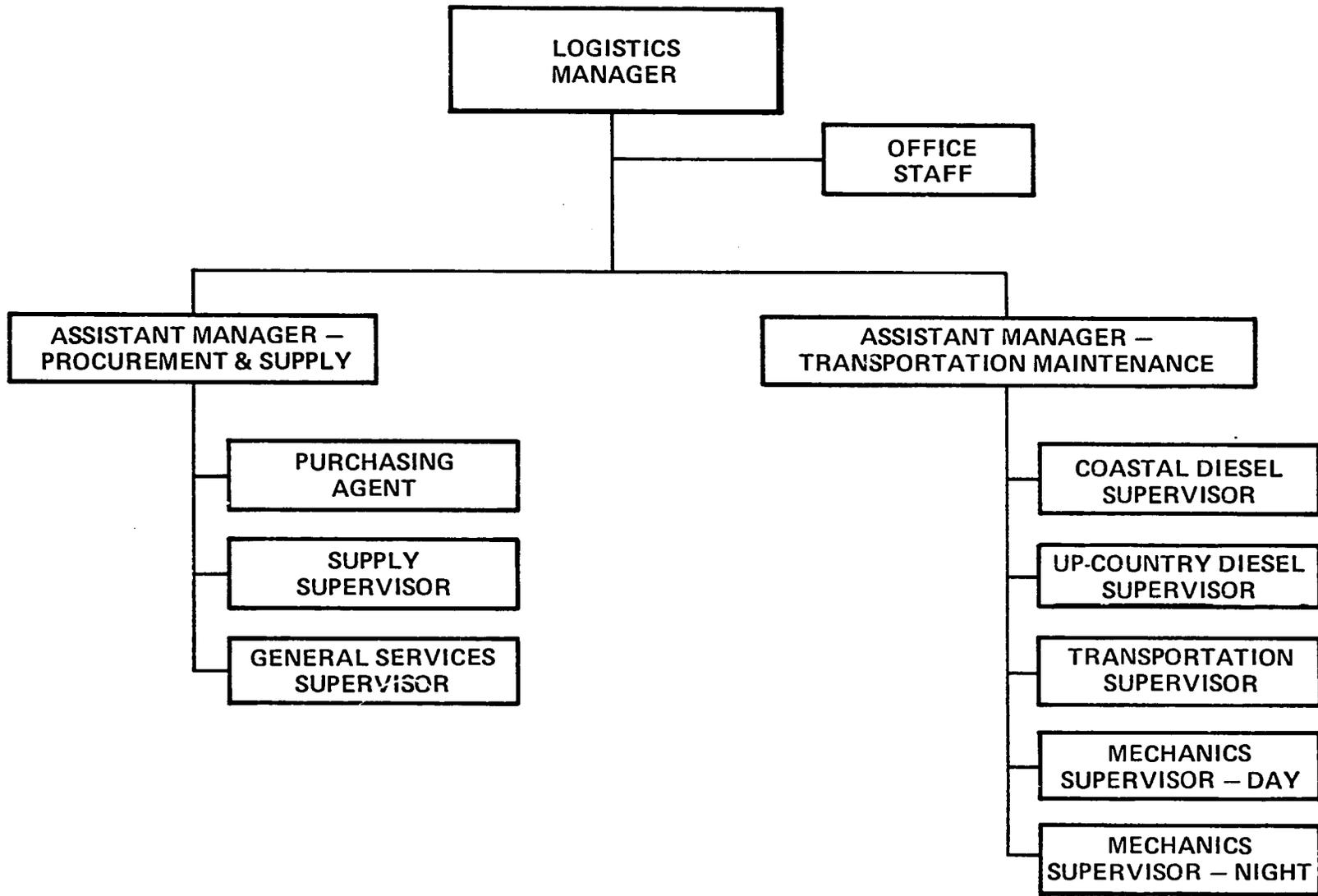






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