JOINT LEGISLATIVE AUDIT AND REVIEW COMMISSION

THE VIRGINIA GENERAL ASSEMBLY

WORKING CAPITAL FUNDS IN VIRGINIA

REPORT OF THE

JOINT LEGISLATIVE AUDIT AND REVIEW COMMISSION

ON

WORKING CAPITAL FUNDS IN VIRGINIA

TO

THE GOVERNOR

AND

THE GENERAL ASSEMBLY OF VIRGINIA

HOUSE DOCUMENT NO. 4

COMMONWEALTH OF VIRGINIA
RICHMOND
1983

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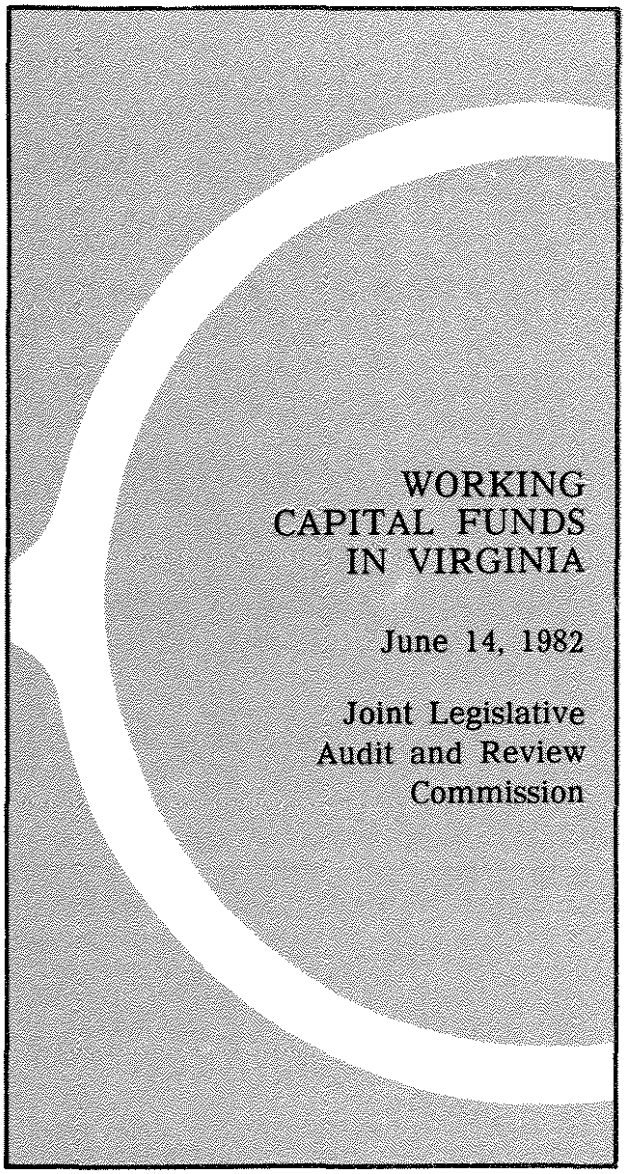

Working capital funds are used to finance and account for support services provided by one State agency to other agencies and institutions. Five working capital funds are currently in use in State government: Computer Services, Systems Development, Telecommunications, Central Warehouse, and Graphic Communications.

The Joint Legislative Audit and Review Commission has certain oversight responsibilities for working capital funds *(Code of Virginia,* §2.1-196.1). The Commission has the authority to authorize new working capital funds and to discontinue those no longer needed. It can also authorize the transfer of excessive retained earnings to the general fund. The Commission reviews the activities of the working capital funds on a periodic basis.

Introduction (pp. 1-9)

The review of working capital funds included evaluations of each of the five funds now in use in Virginia. In addition to the unique issues of the individual funds, several areas of common concern have been addressed. These include the financial condition of the funds, the appropriateness of an agency's designation as a working capital fund agency, the staffing in each agency, and the satisfaction of customers with the services provided.

Financial Condition. Because working capital funds operate in a nonprofit, governmental setting, they must take care not to incur large surpluses or deficits. Rather, revenues should just cover the cost of providing services.

At the close of FY 1981, the level of excessive retained earnings in two agencies appeared unnecessarily high. The Systems Development fund balance was $151,518, and the Central Warehouse fund balance was $351,349.

A JLARC REPORT SUMMARY

Recommendation (1). The Commission should review fund balances for June 30, 1982 and transfer any excess amounts to the general fund. A recommendation on the amount that can be so transferred for each fund will be forthcoming at the close of this fiscal year.

Appropriateness of Virginia's Working Capital Funds. Working capital funds should be used when a central agency is supplying support services to other agencies and it is possible to identify the level of support services provided in measurable units. Current funds appear appropriate with the exception of several functions at the Department of Telecommunications. Two other service agencies meet the criteria established for working capital funds: the Central Garage and correctional industries.

Recommendation (2). The Central Garage and correctional industries might be redesignated as working capital funds.

Staffing. The staffing of working capital fund agencies has grown steadily in recent years. This growth has resulted from continued demand from agencies for more services and an increase in the number of agencies served. Given the rapid increase in staffing and the General Assembly's desire to monitor growth in State government, JLARC will schedule regular staffing reviews in conjunction with biennial budget requests.

Fund Redesignation. The National Council of Governmental Accounting recommends the use of the term "internal service" fund rather than "working capital" fund. Changing the current designation would bring Virginia in line with nationally accepted terminology.

Recommendation (3). The *Code of Virginia* might be amended to replace the term "working capital" fund with "internal service" fund. The comptroller should be requested to determine the impact of such a change on the operation of all funds.

Department of Computer Services (pp. 11-25)

Staffing and Productivity. In FY 1981 four job classifications had turnover rates in excess of 25 percent. Computer operator turnover has been about 36 percent. Vacancy rates are also high. DCS employees appear to receive somewhat lower salaries than those in the private sector, they do not receive a shift differential, and they have a lesser chance for advancement within DCS.

Recommendation (4). A standing list of available candidates should be developed to expedite recruitment for high turnover positions.

Pricing and Billing. Under current DCS procedures, revenues generated by the billing formula in excess of the actual cost are returned to customer agencies in the form of rebates. The current level of rebates indicates that DCS rates are higher than necessary to recover costs. In FY 1981, rebates amounted to $3.9 million, or about 23.5 percent of gross revenues. Because some customer agencies use federal funds, federal approval of a change in rates is required.

Recommendation (5). The Secretary of Administration and Finance should take the necessary action to facilitate prompt federal approval of the DCS cost allocation plan. The plan should be implemented as soon after approval as possible.

Adequacy of the Billing Formula. The billing formula currently in use appears to adequately recover costs. However, there is no direct charge for tape storage, for which much valuable space has been allocated in the computer centers.

Recommendation (6). In order to ensure that agencies directly reimburse DCS for the costs of services, plans for implementing a tape storage charge should be accelerated. The charge should be made as soon as possible after federal approval.

Accuracy and Timeliness of Billings. While DCS billings are accurate and timely, there is still some confusion among some agencies as to the meaning of billing information. Sixteen percent of agencies surveyed had difficulty in understanding the charges and how they were calculated.

Recommendation (7). DCS may wish to reconsider the way in which it reports billing information to customer agencies. An improved format and the use of management-oriented information, such as the cost per transaction or specific item produced, could prove useful to customers. DCS should intensify education of agency management personnel in the billing system.

Lack of State ADP Plan. At a time when data processing is becoming an increasingly important resource, the State is without a current, comprehensive plan which would help to manage that resource. The six year ADP plan prepared by DCS sets forth the goals and objectives for DCS only, and was never intended to be a master plan for managing ADP resources.

Recommendation (8). Under the direction of the Secretary of Administration and Finance, DCS and the Department of Management Analysis and Systems Development (MASD) should prepare an ADP program plan for State government. The new plan should go beyond the scope of previous systems development and six year plans prepared by MASD and DCS, and should include a policy for on-line systems, an analysis of systems needs, an analysis of resources required, and a protocol for management of automated information.

Proposed Consolidation of DCS Facilities. Consolidating DCS computer centers in a single facility could solve many of the problems now experienced by the centers. It would be feasible to provide for an uninterruptable power supply, proper fire protection systems, and backup computer capability for on-line systems.

DCS has submitted plans for the consolidated center to the director of the Division of Engineering and Buildings, and the Secretary of Administration and Finance has approved the consolidation project. However, DCS has not adequately explored and documented the options for implementing the consolidation.

Recommendation (9). While consolidation of DCS operations appears appropriate, DCS and DEB should carefully review all options for acquiring a computer facility, including construction and leasing. The results of such review should be provided to the administration and the General Assembly prior to a capital funding decision. In addition, the comprehensive ADP program plan should be available at the same time.

Systems Development Division (pp. 27-40)

Staffing and Workload. SDD's staff has more than doubled in the past three years. Workload has generally been driven by the demand for systems development services by State agencies and has increased substantially in recent years. The measures SDD currently uses for estimating future revenues and converting workload to staffing needs have not been accurate. This inaccuracy in turn can cause rates to be improperly set.

Recommendation (10). In order to improve estimates of staffing needs and rates, SDD should revise its method of estimating future revenues. If estimates are to be based on budget requests from agencies, SDD should determine the extent to which those budgets have reflected actual expenditures in the past, and should revise its estimate accordingly.

Project Planning and User Satisfaction. In 59 percent of development projects active in FY 1981, project costs exceeded the original estimate given to the customer agencies by more than 10 percent. Agencies surveyed by JLARC staff expressed a general dissatisfaction with SDD's management of projects. As a result, 32 percent of the agencies reported they discontinued some services from SDD.

Recommendation (11). SDD needs to develop improved estimates of project cost and time. A first step might be to require agencies to better define the needs to be met by a proposed system. SDD should provide agencies with guidelines to be used in defining requirements of the system. SDD should also be required to stay within both time and cost estimates for the projects it develops and to document any changes in requirements that occur after agreements have been reached. If a private vendor is rejected, SDD should be prepared to provide equal services at an equal cost. If SDD is unable to accomplish this objective, the Secretary of Administration and Finance may wish to reconsider the requirement that SDD be given the right of first refusal for all systems development work.

Recommendation (12). In order to improve its communications with customer agencies, SDD should explore the possibility of establishing a systems development users' council.

Billings. More than 85 percent of the agencies surveyed by JLARC staff felt that billings were accurate. Several agencies reported problems with SDD billings, howev-

er. Agencies having problems with SDD billings tended to be the large users with many on-going SDD activities. One agency, for example, identified 180 hours of time erroneously charged by SDD.

Recommendation (13). SDD should review its procedures for documenting time expended on projects. Discrepancies in billings should be explained to agencies and corrected.

Department of Telecommunications (pp. 41-53)

Funding of DOT. Two of the three divisions in DOT do not meet the criteria for working capital funds and should not be funded through the Telecommunications Working Capital Fund. The services provided by these divisions are not provided in measurable units and are currently subsidized from charges on telephone services.

Recommendation (14). The legislature may wish to consider funding the Research and Planning and the Public Telecommunications divisions with general fund appropriations.

Staffing. The near total consolidation of the State telephone system along with policy changes requiring agencies to contact DOT for all changes in service has increased DOT's responsibilities. Providing services to all State agencies, however, appears to be beyond the existing capacity of the communications engineering section. According to DOT, the staff works overtime and often at odd hours to insure minimal disruption of agency office time when supervising an installation.

The need for CENTREX operators has declined without a corresponding reduction in staff. The CENTREX operators are often used for duties beyond the normal range of reasonable responsibility.

Recommendation (15). The Telephone Engineering staff of the Communications Engineering, Planning and Analysis section should keep better time sheets to indicate what types of services are being provided, length of backlogs, and hours of overtime. This information should be used to determine the need for additional staff to meet increasing workloads.

Recommendation (16). DOT should close CENTREX operations in Williamsburg, Lynchburg, and Staunton and reduce its operator positions accordingly. The need for additional staff in other divisions could be met by reclassifying some of these positions.

Reduction of Rates. A SCATS surcharge of 12 percent was established for FY 1982, based on FY 1981 rates and usage. This rate has resulted in much larger surpluses than DOT had expected. The current surplus on operations is a result of increased telephone use by agencies and a rate increase by C&P Telephone. Also, DOT charges a flat rate for CENTREX, but has not received approval for the charge from the commission.

Recommendation (17). The Commission should approve the flat charge to CENTREX users to recover the salaries of switchboard operators, and should set the maximum SCATS surcharge at 10 percent.

Billing Problems. DOT does not provide agencies with an itemized bill of all calls and surcharges. Agencies cannot, therefore, exercise management control over telephone use and budget for telephone expenses.

Recommendation (18). DOT should work closely with telephone coordinators to devise alternative methods of controlling SCATS abuse.

Procurement of Phone Systems. Although the DOT has updated and distributed its policies and procedures regarding the use of competitive procurement, some agencies are unaware of the policy and contact vendors directly.

Recommendation (19). DOT needs to better communicate changes in telephone procurement policy to State agencies. It may also need to supplement its staff with technically qualified personnel and develop guidelines for preparing specifications which are fully competitive.

Short- and Long-Term Planning. Significant advances have been made in telephone communications in recent years that improve efficiency, quality, and versatility of services. The integration of computers with telephones has opened an almost unlimited variety of uses for the phone beyond traditional voice communications.

Recommendation (20). DOT should develop short- and long-term plans which identify demands for telephone services and solutions for meeting those demands. The plans should address the advisability of continuing to rely on vendor-provided services. Other items that should be considered include equipment inventory controls, maintenance, and financing of anticipated equipment purchase.

Central Warehouse (pp. 55-65)

Inventory Accuracy. Although error rates in the quarterly inventories appear high, they have nonetheless resulted in acceptably low adjustments to the value of the inventory. The warehouse staff makes an extensive effort to understand large errors, but it currently has no guidelines for determining what value of errors justifies such efforts.

Recommendation (21). The Central Warehouse should establish guidelines for following up errors identified during routine inventories. Guidelines should require that shortages in excess of $150 be thoroughly investigated by warehouse staff.

Automated Inventory System. While the automated inventory system should improve warehouse efficiency, current plans for implementing the system do not allow adequate transition time to the new system. Plans call for the automated system to be operated in parallel with the manual system only between May and August 1982. Staff of the Auditor of Public Accounts suggests that both systems should be operated in parallel until warehouse management is confident in the accuracy of the new system.

Recommendation (22). The Central Warehouse should plan on operating the automated inventory and manual Kardex file in parallel until the accuracy of the automated system is established. Accuracy of the system should be gauged by consistent achievement of specific performance criteria, such as an acceptable level of discrepancies between the two systems, for three consecutive months.

System Funding. The development of the automated inventory system for the warehouse—a working capital fund agency—has been inappropriately funded from the general fund. Total cost to develop the system is estimated at $221,000. An initial repayment of $105,084 to the general fund has been made.

Recommendation (23). The repayment schedule suggested by the Division of Purchases and Supply to cover development of the automated inventory system should be followed. According to the schedule, the division is to repay $105,084.24 to the general fund for expenses incurred by MASD through February 1982, and to repay up to $10,000 per month to the general fund until all the development costs are covered.

Staffing. Several changes in the workload of warehouse staff appear imminent, yet there is currently no staffing plan which ties such workload shifts to staff size.

Recommendation (24). A staffing plan should be developed for the Central Warehouse. The plan should be based on an assessment of tasks that will be performed under the automated inventory system, and should specify how changes in sales volume will affect staffing.

Deliveries. The chief complaint of customer agencies concerning warehouse operations was the delayed delivery of orders. These delays are usually a result of the warehouse practice of making deliveries only when a 40-foot trailer is full and ready for shipment. However, the needs of customers must be balanced with the need to recover delivery cost, which is $1.10 per mile from Richmond.

Recommendation (25). The Central Warehouse should consider the several options for improving deliveries to smaller customers. One option is to add a surcharge for delivering smaller loads, so that small customers willing to pay extra for quicker or more definite deliveries could be accommodated. Warehouse staff could continue to encourage small customers in neighboring areas to consolidate their orders to facilitate delivery.

Unfilled Orders. Fifty-nine percent of customer agencies reported minor problems with orders that are incompletely filled. The usual warehouse procedure is to back-order these items, but this appears to be done inconsistently.

Recommendation (26). Warehouse staff should consistently back-order items for all customers.

Catalog. The warehouse catalog does not reflect current prices and items available because it is issued only once a year.

Recommendation (27). The Central Warehouse catalog should be issued in loose-leaf form with periodic price and item updates. Additional information should be included to assist customers in making efficient use of the warehouse.

Quality of Goods. Ninety-three percent of the customer agencies who purchase foodstuffs from the warehouse were satisfied with the items provided. The warehouse staff works closely with food service directors at State agencies and institutions to ensure adequate quality of foodstuffs. A similar method is not used for non-food items, although it appears to be needed. Several customer agencies mentioned specific products which were not of adequate quality and indicated a willingness to pay a higher price for better quality items.

Recommendation (28). The Division of Purchases and Supply should consider a feedback mechanism to monitor the quality and other aspects of non-food items. A questionnaire sent to customers on a regular basis may be preferable to a special committee on such non-food items.

Office of Graphic Communications (pp. 67-71)

Financial Viability. OGC has been in operation for only 16 months, an insufficient period for determinig its financial viability. Although the fund was showing a small loss by February 1982, additional work expected in the balance of the year could generate a year-end surplus. It would appear reasonable to provide additional time for the office to demonstrate its financial viability.

Recommendation (29). The graphics fund and OGC should be given additional time to demonstrate financial viability. If OGC has not shown that it can regularly recover its costs by that time, it should be discontinued.

Need for Better Utilization of OGC. Some State agencies are not currently utilizing OGC, although OGC prices are competitive with or lower than those of the private sector according to 73 percent of the respondents to JLARC's user survey. None of four agencies with vacant graphic artist positions was using OGC. Two of the agencies reported they were unaware of OGC's operation. Several actions can lead to additional sales volume for OGC and significant savings for agencies.

Recommendation (30). The Secretary of Administration and Finance should direct State agencies to consider using OGC before filling graphics vacancies or using private vendors for graphics services.

Recommendation (31). The OGC director should contact State agencies with vacant graphics artist positions to inform the agencies of services available from OGC.

Recommendation (32). Printing requisitions handled by the Division of Purchases and Supply should be systematically screened for graphics work and referred to OGC for bids.

PREFACE

The Joint Legislative Audit and Review Commission has a continuing responsibility for review of Virginia's working capital funds under authority of Section 2.1-196.1, Code of Virginia. Our last comprehensive study of working capital funds was made in 1976. Following that report a number of changes were made, including a reduction in the number of activities funded by working capital advances. This report reviews selected areas of management of the five funds that now exist.

Overall, the management of working capital agencies has improved significantly. The funds are in sound financial condition, they generally provide high quality services, and customer agencies have expressed a great deal of satisfaction with services.

Several important changes need to be made, however, to enhance the services provided by the working capital fund agencies:

- A revised rate structure for the Department of Computer Services will simplify the billings of user agencies and will eliminate the rebate process now in place.

- Improved project cost estimates made by the Systems Development Division will provide agencies with better information for planning and budgeting new and revised automated information systems.

- The reduction of the SCATS surcharge and the closing of operator stations in three locations will help the Department of Telecommunications hold down the costs of telephone services for State agencies.

- A new automated inventory system for the Central Warehouse will improve its operations.

- Greater use of the services provided by the Office of Graphic Communications by State agencies will help improve the financial viability of the graphics fund.

On behalf of the Commission staff, I wish to acknowledge the cooperation and assistance provided by each of the working capital fund managers and agency employees during the course of this review.

Ray D. Pethtel
Director

June 30, 1982

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I. INTRODUCTION

Working capital funds are used to finance and account for support services provided by one State agency to other agencies and institutions. When properly administered, these funds can take advantage of economies of scale and encourage provision of goods and services in an efficient and businesslike manner. Five working capital funds are currently in use in State government:

- The Computer Services Fund finances the operation of five State-owned computer facilities administered by the Department of Computer Services. A full range of data processing services is provided to more than 50 State agencies. Billings to agencies for ADP services amounted to $14.4 million in FY 1981.

- The Systems Development Fund finances the Systems Development Division of the Department of Management Analysis and Systems Development. The division provides ADP systems design and maintenance services to about 35 agencies. Agency billings for ADP development services totalled $2.4 million in FY 1981.

- The Telecommunications Fund finances the operations of the Department of Telecommunications. The department provides telephone service to all State agencies and coordinates other public telecommunications activities in Virginia. In FY 1981, the total value of services provided was $20.1 million.

- The Central Warehouse Fund finances the warehouse facilities of the Division of Purchases and Supply. The warehouse provides processed and frozen foods, maintenance supplies, and cleaning materials to more than 400 agencies and local jurisdictions. In FY 1981, sales totalled $20.6 million.

- The Graphics Fund finances the graphics and layout section of the Division of Purchases and Supply. This unit provides graphics design, publications layout, and related services to some 35 agencies. The total value of services provided in FY 1981 was $41,485.

A working capital fund may be started with capital provided by direct appropriation from other funds such as the general fund, or with long term advances to be repaid over a fixed period from earnings of the fund. The working capital advances to the five funds total $5,580,000.

The daily operations of the working capital fund agencies are much like those of a private business. The central warehouse is illustrative of the process:

> *The central warehouse purchases various commodities in bulk from private vendors. Customer agencies then order the specific goods that they need. As requests from customers are received, the central warehouse delivers the commodities -- at a reduced cost because of the bulk purchasing. It then bills the customer agencies for the cost of the goods and uses the income to purchase additional supplies for its inventory. In addition, it adds a surcharge to each bill to cover its overhead costs.*

Similar procedures are used at each of the other four working capital fund agencies (Figure 1). In FY 1981, the combined value of goods and services provided by the five working capital fund agencies amounted to more than $57 million.

STUDY APPROACH

The Joint Legislative Audit and Review Commission has certain oversight responsibilities for working capital funds (*Code of Virginia* §2.1-196.1). The Commission has the authority to authorize new working capital funds and to discontinue those no longer needed. It can also authorize the transfer of excessive retained earnings to the general fund.

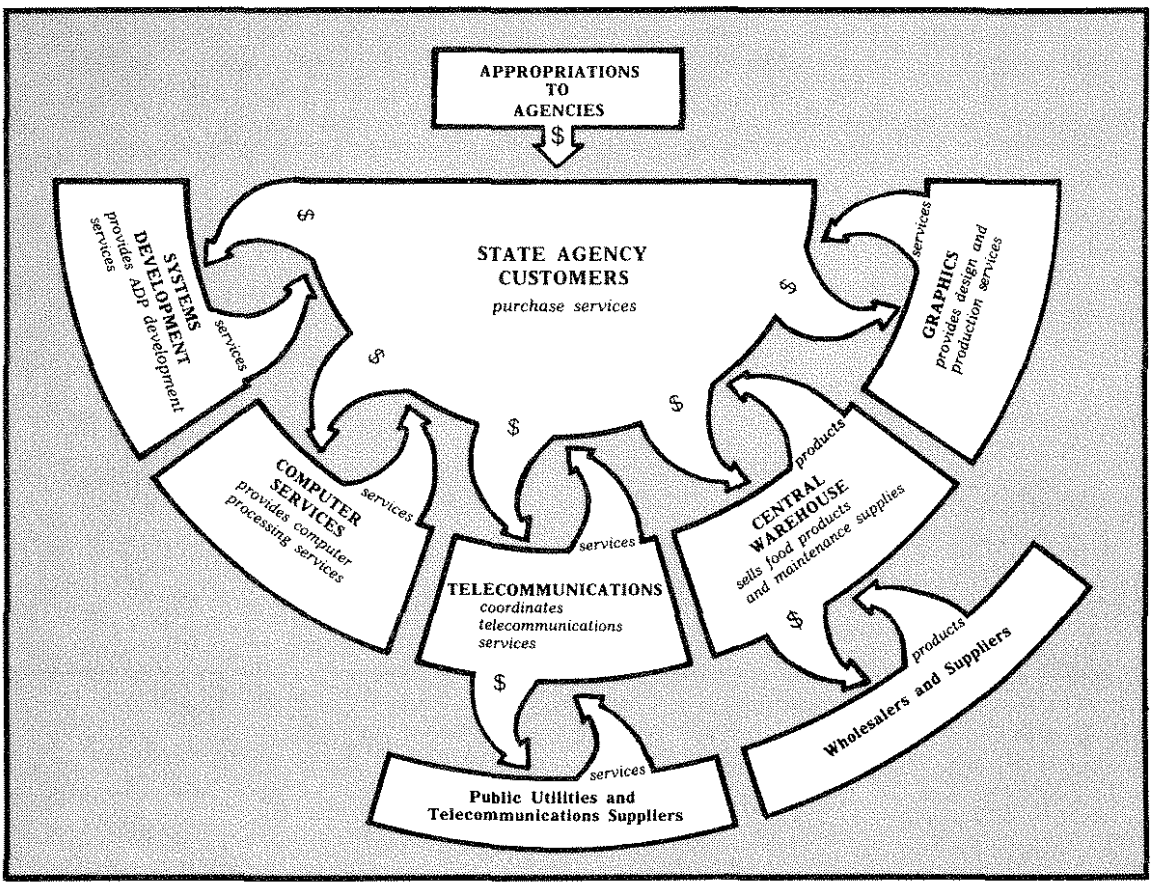
The Commission reviews the activities of the working capital funds on a periodic basis, and is also authorized to conduct follow-up reviews of previous reports. For this study, staff reviewed the progress made by the funds since the JLARC report in 1976.

Methodology

Research for this report included field visits to all of the facilities operated by the working capital agencies. These included CENTREX telephone operations in Lynchburg and Williamsburg, the five computer centers in Richmond, and the Central Warehouse. JLARC staff also conducted a telephone survey of 74 customer agencies. The survey included questions on satisfaction with services, billings, demand for

Figure 1

HOW THE WORKING CAPITAL FUNDS WORK



services, and future needs. In order to make comparisons with other providers of services, JLARC staff visited corporate computer centers and interviewed telephone vendors. JLARC staff also had numerous interviews with working capital agency personnel.

Report Organization

The major issues facing the five working capital fund agencies are discussed in detail in the following chapters. The discussion of each fund includes an analysis of financial condition and the results of reviews of staffing, billing procedures, and other management and operational issues relevant to the individual funds.

The remainder of this chapter summarizes some of the major cross-cutting issues. Chapter II discusses the Computer Services fund and reviews the staffing and consolidation of computer centers.

Chapter III analyzes the Systems Development fund. Chapter IV reviews the operations of the Telecommunications fund. Chapters V and VI deal with the two funds operated by the Department of General Services: Central Warehouse and Graphics.

COMMON AREAS OF REVIEW

In addition to addressing issues unique to individual funds, this report also examines several areas common to all the funds. These include the financial condition of the funds, the appropriateness of an agency's designation as a working capital fund agency, the staffing in each agency, and the satisfaction of customers with the services provided.

Financial Condition

Because working capital funds operate in a nonprofit, governmental setting, they must take care not to incur large surpluses or deficits. Rather, revenues should just cover the cost of providing services. In the event that excessive earnings are accumulated, JLARC is authorized by §2.1-196.1, *Code of Virginia*, to direct the comptroller to transfer surpluses to the general fund. Statute also requires working capital fund managers to establish rates adequate to recover all costs.

For the fiscal year ended June 30, 1981, two of the five funds had net deficits on operations (Table 1). In one case, Telecommunications, the loss on operations was large enough to result in a deficit in the fund balance (Table 2).

Table 1

ANALYSIS OF WORKING CAPITAL FUNDS--FY 1981
(Unaudited)

Fund	Sales or Billing Revenue	Cost of Service	Operating Surplus (Loss)	Net Surplus (Loss)
Central Warehouse	$20,566,839	$20,507,112	$ 59,727	$221,501[1]
Telecommunications	20,105,259	20,226,295	(121,036)	(121,036)
Computer Services	14,373,079	14,412,002	(37,923)	(37,923)
Systems Development	2,422,986	2,404,403	18,583	18,583
Graphics	41,485	39,669	1,816	1,824

[1]Includes $161,774 in miscellaneous revenues, including cash discounts, federal donated food, revenue from rent, and surplus property sales.

Source: Financial statements from the working capital fund agencies.

Table 2

ANALYSIS OF CHANGES IN FUND BALANCES--FY 1981
(Unaudited)

Fund	Fund Balance June 30, 1980	Net Surplus (Loss)	Adjustments	Fund Balance June 30, 1981
Central Warehouse	$264,175	$221,501	($134,327)	$351,349
Telecommunications	86,570	(121,036)	--	(34,466)
Computer Services	204,428	(37,923)	(15,247)	151,258
Systems Development	132,935	18,583	--	151,518
Graphics	1,977	1,824	211	4,012

Source: Financial statements from the working capital fund agencies.

At the close of FY 1981, the level of retained earnings in two agencies appeared unnecessarily high. The Systems Development fund balance was $151,518, the Central Warehouse's $351,349.

Appropriateness of Virginia's Working Capital Funds

The National Council of Governmental Accounting has defined working capital funds as funds that

> ...account for the financing of goods or services provided by one department or agency primarily or solely to other departments or agencies of the governmental unit, or to other governmental units, on a cost-reimbursed basis.

Each of Virginia's funds was evaluated on the basis of this definition. In addition, several other service agencies were reviewed to determine whether the working capital designation would be appropriate for them also.

Current Funds. Working capital funds are the appropriate method of financing and accounting for services provided by the Central Warehouse, Computer Services, Graphics, and Systems Development. The Telecommunications fund is used to finance some planning and research functions which do not meet the criteria for working capital funds because the services are provided on a non-reimbursable basis. As a result, State telephone users subsidize some functions which are not generally considered appropriate to working capital funds. The Commission may wish to reconsider whether the planning functions of the Department of Telecommunications should continue to be funded as working capital funds. This issue is discussed further in Chapter IV.

Other Funds. Two other service agencies meet the criteria established for working capital funds: the Central Garage and correctional industries. The Central Garage is the central agency which

provides motor vehicles for State agency use. The Central Garage was established as a division of the Department of Highways and Transportation (DHT) in 1948 to promote economy and efficiency in the use of State automobiles. Today, DHT administers the Central Garage pursuant to policies developed by an autonomous statewide committee. The Central Garage has 2,410 cars permanently assigned to individuals or to State agencies, leaving 258 available for dispatch to State employees. Customer agencies are billed for vehicle use on a per-mile basis. With the exception of periodic appropriations in the past to purchase additional cars, all costs associated with the Central Garage are paid from user fees. Revenue from agency charges and the sale of cars in FY 1981 was $8.4 million.

Correctional industries also provide goods and services primarily to State agencies and institutions. The Correctional Enterprise fund finances various industries within the Department of Corrections. These include the manufacture of wood products, clothing, shoes, metal products, and license plates. Other services provided include printing, dental laboratory services, book repair, data processing and laundry services. The correctional industry operations have been accounted for by a self-sustaining enterprise fund in which customers are charged prices for goods and services based on the cost of inmate labor, administrative overhead, and raw materials. More than 600 inmates are employed in these activities, and during FY 1981 the fund sold goods and services valued at more than $8 million. Its current designation as an enterprise fund is incorrect, however, since it does not provide services to the general public, as is normally the case for enterprise funds.

An earlier JLARC report recommended that these two operations be considered for redesignation as working capital funds. No action as yet has been taken on that recommendation.

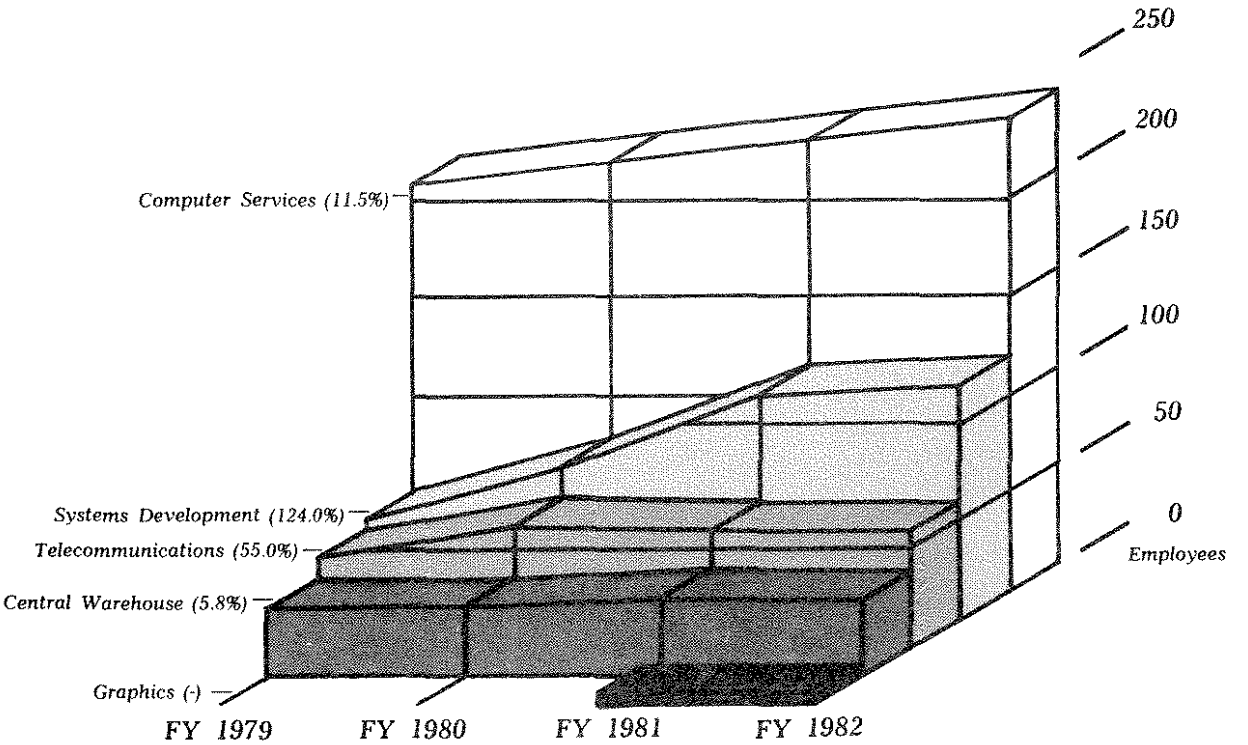
In addition, the General Assembly may wish to amend the *Code of Virginia*, changing the name "working capital" funds to "internal service" funds. This term is recommended by the National Council of Governmental Accounting, and is already in use by most states and by some Virginia agencies. The change would bring Virginia into line with nationally accepted terminology.

Staffing

The staffing of working capital fund agencies has grown steadily in recent years (Figure 2). This growth has resulted from an increase in the number of agencies served and from continued agency demand for more services. This is especially true in the area of data processing. In the case of the Systems Development Division, efforts to curb the use of consultants may also have contributed to the increase in employment.

Figure 2

EMPLOYMENT GROWTH IN WORKING CAPITAL FUNDS



The rapid increases in staffing in working capital fund agencies point to the need for greater oversight of authorized positions. Staff positions requested for the next biennium, in fact, were reduced after a JLARC staff review was made at the request of the House Appropriations Committee. The Department of Computer Services' staffing request was reduced by 34 positions for FY 1983. Central Warehouse requests were reduced by 6 positions.

Given the General Assembly's desire to carefully monitor growth in State agencies, JLARC will schedule regular staffing reviews in conjunction with biennial budget requests.

Management of personnel can also be improved. While the specific problems and needs differ among the five agencies, a common need exists for more aggressive planning and for specific methods to improve productivity. Demand for services can be expected to continue to increase. This demand must be met in part by increased efficiency and productivity in the working capital agencies.

Satisfaction with Services

In a survey of customers of the five working capital fund agencies, users appeared generally to be satisfied with the services

provided (Table 3). This satisfaction is the result of attempts by the working capital fund agencies to improve services and to better meet the needs of the users.

Table 3

AGENCY SATISFACTION

Working Capital Agency	Percent Satisfied	Percent Marginally Satisfied/ Dissatisfied	Percent Dissatisfied	Percent Which Discontinued A Service Due to Quality
Computer Services	90%	10%	0%	4%
Systems Development	53	44	3	32
Telecommunications	88	12	0	12
Central Warehouse	80	17	3	6
Graphics	100	0	0	0

Source: JLARC survey of customer agencies.

One exception to the high level of satisfaction with working capital fund agencies was found among users of the Systems Development Division. The percentage of satisfied customers was 53 percent, a figure perceptibly below that for the other working capital fund agencies. An additional 44 percent of the agencies expressed some reservations about their general satisfaction. Of the 44 percent, 27 percent said they were "somewhat satisfied" and 17 percent said they were "somewhat dissatisfied." In addition, far more users reported that they had discontinued one of SDD's service as a result of poor quality work. These results are reviewed in detail in a later part of this report.

CONCLUSION AND RECOMMENDATIONS

Since JLARC last reported on the management of working capital funds in February 1976, significant improvements have been made. For the most part, agencies are now much more satisfied with the services provided, and the funds are in good financial condition. Several general recommendations are in order for the continued success of Virginia's working capital funds:

Recommendation (1). The Commission should review fund balances for June 30, 1982 and transfer any excess amounts to the general fund. A recommendation on the amount that can be so transferred for each fund will be forthcoming at the close of this fiscal year.

Recommendation (2). The Central Garage and correctional industries might be redesignated as working capital funds.

Recommendation (3). The *Code of Virginia* might be amended to replace the term "working capital" fund with "internal service" fund. The comptroller should be requested to determine the impact of such a change on the operation of all funds.

II. DEPARTMENT OF COMPUTER SERVICES

The Department of Computer Services (DCS) is the working capital fund agency responsible for providing automated data processing services to State agencies. These services include batch and on-line processing, remote job entry, interactive programming, data base support, data entry, and technical consulting. DCS also supports a broad range of utility, statistical, and data management software--the programs, procedures, and documentation necessary for the operation of agency ADP systems.

These services are provided to approximately 50 customer agencies through 5 computer centers located in the Richmond metropolitan area:

- Eighth Street Computer Center is dedicated to the Medical College of Virginia and supports medical, administrative, and operational requirements. DCS operates this center 24 hours a day, 7 days a week under a facilities management contract with MCV. The center operates an Amdahl V/5 computer and has a staff of 20 employees.

- East Broad Street Computer Center provides ADP services to 5 agencies 16 hours a day, 5 days a week. The center operates an IBM 370/158 computer, and has 19 employees. Major users of this center include the Department of Accounts and the Department of Highways and Transportation.

- West Broad Street Computer Center serves approximately 35 customer agencies and operates 24 hours a day, 7 days a week. The center operates an IBM 158-AP and an IBM 3033, and has a staff of 65 employees. Major users include the Division of Motor Vehicles, the Virginia Supplemental Retirement System and the General Assembly.

- South Sixth Street Computer Center serves approximately 18 customer agencies. The center operates a Univac 1100/84 computer 24 hours a day, 5 days a week, and has a staff of 47 employees. The major users of the center include the Department of Welfare, the State Corporation Commission, and the Board of Elections.

- East Main Street Computer Center serves 5 customer agencies and is scheduled to operate 24 hours a day, 5 days a week. This center operates an IBM 370/158-AP computer, and has a staff of 42 employees. Major users include the Department of Taxation and the Virginia Employment Commission.

In addition to the 5 centers, a central office staff of 38 provides fiscal, personnel, administrative, and technical support.

The review of DCS included three major areas: (1) financial condition; (2) management of personnel and equipment resources; and (3) the ability of DCS to meet future ADP needs.

FINANCIAL CONDITION

The Computer Services Fund, which finances all DCS activities, was established in 1978 with a working capital advance of $1,750,000. DCS customer agencies are billed for services based on a formula which accounts for the various ADP resources used. In FY 1981, billings totalled $14.37 million, and expenditures totalled $14.41 million (Table 4). Billings and expenditures are projected to be about $17.0 million in FY 1982.

Table 4

ANALYSIS OF FINANCIAL CONDITION

	Billing Revenue	Cost of Service	Surplus (Loss)	Previous Fund Balance	Adjustments	New Fund Balance
FY 1980	$12,132,587	$12,020,961	$111,626	$ 92,802	$ --	$204,428
FY 1981	14,374,079	14,412,002	(37,923)	204,428	(15,247)	151,258
FY 1982*	11,263,799	11,227,343	36,456	151,258	(25,706)	162,008

*Year-to-Date, February 1982.

Source: Department of Computer Services.

The financial position of the Computer Services Fund was good during the past two fiscal years. On June 30, 1980 the fund reported a $111,626 surplus on billings of $12.1 million (Table 4). This surplus increased retained earnings to $204,428. While this balance was somewhat high (assuming the balance should not exceed approximately one percent of billings), a loss on operations of $37,923 in FY 1981 reduced the balance to an acceptable amount. The fund has a surplus on operations for the first seven months of FY 1982 of $36,456. The fund

balance as of February 1982 was $162,008. DCS makes a practice of returning excess revenues to customers in the form of rebates, thereby minimizing retained earnings.

MANAGEMENT OF DCS RESOURCES

DCS has made continued improvements in personnel and fiscal management. Growth in employment levels has been matched by improvements in productivity. A billing system that once was the object of considerable confusion has been revised and now better serves to recover the costs of ADP resources. Additional efforts should be focused on some remaining problems, however. Personnel turnover and vacancies continue to reduce DCS' ability to maintain an experienced staff, and current measures of productivity may not be fully adequate. In addition, the rates charged by DCS are higher than necessary to recover costs, and all costs are not directly recovered by the billing formula.

Staffing and Productivity

The Department of Computer Services has the largest staff of any working capital fund agency, with 232 employees as of February 1, 1982. The DCS staff includes a wide range of professional, technical, and support personnel, including systems engineers, computer operators, programmers, and clerks. DCS employment has increased at a steady pace, as has productivity. Although the current level of authorized positions is appropriate, continuing problems with turnover and vacancies occur in some classifications.

Employment Growth. The DCS staff has grown steadily over the past four fiscal years. The level of appropriated positions rose from 235 in FY 1979 to 287 in 1982, an increase of 22 percent. The number of positions actually filled increased at a somewhat slower pace. In FY 1979, DCS had filled 208 positions. By the middle of FY 1982, the total number of employees was 232, representing about a 12 percent increase since 1979 (Table 5).

Most of the increase in employment has been in the area of operations. Of the total increase of 24 employees from 1979 to 1982, 20 positions were in operations with only 4 in administrative classifications. Two classifications made up the bulk of the increase: systems engineering increased by 13 employees and an additional 9 computer operators were hired.

DCS originally requested 287 positions for each year of the 1983-1984 biennium. This request was reduced to 260 positions by the Secretary of Administration and Finance. The 1982 General Assembly further reduced DCS' appropriated positions to 240 for each year of the next biennium as the result of JLARC staff recommendations. Because

Table 5

ANALYSIS OF POSITIONS AND EMPLOYMENT

Fiscal Year	Appropriated Positions	Percent Increase	Employed	Percent Increase	Percent Vacant
1979	235	--	208	--	11.5%
1980	245	4.3%	214	2.9%	12.7
1981	272	11.0	226	5.6	16.9
1982	287	5.5	232	2.7	19.2
1983*	240	-16.4	235*	1.3	2.1
1984*	240	0	240*	2.1	0

*Projected

Source: JLARC analysis of DCS data.

DCS' total employment was not expected to exceed 240 for FY 1983, the General Assembly adjusted the maximum employment level for the agency to reflect its actual staffing needs. This action was consistent with the legislature's goal of limiting employment growth in all State agencies.

Appropriateness of Staffing Levels. The current level of employment appears appropriate for the level of service provided by DCS. This assessment is supported by the increase in productivity in recent years.

An apparent improvement in productivity has resulted from technological advances and management improvements. The productivity increase can be seen in terms of the "service units" by which DCS measures its level of service provided. A "service unit" is the equivalent of one hour of central processor time provided to customer agencies. Based on this measure, DCS workload increased 125 percent beween FY 1979 and FY 1981 (Table 6). But for the same period, costs and personnel employed increased at a much lower rate. Consequently, the service units delivered per employee more than doubled between FY 1979 and FY 1981. The increase in employment during this two-year period was only eight percent.

While the increase in productivity was due in part to the use of improved technology, DCS management has also improved, resulting in some increase in productivity. For example, the use of a price discount for agencies which run jobs during non-prime time hours has helped DCS to better schedule workload and to increase the productivity of the non-prime shifts.

Personnel Turnover and Vacancies. According to DCS, turnover has been high for some of its data processing classifications. In the 12 months prior to February 1982, four classifications had turnover

Table 6

ANALYSIS OF DCS PRODUCTIVITY

Fiscal Year	Service Units Delivered	Employees	Units Per Employee	Unit Cost
1979	11,813	208	56.79	$944
1980	14,620	214	68.32	736
1981	26,614	226	117.76	537
1982*	32,500*	232	140.10*	523*

*Projected

Source: JLARC analysis of DCS data.

rates in excess of 25 percent. The most serious problem appears to have been with computer operators, for which the turnover rate was 36 percent. Vacancy rates are also high. Six computer operator positions were vacant as of February 1982. At the same time, 11 systems engineer positions were vacant.

DCS managers have expressed concern that current State personnel policies and salary levels place the department at a disadvantage in the effort to hire and retain qualified personnel. JLARC staff reviewed the practices at three major corporate computer centers in Richmond to determine if DCS is at such a disadvantage. The comparison was important because the corporate centers compete directly with DCS for qualified technical personnel in the Richmond metropolitan area. Data collected by the Department of Personnel and Training was also reviewed. The results of the comparisons seem to indicate that DCS is at a competitive disadvantage in several areas.

With regard to salary, the three corporate centers have a distinct advantage. For the position of computer operator, for example, the starting salary at the corporate centers is $1,000 to $4,000 higher than that of the State (Table 7). The upper end of the salary range for computer operators is $5,000 to $7,000 higher at the corporate centers.

The Department of Personnel and Training (DPT) has recently completed a more extensive survey of the comparability of salaries (Table 8). Four data processing positions were compared across a wide range of Virginia employers. For the position of computer operator, State salaries were about $900 lower than other Virginia employers at the bottom of the salary range, and more than $2,000 lower at the upper end of the range.

Table 7

COMPARISON OF ADP SALARIES

	Computer Operator
State - DCS	11,000 -- 15,000
Corporation A	14,000 -- 19,000
Corporation B	12,000 -- 20,000
Corporation C	15,000 -- 22,000

Note: Corporations not identified at their request.

Table 8

DPT SALARY COMPARISON

Position	State Salary	Virginia Business
Data Entry Operator	$ 9,374 -- $12,797	$ 9,346 -- $13,435
Computer Operator	$11,195 -- $15,293	$12,097 -- $17,443
Programmer	$15,991 -- $21,844	$16,708 -- $24,818
Systems Analyst	$22,847 -- $31,207	$20,942 -- $31,795

Source: Department of Personnel and Training.

In addition to somewhat lower salaries, some other factors may be involved in the DCS personnel turnover and vacancy problems. DCS managers are especially concerned about their inability to pay a shift differential for employees who work at night or on weekends. All three of the corporate centers visited by JLARC pay some sort of bonus for night or weekend shifts. DPT also found that the shift differential was an important part of the compensation program in Virginia businesses. The differential may be in one of two forms: a set per diem amount or a percentage of the employee's salary. The managers of the corporate computer centers confirmed that such a practice was standard for the data processing industry and that it was considered a significant benefit by employees.

Equally important are factors such as the operating environment and the ability of employees to advance within the organization. Because DCS has relatively few management and supervisory positions, experienced personnel may leave in order to advance their careers or to find greater challenges. And in some DCS centers, old equipment or inadequate facilities may reduce morale and provide some incentive for employees to take other jobs.

DCS's difficulties with turnover and vacancies can be addressed in two ways. First, the consolidation of the computer centers will improve promotional and career opportunities. It should also help

improve morale by providing a better working environment. Second, DCS should develop a standing list of qualified candidates to enhance its recruitment efforts. Such a list should facilitate filling high turnover positions such as computer operators.

Pricing and Billing

Customer agencies are billed monthly for use of ADP services. The charges to agencies are calculated by DCS according to a formula which accounts for specific resources used. The first step in the billing process occurs as the customer agency uses a computer at a DCS center. The computer's operating system automatically measures and records the computer resources used by the agency. That information is then used to calculate a charge for each of seven primary items in the billing formula. The formula and rate structure are shown in Figure 3. Additional charges for special services such as keypunching or dedicated disk usage are also made. While the billing process has been greatly improved over the past four years, the rates continue to be high. However, the billing formula does not directly recover all costs.

Figure 3

DCS BILLING STRUCTURE

Formula:

TOTAL JOB COST = MU1+MU2+TS+DS+LP1+LP2+TM

Where:

MU1 = CPU Seconds (processing time)	$0.09	per second
MU2 = Kilobyte Minutes (memory over time)	0.01	per minutes
TS = Tape Service (seconds of input/output)	0.02	per second
DS = Disk Service (seconds of input/output)	0.015	per second
LP1 = Lines Printed (DCS equipment and paper)	0.59	per 1000 lines
LP2 = Lines Printed (agency equipment and paper)	0.30	per 1000 lines
TM = Tape Mounts	0.90	each

Source: Department of Computer Services.

Appropriateness of Rates. Under current DCS procedures, revenues generated by the billing formula in excess of the actual costs of the centers are returned to customer agencies in the form of rebates. It is clear from the rebates made to agencies that the rates charged by DCS are too high. In FY 1981, rebates amounted to $3.9 million, or about 23.5 percent of gross revenues. As of February 1982, the rebates for FY 1982 totalled $2.6 million, or about 20 percent of gross revenues.

The five computer centers charge the same rates for services provided. The cost of providing the services is not the same at each center, however. Because many of the agencies served by DCS are federally funded, federal regulations require that the five facilities operate as separate cost centers, and that the revenues from one center not be used to subsidize the costs at another. The single rate has been set to ensure that it recovers the costs of the least efficient facility. The outcome is that the centers which operate more efficiently are charging a rate higher than necessary.

This system of overcharges and rebates makes the process of planning ADP budgets more difficult than it need be. It probably also adds to the confusion which some agencies have about the way in which they are billed. DCS is aware of this situation and has prepared a cost allocation plan which would correct the problem by charging a separate rate at each center. The rates would recover the costs appropriate for each center. DCS estimates that the new cost allocation plan will reduce the level of rebates to about five or ten percent of revenues.

Because federal approval of the plan is required before its implementation, the plan was submitted to the U.S. Department of Health and Human Services in 1980. Final approval has not yet been given. As a result, the plan was not implemented for the 1982-1984 biennium, and agency ADP budgets were prepared using the old rates.

DCS is not planning to implement the new rates until the 1984-1986 biennium. Since this would require that the current rate be used for at least two more years, however, DCS should accelerate its implementation of the new rates. The Secretary of Administration and Finance should take the necessary action to expedite federal action on the cost allocation plan. Once approved, the plan should be implemented as soon as possible. Because new rates may affect agency budgets, the Department of Planning and Budget should make the necessary adjustments in agency apportionments.

Adequacy of the Billing Formula. The purpose of the billing formula is to recover the costs of ADP resources used by State agencies. The formula currently in use appears to adequately recover costs with one exception. The cost of mounting and using magnetic tapes in processing is recovered by the formula, but there is no charge for tape storage. Tape storage requires significant resources, however, even if the tape is not used by an agency on a regular basis. Tapes stored for long periods as backups to disks or other tapes take up valuable space in the tape libraries. All five of the computer centers have very limited space for storing such tapes.

DCS is aware that it is not directly recovering tape storage costs and has recommended a change in the formula. Because this change is also awaiting federal approval, implementation is not scheduled before the 1984-1986 biennium. In order to ensure that agencies fully reimburse DCS for its costs, plans for implementation of a tape storage

charge should be accelerated. The charge should be made as soon as possible after federal approval is received. The Department of Planning and Budget should review customer agency apportionments in order to minimize the impact of this change in the billing formula.

Accuracy and Timeliness of Billings. In a survey of customer agencies by JLARC staff, the great majority of agencies indicated that DCS billings were accurate and timely. Although this was a major problem area in JLARC's 1976 study, it appears that DCS management has made significant improvements in the billing process in recent years.

Nevertheless, some confusion still exists among some agencies about the meaning of billing information. In the JLARC survey of customers, 16 percent did not know if their bills were accurate because of difficulty in understanding the charges and the method of calculation. Although DCS claims to take every opportunity to educate its customers on the billing process, agencies do not take full advantage of training opportunities. There appears to be a need for DCS to better inform its customers. DCS may wish to reconsider the way in which it reports billing information to agencies. An improved format and the use of more management-oriented information may prove useful to customers. For example, DCS is considering reporting costs per transaction such as cost per license issued or cost per check written. Agency managers could use such information to compare costs over time and to plan budgets. However, implementation of this approach may require agencies to restructure their accounting systems so that functional cost centers can be identified.

MEETING FUTURE ADP NEEDS

The growing use of computerized information and management tools has required DCS to provide increasing levels of ADP services to agencies. While the use of on-line systems promises to further improve the data processing capabilities of the agencies, the State is not fully prepared to manage the use of this growing area of technology. The lack of a State ADP plan is a serious problem. As demand increases and agencies use more on-line systems, DCS believes it will become desirable to consolidate the data centers to provide for proper sharing of data and backup of critical systems.

Demand for ADP Services

Demand for automated data processing services has increased substantially in the past four years. As a result, DCS has had to increase its staff, purchase larger computers, and add to its inventory of disk and tape units. The causes for the increase vary, but include at least three that can be identified: an increase in the number of systems supported by DCS, a change in the type of systems used, and the lack of coordinated development of systems.

The Increase of Systems. DCS is serving more agencies now than it did in the past and is supporting many more systems and applications for customer agencies. In just the past two years, 99 new systems or applications have been added to DCS' workload. Each of the five DCS centers has been involved in the growth:

- The East Broad center implemented 17 new systems for 3 agencies;
- The Eighth Street Center implemented 10 new systems for MCV;
- The Sixth Street Center added 16 new systems for 8 agencies;
- The West Broad Street Center implemented 39 new systems for 21 agencies; and
- The East Main Center added 17 new systems for 8 agencies.

Among the new systems were the Virginia Welfare Client Information System, the Program Budgeting System, the Automated Purchasing System, and the Debt Setoff System.

Use of On-line Systems. A change in the type of systems used by agencies has also had some impact on demand. According to DCS, much of the increase in demand has been for "on-line" systems. On-line systems allow the user to access the information in the computer directly, and have it displayed on a video terminal as it is needed. The user can also directly enter or modify data in the system. Thus, the use of on-line systems makes it possible for agencies to have immediate access to the information processed by the computer. This capability is especially useful for agencies such as DMV or Welfare, which provide services to the public. These agencies must be able to retrieve information while a client is waiting.

But a consequence of the addition of on-line systems is that more and more of DCS' workload is being concentrated into the regular work day when agencies are open to the public for business. The result is increasing pressure for larger, faster computers, more disk space, and larger telecommunications networks. Managing this increased pressure for more resources will be an important task for DCS in the future.

Lack of State ADP Plan. At a time when data processing is becoming an increasingly important resource, the State is without a current, comprehensive plan which would help to manage that resource. The six year ADP plan prepared by DCS sets forth the goals and objectives for DCS only. It was never intended to be a master plan for managing ADP resources. The six year plan prepared by the Department of Management Analysis and Systems Development also does not fully meet the need for a long-range, comprehensive ADP program plan.

The consequence of this lack of coordinated planning is a fragmented information base. On-line systems offer agencies great possibilities for the sharing of information. This benefit of new technology cannot be fully realized, however, because agencies have implemented their systems in many different ways.

DCS and the Department of Management Analysis and Systems Development should prepare an ADP plan for State government under the direction of the Secretary of Administration and Finance. To the extent necessary, major users should be involved in the development of the plan. The new plan should go beyond the scope of previous six year plans and systems development plans prepared by MASD. It should include, but not be limited to the following:

1. A statewide policy on the need, development, and use of on-line systems;

2. An analysis of future systems needs including the use of distributed computing networks;

3. An analysis of the personnel, hardware, and software necessary to support those needs; and

4. A protocol for the storage, retreival, and exchange of information.

The need for such a plan is clear. In a survey of customer agencies, 58 percent of all agencies reported that their use of ADP services would increase over the next biennium. Of those expecting an increase, more than 62 percent said the increases could be substantial.

Existing DCS Facilities

DCS is presently located in five different buildings within the City of Richmond. Each DCS facility is situated within a structure shared by other agencies. In several instances, DCS must pay rent for facilities in commercial, State, or federal buildings. In FY 1981, the rent for these facilities totalled $229,902.

According to DCS, existing facilities will be unable to meet the anticipated ADP requirements of customer agencies. None of the centers has an uninterruptable power source. An interruption of power causes a loss of all ADP service to customer agencies. Such a loss can be critical for on-line systems which provide direct services to the public. None of the centers can provide for backup of on-line systems when computer equipment failures occur. The five centers also have additional unique problems including insufficient space, environmental inadequacies, such as air conditioning and fire suppression, and increasing rental costs.

Insufficient Space. The East Broad Center, located in the Highway and Transportation Building, has no expansion capability for accommodating increased workloads. The current location provides no backup capability for equipment and cannot provide the on-line processing needs of customer agencies.

The East Main Center has recently completed a major expansion. But the VEC Building, where it is located, was not designed as a computer facility and floor-to-ceiling heights are inadequate. DCS was forced to use a raised floor of insufficient height, which has created air conditioning and cabling problems.

Environmental Inadequacies. The Eighth Street Center has two serious environmental problems: inadequate fire protection and inadequate air conditioning. DCS anticipates that the center will outgrow its current facilities within 12 to 18 months. While additional space is available, renovation would require additional raised flooring, electrical power, and air conditioning.

Rental Costs. The Sixth Street Center provides adequate facilities (except for fire suppression and power supply) for both equipment and personnel. The problem with this center is its location in a commercial building for which DCS must pay rent. In FY 1981, rent totalled $143,107. By FY 1985 this is expected to increase to $188,000.

Proposed Consolidation of DCS Facilities

Consolidating DCS computer centers in a single facility could solve many of the problems now experienced by the centers. In such a center an uninterruptable power supply, proper fire protection systems, and backup computer capability for on-line systems would all be feasible.

As part of the preliminary engineering study done for the capital outlay review, DCS prepared an analysis of cost savings and cost avoidances which could be realized from the construction of a consolidated computer facility. The savings/avoidances projected by DCS are substantial over a twenty year period:

Personnel costs	$23,717,378
Redundant equipment costs	5,400,000
Redundant software costs	3,523,100
Facilities cost	12,784,751
Total	$45,425,229

The personnel cost avoidances represent the costs (salary and fringe benefits) of 46 employees over a 16 year period which DCS projects would be needed for multiple centers, but which can be avoided in a consolidated center. An annual inflation factor of 4.5 percent was used by DCS in its projection of personnel costs.

The equipment cost savings, at $270,000 per year, represent the costs of present computer equipment that will become redundant and could be eliminated in the consolidated center.

Most software packages are leased on a site basis. Accordingly, separate packages of the same program are required at each center operating in an IBM compatible environment. DCS estimates that redundant software costs of about $176,000 per year can be saved in the consolidated facility.

Facilities costs includes "space cost" avoidances and elimination of additional costs for separate fire suppression systems. The savings in cost of space have been computed by DCS to be $262,165 for FY 1985 and have been inflated by seven percent each year to allow for rental escalation.

In addition to direct savings and cost avoidances, other benefits can be anticipated. DCS has projected other potential cost avoidances to approximate $18.1 million. The concentration of technical and management personnel, by providing for more challenging careers, would help to reduce current personnel retention problems. Also, the consolidated center could provide significantly better service to many agencies by eliminating the transportation of files and data for interrelated systems between centers. Moreover, it will provide the capability to back up critical State agency ADP systems.

In its analysis, DCS assumed that the consolidated facility would be a newly constructed building, funded with State money. Based on that assumption, the following building related costs were estimated for a twenty year period:

Construction costs (and financing)	$28,900,000
Maintenance costs	4,000,000
Building security	2,000,000
Total	$34,900,000

DCS estimates that this would result in total direct cost savings and avoidances from consolidation of about $10.5 million over the 20 year life of the facility. An additional $18.1 million in avoidances might also be possible.

Based on the analysis provided by DCS, the consolidation of facilities appears appropriate. In addition to expected cost savings, the consolidated computer center should improve service to agencies. It could also be expected to reduce duplication of systems used by agencies and facilitate the sharing of information. But these benefits can only be realized by proper planning. In order to minimize the costs of consolidation, consideration should be given all options for acquisition of the necessary space.

Options for Consolidation. DCS has submitted plans for the consolidated center to the Division of Engineering and Buildings (DEB) for its approval under the State's capital outlay process. The director of DEB and the Secretary of Administration and Finance have approved the project. Funding was not included in the Governor's capital budget for the 1982-1984 biennium, however.

While the proper capital outlay approvals have been obtained, DCS has not fully explored and documented the options for implementing the consolidation. In fact, its request for a capital appropriation in FY 1983 seems to indicate that it has already decided to build a new facility with State funds. If such a decision has been made, it should be reconsidered in light of other options for consolidating that might be more advantageous for the State.

There are at least four ways to acquire the facility necessary for consolidation. The first method is for the State to fund and construct the building itself. Under this option, funds to finance the project would come from a capital appropriation or from loans from the general fund or perhaps from VSRS. DCS already has preliminary plans for such an option.

A second method would be for the State to have a leasing agent construct a building suitable for the computer center, with DCS leasing the structure for an extended (20 year) period. The advantage of this option is that DCS could acquire a new facility built to its specifications without having to provide the capital necessary for construction. The total cost to DCS for this option would probably be about the same as if it provided the funding. DCS would not own the facility, however, and would have to renegotiate at the end of the lease.

The third option is to find a structure already available for use. This option would probably permit DCS to consolidate its centers earlier than now planned and could have a much lower cost. The problem, of course, is finding a structure of appropriate size and design for use as a computer facility. One potential location is the Plaza Building, where DCS now houses its South Sixth Street Center.

A fourth option would be for DCS to occupy a portion of some structure which would be built for other agencies, such as the second tower of the James Monroe Building, or the planned VSRS building. Since there are no plans for immediate construction of these structures, this option might require DCS to wait an unacceptable period of time before consolidating its operations.

DCS and the Division of Engineering and Buildings should carefully study these and other options for acquiring a computer facility. The results of such study should be reviewed by the administration and the General Assembly before making a capital funding decision. In addition, the comprehensive ADP program plan should be available at the same time.

CONCLUSION AND RECOMMENDATIONS

Since the last JLARC working capital fund report in 1976, DCS has made substantial improvements in the ADP services provided to State agencies. In the survey of customers, 90 percent reported satisfaction with the services. With additional attention to current problems in staffing and the billing structure, and a properly planned merger of facilities, DCS can continue to improve the services it provides to customers.

Recommendation (4). A standing list of available candidates should be developed to expedite recruitment for high turnover positions.

Recommendation (5). The Secretary of Administration and Finance should take the necessary action to facilitate prompt federal approval of the DCS cost allocation plan. The plan should be implemented as soon after approval as possible.

Recommendation (6). In order to ensure that agencies directly reimburse DCS for the cost of services, plans for implementing a tape storage charge should be accelerated. The charge should be made as soon as possible after federal approval.

Recommendation (7). DCS may wish to reconsider the way in which it reports billing information to customer agencies. An improved format and the use of management-oriented information, such as the cost per transaction or specific item produced, could prove useful to customers. DCS should intensify education of agency management personnel in the billing system.

Recommendation (8). Under the direction of the Secretary of Administration and Finance, DCS and MASD should prepare an ADP program plan for State government. The new plan should go beyond the scope of previous systems development and six year plans prepared by MASD and DCS, and should include a policy for on-line systems, an analysis of systems needs, an analysis of resources required, and a protocol for management of automated information.

Recommendation (9). While consolidation of DCS operations appears appropriate, DCS and DEB should carefully review all options for acquiring a computer facility, including construction and leasing. The results of such review should be provided to the administration and the General Assembly before a capital funding decision is made. In addition, the comprehensive ADP program plan should be available at the same time.

III. SYSTEMS DEVELOPMENT DIVISION

The Systems Development Division (SDD) of the Department of Management Analysis and Systems Development (MASD) provides systems analysis, design, development, and maintenance services to State agencies through a working capital fund. These services have been provided under a separate working capital fund since 1978 when the Division of Automated Data Processing was reorganized into two agencies, the Department of Computer Services and the Systems Development Division.

The Systems Development Division currently maintains 66 operational systems for 35 agencies. It also provides consulting services on the development of automated data processing systems to other State agencies and institutions. The *Code of Virginia* is clear as to MASD's role and function. In practice, the following statutory responsibilities of MASD have been assigned to SDD:

- to create and direct a comprehensive program of systems development for State government;
- to design major systems with application to more than one agency;
- to develop systems for agencies when directed by the Governor or the Secretary of Administration and Finance.

As agencies turn more and more to automated systems to meet increased workloads, the Systems Development Division will come under greater pressure to develop and maintain systems.

JLARC's review of the Systems Development Division included (1) a survey of user agencies, (2) interviews with SDD management, and (3) reviews of project cost and time estimates prepared by SDD staff. The survey of user agencies included more than half of the agencies using SDD services, and personnel at some of the user agencies were interviewed about specific projects. JLARC staff also reviewed project documentation for a selected group of projects.

This review of the Systems Development Division addresses the financial condition of the systems development fund, operations, financial management, and future SDD needs.

FINANCIAL CONDITION

In FY 1981 billing revenues for the Systems Development Division totalled $2.4 million (Table 9). SDD projects that billings

Table 9

ANALYSIS OF FINANCIAL CONDITION

	Billing Revenues	Cost of Service	Surplus (Loss)	Previous Fund Balance	New Fund Balance
FY 1980	$1,653,867	$1,654,547	($680)	$133,615	$132,935
FY 1981	2,422,986	2,404,403	18,583	132,935	151,518
FY 1982*	1,951,812	1,976,002	(24,190)	151,518	127,328

*As of January 1982.

Source: Systems Development Division.

to agencies in FY 1983 will reach $4.0 million. The fund reported earning a surplus of $18,583 for FY 1981 and the fund balance on June 30, 1981 was $151,518. The ratio of retained earnings to billings is 6.3 percent. As of January 1982, the fund showed a deficit of $24,190 as a result of seasonal fluctuations in activity. SDD expects to have surpluses totalling $60,000 in the next three months, however, so the retained earnings will remain high.

The Commission may wish to direct that a portion of the surplus earnings on June 30, 1982 be transferred to the general fund. A recommendation on the amount to be transferred will be forthcoming after the close of FY 1982.

DIVISION OPERATIONS

The Systems Development Division staff has more than doubled in the past three years. Workload has been driven by the demand for systems development services by State agencies and has increased substantially in recent years. JLARC's evaluation focused on issues involving staffing, workload, project planning and cost estimation, and the overall level of user satisfaction.

Staffing

SDD's current staff of 112 employees makes it the second largest working capital fund agency. SDD has grown to this size quite rapidly, with especially substantial growth during the last four years. For the most part, growth appears to have been driven by new demands. Positions filled increased from 50 in FY 1979 to 112 as of January 1, 1982 (Table 10). During this period, the increase for systems development positions in individual agencies was about ten percent. SDD managers maintain that the availability of their systems development services has helped to keep the growth of personnel in agencies at this level.

Table 10 also shows that employment exceeded appropriated positions in two of the four years. This situation occurred because working capital funds have been exempt from the provisions of the Manpower Utilization Plan (A&F Directive 3-80). SDD and other working capital fund agencies can fill any positions which have been authorized by the Department of Personnel and Training. In fact, while SDD had only 96 appropriated positions in FY 1981, DPT had approved 126, and SDD could have employed up to that limit.

Table 10

POSITIONS AND EMPLOYMENT

Year	Appropriated Positions	Authorized by DPT	Employed
FY 1979	89	60	50
FY 1980	89	86	77
FY 1981	96	126	108
FY 1982	96	144	112
FY 1983*	127	--	127*

*Projected by SDD.

Source: Systems Development Division.

The Appropriations Act just approved by the 1982 General Assembly would also permit working capital fund agencies to hire at levels below or above the estimated employment levels specified in the Act, dependent on the level of work activity and resulting nongeneral fund revenues (§4-7.01). The impact of this provision is that in FY 1983 SDD can employ up to the 144 positions approved by DPT.

Workload

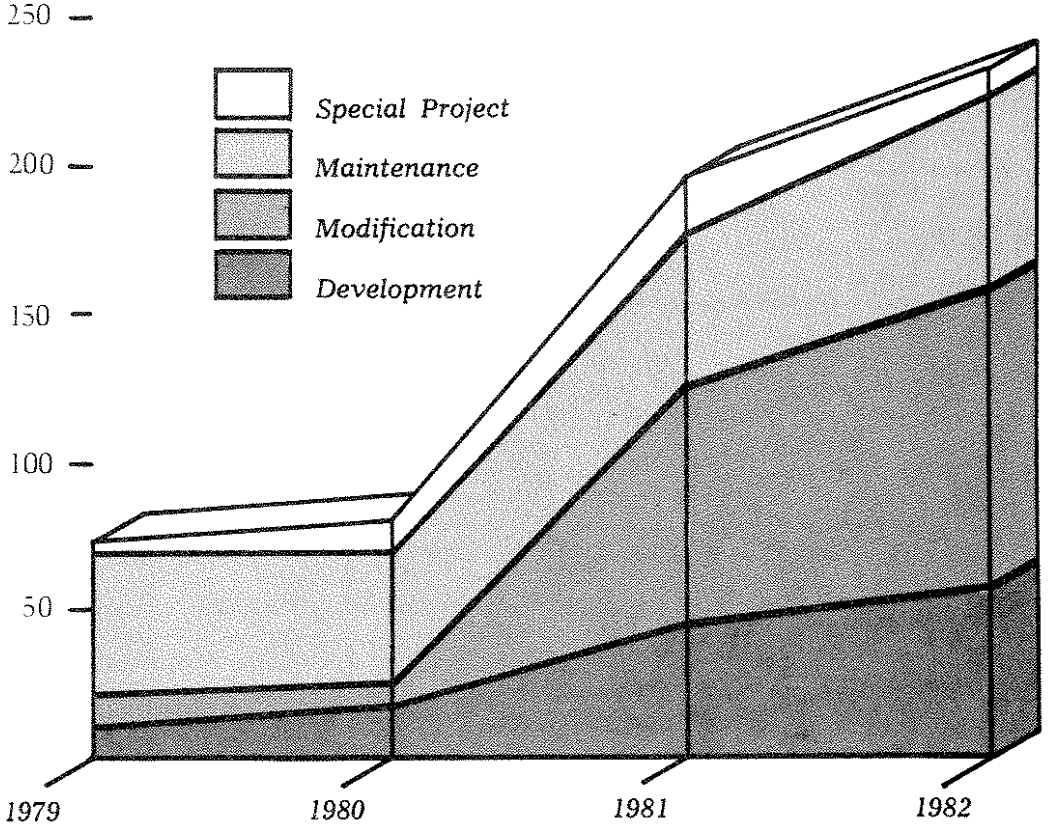
SDD's workload is based on agency requests for systems development services. Agencies are using many more automated systems to help them meet workload requirements. While many agencies still develop their own systems, recent trends indicate that SDD is beginning to absorb a large portion of the work previously done in agencies.

SDD provided systems development services to 75 percent more agencies in FY 1981 than in FY 1979. Total project workload for the division has increased 205 percent, from 77 projects in FY 1979 to 235 projects in FY 1982. An important factor in the dynamic growth of SDD's project workload is the secretarial order giving SDD the right of first refusal on all systems development projects. In May 1980, the Secretary of Administration and Finance issued a directive on the use of consulting and professional services by State agencies (A&F Directive 2-80). In addition to defining consulting services, the directive

requires agencies to use SDD for systems development services to the maximum extent possible. In all cases agencies are required to first examine the use of SDD services as an alternative. While SDD has never used the right of first refusal, the directive has influenced the decisions of the agencies to use State resources instead of outside consultants. SDD's project workload (Figure 4) more than doubled after the A&F directive took effect in 1980. Most of the increase was for development and modification projects.

Figure 4

SDD PROJECT WORKLOAD



The Systems Development Division bases its workload and corresponding staffing levels on agency budget requests for systems development work. SDD reviews all subobject codes dedicated to systems development when agencies submit biennial budget requests to the Department of Planning and Budget. SDD then adds eight percent to this workload factor to account for requests not identified by agencies during budget submissions. These workload measures are then converted

to staffing levels based on the formula illustrated in Figure 5. SDD managers contend that staff will only be added when agency demand dictates the need.

Figure 5

SDD WORKLOAD CONVERSIONS

Formula:

ANNUAL STAFF NEEDS = (REV COST) + UNP + MGT

Where:

REV = Estimated Annual Revenue
COST = Cost per DP Manyear
UNP = Eight Percent Addition for Unplanned Requests
MGT = Management and Administrative Positions

FY 1983 Example:

BUDGETED STAFF NEEDS ($4,010,788 $37,285)	=	108
PLUS EIGHT PERCENT UNPLANNED (108 x .08)	=	8
PLUS 11 MANAGEMENT POSITIONS	=	11
ANNUAL STAFF NEEDS	=	127

Source: Systems Development Division.

Basing staffing needs on agency budget requests for systems development needs may not accurately account for the actual demand. In each of the two previous fiscal years, SDD's estimates of revenue exceeded actual revenues by more than $600,000. This is a 25 percent error rate. As a result, SDD's estimation of staffing needs could be exaggerated by as many as 16 positions in FY 1983. While SDD does not actually fill these additional positions, it does base its rates on the total staff level. Inflated staffing estimates cause rates to be lower because fixed costs are spread over a larger number of billable hours. An underestimation of staff increases rates and can cause excess revenue to be generated. The high level of retained earnings for SDD is evidence that this has occurred in the past. SDD is considering the need for an increase in rates for the 1983 fiscal year. Any increase will have to be very closely reviewed in light of previous surpluses.

SDD should improve its method of estimating workload and revenues. If estimates of revenue are to be based on budget requests from agencies, SDD should determine the extent to which those budgets have reflected actual expenditures in the past. It can then adjust its estimates to reflect the deviation of actual costs from budgets.

Project Planning and Cost Estimation

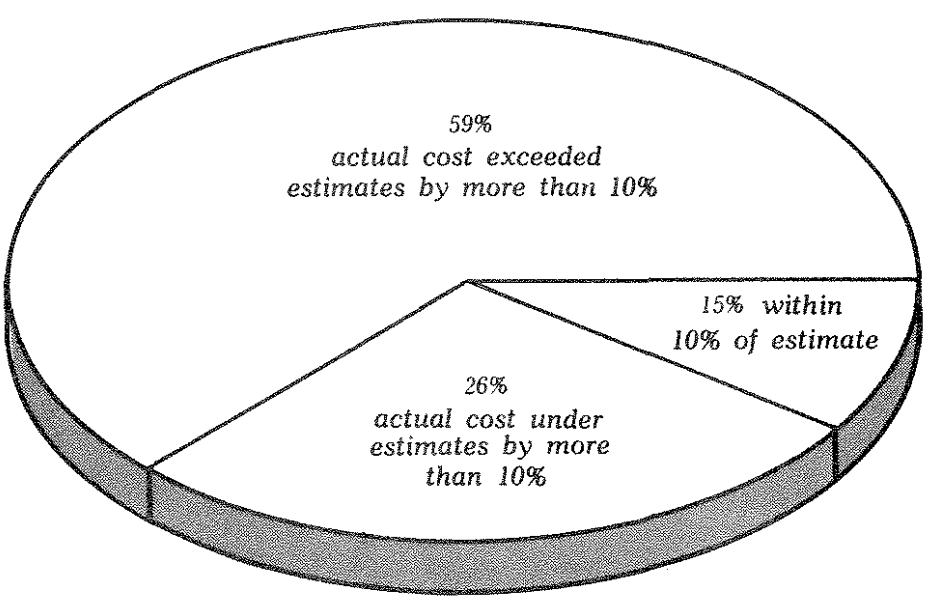
An important part of the systems development process is the definition of project scope. Agencies do not have unlimited resources to commit to ADP development activities, so the estimation of cost and time for the project is important. First, the estimation is necessary for the agency to determine whether the expected benefits of the project justify the costs involved. Second, the estimate gives the agency the information it needs to plan, budget and otherwise allocate resources to the development efforts. Failure to provide reasonably accurate estimates can make the ADP development process more difficult to manage and can cause severe budgetary problems for agencies.

Project Estimates. JLARC staff reviewed all 35 of the development projects for which there was activity during FY 1981. For each of these projects, actual costs and time were compared to the estimates made by SDD.

As illustrated in Figure 6, in 59 percent of the projects, actual costs exceeded original estimates by more than 10 percent. In 7 cases, the actual costs exceeded the estimates by more than 50 percent. Fifteen percent of the projects were within 10 percent of the estimate in the agreement with the agency.

Figure 6

SDD DEVELOPMENT PROJECTS
FY 1981

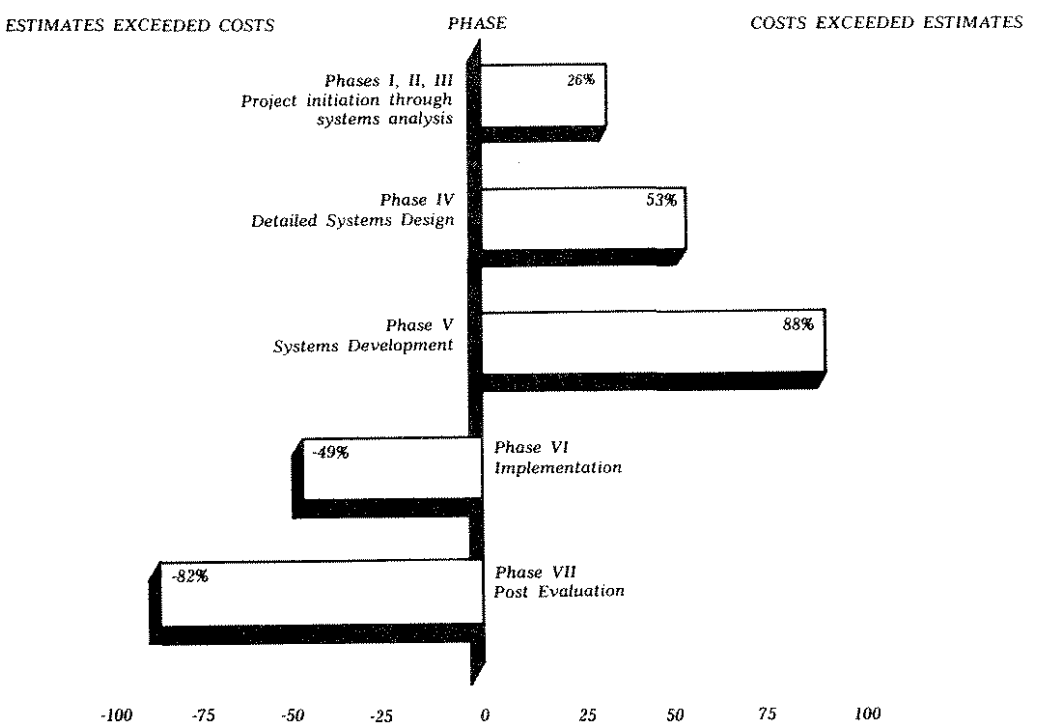


Source: JLARC review of SDD projects.

Because SDD follows an iterative, phased approach to systems development, JLARC staff compared the estimated and actual costs for each phase of the 35 development projects reviewed. As illustrated in Figure 7, the systems development phase had the greatest cost overruns, with actual costs exceeding estimates by 88 percent. The detailed design phase also had unusually large overruns.

Figure 7

COMPARISON OF SYSTEMS DEVELOPMENT COSTS AND ESTIMATES BY PHASE FY 1981



Source: JLARC review of SDD projects.

The difference between estimated and actual costs has several causes. First, in many cases agencies do not adequately communicate to SDD personnel their needs prior to initiation of the development project. Agencies must be able to describe their own process, data, and future needs in order for SDD to design systems that meet their needs.

Second, given the large overruns in the systems development phase, it would appear that SDD and its customer agencies have not

adequately explored and defined project requirements and alternatives. As a result, SDD has, on occasion, made estimates of project costs before it had a realistic idea of what work would be involved. Subsequently, agencies requested modifications after design had begun, causing redesign and increased costs.

Third, personnel from the agency and SDD sometimes change, resulting in delays, additional project orientation, and ultimately higher costs. While it is impossible to control staff turnover, SDD should have some technique for managing the restaffing and training in a way that minimizes the impact on the project.

These findings were confirmed by agency personnel in interviews with JLARC staff. The following case example is illustrative of problems experienced by agencies:

> *The Department of Aviation, when it separated from the State Corporation Commission, needed to transfer its accounting system. MASD offered a proposal of $3,000 for the transfer and $1,500 for training on the system.*
>
> *SDD took five months to complete the transfer at a cost of $9,786. The cost nearly doubled and the project took five times longer to complete than originally estimated.*

It is clear from this example that SDD under-estimated the complexity of the project. SDD managers reported that a more thorough definition of requirements on the project would have prevented this problem.

The problems experienced by the Department of Aviation were not unique. The Department of Telecommunications and the Department of Labor and Industry also reported some problems with estimates:

> *In December 1980, SDD offered the Department of Telecommunications (DOT) a proposal to develop and implement a telephone equipment billing system for $26,800. The cost for this project included the proposal through the implementation phase. The Department of Telecommunications stopped the project after the detailed design was completed at a cost of $22,150 -- 83 percent of the full proposal estimate.*
>
> *SDD estimates that an additional $26,360 will be needed to develop and implement the system. The project costs have nearly doubled from the original estimate and the project has not yet been developed.*

* * *

The Department of Labor and Industry contracted with the Systems Development Division in January 1980, to determine the requirements for an employment statistics system and to recommend a system to meet those requirements. A two-phased plan was agreed to by both parties at a cost of $113,563. The project was scheduled to be completed in February 1981.

As of February 1982, Phase I was still not complete and the costs have been $125,244; an $11,678 overrun has already occurred and the Phase II portion has not been started.

Improving Project Estimates. SDD management indicated that an improved process for estimating the cost and timeframes for projects was needed. In many cases SDD personnel are not sufficiently aware of an agency's role, mission, and function to determine what a project will involve. As a first step, agencies should better define their needs for ADP services before contracting with SDD. A more thorough definition of the objectives and scope of the project by the agency might decrease the effort and cost of SDD personnel.

For its part, SDD needs to develop guidelines to help agencies better define the requirements and objectives of systems. SDD also needs to communicate to agencies what resources will be necessary from the agency to produce the product. Possibly a detailed overview of the development process at the project initiation phase would help agency personnel to understand what will be required of them.

SDD must also be held accountable for the products it delivers. If changes occur during the development process, these should be documented.

Overall Level of User Satisfaction

Survey agencies were requested to describe their overall level of satisfaction with SDD services and products. Of the agencies interviewed, 53 percent were generally satisfied with the services and products provided by SDD. An additional 27 percent said they were "somewhat satisfied" and 17 percent said they were "somewhat dissatisfied" with SDD services. One additional agency reported being completely dissatisfied.

The reservations resulted from SDD's management of specific services and products. As a result of their dissatisfaction, 32 percent of the agencies reported that they discontinued some services from SDD. Specific weaknesses identified by agencies include the following:

- The learning curve for SDD staff at the beginning of a project is too long and results in higher costs to agencies.
- Feasibility studies and analysis of requirements are not sufficient.
- Cost and time estimates are uncontrollable by customer agencies.
- Improper charges have been included on some billings.
- Turnover on projects is high and projects lose continuity.
- Some project teams provide considerably better products than others.

In order to address these problems, SDD should evaluate existing concerns of agencies and improve its communications with the agencies using its services. SDD should explore the possibility of establishing a systems development users' council. Such councils have been used effectively by the Department of Computer Services and the Central Warehouse. The purpose of the council would be to inform SDD on a regular basis of common user concerns and needs. It would also offer SDD an instrument for discussing its policies and procedures.

FINANCIAL MANAGEMENT

SDD rates are based on direct and indirect costs. The direct costs are those for the actual hours of time spent performing services. Indirect costs include all overhead charges. SDD charges agencies for services based on the number of hours expended on projects.

SDD Rates

Rates are based on SDD's best estimate of agency budgets for systems development services and the estimated cost of those services. Rates are calculated using productive and non-productive time (Table 11). Total productive time is the total billable hours SDD can expect from its employees. The difference between the annual State working hours and the total productive time is the overhead or non-billable hours SDD distributes across all staff.

SDD then applies the non-billable and billable hours to each staff category and arrives at the cost per hour to support those staff members.

The rates SDD charges appear to be competitive with those charged by the private sector. SDD surveyed Richmond area vendors and found that SDD rates were about 30 percent below the prevailing private vendors rates (Table 12).

Table 11

PRODUCTIVE AND NON-PRODUCTIVE TIME

	Program Manager	Team Member
Annual State Working Hours	2088	2088
Non-project Staff Meetings	152	60
Administrative Time	340	100
Training Administration	80	20
Orientation & Training	120	120
Annual Leave	144	110
Sick Leave	60	70
Holiday Leave	112	112
Unassigned Time	--	10
Pre-project & Non-bill projects	180	26
Total Productive Time	900	1460

Source: Systems Development Division.

Table 12

SDD SURVEY OF RICHMOND
ADP VENDOR RATES

Classification	Daily Rate SDD	Daily Rate Vendor 1	Daily Rate Vendor 2
Senior Consultant	$256	$328	$320
Program Manager	192	264	240
Systems Analyst	152	184	200

Source: Systems Development Division.

Of the agencies surveyed by JLARC staff, 49 percent felt that SDD rates were competitive with those charged by the private sector. About 48 percent did not know whether rates were competitive. Only one agency felt that SDD rates were not competitive.

SDD Billings

SDD bills agencies based on the hours of time expended by the various personnel classifications. More than 85 percent of the agencies surveyed by JLARC staff felt that billings were accurate. And more than 88 percent of the agencies felt that billings were provided within a reasonable period of time after the services were provided by SDD.

Several agencies reported minor problems with SDD billings, however. One agency, for example, was not able to track the hours of time expended by SDD personnel when compared to the documents produced. In another agency several charges were questioned by the user, and SDD was unable to provide a clear explanation for the charges.

SDD should review its procedures for documenting time expended on projects. When problems occur SDD should explain to the agency why the problems exist.

MEETING FUTURE SDD NEEDS

The demand for SDD services has increased dramatically in the past four years. The future demand appears to be even greater. While the use and development of interagency systems and on-line agency-specific systems have improved the efficiency of government, the State is not fully prepared to manage the use of this advanced technology. MASD has statutory responsibility for ADP policies and standards and coordination of ADP planning. But the lack of a comprehensive State ADP plan is a serious problem.

Interagency Systems Development

Interagency systems development involves the development of management information systems which support functions common to more than one agency. SDD has the statutory responsibility for developing these types of systems.

Six major interagency systems have been implemented as of the 1980-82 biennium and a seventh system is nearing completion:

- Personnel Management Information System (PMIS)
- Commonwealth Accounting and Reporting System (CARS)
- Interim Budgeting System (INTBUD)
- Commonwealth Registration and Licensing System (CORALS)
- Fixed Asset Information System (FAIS)
- Commonwealth Payroll System (PAYROLL)
- Program Budgeting System (PROBUD)

With the exception of CARS and PAYROLL, these systems were developed by SDD.

Interagency systems are supported through general funds. The costs since the 1978-80 biennium have been nearly $7 million. The 1982-84 budget has over $4 million appropriated for interagency systems development and maintenance activities.

Interagency systems should focus on minimizing duplication of effort and data, and at the same time provide more efficient and effective management information. Currently more than 150 independent

automated systems throughout the State either provide common data or perform common functions or processes. MASD's Plans and Operations Section has identified 52 areas that show potential for interagency development.

The 52 interagency systems for the next three biennia are estimated by MASD to cost $35.5 million. The areas that show potential for development include licensing, accounting, inventory, personnel management, and grants management. MASD has prioritized these development efforts by secretarial area with the assistance of the Governor's secretaries. Operating costs at the Department of Computer Services and on-going maintenance and modifications for these interagency systems would increase the cost even more.

The growth in SDD services for agency-specific systems has been substantial in the past four years, and the future demand promises to be even greater. But no comprehensive ADP program plan exists to manage resources at a time when expenditures for systems are nearly doubling. As indicated in the chapter on the Department of Computer Services, MASD, under the direction of the Secretary of Administration and Finance, should prepare an ADP program plan for State government. SDD and DCS should participate actively in the development of the plan. The new plan should go beyond the scope of previous systems development and operating plans prepared by MASD and should include (1) a statewide policy on the need for future systems development, (2) the agency and SDD resources necessary to meet those needs, and (3) a priority system for agency and interagency systems development activities.

CONCLUSION AND RECOMMENDATIONS

The Systems Development Division's staffing levels and project workload have increased dramatically since 1979. The major causes of these increases are increased user demands, executive action encouraging the use of the SDD for systems development, and the Manpower Utilization Plan which limits agency personnel growth. SDD needs to address several problem areas, including project cost estimation, billing, and long-range planning.

Recommendation (10). In order to improve estimates of staffing needs and rates, SDD should revise its method of estimating future revenues. If estimates are to be based on budget requests from agencies, SDD should determine the extent to which those budgets have reflected actual expenditures in the past, and should revise its estimates accordingly.

Recommendation (11). SDD needs to develop improved estimates of project cost and time. A first step might be to require agencies to better define the needs to be met by a proposed system. SDD should provide agencies with guidelines to be used in defining requirements of the system. SDD should also be required to stay within both time and

cost estimates for the projects it develops and to document any changes in requirements that occur after agreements have been reached. If a private vendor is rejected, SDD should be prepared to provide equal services at an equal cost. If SDD is unable to accomplish this objective, the Secretary of Administration and Finance may wish to reconsider the requirement that SDD be given the right of first refusal for all systems development work.

Recommendation (12). In order to improve its communications with customer agencies, SDD should explore the possibility of establishing a systems development users' council.

Recommendation (13). SDD should review its procedures for documenting time expended on projects. Discrepancies in billings should be explained to agencies and corrected.

IV. DEPARTMENT OF TELECOMMUNICATIONS

The Department of Telecommunications (DOT) is responsible for coordinating all public telecommunications activity in Virginia. The department serves almost all State government telephone users. It also provides services to local schools with instructional television systems and to localities wishing to franchise cable television operations. Through the Virginia Public Telecommunications Board, the Department contracts for public television programming and oversees capital outlay grants for public broadcasting stations.

The State government telephone system is made up of 11 large multi-user systems, generally called CENTREX. The 11 CENTREX systems handle local calls in various regions of the State. These systems are tied together in a statewide network, the State Controlled Administrative Telephone System (SCATS).

The Department of Telecommunications was established in 1980 when several different telecommunications activities were drawn together. The department has accomplished a great deal in the past two years. It has begun to provide the coordination of telecommunications activities lacking in the past. Users, responding in a telephone survey, indicated general satisfaction with the department. Still, improvements in both organization and management should be considered to meet the changing needs of the Commonwealth.

When the department was organized, the activities financed through the working capital fund were expanded from telephone services to include all the activities of DOT. A review of these functions show the need to reconsider the current funding arrangement and the distribution of staff within the various divisions. Also, changes in telephone technology and telephone regulation require that DOT have the in-house capability to evaluate and select for acquisition phone systems most suited to State agency needs. The State's telecommunications activities can also benefit from more detailed short- and long-term planning documents within the department.

FINANCIAL CONDITION

The operations of DOT are financed by the Telecommunications Working Capital Fund. The fund was established with an advance of $375,000 and receives its revenues from charges applied to agencies' bills.

In spite of improvements in billing procedures and collections by DOT, the fund had a net loss of $121,036 during FY 81 (Table 13). However, due to a surplus of $147,077 during FY 1980 and a resulting fund balance of $86,570 for the year, the fund deficit at the close of FY 1981 was only $34,466.

Table 13

ANALYSIS OF FINANCIAL CONDITION

	Billing Revenue	Cost of Service	Surplus (Loss)	Previous Fund Balance	New Fund Balance
FY 1980	$16,173,600	$16,026,522	$147,078	($60,507)	$86,571
FY 1981	20,105,259	20,226,295	(121,036)	86,570	(34,466)
FY 1982*	10,289,766	10,178,619	111,147	(34,466)	76,681

*Year to date, January 1981.

Source: Department of Telecommunications.

In the current fiscal year, DOT's operating costs are lower than the revenues generated by agency billings. After six months of operations, revenues exceeded costs by $111,147, eliminating a beginning deficit of $34,466 and creating a fund balance at the end of January of $76,681.

REORGANIZATION OF TELECOMMUNICATIONS

The Department of Telecommunications has three divisions: Governmental Communications, Public Telecommunications, and Research and Planning. DOT's current organizational structure is the result of a reorganization in 1980. Overall, the reorganization of the State's telecommunications services has improved management and coordination of telecommunications activities. The reorganization has, however, resulted in an expansion of the use of the working capital fund to the extent that it is not consistent with the overall purpose of such funds. Some divisions of DOT appear to need a realignment of personnel in order to meet the growing needs of customer agencies.

Reorganization

In response to concerns over the growth in spending for telecommunications services, the Telecommunications Study Commission was established in 1978 to evaluate the Commonwealth's public telecommunications programs. In its report to the 1980 General Assembly, the

Commission concluded that the Virginia Public Telecommunications Council (VPTC) placed too much emphasis on public broadcasting and was not meeting needs for comprehensive statewide management, coordination, and oversight. The report made 36 recommendations, one of which was the creation of the Department of Telecommunications. The new department was to have increased telecommunications responsibilities and provide the coordination of telecommunications activities that had been lacking in the past. Subsequently, the Department of Management Analysis and System Development (MASD) performed a review of the study commission's report and proposed a specific organizational plan for implementation.

DOT has successfully implemented many of the reorganization objectives and has effectively consolidated State public telecommunications and telephone service. As a result of the reorganization, however, some functions of DOT are being improperly funded through the working capital fund.

Funding of DOT

A comparison of the functions of DOT's three divisions with the criteria for working capital funds suggests that two of the three divisions should not be funded through the Telecommunications working capital fund. According to the National Council on Governmental Accounting, a working capital fund can be justified when

- the responsibility for providing a support service solely or primarily to state agencies has been centralized in a state agency; and
- it is possible to identify the level of services provided in measurable units.

The functions of two divisions meet the criterion for providing centralized support services but do not qualify under the provision that the services be provided in measurable units. These two divisions are Public Telecommunications and Research and Planning.

Currently, all operating funds for DOT are generated through a surcharge on State telephone users. Under current billing procedures, DOT prepares the individual bills for agencies from a computer tape provided by the telephone company. The surcharge, calculated as a percentage of the billing, is then added to the agency bill. This surcharge, under generally accepted principles, is to recover the full cost of providing those telephone services. But under DOT's current organization, the operating costs for the Research and Planning, and Public Telecommunications divisions are recovered through the surcharge also.

As a result, telephone users are subsidizing studies on instructional television, public service announcements, and advisory

services to localities wishing to franchise cable television networks. An estimated $134,000 in salaries alone was spent on such activities in the last year by the Public Telecommunications, and Research and Planning divisions. Funded projects include the following:

- The review and approval of State agency media equipment purchases and consultation on the acquisition of media services cost DOT approximately $30,000.

- A three part study of cable television use for local school divisions that included development of minimum standards for municipal cable franchises cost over $19,000.

- A study of how frequently State agency public service announcements are broadcast by television and radio stations was conducted at a cost of approximately $13,000.

- DOT's participation in a study of the effectiveness of instructional television methods focusing on elementary and secondary school uses has cost over $11,000.

While all these activities are clearly related to DOT's mission and logically draw upon the staff's expertise, supporting them with surcharges on agency telephone bills does not appear consistent with the State's working capital fund policies. Because the majority of the activities performed by the Research and Planning, and the Public Telecommunications divisions do not meet the criteria for working capital funds, funding from alternative sources may be appropriate. Moving 75 percent of the two divisions' funding from working capital funds to general funds would involve approximately $134,000, or 12 percent of the department's current cost for personnel. This change could result in a decrease of approximately 1.3 percent in the surcharge to telephone users.

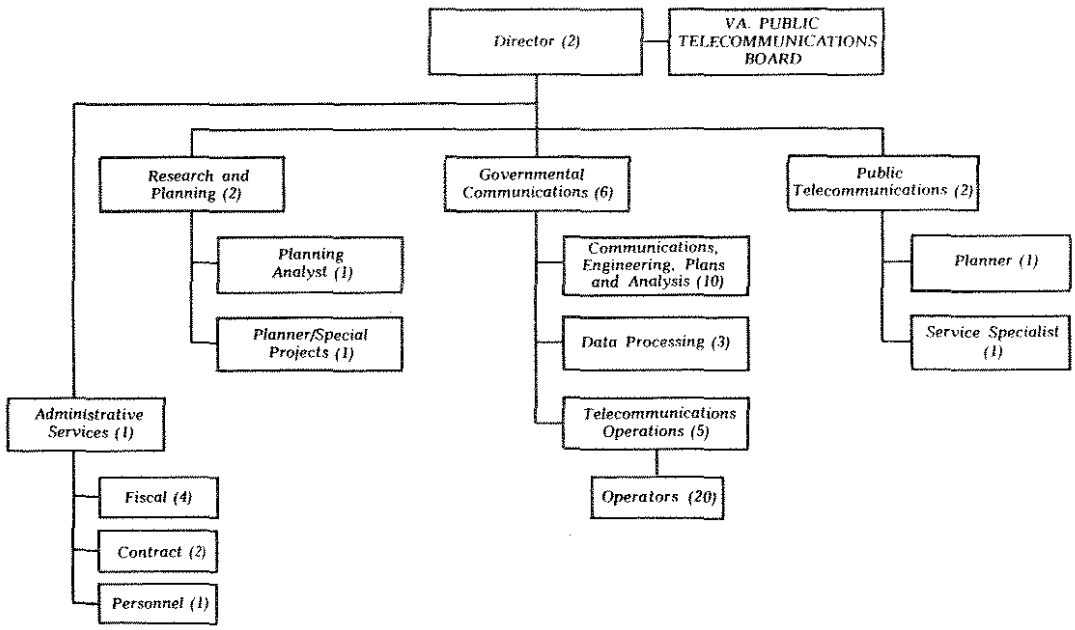
The legislature may wish to provide general funds for those activities not properly classified as working capital fund activities. This would require a general fund appropriation of $70,500 for the Research and Planning division and an additional appropriation of $63,500 for the Public Telecommunications division.

Staffing

DOT currently has 62 employees. More than two-thirds of the employees are assigned to the Government Communications Division, which is responsible for all State government telephone, data transmission, and radio services (except State Police communications). Within the division, 10 fulltime and 20 part-time employees are assigned to three CENTREX operations outside the Richmond area (Figure 7). The current level of staffing in the division needs adjustments.

Figure 8

DEPARTMENT OF TELECOMMUNICATIONS



Source: DOT.

Communications Engineering, Plans, and Analysis Section. When the Telecommunications Study was conducted in 1978, about one-third of State government telephones were consolidated. The study projected that by 1982 half of the State's phones would be consolidated. Consolidation has far exceeded expectations and the Government Communications Division is now responsible for virtually 100 percent of the State's telephones. This consolidation of telephone service and changes in policy have increased the responsibilities of the department and resulted in an increase of personnel in the Governmental Communications Division by 8 positions, from 34 to 42.

The Communications Engineering, Planning and Analysis section (CEPAS) provides planning and analysis of governmental telecommunications requirements in order to assist agencies and institutions in the design and development of specifications for equipment and services to be competitively procured. The telephone sub-section within CEPAS consists of a telephone engineer and five service specialists. It is the responsibility of this section to

- design and write specifications for procurement of telecommunications equipment, facilities, and services;
- perform cost evaluation studies;

- educate users; and

- maintain a complete inventory of equipment, facilities, and services.

This section provides assistance to State agencies upon request or when the department detects a problem. The near total consolidation of the State system along with policy changes requiring agencies to contact DOT for all changes in telephone service has increased the section's responsibilities. Providing services to all State agencies appears to be beyond the existing capacity of the section. As a result, the department has had to set priorities, with systems design and installation work taking top priority, followed by cost reduction surveys and education seminars. According to DOT, the service specialists work overtime, often at odd hours, to insure minimal disruption of agency office time when supervising an installation. The department, however, cannot adequately document workloads because of inadequate records.

Although cost reduction surveys are low on the list of priorities for the section, such surveys can yield savings to the Commonwealth. The following examples demonstrate how these surveys have helped agencies reduce costs:

> *A cost reduction survey showed that the Virginia Rehabilitative Center for the Blind could reduce its telephone costs. Continuing cost reduction measures taken by the center have cut its costs by half.*

> *A major cost reduction survey at Thomas Nelson Community College showed it would save approximately $13,000 annually.*

In addition to cost reduction suggestions, the service specialist also educates users, which leads to further cost savings. For example:

> *A review of the Department of Education revealed that many SCATS calls were excessively long. DOT recommended that staff should prepare in advance and complete calls expeditiously. A goal of ten minutes was established. Those calls exceeding the "Ten Minute Rule" suggested inadequate planning. By adhering to this and other recommendations, it was estimated that the department would save approximately 20 percent on its telephone bills.*

DOT needs to reassess the staffing and responsibilities of the telephone sub-section in CEPAS. The section needs to keep better time sheets to indicate what types of services are being provided, length of backlogs, and hours of overtime in order to properly assess

staffing needs. In addition, DOT may want to readjust the personnel assigned to each section, in order to place greater priority on services to agencies. Any change should be based on improved workload information.

CENTREX Operations. DOT provides directory assistance and information through operators it employs in Richmond, Williamsburg, Lynchburg and Staunton. Over the years, the need for telephone operators has generally declined as greater automation and direct dialing eliminated frequent operator interventions. DOT has closed operator attended stations in all CENTREX locations except in Williamsburg, Lynchburg, Staunton, and its main center in Richmond.

The CENTREX operators in Lynchburg are located at the Lynchburg Training School and Hospital (LTSH). In Williamsburg they are located at the College of William and Mary, and in Staunton, the operator is located at Western State Hospital. In all locations the operators perform duties which primarily serve the institutions in which they are housed. Many of these duties are beyond the scope and responsibility of a telephone operator. In some situations the operators are functioning in areas where the duty is far beyond the range of reasonable responsibility.

> *At the Lynchburg Training School and Hospital the operators distribute sets of keys and maintain personnel attendance logs for overtime workers. They also deposit money for residents and assist in the formation of search parties for missing residents. They are also responsible for directing fire and rescue crews in the event of a crisis.*

Authority over these DOT personnel is blurred. Dual management exists for these individuals, with their agency managers located in Richmond and day-to-day supervision left to another agency.

Aside from problems associated with assignments of DOT staff to other agencies, these operator centers serve little purpose for overall State telephone service. Existing telephone traffic surveys show that over 90 percent of calls made to these stations are directed to the institutions which house the operators and are not for general State directory information. These staff represent an inappropriate use of the DOT working capital fund because they do not provide equal services to the CENTREX users who pay their salaries, but primarily provide miscellaneous services to the agencies where they are located.

Eliminating operator centers outside of Richmond would require only a request to C&P Telephone and would not require the purchase of any additional equipment. The consolidation could result in a reduction of $150,000 in operating costs for the local CENTREX systems. DOT could also reclassify some positions to help meet growing demands for services provided by other divisions. DOT should eliminate CENTREX

operator positions in Williamsburg, Lynchburg, and Staunton as soon as possible.

MANAGEMENT OF TELECOMMUNICATIONS RESOURCES

The Department of Telecommunications faces the challenges of managing an important State resource in an environment of changing technology and industry deregulation. DOT has improved the management of telecommunications services in recent years by consolidating telephone systems. In 1978, when only a third of the State's telephones were centralized, the average expenditure per employee for centralized telephones was $332, as opposed to $424 for noncentralized phones. Today, with almost 100 percent of the State's telephone system centralized, the average expenditure per set is $313. But more remains to be done. Problems with DOT's billings, procurement, and planning must be addressed if the department is to continue to improve services.

Pricing and Billing

Rates charged to all customers by AT&T are set by tariffs through the jurisdiction of the State Corporation Commission. A single charge for statewide telephone service by agencies is sent directly to the Department of Telecommunications by C&P Telephone Co. The department, in turn, processes bills for the individual agencies, adding surcharges to cover its operational costs. Two charges are added to agency billings: a SCATS surcharge and a CENTREX charge.

Reduction of Rates. A SCATS surcharge of 12 percent was established for FY 1982, based on FY 1981 rates and usage. This rate has resulted in much larger surpluses than DOT had expected. According to the manager of DOT's Administrative Services section, the current surplus on operations is a result of increased telephone use by agencies and a rate increase by C&P Telephone. The net surplus for the first six months of FY 1982 was $111,146, giving DOT a fund balance of $76,800. At this rate the projected year-end fund balance would have been more than $185,000. In January 1982, DOT lowered the surcharge to 10 percent in order to reduce this surplus. JLARC estimates that this rate will yield a surplus of approximately $5,000 in the second half of the year, giving DOT an end-of-year fund balance of approximately $81,000.

The Commission should formally establish the 10 percent rate as the maximum surcharge for DOT. The department believes that the 10 percent surcharge will be sufficient throughout the next biennium.

Unauthorized CENTREX Charges. The SCATS surcharge recovers all DOT costs except for CENTREX operators and common equipment. The common costs for each CENTREX location are divided by the number of

telephones served by a CENTREX area. Agencies are then billed a flat rate per phone.

Charges for CENTREX services are desirable because agencies which have limited or no SCATS use still contribute to overhead costs directly caused by CENTREX service. This form of cost recovery, however, has not been authorized by JLARC as required.

The Commission may wish to officially recognize and accept this form of cost recovery at DOT. The department should report current CENTREX line charges in its quarterly financial statements provided to JLARC.

Billing Problems. The Department of Telecommunications receives detailed billings in the form of computer tapes from C&P and other telephone vendors. The department aggregates an agency's charges, adds its surcharges, and sends a complete bill to the agency. A survey of 20 agencies revealed that while they were generally satisfied with DOT services 40 percent of the respondents were dissatisfied with this billing system.

As a result of having to process charges for every State telephone, DOT faces another problem of being unable to provide agencies with prompt bills. Survey respondents reported that telephone bills processed through DOT are often two or three months late. This makes it difficult for an agency to exercise management control over telephone use and to budget for telephone expenses.

An additional problem, as the result of not providing itemized bills, is the difficulty of the agencies to control telephone abuse. While agencies reported that the itemized bills once provided by vendors aided them in controlling telephone abuse, the cost to DOT of providing agencies with itemized billings is high. If DOT is unable economically to provide agencies with itemized information, it could work closer with agencies to devise alternative methods for identifying and controlling the improper use of telephones. Such methods include restricting access to SCATS lines and recording the time and purpose of calls.

Until recently, the DOT billing process also resulted in late payments to private vendors. On April 2, 1981, JLARC staff was informed by the administrative services manager of the fund that the State was consistently behind in its payments to C&P Telephone Company, with as much as two million dollars outstanding in excess of 30 days. The cause of the late payment was a cumbersome method of billing and rebilling between the Department of Telecommunications and other State agencies. JLARC staff worked with the comptroller's office and the Department of Telecommunications to develop a method of expediting payment to C&P. As a result, the State was current with C&P by April 28, 1981.

Procurement of Telephone Systems

Under Section 2.1-563.5 of the *Code*, the purchase of telephone systems has been centralized in the Department of Telecommunications. The department has developed standard bid forms and procedures for competitive procurement of telephone systems. This authority has enabled the department to provide statewide control. Further steps need to be taken, however, to strengthen the procurement system, especially with agency compliance and bid specifications.

Assuring Agency Compliance. Although the department has updated and distributed its policies and procedures regarding competitive procurement, many agencies are unaware of the policy and contact vendors directly. The State's largest vendor, C&P Telephone has cooperated with DOT by informing company representatives of the State's policy. If an agency contacts C&P, the C&P representative will refer the agency to DOT.

> *Virginia Commonwealth University called C&P Telephone to set up the telephone system for the new MCV Hospital. C&P referred the university to DOT. DOT made the necessary arrangements for installation of the system.*

The department has not met with the same degree of cooperation from other vendors. The department needs to better communicate procurement policies and the responsibility of all agencies to contact DOT instead of a vendor.

Specifications. DOT has a staff of five analysts who prepare specifications for each bid proposal. An analyst drafts the specifications based on interviews with the user agency and a survey of the facility. Some problems have been noted by vendors with the scope and appropriateness of the bid specifications.

Based on interviews with five vendors, a pattern of concerns emerged about the specifications prepared by DOT analysts. The basic concern was that the specifications were limiting as to what features were to be included in a system. For example, a bid proposal might specify a private branch exchange system (PBX), even though a key system will often meet the user agency's needs at a greatly reduced cost. Also, specifications sometimes request certain features, such as a "hands-free" intercom, when other features would still meet the user agencies' needs. Vendors are currently able to offer systems counter to specifications in a bid. A more open approach would be to specify the functions that the system should provide, rather than special features.

Most vendors felt that the problems they observed with specifications resulted from a lack of experience and technical expertise among DOT staff. Thus, many of the problems should be overcome in time

as the staff works with more systems and vendors. But DOT should also review its need to (1) supplement its staff with technically trained personnel and (2) develop specific guidelines for preparing competitive specifications based on the function of a piece of equipment, rather than on some special feature offered by a single manufacturer. This need will become more critical as the State assumes a greater role in maintaining its own telephone systems.

Telecommunications Planning

The telecommunications industry is in flux today with the impending divestiture of AT&T and the significant changes in technology. The situation requires careful analysis and planning by the Commonwealth since these changes could have severe impacts on the management of State resources such as personnel and on the procurement of telecommunications systems.

Divestiture of AT&T. After seven years of anti-trust litigation with the U.S. Justice Department, AT&T agreed to a settlement in January 1982. The settlement, which divests AT&T of its local operating companies, is subject to modification by the federal courts and has not been implemented. Thus, neither DOT nor vendors are certain how the divestiture of AT&T will affect State phone users.

Still, the divestiture promises to have significant impact on the State's telephone system. First, rates charged for basic telephone line service by local operating companies are expected to increase as AT&T's long distance charges will no longer be available to subsidize expenses for local services.

Second, the local operating companies are expected to discontinue existing equipment rentals and require that customers own all on-premises equipment. (Non-AT&T companies such as Continental Telephone and Centel of Virginia are moving in this direction already.) As the State is required to purchase more and more of its phone equipment, effective maintenance and inventory controls will be needed.

Third, large switching equipment facilities currently located on AT&T property but dedicated to the State's use may have to be purchased or replaced by the State. These include the CENTREX facilities and the long distance switching equipment which link the SCATS network. These facilities are complex and will require significant lead time to replace.

Technological Changes. Significant advances have been made in telephone communications in recent years that improve efficiency, quality, and versatility of services. Electronic computer switching, digital transmission, microwave, and laser links have been introduced to greatly expand transmission capacities. Also, the integration of computers with telephones has opened an almost unlimited variety of

uses for the telephone beyond traditional voice communications. To fully utilize the new and expanded capabilities of phone systems, the State will need to carefully analyze new and emerging technology.

Short- and Long-Term Planning. The Commonwealth faces a new and complex environment in obtaining telephone services for State users. The combination of divestiture of AT&T, greater competition among equipment vendors, and new technology require that the State take a considered approach to meeting its telephone needs. DOT should begin to develop short- and long-term plans to provide options that ensure it continues to meet State agency demands for phone services.

These plans should identify immediate and long-term needs for telephone service. They should address the advisability of continuing to rely on CENTREX services and consider the problems of inventory management and equipment maintenance. The plans should also identify means for financing anticipated equipment purchases and the impact of future needs on staffing.

DOT is currently discussing costs of major equipment components for a State-owned telephone network with vendors. Such equipment should not be purchased without adequate long-term planning.

CONCLUSION AND RECOMMENDATIONS

DOT has made significant improvements in telephone services as evidenced by agency responses to a JLARC survey. The majority of survey respondents indicated that they enjoyed a good working relationship with the department and that the department has been responsive to agency needs. DOT has successfully consolidated the State's telephone systems and provides the coordination of telecommunications that has been needed but lacking in the past.

DOT should now focus on several additional problems in order to continue its improvement of telecommunications services. A need exists to review the functions currently funded through working capital funds and the agency's staffing in certain divisions. Also, the billing process should be improved to provide agencies with better management information. Finally, DOT needs to prepare itself for the changes which will result from the AT&T divestiture.

Recommendation (14). The legislature may wish to consider funding the Research and Planning and the Public Telecommunications divisions with general fund appropriations.

Recommendation (15). The Telephone Engineering staff of the Communications Engineering, Planning and Analysis section should keep better time sheets to indicate what types of services are being provided, length of backlogs, and hours of overtime. This information

should be used to determine the need for additional staff to meet increasing workloads.

Recommendation (16). DOT should close CENTREX operations in Williamsburg, Lynchburg, and Staunton and reduce its operator positions accordingly. The need for additional staff in other divisions could be met by reclassifying some of these positions.

Recommendation (17). The Commission should approve the flat charge to CENTREX users to recover the salaries of switchboard operators and should set the maximum SCATS surcharge at 10 percent.

Recommendation (18). DOT should work closely with telephone coordinators to devise alternative methods of controling SCATS abuse.

Recommendation (19). The department needs to better communicate changes in telephone procurement policy to State agencies. It may also need to supplement its staff with technically qualified personnel and develop guidelines for preparing specifications which are fully competitive.

Recommendation (20). DOT should begin to develop short- and long-term plans which identify demands for telephone services and solutions for meeting those demands. The plans should address the advisability of continuing to rely on vendor provided services. Other items that should be considered include equipment inventory controls, maintenance, and financing of anticipated equipment purchases.

V. CENTRAL WAREHOUSE

The Central Warehouse operates through a working capital fund administered by the Division of Purchases and Supply of the Department of General Services. The warehouse is a 155,000 square foot facility with a staff of 36 who purchase and distribute commodities to State agencies. The warehouse stores and distributes large quantities of approximately 1,200 items including

- canned and frozen foods;
- paints and painting supplies;
- paper towels and other paper products; and
- cleaning, laundry, and dishwashing supplies.

Approximately 57 percent of the items in the Central Warehouse catalog are foodstuffs. The most expensive items offered are frozen meats and disinfectants. Net sales during FY 1981 totalled $20.6 million, up substantially from the $12.9 million in sales during the FY 1975 period covered by the prior JLARC report.

Primary warehouse customers at the State level include hospitals, correctional facilities, and colleges and universities. At the local level, cities, counties, school divisions, and individual public institutions may purchase through the warehouse. State agencies accounted for 85 percent of sales in FY 1981. The warehouse served approximately 425 customers in FY 1982 representing 130 State agencies and 295 cities, counties, and other political subdivisions. Beginning in FY 1983 volunteer fire companies and rescue squads will also be eligible to purchase items from the Central Warehouse.

A variety of methods were utilized for this review. The JLARC staff surveyed a representative sample of 36 customer State agencies by telephone to gather opinions about warehouse performance. JLARC also interviewed staff of the Division of Purchases and Supply, Central Warehouse, and Auditor of Public Accounts. A variety of financial records were reviewed, and JLARC staff observed a portion of the quarterly inventory conducted in March 1982.

FINANCIAL CONDITION

The Central Warehouse has demonstrated that it is an economically viable operation, having generated a surplus in each of the last three fiscal years. At the end of FY 1981 the Central Warehouse working capital fund showed a $59,727 annual surplus on $20.6 million in

sales (Table 14). An additional $161,773 income from such miscellaneous sources as discounts for prompt payment yielded a total annual surplus of $221,501. Added to the prior year's fund balance of $264,176, less adjustments from prior years, the Central Warehouse fund balance at the close of FY 1981 was $351,350.

Due to the increasing cumulative surplus the overhead charge may need to be reviewed and adjusted. The overhead charge added to the cost of goods was increased from 4.5 to 5.0 percent with JLARC approval in October 1980. Because of the accumulation of surpluses, continued monitoring of the surcharge by JLARC is appropriate.

As a general rule, adopted for this report, a working capital fund should retain earnings of no more than one percent of billings. The accumulated Central Warehouse fund balance of $351,350 at the close

Table 14

ANALYSIS OF CENTRAL WAREHOUSE FINANCIAL CONDITION

	Billing Revenues	Cost of Service	Surplus (Loss)	Previous Fund Balance	New Fund Balance
FY 1980	$17,614,730	$17,556,228	$150,523	$113,653	$264,176
FY 1981	20,581,481	20,479,581	87,174	264,176	351,350
FY 1982*	13,910,042	13,218,477	74,717	351,350	426,066

*Year-to-date, February 1982.

Source: Division of Purchases and Supply, Central Warehouse.

of FY 1981 exceeded this limit by $145,682 (Table 15) and has continued to grow. The director of the Division of Purchases and Supply has indicated that a portion of the surplus will be used to pay for an automated inventory system. JLARC may also wish to direct that some portion of the fund balance be returned to the general fund at the close of the fiscal year. The remaining balance could be available for warehouse operation and for planned improvements.

Table 15

RETAINED EARNINGS ANALYSIS

Fund Balance, June 30, 1981	$351,350
One Percent of FY 1981 Sales	205,668
Excess Retained Earnings	145,682

Source: Division of Purchases and Supply, Central Warehouse.

WAREHOUSE MANAGEMENT

The Central Warehouse enables State agencies and localities to reduce the costs of institutional food and supplies through bulk purchasing. Since JLARC's 1976 review, improvements have been made to the facility and operation of the warehouse resulting in greater efficiency and responsiveness to customers' needs. The survey of 36 customer agencies found that 82 percent were generally satisfied with the services provided by the Central Warehouse. Eighty-six percent said the warehouse was responsive to their needs.

Although many improvements have been made, the Central Warehouse can make improvements in several additional areas. Guidelines for following up excessive inventory adjustments are needed, and the funding and transition planning for an automated inventory system have been inappropriate. In addition to these, staffing needs are not adequately tied to anticipated workload, and several specific improvements in services to customers could be made.

Inventory Management

The 1976 JLARC report on the Central Warehouse noted problems stemming from the existence of two geographically separate facilities, deficiencies in handling materials, and inadequate inventory controls. While most of these problems have been resolved, a few remain.

Material Handling. In 1977 a warehouse was purchased in Southside Richmond which provides adequate space and access to a rail siding as well as to Interstate 95. Previously two locations, separated by 10 miles and 30 minutes' driving time, were used by the Central Warehouse. Frequent trips between the two facilities were required because customer orders usually involved items stored at both locations. In addition, the two facilities required extra utilities, maintenance, and supervision.

The single facility now used by the Central Warehouse has eliminated these extra costs and has enhanced overall efficiency. For example, individual items are now consolidated into customer orders in portions of the warehouse specially designated for this process. The previous facilities lacked such staging areas, which led to the misplacement of items and errors in filling orders.

In 1976 JLARC reported that the Central Warehouse lacked a systematic method for locating items. A stock locater system has been developed and is now in use. The system specifies the location of each type of item and has reduced the time necessary to find items.

Inventory Accuracy. A key recommendation of the 1976 JLARC report was for the warehouse to improve its inventory controls. Prob-

lems noted included excessive errors in and adjustments of the inventory, and poor internal controls which made it impossible to determine whether inventory losses were caused by theft or clerical errors. The earlier report also recommended consideration of an automated inventory system.

One measure of the effectiveness of inventory control has improved significantly since the earlier report. The gross stock adjustment ratio measures the relationship of overages and shortages to the average monthly value of total inventory. As noted in the earlier report, in FY 1975 gross stock adjustments of $54,036 and an average monthly inventory of $1,620,000 resulted in a gross stock adjustment ratio of 3.3 percent ($54,036/$1,620,000 = 3.3%). Table 16 shows that the ratio performance since FY 1975 has been substantially better.

Another measure of inventory control shows no improvement since the 1976 report, however. The inventory error rate reflects the

Table 16

GROSS STOCK ADJUSTMENTS
OF CENTRAL WAREHOUSE INVENTORIES

	Gross Stock Adjustments	Average Monthly. Inventory	Gross Stock Adjustment Ratio
FY 1975	$54,036	$1,620,000	3.33%
FY 1980	30,429	1,546,000	1.97
FY 1981	40,977	1,823,200	2.25
FY 1982 (thru February 28, 1982)	26,257	2,039,600	1.29

Source: JLARC analysis of Central Warehouse data.

proportion of items for which an inventory error of more than $20 occurred. For the September 1975 inventory this proportion was 20 percent, and was judged to be excessively high. For the December 1981 inventory this proportion was 33 percent. After adjusting the $20 amount for the effects of inflation since 1975, the error rate was still 31 percent, 11 percent higher than that noted in the prior report. Warehouse staff indicated that line item errors detected during quarterly inventories typically occur in as many as 45 to 50 percent of all items. Seventeen errors of $500 or more were identified in the December 1981 inventory.

Although the inventory error rate appears high, it has nonetheless resulted in acceptably low adjustments to the value of the inventory, as shown in Table 16. An error rate of this level may

suggest a potential for pilferage and theft, but thefts detected and reported only amounted to $5,500 of a total inventory of $20.6 million in FY 1981. Most of the losses appeared to occur from boxcars and trailers stored at the warehouse, not directly from the warehouse itself.

Central Warehouse staff do attempt to determine the reason for inventory adjustments of relatively high value, as in the following example:

> *In the December 31, 1981 inventory, 685 cases of pickle relish were counted in the warehouse. The Kardex inventory file showed that there should be 817 cases, for a gross shortage of 132 cases. After taking account of a shortage of 40 cases found in the September inventory, a net shortage of 92 cases resulted. At $10.80 per case, this amounted to a discrepancy of $993.60.*
>
> *The warehouse accountant called all customers who had ordered the item, and checked quantities ordered with quantities logged in the Kardex file and with shipping records, but could not locate the cases. In fact, the warehouse could not verify that it had ever received the 92 cases. The amount was ultimately written off as an inventory shortage.*

Warehouse management should be concerned about any discrepancies in the inventory and should make every effort to ensure that errors are corrected. An extensive effort to account for inventory errors is appropriate for large amounts. However, there are currently no guidelines for determining what value of errors justify such effort. To improve management control and to reduce the possibility that errors are inconsistently followed up, the Central Warehouse should establish guidelines to assure uniform efforts to discover reasons for inventory errors. The guidelines should require that all shortages over $150 be thoroughly investigated by warehouse staff. The findings of the investigation should be documented in a memorandum for Central Warehouse files. These files should be retained for three years.

Automated Inventory

In addition to improving inventory procedures related to the manual Kardex file, the 1976 JLARC report recommended that an automated inventory system be considered. The system has only recently come under development because MASD determined earlier that the warehouse lacked sufficient line items to justify automation. The grand jury investigations of the Division of Purchases and Supply in 1979 apparently led the Secretary of Administration and Finance to expedite automation of division systems. Consequently, a feasibility study and related work on the inventory system were initiated in FY 1981.

Although the system will improve operations at the warehouse, inadequate time has been allocated to implement the automated inventory. Additionally, the source of funding for developing the system has been inappropriate.

System Implementation. The system currently under development will eliminate such sources of error as manual calculations and will facilitate effective inventory management. For example, the system will monitor stock levels and automatically notify buyers to order additional items when the level falls below a pre-set reorder point. Currently these tasks are performed manually.

While the automated inventory system should improve warehouse efficiency, current plans for implementing the system do not allow adequate transition time to the new system. Staff at the Auditor of Public Accounts (APA) suggest that manual and automated systems should be operated in parallel until management is confident in the accuracy of the automated system. Often this means that both systems remain in operation until a specific performance level is consistently obtained by the new system. For example, a period of three consecutive months with an acceptable level of discrepancies between the two systems might indicate acceptable performance.

Plans call for the automated system to be operated in parallel with the manual Kardex system only between May and August. The automated system will be in full use beginning July 1, 1982, and by mid-August it is anticipated that the automated system will be the only inventory available.

Three months is not enough time to ensure the accuracy of the new system. A transition period of six months is not unusual, according to APA staff, and longer periods are sometimes necessary. Although the warehouse manager is concerned that extensive effort will be required by warehouse staff to operate both systems, the effort appears necessary to ensure proper accountability of the new system.

System Funding. Because the Central Warehouse is a working capital fund, development of the automated inventory system should be funded from working capital sources and not directly from the general fund. Typically, costly operational improvements for working capital fund agencies are funded from the working capital advance. For example, the advance to the Central Warehouse was increased in October 1980 to purchase new equipment and renovate office space. Alternately, the cost of the new system could be recovered through the overhead charge added to the cost of goods.

The development of the automated inventory system has been inappropriately funded from the general fund. Approximately $180,000 is budgeted for design and development of the system in FY 1982, and additional funds were spent on a feasibility study and requirement

definition during FY 1981. Total cost to develop the system is estimated at $221,000.

The system is funded by the inter-agency systems development subprogram, which is used to fund development of automated systems, such as PROBUD and PMIS, which serve multiple users. Under this rationale the subprogram has been used to fund the development of other systems within the Division of Purchases and Supply.

The director of the Division of Purchases and Supply has suggested the funds be transferred from the warehouse surplus to cover system development expenses, which have been incurred by MASD. The suggestion is for $105,084.24 to be transferred immediately, and for up to $10,000 a month to be transferred until the system is fully developed and accepted. This repayment schedule appears reasonable in light of the substantial surplus accumulated by the warehouse.

JLARC policy requires that working capital fund managers inform the Commission of such developments as a proposal to rent or purchase fixed assets valued at more than $100,000. Consequently JLARC should have been notified and provided the opportunity to consider funding alternatives.

Staffing

Although sales volume has increased 32 percent, the Central Warehouse has operated with a basically stable work force size since FY 1979. Thirty-four positions were authorized in the 1978-80 biennium, and 36 positions were authorized and are filled in the current biennium. The Appropriations Act authorizes working capital funds to add staff if increased activity generates additional nongeneral fund revenue. This provision would permit the warehouse to add staff if, for example, additional political subdivisions became Warehouse customers and generated new revenue.

The warehouse does not have a plan that links staff levels to workload. Consequently warehouse management is not able to estimate the impact of increased sales, for example. The ability to do so is especially important since 29 percent of the customer agencies surveyed by JLARC anticipate increasing their purchases from Central Warehouse in the next biennium.

Implementation of the automated inventory underscores the need for better manpower planning, because some tasks will be eliminated under the new system. For example, approximately 80 staff-hours per month are required to manually multiply the number of items shipped per order by the item price to arrive at the customer price. The new system will perform this calculation by computer, eliminating the need for 80 staff-hours per month.

The Central Warehouse should develop a staffing plan based on an assessment of tasks that will be performed under the automated inventory system. The plan should specify how changes in sales volume will affect staffing.

Quality of Goods and Service

The Central Warehouse appears overall to provide goods to customer agencies in an appropriate and effective manner. Eighty-four percent of the customer agencies surveyed thought warehouse prices were competitive with private vendors, and 87 percent felt they had achieved savings by using the warehouse. Similar proportions agreed that goods were delivered in a timely fashion and were of acceptable quality, and that billings were accurate and timely. Eighty-six percent of the agencies surveyed had no difficulty in having complaints resolved by warehouse staff.

Although there is a high level of agreement about warehouse performance, several problems were identified by customer agencies. Deliveries of small orders are not always timely, and orders that are not completely filled appear to be inconsistently back-ordered. Some agencies also felt the warehouse catalog should be improved. Finally, the quality of certain janitorial products appears to be unsatisfactory to some customers.

Deliveries. In the JLARC survey of customer agencies, the chief complaint made by customers concerned the delivery of goods. Thirteen percent of the customers said they were dissatisfied with the delivery service. Most of the dissatisfaction stemmed from the warehouse practice of making deliveries only when a full trailer-load of items is ready for shipment. This means that a customer whose order does not fill a 40-foot trailer must wait for delivery until the warehouse accumulates a trailer load of items for shipment to the customer's area. These problems are illustrated in the following case.

> *Patrick Henry Community College in Martinsville reported having an "awful time with warehouse deliveries." Staff at the college place an order four weeks ahead of the requested delivery date. They say they usually receive about half of what is ordered, and the remainder has been delayed as long as six months. The warehouse provides no notice of what will not be delivered, so the college can not depend on items being provided. In some cases the college has had to purchase items locally while waiting on Central Warehouse deliveries.*

The warehouse manager indicated there is no fixed policy on delivering only trailer-load shipments, and suggested a willingness to accommodate smaller customers in a variety of ways. Customers can always pick up their orders directly at the warehouse. In addition, the warehouse has recently begun to encourage customers to pool orders.

Three school divisions in a distant part of the State were placing orders individually with the Central Warehouse. Warehouse staff called the divisions and encouraged them to consolidate and time their orders so the warehouse could make a single delivery instead of three deliveries at differing times. The school divisions subsequently pooled their orders.

The current cost for the warehouse to deliver shipments is approximately $1.10 per mile from Richmond, so there is a need to have a sufficient volume of goods to be delivered to recover this cost.

The Central Warehouse might consider several options in order to make the delivery of smaller quantities more practical. One option would be to add a surcharge for delivering loads less than a certain weight or volume. Thus agencies who are willing to pay extra for quicker deliveries, or for deliveries by a specific date, could be accommodated. Alternatively, customers in adjoining areas should be encouraged to consolidate orders to facilitate deliveries.

Unfilled Orders. The proportion of items delivered to those initially ordered has been increasing in recent years. In 1980 the fill rate averaged 84 percent, and by early 1982 the average fill rate for all customers had improved to 95 percent. Although this reflects an overall improvement in warehouse performance, the warehouse appears to handle the unfilled portion of the order inconsistently.

Of the customer agencies surveyed, 59 percent said they had experienced problems with unfilled orders. In most cases the customers noted that unfilled orders were not a major problem. Several reported that they had to keep track of unfilled items and reorder these, although other customers said the warehouse staff automatically back-ordered out-of-stock items. The dissatisfied customer agencies reported bookkeeping problems, increased paperwork in reordering, and unpredictable delays in deliveries as a result of unfilled orders. Service would be improved if warehouse staff consistently back-ordered items for all customers.

Warehouse Catalog. The Central Warehouse issues an annual catalog listing approximately 825 items. Prices listed are current when the catalog goes to press, although prices actually charged change to reflect the last price paid by the warehouse when purchasing goods. Several customer agencies noted in the JLARC survey that they could not be sure of the price of their order until the goods were delivered. An additional problem identified by some customers was that items may be dropped or added by the warehouse throughout the year without notifying customers.

These problems could be corrected by issuing a catalog in a loose-leaf binder and making periodic updates. The utility of the

catalog could be further improved by including information on how deliveries are scheduled and practical advice on how to order economical quantities and make the best use of the Central Warehouse. These aids would be especially important for smaller customer agencies where the staff devotes only part of its time to purchasing and receiving goods.

Quality of Goods. Ninety-three percent of customer agencies who purchase foodstuffs from the warehouse were satisfied with the items provided. Warehouse staff work closely with the food service directors at State agencies and institutions to ensure adequate quality in the foodstuffs provided by the warehouse. As members of the Virginia Food Service Management Council, the directors attend quarterly meetings to review foodstuffs purchased through State contracts as well as Central Warehouse items. The Council monitors the quality of food available to agencies and provides feedback about other aspects of the operation to the Division of Purchases and Supply and the Central Warehouse.

The Council appears to provide an effective method of ensuring that foodstuffs are of adequate quality. A similar method is not used for such products as janitorial supplies although it appears to be needed. Several customer agencies mentioned that specific cleaning and wax products were not of adequate quality, which sometimes led, for example, to rewaxing a floor several times. Some customers indicated a willingness to pay a higher price in order to receive better quality supplies.

A feedback mechanism should be considered to monitor the quality of non-food items supplied by the Central Warehouse.

CONCLUSION AND RECOMMENDATIONS

The Central Warehouse has demonstrated that it is economically viable, and operations have improved significantly since the 1976 JLARC report. Consolidation of warehouse facilities into a single location has led to improved material handling and greater overall efficiency. Eighty-two percent of the customer agencies surveyed said they were generally satisfied with services provided by the warehouse. With additional attention to implementing the automated inventory system and to accommodating customers' needs, the warehouse should be able to continue improving its operations.

Recommendation (21). The Central Warehouse should establish guidelines for following up errors identified during routine inventories. Guidelines should require that shortages in excess of $150 be thoroughly investigated by warehouse staff.

Recommendation (22). The Central Warehouse should plan on operating the automated inventory and manual Kardex file in parallel

until the accuracy of the automated system is established. Accuracy of the system should be gauged by consistent achievement of specific performance criteria, such as an acceptable level of discrepancies between the two systems for three consecutive months.

Recommendation (23). The repayment schedule suggested by the Division of Purchases and Supply to cover development of the automated inventory system should be followed. According to this schedule, the division is to repay $105,084.24 to the general fund for expenses incurred by MASD through February 1982, and to repay up to $10,000 per month to the general fund until all system development costs are covered.

Recommendation (24). A staffing plan should be developed for the Central Warehouse. The plan should be based on an assessment of tasks that will be performed under the automated inventory system, and should specify how changes in sales volume will affect staffing.

Recommendation (25). The Central Warehouse should consider several options for improving deliveries to smaller customers. One option is to add a surcharge for delivering smaller loads, so that small customers willing to pay extra for quicker or more definite deliveries could be accommodated. Warehouse staff should continue to encourage small customers in neighboring areas to consolidate their orders to facilitate delivery.

Recommendation (26). Warehouse staff should consistently back-order items for all customers.

Recommendation (27). The Central Warehouse catalog should be issued in loose-leaf form with periodic price and item updates. Additional information should be included to assist customers in making efficient use of the warehouse.

Recommendation (28). The Division of Purchases and Supply should consider a feedback mechanism to monitor the quality and other aspects of non-food items. A questionnaire sent to customers on a regular basis may be preferable to a special committee on such non-food items.

VI. OFFICE OF GRAPHIC COMMUNICATIONS

The Office of Graphic Communications (OGC), within the Division of Purchases and Supply of the Department of General Services, provides graphics services to State agencies. It began operations in December 1980 and currently has a staff of three (a director and two graphic artists). OGC was created when the printing and graphics operation was closed with JLARC approval in 1980.

From December 1980 through February 1982, OGC provided $100,000 in the following graphics services to 35 State agencies:

- design
- letterheads, logos, and mastheads
- illustrations
- typesetting and typography
- visual presentations
- signage
- layouts
- photography
- camera services
- exhibit designs

State agencies currently spend more than $1.2 million annually on graphics operations. This amount includes $1.1 million for 81 graphics artists' positions in 39 agencies and estimated OGC billings for the current year of $87,000. Additional amounts are spent by the agencies for graphics equipment and supplies and for graphics work contained in many printing jobs contracted to the private sector.

Graphics are currently prepared for agencies in four ways. First, many agencies prepare graphics in-house with assigned graphics artists. Second, agencies with graphics work exceeding $300 must go through the bidding procedure which has been established by the Division of Purchases and Supply. Third, for work amounting to less than $300 that is not covered by a State contract, agencies may choose any vendor without using DPS procedures. Fourth, agencies may take any amount of graphics work directly to OGC or another State agency.

In addition to OGC, at least two other State agencies provide graphics-related services. The Department of Education has a film unit and the Department of Highways has a photo lab. Both units prepare color slides and other visual aids. Any State agency can use these services without following DPS procedures.

At OGC, the director seeks to provide "turnkey" services to agencies, whereby an agency presents a general idea for a publication to OGC, and OGC returns a finished design with complete specifications to the agency or the agency's printer. This approach frees agency staff from the technical details of preparing copy for printing and enables agencies to use private printers who provide only printing services. OGC handles coordination with the agency, with other graphics providers where necessary, and with printing firms. In addition to "turnkey" services, OGC provides more specific "art work" which is given to the agency for its inclusion in the final copy.

Methods used by JLARC for this review of OGC included interviews with OGC and Division of Purchases and Supply staff, a review of financial records, and a telephone survey of 20 user agencies. The three largest were surveyed, in addition to a randomly selected sample of 17 other user agencies. Thus, the sample is representative of all OGC users.

FINANCIAL CONDITION

For the first six months of its existence, OGC made a net profit of $1,977, as shown in Table 17. While the surplus exceeded the amount that would be generally acceptable based on sales, the fact that billings were small and the fund operated for only six months in FY 1981 made judging the appropriateness of the surplus difficult. However, since July 1981, OGC has lost money in some months. As of February 28, 1982, the graphics fund had a deficit of $618.

Table 17

ANALYSIS OF GRAPHICS FUND FINANCIAL CONDITION

	Billing Revenues	Cost of Service	Surplus (Loss)	Previous Fund Balance	New Fund Balance
FY 1981*	$41,485	39,669	2,035	1,977	4,012
FY 1982**	54,104	58,421	(4,639)	4,012	(618)

*Fund started on Dec. 9, 1980.
**Year-to-date, February 1982.

Source: Division of Purchases and Supply.

In a March interview, the OGC director stated that OGC made a profit in February and would "at least break even" this fiscal year for two reasons: (1) OGC has only been fully staffed since January 1982,

and (2) additional work is expected by the close of the fiscal year. The director of the Division of Purchases and Supply has stated that he would recommend closing OGC if it does not soon show it can pay its way. But because OGC has been in operation for only 15 months, it would appear reasonable to provide additional time for the office to demonstrate its financial viability.

AGENCY UTILIZATION OF OGC

The graphics fund functions appropriately as a working capital fund because the Office of Graphic Communications provides support services to other State agencies. Agency use of OGC has increased during the past 15 months, resulting from several benefits that OGC holds for State agencies. The chief advantage is price. In addition, factors such as customer satisfaction, quality of work, and rapid turnaround also appear to be benefits of using OGC.

Benefits of Using OGC

According to 73 percent of the respondents to JLARC's user survey, OGC's prices are competitive with those of the private sector. Only five percent said prices are not competitive. Sixty-eight percent of the respondents reported savings to their agencies.

One respondent who used OGC for several jobs stated that OGC's prices are lower than almost any private firm in the Richmond area. The OGC director maintains that his agency's prices ($18/hour for production tasks and $25/hour for creative tasks) are 40 percent below prices charged by private firms in the Richmond area.

In addition, several JLARC survey respondents stated that OGC staff advised them on how particular graphics jobs could be done most economically.

> *One information director stated that the OGC staff's advice on the quality and prices of paper and ink resulted in savings to her agency. She added that private firms would rarely be willing to counsel her on the cheapest way to do a job because these firms are primarily interested in making money and are not as aware of government agency budgetary constraints as the OGC.*

There are additional reasons for State agencies to use OGC services. First, an agency which continually uses the OGC can develop and maintain a continuity of image across all its publications. Second, OGC is located in downtown Richmond and is thus conveniently located

for many State agencies. Third, OGC is staffed with trained graphics artists, which helps ensure that OGC will produce high quality products.

These benefits are reflected by the high degree of satisfaction with OGC services expressed by current users. Ninety percent of the respondents said they were "very satisfied" with OGC services and the remaining ten percent were "satisfied". Customers who were asked individually to rate each service that OGC had performed for them (such as layouts, letterheads and logos, design, and signage), rated no service below "satisfactory"; most services were rated "very satisfactory." All customers replied affirmatively when asked whether OGC was responsive to agency needs. No respondent had ever discontinued a service because of poor quality or any other reason; and none believed that private firms produce higher quality products than the OGC. No one had ever failed to have a complaint addressed adequately by the OGC. Finally, 95 percent of the respondents were either "satisfied" or "very satisfied" with OGC turnaround time.

OGC has proven especially useful for some small agencies which lack enough graphics work to justify a full-time graphics artist position. Of the 35 agencies which have used OGC, 27 lack a staff graphics artist. For example, Mary Washington College has frequently used OGC.

> *OGC's biggest customer is Mary Washington College, which has no graphics staff of its own. OGC has designed numerous brochures and other publications for the college. The college's director of publications stated that OGC does excellent work and "gives us a much lower price than private vendors."*

Because of the savings and other benefits accruing to agencies through use of OGC, agencies should be encouraged to use OGC services. Demand by current customers for services is likely to increase, since 46 percent of the respondents in the user survey stated they anticipate increasing their use of OGC in the next biennium.

Improving Utilization of OGC

Some State agencies are not currently utilizing OGC for their graphics needs. JLARC staff contacted four agencies which had vacant graphics artist positions. Due to the hiring freeze it was expected that these agencies would be interested in utilizing OGC. This was not the case. Two of the agencies were using private vendors because they were not aware of OGC. One agency felt that freelance graphics artists could do the work more cheaply than OGC. The fourth agency readjusted workloads among remaining staff and was able to meet its own graphics needs.

Because of its benefits, agencies should be encouraged to make better use of OGC. The Secretary of Administration and Finance may wish to direct that agencies consider using OGC prior to filling graphics vacancies or utilizing private vendors. In addition, OGC staff should routinely call agencies with vacant graphics artist positions to inform them of services available from OGC.

A procedural change should also be considered within DPS. Currently, when a State agency sends a graphics-only job to DPS for bids, the printing manager refers the job to OGC. Only two such jobs have fallen into this category. If a job involves both printing and graphics work, however, OGC may not learn of the job. More jobs would flow to OGC if all jobs that involve some graphics were referred for a bid by OGC. This procedure would increase agency exposure to OGC and, due to OGC's lower costs, potentially save State agencies money. In addition, the opportunity to bid on such jobs would give OGC a potential source of contracts during periods when it lacks enough activity to break even.

CONCLUSION AND RECOMMENDATIONS

Because OGC provides support services to other State agencies, it is appropriately financed by the graphics working capital fund. The potential savings and other benefits available through OGC warrant its continued operation until its financial viability can be established. At this time the fund and OGC have not been operating long enough to demonstrate viability conclusively. Additional sales volume can be generated for OGC through several actions.

Recommendation (29). The graphics fund and OGC should be given additional time to demonstrate financial viability. If OGC has not shown that it can regularly recover its costs by that time, it should be discontinued.

Recommendation (30). The Secretary of Administration and Finance should direct State agencies to consider using OGC before filling graphics vacancies or using private vendors for graphics services.

Recommendation (31). The OGC director should contact State agencies with vacant graphic artist positions to inform the agencies of services available from OGC.

Recommendation (32). Printing requisitions handled by the Division of Purchases and Supply should be systematically screened for graphics work and referred to OGC for bids.

Appendix A

TECHNICAL APPENDIX SUMMARY

JLARC policy and sound research practice require a technical explanation of research methodology. The full technical appendix for this report is available on request from JLARC, Suite 1100, 910 Capitol Street, Richmond, Virginia 23219.

The technical appendix includes a detailed explanation of the methods and research employed in conducting this study. The following areas are covered:

1. Survey of Customer Agencies. The JLARC staff surveyed customer agencies by telephone to determine their level of satisfaction with the services provided by the working capital fund agencies. Customer agencies were selected by using a stratified sampling technique. Appropriate weights were applied to each interview to project the responses back to the population of customers. Ninety-six interviews were conducted in all.

2. Review of SDD Development Projects. JLARC staff requested SDD to complete a data form for each active development project in FY 1981. In all, JLARC reviewed 35 projects and compared estimated and actual costs for all phases completed in each project. Percent differences between the two costs were then computed. In addition, the differences between estimated and actual costs for each phase of the development process were summed for all projects and a percent difference calculated.

Appendix B

Agency Responses

As part of an extensive data validation process, each State agency involved in JLARC's review and evaluation effort is given the opportunity to comment on an exposure draft of the report.

Appropriate technical corrections resulting from the written comments have been made in the final report. Page references in the agency response relate to the exposure draft and may not correspond to page numbers in the final report.

COMMONWEALTH of VIRGINIA

Department of Computer Services

HIRAM R. JOHNSON
Director

EIGHTH STREET OFFICE BUILDING
RICHMOND, VIRGINIA 23219

(804) 786-7310

May 17, 1982

Mr. Ray D. Pethtel, Director
Joint Legislative Audit and Review
Commission
Suite 1100
General Assembly Building
910 Capitol Street
Richmond, Virginia 23219

Dear Ray:

I have reviewed the JLARC draft report relating to the Department of Computer Services. I was pleased with the content of the report. It confirms my belief that the programs we have instituted to improve State agency customer services and relations are working. The review was most beneficial to this Department.

Please find attached a summary response to each JLARC recommendation. A detailed response was provided to Mr. Glen Tittermary of your staff on May 7, 1982.

The draft report surfaces three (3) issues that I would like to highlight:

(1) The consolidation of the Department of Computer Services' dispersed facilities into a single facility is more than an operational and financial practicality. It is an extension of our philosophy of providing data processing services to our customers in the most cost-effective and efficient manner as well as a means whereby the Department of Computer Services will measurably enhance its ability to manage its human resources and improve the Commonwealth's productivity.

(2) The Department of Computer Services continues to experience high turnover in several of its data processing classifications. This Agency cannot effectively compete for qualified technical personnel in the Richmond metropolitan area due to present salary levels, personnel policies, promotional opportunities, and employee benefits. Attempts to address this problem through the normal State personnel channels have met with very limited success.

(3) The Department of Computer Services fully acknowledges the need for a statewide data processing direction. Without such a plan, the Commonwealth will encounter the issue of the proliferation of non-compatible automated equipment and systems that will eventually curtail the ability of agencies to exchange information. It is entirely possible that divisions within the same agency could experience a similar "information lock out." Additionally, there will be a dramatic increase in State agency expenditures for data processing equipment and personnel. The Department of Computer Services is the logical agency which should be charged by statute to develop the hardware and software plan for the Commonwealth agencies operating within DCS Computer Centers. The data processing direction for the Commonwealth is a responsibility which should be jointly pursued and developed by the Department of Computer Services and the Department of Management Analysis and Systems Development.

The Department of Computer Services is appreciative of the professional and objective manner in which the JLARC staff conducted the review. Please convey my personal thanks for their patience and understanding in dealing with both the technical and management issues of this Department.

Sincerely,

Hiram R. Johnson

/t

Attachment

May 17, 1982

DEPARTMENT OF COMPUTER SERVICES'
Response to the Recommendations of the
JOINT LEGISLATIVE AUDIT AND REVIEW COMMISSION

Recommendation (1). In order to improve the hiring and retention of qualified personnel, DCS should identify specific causes of turnover, and should work with DPT in developing a plan for addressing these causes. A standing list of available candidates should be developed to expedite recruitment for high turnover positions. Also, the consolidation of facilities could help to improve morale by providing an improved working environment and additional career opportunities.

Department of Computer Services' Response

The Department of Computer Services identified and has presented to the Department of Personnel and Training significant causes for the inability to attract and retain qualified employees:

(a) Lack of shift differential,

(b) Non-competitive salaries and benefits, and

(c) Serious salary compression in the upper one-third of data processing salaries. The Department maintains a three-month active file on available applicants, many of whom cannot be hired due to salary and benefits requirements. Likewise, exiting employees are leaving for better salary and benefits.

Recommendation (2). DCS should develop additional methods of measuring productivity which would account for the quality of service provided. Among those that should be considered are: (1) customer satisfaction, (2) frequency of systems failures, (3) frequency of operator errors, (4) response time for on-line systems, (5) response time for batch processing, and (6) service backlogs. In addition, DCS should explore the use of labor/equipment ratios as a measure of operational productivity.

Department of Computer Services' Response

The Department of Computer Services has several measures of productivity now in use. As a useful measure of the output for the Agency as a whole, the Department of Computer Services uses the service unit. Additionally, the Department of Computer Services has developed and implemented these measures of productivity:

(1) Qualitative customer satisfaction surveys which are conducted periodically with the results summarized and presented to the Department of Computer Services' customers.

(2) The Department of Computer Services' Objective 135-001 formally defines critical operational performance standards. Compliance to standards is regularly monitored and reported with variations noted.

DCS has implemented a formal Management By Objectives (MBO) program and has established operational performance objectives for all levels of Department management in support of the Agency's overall goals.

(3) Daily center management meetings cover problems experienced during the prior 24 hours, their causes, and corrective actions to prevent recurrences.

(4) The Department of Computer Services' Administrative Services Division issues a semi-annual summary report of customer credits issued identifying reasons for the credit and frequency of occurrence.

Copies of documentation pertinent to the Department of Computer Services' measures of productivity have been forwarded to JLARC.

Recommendation (3). The Secretary of Administration and Finance should take the necessary action to facilitate prompt federal approval of the DCS cost allocation plan. The plan should be implemented as soon after approval as possible.

Department of Computer Services' Response

Any action of the Secretary of Administration and Finance to expedite Federal approval of the Department of Computer Services' Cost Allocation Plan would be of little consequence for the 1982-84 biennium. Implementation of the new Plan would not be feasible since agency budgets were not developed or approved based on this Plan. Implementation would create major financial problems across agencies, secretarial areas, and with Federal grant allocations to agencies. The earliest practical implementation is the 1984-86 biennium.

The Department of Computer Services is pursuing the new Cost Allocation Plan for implementation in 1984-86.

The Department of Computer Services suggests that the appropriate State authorities seek Federal approval for block grants and the freedom to manage ADP without Federal interference in areas such as ADP procurement and charge back systems.

Recommendation (4). In order to ensure that agencies fully reimburse DCS for its costs, plans for implementing a tape storage charge should be accelerated. The charge should be made as soon as possible after federal approval.

Department of Computer Services' Response

The Department of Computer Services is aware that it is not directly recovering tape storage costs. The Department plans to implement a tape storage charge upon approval by the Federal government of the new Cost Allocation Plan. However, customer agencies do fully reimburse the Department of Computer Services for all of its operational costs.

Recommendation (5). DCS may wish to reconsider the way in which it reports billing information to customer agencies. An improved format and the use of management-oriented information such as the cost per transaction or specific item produced, could prove useful to customers.

Department of Computer Services' Response

The Department of Computer Services is developing a method for reporting costs per transaction (e.g., cost per license or cost per check written) in order to provide management-oriented financial information. The success of this type of reporting will be largely dependent on the customer agencies' implementation and monitoring of an appropriate account code structure into functional cost pools.

Recommendation (6). Under the direction of the Secretary of Administration and Finance, DCS and MASD should prepare an ADP program plan for State government. The new plan should go beyond the scope of previous systems development and six year plans prepared by MASD and DCS, and should include a policy for on-line systems, an analysis of systems needs, an analysis of resources required, and a protocol for management of automated information.

Department of Computer Services' Response

The Department of Computer Services concurs with this recommendation.

Recommendation (7). While consolidation of DCS operations appears appropriate, DCS and DEB should carefully review all options for acquiring a computer facility, including construction and leasing. The results of such review should be provided to the administration and the General Assembly prior to a capital funding decision. In addition, the comprehensive ADP program plan should be available at the same time.

Department of Computer Services' Response

The Department of Computer Services has explored the options described in this Report. They have been presented to, and discussed with, the members of the Capital Outlay Subcommittee, Administration and Finance, and VSRS Board members. The Department of Computer Services was advised to pursue the alternative selected.

WORKING CAPITAL FUNDS IN VIRGINIA
INTRODUCTION

Recommendation (1). The Commission should review fund balances for June 30, 1982 and transfer any excess amounts to the general fund. A recommendation on the amount that can be so transferred for each fund will be forthcoming at the close of this fiscal year.

Department of Computer Services' Response

Automatic transfer of excess amounts in the Working Capital Funds will severely restrict the Department of Computer Services in such areas as facilities growth and the reserve for major equipment purchases. The Department of Computer Services suggests that each WCF agency have the right to present its case prior to any JLARC recommendation to transfer funds. Additionally, there is a potential legal question whether Federal and other special funds allocated for data processing project and service costs may be reverted to the General Fund without Federal audit review.

COMMONWEALTH of VIRGINIA

R. W. MILLER
DIRECTOR

Department of Management Analysis
and Systems Development

JAMES MONROE BUILDING
101 NORTH 14th STREET
RICHMOND, VIRGINIA 23219
(804) 225-2108

June 10, 1982

MEMORANDUM

TO: Mr. Ray Pethtel, Director
Joint Legislative Audit and Review Commission

FROM: R. W. Miller

SUBJECT: JLARC Report on Working Capital Funds

I have attached my comments on the exposure draft of the chapter on MASD's Systems Development Division. As I have indicated, we are generally supportive of the conclusions and recommendations in the report. We are also appreciative of the openness and cooperation of the members of your staff who worked on the study. The team has been very willing to discuss and resolve any factual issues. As an organization that performs similar reviews, we can truly appreciate the level of professionalism your staff exhibited.

If there are any other questions, please contact me.

/bdw

cc: Mr. Wayne F. Anderson
Secretary of Administration and Finance

COMMENTS ON JLARC'S EXPOSURE DRAFT ON
THE SYSTEMS DEVELOPMENT DIVISION
BY
THE DEPARTMENT OF MANAGEMENT ANALYSIS AND SYSTEMS DEVELOPMENT
June 9, 1982

The exposure draft of JLARC's study of the Systems Development Division of MASD in general reflects the SDD environment accurately. MASD is generally supportive of the conclusions and the recommendations contained in the report. We also appreciate the commitment of the JLARC staff to be open, objective and accurate in the factual material contained in the report.

One section of the report that is obviously of concern to us is the section on "Project Planning and Cost Estimation." We totally agree that estimation of cost and time is an important part of our responsibilities. We also concur that SDD needs to continually refine its techniques for estimating. The data used by JLARC to illustrate this unarguable point, however, paints an uncharacteristically negative picture of our performance in this area.

The development of an information system is a disciplined, phased process. In SDD, seven distinct phases are used:

1. Project Initiation - the definition of project scope and objectives, and a plan for the next two phases is produced.

2. Requirements Definition - the actual information and system requirements are rigorously defined.

3. Systems Analysis and General Design - alternatives for meeting the requirements are designed and evaluated on a cost-benefit basis.

4. Detailed Design - the selected alternative is designed at a very detailed level.

5. Development - actual computer programs, manual procedures and associated system components are created and tested.

6. Implementation - training in new system, conversion of existing data and start-up of new system occurs.

7. Post-implementation Review - a review of the performance of a system versus the original requirements and objectives is conducted.

In this light, the development of an information system is roughly analagous to the design and construction of a building.

It is important to note that the JLARC analysis was primarily based on original estimates at the Project Initiation phase. They are based on the best judgment of a senior SDD manager based on a brief discussion of the problem or situation with the customer agency. The JLARC report graphically and validly establishes that these estimates are not generally accurate. They further conclude that there must be some problems that cause this lack of precision. SDD's position is, and has been, that inaccuracies in these early estimates are not in themselves indicators of poor estimations. The quality of any estimate is directly related to the amount of knowledge about the task being estimated. It is the nature of the systems development process that limited specific data is available about the system at Project Initiation.

JLARC Note: While it is recognized that an iterative development process results in changes in project scope and revisions of earlier estimates of cost, SDD does have two major decision points in its process at which agencies are given estimates. Estimates used in the JLARC analysis were from both of these major decision points, not just the first. Estimates for phases I, II and III were from the project initiation phase. Estimates for phases IV, V, VI and VII were from the general systems design. The important point is that the estimate made at the general systems design stage was less accurate for phases IV and V than the first estimate was for phases I, II and III. Estimates should become more, not less, accurate in later phases.

The point of developing systems in phases is to establish management checkpoints where customers review and approve products, and authorize work to continue on the next phase.

The authorization to continue with the next succeeding phase should be based on a highly reliable estimate of the cost of that next phase. It is the reliability of these incremental estimates that should be the criterion by which SDD is judged. Based on this managemental decision approach SDD concurs with the recommendations of JLARC that refinement in estimations is an on-going process.

The second point to be made concerning the cost estimation section is that concentration on original estimates ignores the fact that some changes in the course of a project are appropriate, even necessary. In fact, business environments do change, laws are passed and new requirements are handed down from the Federal government. In these cases, and many

others, the nature and scope of the project must change to adapt to external influences. We clearly would not continue to develop a system that does not meet newly mandated reporting requirements. Yet, the original project budget will undoubtedly be affected. Two of the examples used in the report are cases in point. Legitimate changes in the systems being designed impacted the project budgets and schedules in both the Department of Telecommunications and the Labor and Industry examples. In fact, in these agencies, project impacts due to changes handed down by the C & P Telephone Company and the Federal government respectively are the rule rather than the exception. The report fails to distinguish the cases where project budgets are legitimately impacted, from those cases where faulty estimates were given.

As indicated, we do acknowledge the imperfectons in our estimating process. Where we have misestimated a project or phase, we have been candid with the customer and with JLARC. We have absorbed overruns in projects, particularly in the past year, where failure to meet a project budget commitment was the fault of SDD. Where overruns have occurred due to some circumstance beyond SDD's control, the schedule and budget impacts have been routinely documented and shared with the user. Finally, we have constructed a feedback mechanism to help refine our estimations, through a "lessons learned" process at the end of each project.

When legitimate changes to project budgets are approved by the user, SDD's success rate has averaged about 80% during the current fiscal year. That is, we have completed 80% of all project phases and projects within our budget estimate. The discrepancy between these figures and the JLARC figures highlights the consequences of ignoring legitimate changes to project budgets.

A second major area of concern in the report is the section on "Overall Level of User Satisfaction." We would, of course, prefer to have all our customers indicate a "very satisfied" response. Over the past four years, we have routinely met each month with key managers of our customers. The feedback we have received is not consistent with the results found by JLARC. We agree it is appropriate, then, to explore the possibility of using some additional feedback mechanism to capture customer attitudes and concerns.

One point needs to be noted on the customer satisfaction results. We require that an adequate justification be established for any system we develop. We will not develop a computer system just because a customer wants it and has

the money to pay for it. We insist on an adequate cost-benefit assessment of various alternatives to meet user requirements. To that extent, we sometimes find ourselves telling a customer what he ought to hear, rather than what he wants to hear. The customer satisfaction results may well reflect this fact, as may the figures on the number of customers who have discontinued services with us.

The remainder of the report is fair and very helpful. We will continue to refine our method of estimating revenues to try to narrow the gap between agency systems development budgets and actual project efforts. We will continue our efforts in refining our estimation process, and to explore the extent to which "fixed-price" types of agreements can be administered in a working capital fund environment.

We will continue our monthly meetings with our customers and we will explore the use of a users group to give us regular candid feedback on our services. We will continue to monitor our time accounting and billing processes. Finally, SDD will continue to contribute to the effort by MASD, already well underway, of developing a strategic plan for data processing in the 80's.

COMMONWEALTH of VIRGINIA

DEPARTMENT OF TELECOMMUNICATIONS

Suite 1100, Ninth Street Office Building
Richmond, 23219
(804) 786-3152

May 13, 1982

Mr. Ray D. Pethtel, Director
Joint Legislative Audit and Review Commission
910 Capitol Street, Suite 1100
Richmond, Virginia 23219

Dear Mr. Pethtel:

I want to thank you for furnishing the exposure draft of the recent audit performed by the JLARC staff on the Telecommunications working capitol fund. The draft has been reviewed by the Departmental staff, and in our opinion, does not require extensive written comment. Mr. DesAutels, of our staff, will discuss a few minor points with Mr. Tittermary of your staff.

I would like to take this opportunity to thank the members of the study team for their assistance and the professionalism they exhibited throughout the study period.

Enclosed you will find some additional documentation that you may wish to add to the report. In the case of the RFI, we had it completed prior to the study effort, however, it had not been reviewed by the new incoming administration and we felt that the premature release could have hindered our efforts.

With best personal regards, I remain

Sincerely,

George L. Hall
Director

GLH:skt

Enclosures

COMMONWEALTH of VIRGINIA

Department of General Services

OFFICE OF DIRECTOR

209 NINTH STREET OFFICE BUILDING
RICHMOND 23219
(804) 786-3311

May 6, 1982

Mr. Ray D. Pethtel, Director
Joint Legislative Audit and Review Commission
Suite 1100, 910 Capitol Street
Richmond, Virginia

Dear Ray:

Attached is the formal response to your exposure draft on Working Capital Funds which is signed by Don Moore and me.

Not significant enough to be put in our formal response, but consistent with my telephone conversation with you the other day, I would appreciate your making the following editorial changes:

Page 1, next to last paragraph, second line, after the word "Supply" insert "of the Department of General Services."

Page 1, last paragraph, second line, after the word "Supply" insert "of the Department of General Services."

Lastly, I certainly subscribe to retaining only such funds as required to operate either function, but the language on page 3 of the section of the exposure draft concerning the Central Warehouse seems to indicate more of the $145,000 can be returned to the General Fund than, in fact, could be returned if approximately $105,000 is utilized for reimbursement to MASD. This ties in with Don Moore's response to your Recommendation 1 under the Central Warehouse.

Hopefully this properly addresses your request.

Sincerely,

H. Douglas Hamner, Jr.
Director

di

Attachment

cc: Mr. Donald F. Moore
Mrs. Patty W. Fowler

COMMONWEALTH of VIRGINIA
Department of General Services
Division of Purchases and Supply
217 Governor Street

OFFICE OF
DIVISION DIRECTOR

POST OFFICE BOX 1199
RICHMOND, VIRGINIA 23209
(804) 786-3845

May 6, 1982

Mr. Ray D. Pethtel, Director
Joint Legislative Audit and Review Commission
Suite 1100, 910 Capitol Street
Richmond, Virginia 23219

Dear Mr. Pethtel:

Mr. Hamner and I have reviewed the exposure drafts on the Central Warehouse and Graphics Working Capital Fund. The constructive reviews by your staff are very much appreciated. Responses to the recommendations included in each fund follow.

OFFICE OF GRAPHICS COMMUNICATION

Recommendation 1. We agree with the JLARC proposal. Sales, expense, and projections are reviewed monthly to insure that the specific objective of expanding the services of the Office of Graphic Communications to State agencies is being realized.

Recommendation 2. Support by the Secretary of Administration and Finance will considerably aid OGC objectives.

Recommendation 3. The manager of OGC will immediately implement this recommendation.

Recommendation 4. When a requisition indicates a need for graphic design, the Division of Purchases and Supply will forward the requisition to OGC for review. When applicable and economically feasible, OGC will furnish graphic assistance.

CENTRAL WAREHOUSE

Recommendation 1. JLARC is requested to consider pending capital outlay requirements before determining amount of retained earnings to be returned to the General Fund. The cash flow projections submitted 9/80 are being updated. This will be sent for the Commission's consideration within the next few days.

Recommendation 2. Inventory adjustment guidelines in accordance with your proposal have been established. At the option of the Warehouse manager, investigation will be initiated for errors under the $150.00 threshold.

Recommendation 3. Dual systems will be maintained until such time the accuracy levels of each system are in balance.

Recommendation 4. No comment.

Recommendation 5. Review of staffing needs is an ongoing process. Manpower planning and utilization are subject to evaluation as new methods, systems and automation are implemented. The impact of these factors on vacancies are considered before replacement is recommended and/or approved. The elimination of requested staff additions from the 82-84 budget is a result of planning.

Recommendation 6. A high level of service is a key objective of the Central Warehouse. Efforts are continuing toward improving service. The concerns of the smaller customers will be more closely considered. The level of satisfaction contained in the JLARC review recognizes the improvement achieved over the past two years.

Recommendation 7. The Warehouse catalogue includes a paragraph which requests the customers to advise on the order if a back order is desired. Generally, customers prefer to reorder rather than backorder. The Central Warehouse has a procedure to advise customers when items are not available, thus permitting them a choice of backorder or substitution.

Recommendation 8. The automated system, which becomes operational approximately July 15, will permit frequent update of price information in a loose-leaf form.

Recommendation 9. The Specifications Section of DPS is currently reviewing all non-food specifications. It is part of their plan to solicit input directly from the end user. In addition, DPS will re-emphasize the importance of using current complaint procedure concerning quality, delivery, et al. for Warehouse customers.

Very truly yours,

Donald F. Moore
Director

Concur - H. Douglas Hamner, Jr.
Director, Department of General Services

DFM:c

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