

FN ACD-699  
99-65

**DISTRIBUTION SUBSECTOR  
COMMERCIALIZATION  
PILOT PROJECT**

**NIS Institutional Based Services Under the  
Energy Efficiency and Market Reform Project  
Contract No CCN-Q-00-93-00152-00**

**Delivery Order No 14  
Georgia Power Sector Reform**

*Final Report*

*Work in Progress Draft Submitted  
October 31, 1997*

*Prepared for*

U S Agency for International Development  
Bureau for Europe and NIS  
Office of Environment, Energy and Urban Development  
Energy and Infrastructure Division

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September 1998

PN-ACD-699

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## CONTENTS

### EXECUTIVE SUMMARY

<b>1</b>	<b>BACKGROUND</b>	<b>4</b>
<b>2</b>	<b>SCOPE OF WORK</b> Purpose Range of Activities	<b>5</b>
<b>3</b>	<b>DETAILED DESCRIPTION OF TASKS</b> Selection of Pilot Location Customer Accounting Utility Policies and Procedures Legal and Regulatory Reform Service Wiring Modifications Full-Service Agreements Public Information Programs	<b>8</b>
<b>4</b>	<b>EQUIPMENT AND LEVEL OF EFFORT</b> Equipment Level of Effort	<b>15</b>
<b>5</b>	<b>IMPLEMENTATION SCHEDULE</b>	<b>18</b>

## EXECUTIVE SUMMARY

This Project proposes to procure and install a computer system to demonstrate the operation of a modern utility billing system among approximately 4 000 customers of a Georgian electric distribution company. The concept of monthly billing cycles will be introduced, and sufficient distribution company staff will be engaged to conduct the program on a full-time basis. Additional support will be provided by Georgia accounting and computer specialists.

Pilot project efforts will focus principally in the area of customer accounting, but will include related efforts to the extent that they enhance distribution company commercial procedures, and support elements of the overall reform process.

These other efforts fall into the following categories:

- Utility Policies and Procedures
- Legal and Regulatory Reform
- Service Wiring Modifications
- Full-Service Agreements

They include the adoption and implementation of the Chart of Accounts soon to be adopted by the Georgian National Electricity Regulatory Commission, and the relocation of meters and modification of service entrances to facilitate both monthly meter reading and disconnection of delinquent customers. Also included will be efforts to obtain 24-hour power supplies for the pilot project distribution feeder from the wholesale supplier. The pilot project proposes a much more strict enforcement of disconnection for non-payment.

The implementation period of the project is from November, 1997 through September, 1998. Customer billing is scheduled to commence in March, 1998, contingent upon early purchase of accounting software and computer hardware.

Equipment purchases have been organized in stages, based on order of priority and the magnitude of funds available, ranging from the initial software and computer costs of \$33,250, up to a maximum of \$196,450 for service entrance modifications and meter test and calibration equipment.

## 1 BACKGROUND

The financial position of the electric companies in Georgia is perilous. Payments for electricity service by customers are not sufficient to sustain financial viability of the Georgian electricity sector. Distribution companies pay only a portion of their wholesale power bill to Sakenergo, and Sakenergo pays only a portion of its bills to the generating companies. The system does not produce enough revenue to buy fuel for the generators, pay employees regularly, or perform proper system maintenance. Accounting practices are obscure and make tracking of cash flows difficult for the Regulatory Commission and other Government agencies.

The present collections procedures of Distributors violate a fundamental principal of commercial practices, that is, the separation (compartmentalization) of meter reading, bill calculation, and bill payment functions. Each function should be carried out by separate groups of employees in order to minimize the opportunity for individuals to defraud either the utility or customers.

While it is reported that a large proportion of customers have the means to pay the relatively modest electric costs, most do not because there are generally no consequences for non-payment. Electricity is rarely terminated because of failure to pay. Service entrance wiring does not provide a convenient means for secure disconnect, and even when disconnected, customers often reconnect themselves. Distributor personnel are not diligent in the detection and elimination of power theft.

The Government of Georgia has mandated the privatization of the distribution companies, but there is no certainty as to when privatization might occur, whether all of the companies can be sold, or whether the buyers will be strategic investment companies or regional investors without the financial resources or technical expertise to make the systems commercially viable. It would therefore be prudent to proceed now with those commercial reforms which might be implemented at minimum cost. Any improvements realized would provide immediate financial benefit, and the lessons learned could be useful in modernizing other Georgian distribution systems, whether privatized or not.

## 2. SCOPE OF WORK

### Purpose

The purpose of this pilot project is to improve commercial operations of a Georgian electric distribution company by the introduction of Western management, accounting, and commercial procedures

To improve commercial operations the project will carry out the following activities

- Procurement, installation, and use of computer hardware and customer accounting software to demonstrate the operation of a monthly utility billing system
- Definition of a new relationship between the distribution company and its customer  
For increased power quality and availability, payment will be required or service will be disconnected
- Standardization of reporting procedures to the Regulatory Commission in accordance with International Accounting Standards
- Establishment of commercial relationships between the distribution company and the wholesale power supplier for power supply and payment agreements

Fundamental to any plan for commercial reform of Georgia's distribution subsector is the establishment of a customer accounting procedure which requires customer payment discipline and sound financial management - This may be achieved through the introduction of a computerized meter reading, billing, and collection program such as those which have been used successfully by other utilities throughout the world for many decades

This Project proposes to procure and install at an appropriate test site the computer hardware and customer accounting software necessary to demonstrate the operation of a conventional utility billing system among approximately 4,000 customers of an electric distribution company. The concept of billing cycles will be introduced, and sufficient distribution company staff will be engaged to conduct the program on a full-time basis. Additional support will be provided by accounting and computer specialists. Hagler Bailly direction will be provided principally by one consultant, with office and other specialist support as required.

Equipment costs for the pilot project range from just over \$30,000 to just below \$200,000, depending on the level of effort and equipment purchases that can be funded. Georgian labor requirements are about 2,000 person-days over a 9-month period.

Procurement should be expedited so that computer hardware and software will be available in January, 1998

### Range of Activities

Complete commercial reform of the distribution sector requires fundamental changes in the following areas

- **Customer Accounting**, including the implementation of a computerized monthly meter reading and billing process wherein revenue is recognized on a per-customer basis during the period in which electricity is used, full payment is required each month and past-due accounts are reported by age
- **Utility Policies and Procedures**, includes the implementation of a model service agreement between the Distributor and Customer. This formal legal contractual relationship would specify the terms and conditions of service, including denial of service in the absence of specified payments
- **Legal and Regulatory Reform**, includes legal and regulatory requirements that distribution companies use a suitable Chart of Accounts, new General Ledger format, reporting formats, fee schedules, and other follow other rules to strengthen Distributor's commercial operations and facilitate Regulatory oversight
- **Service Wiring Modifications**, involving development of cost-efficient designs and procedures to provide accessible, outdoor metering and a secure means of disconnection at individual customer locations, in order to facilitate monthly meter reading and cut-off for non-payment
- **Full-Service Agreements**, such as the gradual phase-in of 24-hour service for feeders or transformers where customers subscribe to full payment in exchange for full service. This requires extensive metering equipment changes and suitable wholesale power supply contracts with Sakenergo

As described above, this project will concentrate principally in the area of customer accounting methods but will propose and undertake changes in the other areas to the extent that they enhance the pilot distribution commercialization process, and can be performed within the allowed budget. Implementation of some of these other elements of distribution commercial reform will require the participation and approval of other power sector and governmental entities, such as the Regulatory Commission, Sakenergo, Sakenergo Generation, and the Ministry of Fuels and Energy

The entire range of objectives of this project are the following

- Implementation of computerized monthly billing of customers

- Adoption of the uniform Chart of Accounts selected by the Georgian National Electricity Regulatory Commission for standardized financial reporting
- Introduction of General Ledger software and procedures to which the billing software will be linked
- Introduction of new distribution company rules, regulations, rates and charges to improve revenue flow
- Implementation of a model service agreement between the distribution company and customers This service agreement will define the rights and responsibilities of both parties
- A public information program to gain customer support of the new programs
- The design and testing of new service connection and metering standards
- Propose new employee pay and compensation plans,
- A model power supply contract between the distribution company and Sakenergo for the supply of wholesale power that is consistent with market rules and a new tariff methodology being developed
- Development of a plan to phase in full-time electric service to customers, keyed to feeders or transformers where agreements for full and regular payments can be established
- Implementation of other legal and regulatory reforms required to properly support commercial operations

### **3. DETAILED DESCRIPTION OF TASKS**

Following are the activities that will be undertaken to reform the commercial process in a selected pilot distribution company

Work to be undertaken as part of this commercialization pilot project is divided into the following task areas

- Selection of Pilot Location
- Customer Accounting
- Utility Policies and Procedures
- Legal and Regulatory Reform
- Service Wiring Modifications
- Full-Service Agreements
- Public Information Programs

In the following, we describe the activities that will be undertaken in each of the above-listed areas

#### **Selection of Pilot Location**

The Rustavi company has been proposed for the demonstration because it is the largest Georgian municipal system outside of Tbilisi, it is easily accessible from Tbilisi, previous work has been done there by Kantor and IESC, and computer support is readily available. However, other sites are being investigated, including Martkopi, Gardabani, Mtskheta, and the Mtatsminda, Vake, and Bagebi regions of Tbilisi.

The following criteria are being used to evaluate the different options of sites where the distribution pilot will be carried out

- Travel time from Tbilisi to the test site is reasonable
- A typical customer group where most people have the potential to pay for electric service (not dominated by pensioners or the very, very poor)
- An area where customers are accustomed to an average or better power supply, that is, the lights are usually on more than they are off
- The power supply transmission and switching network would permit 24-hour electric supply in exchange for 100% payment of the wholesale power bill

- Utility management is competent and amenable to innovations that improve employee performance and accountability
- Municipal government leaders are cooperative and would give a relatively free hand in introducing and enforcing commercial reforms, including disconnection for non-payment
- The number of customer accounting staff that have typing and computer skills, and the existence of any employees proficient in English
- The existence of any established relationships between the distribution company and outside computer consultants and accountants that could help provide long-term support beyond the period of the demonstration project
- The size of the available customer base

Site evaluation and final selection is scheduled to be completed in November, 1997

### **Customer Accounting**

A computerized customer billing and accounting program is the heart of modern distribution commercial practices, and can be installed at a very modest capital investment using PC-based billing software

A number of utility billing programs have been developed which are used widely in other countries. Most contain other accounting modules such as general ledger, accounts payable, inventory, and payroll, and thus have value beyond the billing function. One complete system suitable for Georgian utilities is used by a number of municipal utilities in the U.S. and can be purchased for \$8,250. Conversion to Georgian language may be done for about \$7,000. Another option may be software developed for Armenia, although this software does not have modules that produce overall financial statements for management and regulators. Three utilities (including Rustavi), have most of the computer hardware required, which was provided by the Kantor Consulting company under a World Bank-funded effort that ended earlier this year.

The software selected should have the capability to produce reports in accordance with International Accounting Standards, and also in the format required for tax payments to the Georgian Government. These separate systems use two different Charts of Accounts which must be reconciled within the computer program.

The computerization proposed in this Pilot Project introduces a high degree of efficiency into the billing program. Meters can be read one day, bills calculated and printed the next day, and bills delivered to customers on the third day. Payment would be required no later than 15 days after bills are delivered, with disconnection of unpaid accounts.

scheduled following a 15 or 20-day grace period. Customers would be divided into billing groups (up to 20) so that the work load for each department or function is spread evenly throughout the month.

Specific Customer Accounting tasks will include

- Selection of the utility site, accounting program, and local personnel to operate the system
- Installation of equipment, training of personnel, organizing the billing routes, and purchase of forms and supplies
- Exercising the complete billing cycle each month including meter reading, data entry, bill printing and bill delivery,
- Collection of bills at payment stations, with follow-up field collections of delinquent accounts, and posting of payments to the customer database
- Production of disconnect lists, the dispatch of disconnect crews, and the cut-off of customers who do not pay
- Production of periodic financial and management reports

#### **Utility Policies and Procedures**

This phase of the work would provide drafts of policies and procedures to be implemented by the Distributor. A detailed listing is included in the Rules and Regulations outlined in Appendix B, Schedule B.

Specific tasks to be undertaken include

- A review of terms and conditions of service to customers as presently practiced, and the drafting of a formal agreement between customers and the distribution company, to be signed when new accounts are opened, or (for existing customers) when service is restored following disconnection
- Draft distribution company policies and consumer literature which set forth new rules which will require service to be disconnected if the bill is not paid within the specified period, levy fees and penalties for service trips related to field collections and disconnections, and require a 3-month deposit as a condition of continued service
- Identification and establishment of working relationships with the key managers at the Distributor that will approve and assist in various aspects of the project
- An examination of the present organizational structure of the Distributor, including position descriptions, titles, functions, and pay levels, and the development of a modified organizational structure which will be necessary to

- support the new billing system, including titles, functions, position descriptions, and pay scales
- The development of all new policies and procedures required to implement and support the new billing program and other activities necessary to reduce non-technical system losses

### **Legal and Regulatory Reform**

There are a number of areas where the Government of Georgia should take action to strengthen the position of the Distributors in dealing with their customers. Most of the required actions could be taken by the newly established Georgian National Electricity Regulatory Commission. These would include new requirements or authorizations related to

- Tariff factors, including minimum bills, late payment charges, common building supply, and estimated bills,
- Conditions of Service, including customer agreements, deposits, disconnection for non-payment, final billings, and metering and service attachment requirements
- Special Service Fees, including those for connection of new service, testing of meters, delinquent collection trips, and disconnect and reconnect for non-payment,
- Quality of Service, including voltage, frequency, and service interruptions,
- Monthly Reporting Requirements to the Regulatory Commission, and
- Wholesale Power Supply Contracts between Distributors and Sakenergo

Other reforms may require actions by Parliament or various Ministries. These would relate principally to the review, strengthening, and enforcement of statutes associated with the theft of power, particularly in regard to collusion between utility employees and customers, and also to programs of assistance to very poor customers.

This Project would provide draft documents for consideration by Parliamentarians, Regulatory Commissioners, Ministries, and Sakenergo officials, as appropriate. Appendix B lists many legal and regulatory issues for consideration, including recommended positions and the rationale for each. Appendix C outlines a proposed Power Supply Contract between Sakenergo and Distributors which embodies many of the proposed regulatory reforms listed above.

Specific Tasks will include

- A review of laws and judicial procedures relating to the theft of electricity in Georgia and other countries, the drafting of any new legislation and operating procedures to deter and punish power theft, and the presentation of such proposal to the Regulatory Commission, Ministries, and Parliament, as appropriate
- The drafting and approval of rules which allow a minimum bill to be sent to customers each month, said minimum bill to include (or not include) the use of a specified number of kWh, but due and payable whether or not the kWh are used
- The drafting and approval of rules which allow a flat monthly fixed charge to be added to the bills of customers living in apartment buildings where electric service is provided to common facilities such as lighting in public areas and elevators
- The drafting of certain provisions to be included in a new power supply contract between the distribution companies and Sakenergo which relate to payment of wholesale power bills, specific provisions being (1) that the power bill must be paid in full or the municipal company will lose its franchise, with ownership and management reverting to the government,<sup>1</sup> and (2) that a penalty charge and interest charges will be added to power bills if not paid by the specified date
- The drafting of a revised wholesale power supply, billing and payment procedure wherein billing and payment may be made on a substation-by-substation basis, provided the distribution company maintains complete and accurate records of customer billings and payments each month which are in a form which may be audited by Sakenergo, the purpose of such arrangement being to facilitate a proposal, also to be drafted, which would adjust power supplied to a substation in relation to the payment record of customers served by that substation

### **Service Wiring Modifications**

The most difficult and most costly problems related to improving collections relate to the meters and service wiring in apartment blocks and other housing. Measures for correction include

- Hardening service networks against theft,
- Providing individual customer disconnect methods, and
- Relocating meters to make them accessible for monthly readings

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<sup>1</sup> This would require that Sakenergo or other government agency have trained management personnel which could be dispatched to operate the system. The main purpose of this provision would be to remove control of funds from local municipal authorities

Rehabilitation of all metering installations and service connections is necessary, and will require an estimated 30% of all distribution system rehabilitation expenditures of a strategic investor, according to a September, 1997 analysis conducted by Hagler Bailly. A large (40,000 units) demonstration of such a rehabilitation effort was proposed by the International Executive Service Corp (IESC) in September, 1997. The cost was estimated at \$72 per location (including all overheads). Funding for such work would be difficult to arrange, and although very desirable, is not a prerequisite to the other commercialization elements discussed herein.

Since the most fundamental tool available to the utility for enforcing collections is the prompt disconnection of service for non-payment, this Project proposes to establish policies and organize staff as necessary to make disconnection of service a part of the Commercial Reform activities. Since the wiring in most apartment buildings does not provide a convenient means for disconnection, the service wire between the building feeder and customer's meter must be accessed, cut, and secured in such a way as to make customer reconnection both difficult and obvious.

In those cases where service is actually cut, provision must be made for reconnection. The reconnection procedure should include modification of the service wiring so that both the meter and a convenient disconnection means are located outside the apartment. Because of the wide variety of building and wiring designs, a number of different situations are expected to be encountered where service is disconnected.

Some exploratory work has been done in this area involving a number of different techniques, but there is divided opinion on the best approach, and no "best solution" has yet been devised. Massive conversions of apartment wiring have been undertaken experimentally, but such programs require very large capital expenditures. The option involving the lowest cost appears to be used U.S. socket-type meters provided through NRECA, with sockets being manufactured in Georgia. A more detailed discussion of service entrance modifications is contained in Appendix D.

This Project proposes to work with Georgian electricians in exploring this and other options and developing the most effective solutions to the modification of service wiring when service is restored following disconnection. To that end, the budget for this Project includes funding for the purchase of meters and associated wiring for the modification of 100 service entrances on an experimental basis.

### **Full-Service Agreements**

The most fundamental expectation of electric utility customers is that service should be available 24-hours per day. The principal reason this is not the case in Georgia is the low collection rate. Many customers cite poor service as one reason for not paying for their electricity.

This Project proposes to test the assertion that 80% of Georgian families have the money to pay for electricity, and would do so if power were available 24 hours a day. The plan is to offer customers full service if they sign an agreement to pay fully on a regular basis, and show their good faith and commitment by payment of a 3-month deposit.

Prerequisites are

- The selected feeders can remain energized during rotating blackouts,
- Special check metering can be installed and used for Sakenergo billing of the “protected” feeders,
- A computerized customer accounting system can promptly identify delinquents,
- Service will be promptly cut off to all customers who don’t pay, and
- An intense surveillance program keeps the full-time feeders free of illegal connections

The full-service program plan is described in substantial detail in Appendix E. If the program is conducted in an area where computerized billing has been implemented, the principal additional cost would be for check metering of the feeders and transformers.

### **Public Information Programs**

Georgian electric utility companies and Government operations are held in low esteem by some electric customers because of poor service, lack of trust, and a perception of corruption. A very intensive public information program will be required to inform customers of

- The true condition of the electric system in Georgia,
- What needs to be done to improve it,
- The steps being undertaken by the Distributor, and
- The degree of participation and commitment required of the customers

This Project proposes to provide assistance to the Distributor in the developing an effective public information plan, writing of materials, and payment for printing and advertising. The Public Information plan is described in substantial detail in Appendix F.

## 4. EQUIPMENT AND LEVEL OF EFFORT

### Equipment

The following table of equipment and material to be procured is arranged in descending order of priority and preference. For example, the Customer Accounting hardware, software and supplies are critical to the entire project and must be obtained as quickly as possible, preferably by January.

	<u>Estimated Cost</u>		<u>TOTAL</u>
	<u>U S</u>	<u>Local</u>	
<b><u>Customer Accounting</u></b>			
Customer Accounting Software			
NMPP complete package (Option 1)	8 250		
Conversion to Georgian language by NMPP	7 000		
Armenia Billing Program (Option 2)			
4 PC computers and monitor		10 000	
Printer UPS and other peripherals		3 000	
Printing and billing supplies		5 000	
Sub-total for customer accounting	15 250	18 000	33 250
<b><u>Service Entrance Modification - Phase 1</u></b>			
Used U S Socket-type meters (200)	2 000		
Shipping costs for meters (air freight)	3 500		
Sockets for U S meters		3 000	
Wiring Material		3 000	
Sub-total for service modification	5 500	6 000	11,500
<b><u>Full Service Feeders</u></b>			
Landis & Gyr S4 electronic meters (40 ea )	16 000		
Current Transformers		2 700	
Potential Transformers		3 000	
Mounting hardware		3 000	
Laptop PC software probe	2 000		
Sub total for full service feeders	18 000	8 700	26,700
<b><u>Service Entrance Modification - Phase 2</u></b>			
Used U S Socket-type meters (6 000)	30 000		
Shipping costs for meters (40 container)	6 000		
Sockets for U S meters		45 000	
Wiring Material		30 000	
Sub-total for service modification	36 000	75 000	111,000
<b><u>Meter Test and Calibration Equipment</u></b>			
	15 000		15 000
<b>TOTAL FOR PROJECT</b>	89 750	107 700	196,450

Major items in the above budget are described below

- a) Software The NMPP software is thought to be preferable over the Armenian software because it is a complete package. However, it is not necessary to purchase the complete package initially. It is proposed that only the Billing module be purchased first. Only after it has been proven acceptable would the project be expanded to include the General Ledger module. The Inventory module would follow later. A fourth phase of implementation may be modifying screen images to present Georgian language, but that is proposed for a later project if the application is to be adopted for expansion to other areas.

The Armenian billing software may be adequate for billing purposes, but is thought to not have a General Ledger or other modules which would be critical for proper accounting and reporting to both the Regulatory Commission and Georgian tax authorities. Further evaluation of the two programs will be made before a final selection is made.

- b) Hardware If the project is conducted at Rustavi it may be possible to use one or both PC's provided under an earlier project. A laser jet printer exists there, but a dot matrix printer would be more suitable for printing bills and reports. If the project is conducted elsewhere, the billing program cannot begin until all of the hardware shown is provided.
- c) Service Entrance Modification Planning and preparations will occur in parallel to other work, but this aspect of the project will be implemented only after the billing program is fully functional. The extent to which this work is conducted will depend upon the availability of time and resources.
- d) Full Service Feeders Planning and preparations will occur in parallel to other work, but implementation will depend upon the ability to identify feeders which can remain energized, and acceptable administrative and operational arrangements. This phase of the work requires detailed customer accounting procedures and extensive metering of feeders and transformers during the phase-in period.

#### **Level of Effort**

There will be a requirement to provide salaries or supplement the pay for a number of Georgian participants in the program. The first five positions listed below would be

utility employees assigned for full-time work in the project. A higher-than-normal pay level should be provided by the project in order to assure adequate support. Others would be part-time participants. Ex-patriot manpower and expenses would be covered under the present Hagler Bailly budget.

<u>Full-time Positions</u>	<u>Man days</u>	<u>Function</u>	<u>Cost</u>
Meter Reader	180	Read 1 meter route each day. 20 days/month. 200 meters/route. Total customers in demonstration: 4,000 customers	\$ 1,800
Computer Operator	180	Enter meter readings from previous day. print 200 bills per day	1,200
Bill Delivery	180	Each day deliver the 200 bills printed the previous day	1,800
Teller/Cashier	180	Maintain a payment desk or window. enter payments received each day into the computer. Perform all standard cash management steps	1,200
Surveillance/ Disconnect	360	Full time surveillance of 4,000 customer connections. Disconnects illegal taps. Disconnects customers who don't pay	7,200
 <b><u>Part-time Positions</u></b>			
Commercial Manager	40	Part-time present manager of collections	1,800
Director General	40	Part-time present Director	1,800
Policeman	90	Part-time to accompany Disconnect person to locations of uncooperative customers	1,200
Linemen	40	Install check meters for full-time feeders/transformers	400
Electricians	540	Relocate meters. rewire service entrance connections (may become full time)	5,400
Meter Technician	90	Test and calibrate meters when relocated	900
Accounting Consultant	40	Part time technical advisor to help transition from existing accounting concepts to those embodied in billing software	1,800
Computer maintenance	20	Maintain equipment and network	1,000
Interpreter	50	50 days	2,500
<b>Total labor cost</b>	<b>2,030</b>	<b>man-days</b>	<b>\$ 30,000</b>
<b>Transportation</b>		Utility employee support	10,000

## 5. IMPLEMENTATION SCHEDULE

This project will begin immediately upon approval by USAID. It is proposed to begin customer billing with the new software and procedures by March, 1998. This will allow 7 months of operation and supervision until September 1998.

Procurement of the billing software and hardware should be approved by December 1 in order to begin installation and training in January.

The complete project schedule is shown on the following page.

EXECUTION SCHEDULE

