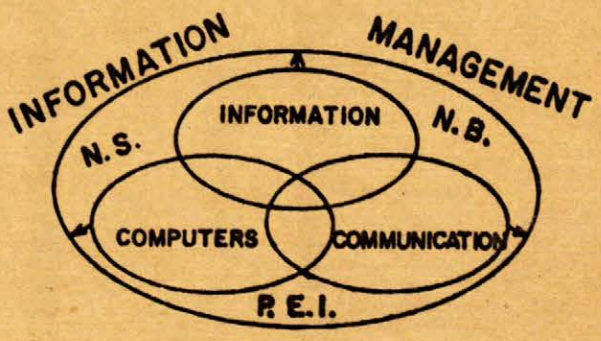
Communications
Canada

HARMONIZATION OF COMPUTING RESOURCES WITHIN THE THREE MARITIME PROVINCES

- FINAL REPORT -



PLANNING BRANCH
LONG RANGE PLANNING SERVICES

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I. EXECUTIVE SUMMARY

The Council of Maritime Premiers, consisting of the Premiers of New Brunswick, Nova Scotia and Prince Edward Island, was formed to co-ordinate the policies of the three provincial governments, to assess the possibilities for economic and other forms of regional co-ordination and co-operation and to secure agreement between the three governments for common action.

An area of concern common to the three provincial governments is the effective utilization of electronic data processing and communication facilities to achieve economies in the mounting volumes of governmental administrative processes. The Council indicated its desire to harmonize the activities of the three Maritime provinces in the whole field of computer use and formally requested the Federal Department of Communications for assistance in analyzing the existing situation and recommending a future course of action.

The Department assigned officers of its Long Range Planning Services Branch to meet this request. Working with the Secretariat and various Committees of the Council, the scope of the task was assessed and a plan of action developed.

The primary task identified was to determine the total of information processing resources within the three Maritime provinces and to assess the present and potential demand for their use. While the Council's Regional Data Bank Committee agreed in principle with the primary task, they considered that it should first be supplemented by a pilot study of the feasibility of regional operations among the three Maritime provinces.

In order to comply, DOC employed the consulting services of DCF Systems Limited who conducted a pilot study in the application area of motor vehicle registration and driver licensing. For the primary task, DOC had contracted with the consulting firm of Urwick, Currie and Partners to conduct a study of Information Management in the Maritime provinces.

Both the interim and final reports of DCF Systems Limited appear in Appendix A, while the report from Urwick, Currie and Partners appears as Appendix B to this report.

The reports from DCF Systems Limited concluded that:

1. A uniform system is technically feasible and would produce significant benefits including improved service to the public, increased flexibility in meeting new requirements and the ability to support the growth of registration at low cost.

2. Development costs would be totally offset by operating savings over an eight year system life cycle.

3. Marginal cost savings of one million dollars over eight years would result from developing the system jointly rather than individually in each province.

4. The more serious problems to achieving success in joint computer-based systems development are administrative and managerial rather than technical. Consequently, a three-year development plan was proposed to allow the motor

vehicle registries time to adapt to the administrative changes that such a system will bring.

The Urwick, Currie report provides, in general, a basis for future activities of the three provincial governments in the area of information management. It indicates potential for individual and joint action, recommends an organizational framework to plan and co-ordinate the activities, and proposes an implementation program.

The major conclusions of the Urwick, Currie report were:

1. The combined Maritime governments are spending in the order of $3,000,000 per year in direct costs for data processing and additional sums of equal magnitude in computer-related activities.

2. These costs will increase by at least 15% to 20% per year.

3. Each government has recently converted to a new computer and no cost savings are available by converting to a shared facility at this time. Cost savings will become available in a few years however, by sharing the operating and maintenance costs of common facilities.

4. Significant cost savings are available immediately through joint system development efforts.

5. Joint efforts in system development and shared operating facilities can reduce the present growth of the computer-related budget as much as 50%.

6. Users may benefit from joint efforts through shortened development time, improved service levels and higher quality of information and information processing.

It is important to note that both Consultants recognized and drew attention to the necessity for top level commitment to joint activities in order to provide motivation for co-operation. Such co-operation, it is concluded, is essential if the desired benefits are to be attained.

II. INTRODUCTION

On March 26, 1968 the Premiers of Nova Scotia, Prince Edward Island, and New Brunswick sponsored a special study on Maritime union including the possibilities for economic and other forms of regional co-ordination and co-operation.

The purpose of the Maritime Union Study was to determine what improvements in public policies and public services could be achieved through closer co-operation among the three Maritime Provinces and to provide information to the governments and the people of these provinces which would assist them in considering what other forms of co-operation would be to their mutual advantage.

In considering the data processing trends relevant to Maritime Union, the study established:

a) Developments in electronic data processing and communication facilities have opened up new possibilities for achieving economies in the mounting volumes of governmental administrative processes.

b) The state of computer application technology has advanced to the level where an effective centralized or concentrated body of talent and facilities could serve all areas of the Maritimes from one or several locations, and at the same time provide equal service to all users.

The study stressed that the potential economies from the rapidly developing new technology cannot be realized without the increase in scale possible only by combining the efforts of the relatively small individual units of government.

Following these studies, on May 25, 1971, the Council of Maritime Premiers was formed, consisting of the three Premiers of the Maritime provinces. The Council, through a small Secretariat, considers recommendations, approves joint submissions, negotiates with federal authorities on behalf of the region, co-ordinates policies of the three provincial governments, and secures agreements between the three governments for common action.

With respect to this study, the Council, in discussions with the Federal Minister of Communications, indicated its desire to harmonize the activities of the three Maritime provinces in the whole field of computer communications. Subsequently, on February 15, 1972, the Council, through Premier Alex Campbell formally requested the assistance of the Federal Government in the co-ordination of these activities.

PRIORITY TASKS
REQUESTED BY
THE COUNCIL OF MARITIME PREMIERS

In general, to analyze the present situation and make recommendations as to a future course of action. In particular:

1. A review of the various areas of activity now underway or contemplated on a regional basis with a view to identifying those activities which are likely to require regional efforts in the use of data, with recommendations as to how best to proceed.

2. A study of existing capability in the region in the field of program application and systems design, with recommendations as to the feasibility and/or desirability of regionalizing these capabilities.

3. Identification and analysis of available computer facilities and equipment in the region with recommendations as to how these facilities might most advantageously be tied into a regional information system.

4. An analysis of present computer programming systems used in the three Maritime Provinces with recommendations as to how these might be made compatible.

III. APPROACH

Following a number of meetings with members of the Secretariat to the Council of Maritime Premiers and its various Committees, the Department of Communications prepared a study paper entitled "Computer/Communications in the Maritimes". This provided an overview of the scope of the task and the major elements involved in the development of a common approach in the field of computer/communications.

The paper discussed the substantive dimensions of computers, communications and information technologies and the procedural dimensions of the planning process. It suggested that an understanding of these dimensions provides an information management perspective and a sound basis for a plan of action.

It was proposed to restrict the scope of the study to provincial government information management activities; to conduct a cost and feasibility survey in the area of motor vehicle registration and driver licensing to assess the problems and benefits of joint efforts; to construct a common information base on the current availability and use of computing resources, systems and services; and to prepare recommendations for a future course of action. The Council of Maritime Premiers gave approval in principle to this approach and the Department subsequently agreed to the action plan that was submitted.

The action plan required that a major part of the direct activities be performed by Consultants; that the provincial governments' senior administrators

and staff provide assistance and co-operation; that project leaders be appointed by the Department to ensure that effective maximum progress was being made; and that the activities specified in the action plan be completed by March 31, 1973. The full participation of the staff and committees of the Secretariat to the Council was achieved in the preparation of terms of reference, the selection of Consultants, and the review of findings, conclusions and recommendations. Consequently, these represent an accurate reflection of the separate provincial government and regional interests.

IV. ORGANIZATION AND MANAGEMENT

Organization

The organizational relationships between the Department and the Secretariat to the Council of Maritime Premiers and Committees of the Council are illustrated on Chart 1. The approach taken by the Department in conducting the Study is best understood within this environmental context.

COUNCIL OF MARITIME PREMIERS

ORGANIZATION ROLES

Secretariat to the Council provides the mechanisms for co-ordinating joint action by the three Maritime provincial governments and the Department.

Regional Data Bank Committee advises the Council on matters relating to the development of regional approaches to data of common interest.

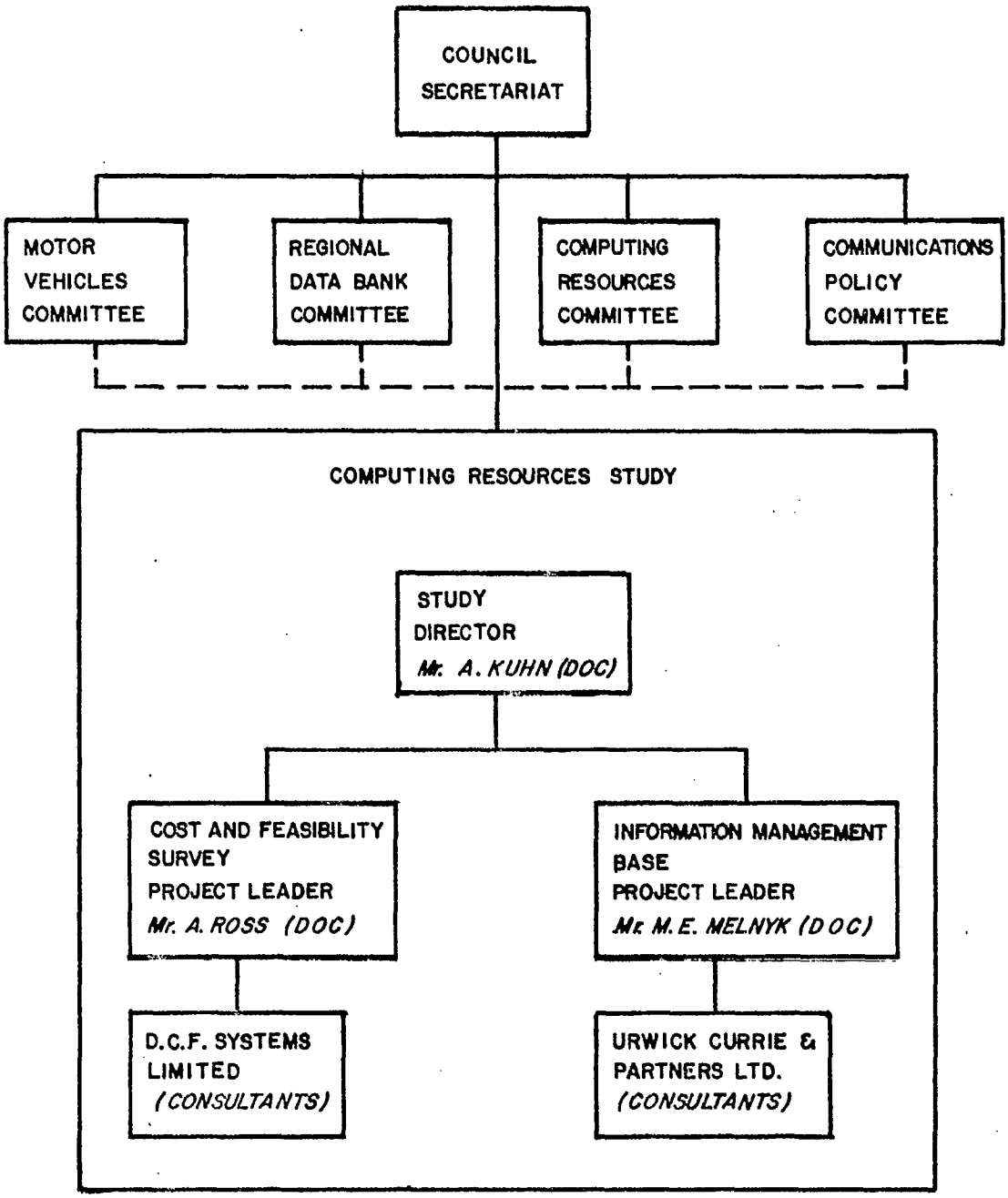
Motor Vehicle Registration and Licensing Committee advises the Council on matters relating to the development of common approaches to motor vehicle registration and driver licenses.

Maritime Consultative Committee on Communications (a joint Maritime provinces-Department of Communications Committee) develops common policy advice respecting telecommunications in the three Maritime provinces.

Maritime Computing Resources Committee advises the Council on significant technical aspects of data processing and co-ordinates the development of a regional approach.

COMPUTING RESOURCES STUDY

ORGANIZATION CHART



LEGEND

——— REPORTING LINES

– – – – – COMMUNICATION LINES

CHART I

Milestone Events

Starting with the formal request for assistance by Premier Alex Campbell, the following milestone events occured:

1.	Original Request for Assistance	- 14 Feb. 72
2.	Computer/Communications Concept Paper	- 15 May 72
3.	Approval in Principle: Council Acceptance of Action Plan: Department	- mid June 72 to mid July 72
4.	Cost and Feasibility Survey Started	- Oct. 72
5.	Cost and Feasibility Survey Interim Report	- Nov. 72
6.	Information Management Base Started	- Dec. 72
7.	Cost and Feasibility Survey Final Report	- Feb. 73
8.	Information Management Base Summary Report	- 22 March 73
9.	Information Management Base Final Report	- 31 March 73
10.	Harmonization Study Final Report	- mid April 73

Incurred Expenditures

1.	Cost and Feasibility Survey (DCF Systems Limited)	$24,300
2.	Information Management Base (Urwick, Currie & Partners Ltd.)	$43,890
3.	Other costs reflecting staff, travelling, living and staff support	$60,000 (approx.)

Task Organization

The tasks co-ordinated by the Department and their contribution to the overall harmonization objective is illustrated in flowchart form on Chart 2.

TASK ACTION PLAN

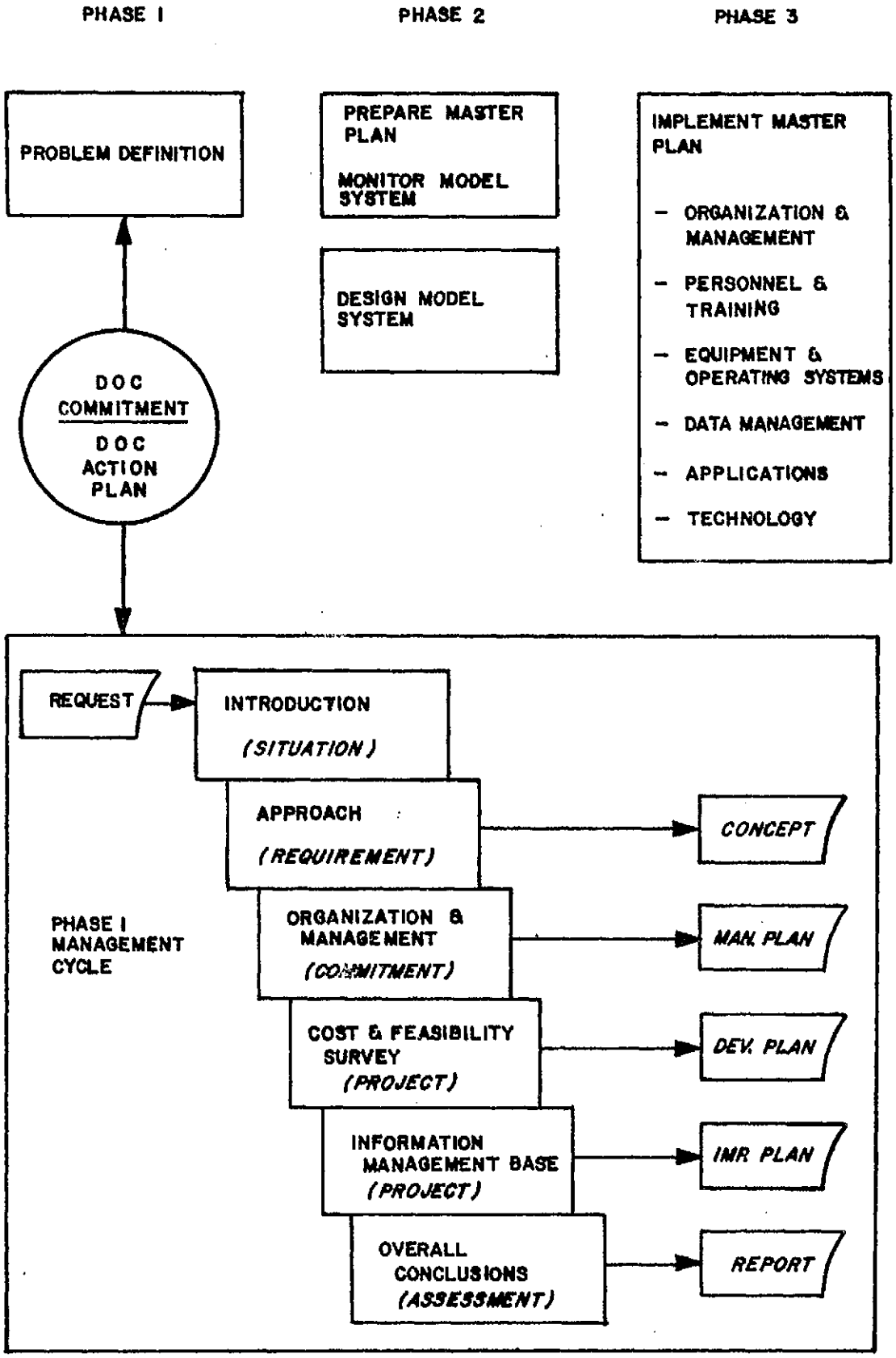


CHART 2

V. COST AND FEASIBILITY SURVEY

Introduction

DCF Systems Limited was selected on September 19, 1972 to conduct a cost and feasibility survey of the motor vehicle registration and driver licensing application area to demonstrate the economic and practical feasibility of a common approach to computer/communication systems within the three Maritime provinces. Further, it was hoped that the results would:

a) test the utility and practicality of such a regional approach;

b) uncover the major constraints to any joint computer-based developments; and

c) identify possible actions that could be taken to overcome the more general problems.

The motor vehicle registration and driver licensing area was selected because of its relatively high visibility to the public and the three provincial administrations; successful application of computer technology to this area in other jurisdictions and; a history of co-operation between the three Motor Vehicle administrations. The Consultant's report appears as Appendix A.

MOTOR VEHICLE REGISTRATION AND DRIVER LICENSING

STUDY TERMS OF REFERENCE

To conduct a cost and feasibility survey of the motor vehicle registration and driver licensing computer/communications systems for the three Maritime provinces:

- to determine the economic and practical feasibility of a common approach in this specific area;
- to demonstrate the feasibility and advantage of a common approach in general;
- to demonstrate an approach by which computer-based resources may be studied and used to better advantage.

Furthermore, the report was to provide for:

- flexibility to accommodate later changes and growth within the application area;
- documentation of the approach used suitalbe for use in other application areas;
- sharing of systems developments with other application areas.

Results

The Consultant's interim report showed that a uniform system was technically feasible and that significant benefits to the motor vehicle registries would result. These included improvements in service to the public, increased flexibility in meeting new requirements and the ability to support the growth of registrations at low cost. TABLE 1 compares the marginal cash flow of a joint approach over separate approaches.

TABLE 1

COMPARATIVE SUMMARY OF MARGINAL CASH FLOWS
JOINT AND SEPARATE COST/(SAVINGS)-$000

		N.S.	N.B.	P.E.I.	REGION
A.	Joint Approach				
	Investment	163.2	182.4	57.6	403.2
	O.&M.	(326.6)	(124.6)	7.0	(444.0)
	Total Marginal cost/(savings)	(163.4)	57.8	64.8	(40.8)
B.	Separate Approach				
	Investment	230.4	259.2	240.0	729.6
	O.&M.	(184.4)	320.6	138.5	274.7
	Total Marginal cost/(savings)	46.0	579.8	378.5	1004.3
C.	Marginal Cost/(savings) of A over B				
	Investment	(67.2)	(76.8)	(182.4)	(326.4)
	O.&M.	(142.2)	(445.2)	(131.3)	(718.7)
	Total Marginal cost/(savings)	(209.4)	(522.0)	(313.7)	(1045.1)

NOTES: 1. 8 year life-cycle assumed in calculating marginal operating and maintenance (O.&M.) cost/(savings).
2. Cost/(savings) data from DCF Systems Limited reports.
3. Common Investment and O.&M. costs under joint approach allocated 45%:45%:10% among the three provinces.

TABLE 1 shows clearly that investment savings of over $300,000 and operating and maintenance cost savings of over $700,000 are possible by using a joint approach. A joint approach allows full recovery of the investment over the projected life cycle. The economic benefits and cost savings in the joint development of a computer-based system in the motor vehicle registration and driver licensing area has been clearly demonstrated.

The cost and feasibility survey has produced important information on the utility and practicality of a regional approach and the type of constraints that apply to any joint computer-based development. It is now clear that the more serious problems to achieving success in joint computer-based systems developments and operations are administrative and managerial rather than technical.

A relatively long three-year development period has been recommended to allow the motor vehicle registries time to both reach a common level of operations between provinces and to adapt individually to the administrative changes that the uniform system will bring about. The need for individual senior management commitment to joint efforts and a regional approach is stressed and finally, training of management and staff in the use of management and technical information is recommended as a means of correcting some current problems.

Development Plan

The Consultant's final report on March 1, 1973 provided the plans for the development of the uniform system. The current problems facing each administration are described and the plans and management responsibilities to meet these problems and requirements are included. The three phased approach provides for management improvements in each administration and the development of the basis for the uniform system in New Brunswick in the first year, the development of a computer-based demerit point system in the second year, and the development of an on-line inquiry system in the third year. The computer system used in Ontario was taken as the basic model for the on-line inquiry system.

MOTOR VEHICLE REGISTRATION AND DRIVER LICENSING
THE UNIFORM SYSTEM

A uniform motor vehicle system has been defined here as a single set of computer programs that provide:

- driver licenses and license renewals
- motor vehicle registrations and registration renewals
- statistical analyses of accidents, convictions, vehicle inspections and driver examinations
- fee accounting and filing of vehicle registration and driver licenses
- demerit point assignments, warning letters, suspension notices, reinstatement notices, and suspension lists
- on-line retrieval of driver records via computer terminals

The phased approach to the development of the uniform system has administrative as well as technical and economic advantages. Scheduling in three separate phases provides ample opportunity for management review of progress and leaves open various options to proceed at a pace acceptable to each province. The motor vehicle registries require time to plan for change, to resolve administrative problems, and to improve administrative skills. The final phase, the development of the on-line inquiry system, represents the major investment cost and is economically justified only if shared with other systems requiring a similar capability. The uniform system can be run on a central, common facility or on separate facilities. Finally, the development plan provides a model for cooperative efforts within and between provinces in resource sharing and systems development at a minimum cost to each province.

MOTOR VEHICLE REGISTRATION AND DRIVER LICENSING
UNIFORM SYSTEM
THE PHASED APPROACH

The development of the uniform system requires an extensive effort and produces a substantial impact. Therefore the system should be developed and installed gradually.

Phase 1: March 1, 1973 - November 1, 1973

Improve the operating conditions of each motor vehicle system to provide a sound foundation for further development work. This phase will result in equivalent, improved services that operate soundly.

Phase 2: January 1974 - October 1974

Develop a computer based demerit point system and information retrieval system to serve the needs of each registry (one set of computer programs that can operate on all three machines).

Phase 3: January 1975 - November 1975

Develop an on-line inquiry system.

VI. INFORMATION MANAGEMENT BASE

If we could first know where we are, and whether we are tending, we could better judge what to do, and how to do it.

- Abraham Lincoln

Introduction

Urwick, Currie & Partners was selected on October 4, 1972 as the Consultant to conduct the information management base study. The project was intended to provide a documented information base on the current and projected level of information and information processing resources, systems and services. Such a base-line of common information is essential for effective planning. The analysis of the information base combined with a study of the alternatives available made it possible for the Consultant to recommend a future course of action in the area of information management for the three Maritime provincial governments, individually, and as a whole. The Consultant's report appears as Appendix B.

INFORMATION MANAGEMENT IN THE MARITIME PROVINCES

STUDY TERMS OF REFERENCE

To examine the present situation respecting information management within the three Maritime provinces; to determine the trends in the development of information systems and services; to assess the current and expected future requirements for information on the part of the users; and to develop recommendations on appropriate actions to be taken.

Information Management includes:

- organization and management
- personnel and training
- equipment and operating systems
- data management
- applications
- technology

Results

A concise summary of provincial government computing resources, systems and services and current priority areas is provided in tabular form in the following tables.

INFORMATION MANAGEMENT BASE SUMMARY

I. ORGANIZATION AND MANAGEMENT

Nova Scotia	New Brunswick	Prince Edward Island
Organized as a Management Consulting Service (MCS) in the Department of the Provincial Secretary to provide data processing and management consulting services	Organized as a Data Processing Branch (DPB) in the Department of Supply and Services to provide data processing services	Organized as a Data Processing Division (DPD) in the Department of Finance to provide a centralized service bureau.
MCS consists of an EDP Directorate for data centre operations and systems programming and an O.&M. Directorate	DPB consists of Computer Operations, Data Preparation, Systems Development and Applications Divisions	DPD consists of Operations, Analysts and Programming Groups
Three year budgets and five year plans prepared annually	Single year budgets and four year plans prepared annually	Single year budgets prepared annually
Growth rate is 10% per year 72/73 budget is $1,250,000 (approx.)	Growth rate is 20% per year 72/73 budget is $1,100,000 (approx.)	Growth rate is 30% per year 72/73 budget is $250,000 (approx.)
Objectives and priorities established by the Coordinator, MCS and formal systems and procedures apply to all activities	Objectives and priorities established by a DP Advisory Committee and informal systems and procedures apply generally	Objectives and priorities established by the Director, DPD and informal procedures apply

II. PERSONNEL AND TRAINING

No formal training and career development programs exist in any of the three provincial governments. Training is provided by the equipment suppliers, in-house and on-the-job. Staff growth is provided as follows:

N.S.	N.B.	P.E.I.
n.a.	35(1966)	4(1966)
93(1972)	90(1972)	25(1972)

III. EQUIPMENT AND OPERATING SYSTEMS

N.S.		N.B.		P.E.I.	
Unit Record(1954-1965)		Unit Record(-1961)		Unit Record(1960-1966)	
IBM 360/30	1966	IBM 1401	1961	IBM 1130	1967
IBM 360/40	1968	GE 145,425	1966	UNIVAC 9400	1972
IBM 370/145 VSI	1972	UNIVAC 1106 EXEC 8	1972		

IV. DATA MANAGEMENT

Data management as an integrating concept is not formally recognized in any of the three provincial governments. Each department and agency is responsible for its own data administration.

V. APPLICATIONS

Major Existing (in order of activity)

N.S.	N.B.	P.E.I.
Medicare	Medicare	Property Tax
Motor Vehicles	Student Scheduling	Payroll
Power Commission Billing	Appropriations	Welfare
Payroll	Welfare Information	Medicare
Highways Accounting	Property Tax	Motor Vehicles
Welfare	Payroll	Sales Tax

Proposed

N.S.	N.B.	P.E.I.
Education	Welfare	Inventory
Medical	Hospital	Stock Control
Personnel	Education	Appropriations
Property Tax	Payroll	IITRAN(Student Prog.)
APL(Student Prog.)	Personnel	Library
	Mental Health	Scientific

VI. TECHNOLOGY

ITEM	N.S.	N.B.	P.E.I.
Primary Software	ASSEMBLER RPG	COBOL	COBOL
Other	APL	FCRTRAN	IITRAN
Packages	CULPRIT VALUE COMPUTING	under study	EXTRACTO

Conclusions and Recommendations

The information provided in the summary tables shows that:

a) the combined direct costs for data processing amount to approximately $3,000,000 and is growing by 15% to 20% per year;

b) each provincial government converted to a new computer in 1972 and therefore no cost savings would be available in converting to a shared facility, at this time.

The problems of conversion, administrative disruptions and incompatibilities, need to be analyzed further and plans prepared before any integration of equipment and operating systems is attempted. Significant cost savings are available immediately, however, through joint system development efforts and later through the sharing of operating and maintenance costs of common facilities.

The Urwick, Currie report notes the current weakness in planning for the development and use of information and information processing resources, systems and services. The current dominance of administrative over planning-oriented computer applications suggests that provincial government managers have not adequately defined their information requirements and that the essential role of information in management decision-making is not seen as an urgent problem. The three provincial governments are at a further disadvantage when compared to other provinces with respect to external technical resources, e.g. inadequate commercial data centres, time-sharing

services, computing consultants and teleprocessing rates. These disadvantages and weakness combine to make the recent developments in information technology and information management practices inaccessible to the provincial governments in the near future.

The unattractive future that can be projected from the present situation reinforces the urgency for concerted action by the three provincial governments in the area of information management. Potential cost savings in joint system developments are available immediately and in combined operation of shared facilities at a later date. Cost savings, however, will prove elusive without an adequate organization and planning framework to focus attention and direct activity to achieve effective results. The major benefits, however, lie outside direct information management activities; they appear in the areas of regional development and improved levels of service to the public through more effective government programs.

The recommendations provided here address themselves to the construction of an organization and planning framework through which effective information practices will develop at both the provincial government and regional level and more effective government programs will result. The three provincial governments, individually and collectively, must therefore concern themselves with acquiring the administrative and management awareness and understanding to use the available and projected technical and specialist resources more effectively. The user departments, senior administration and staff, need to acquire the capability to define their information requirements and orient their organizations to the more effective use of information as it becomes more readily available.

INFORMATION MANAGEMENT IN THE MARITIME PROVINCES

RECOMMENDATIONS

1. That an organizational structure be developed immediately to provide a focus on information requirements and use as opposed to information processing only to include:
   - an information resources policy advisor to the Council
   - an information coordinator within each provincial government
   - a regional committee of directors of data processing within each province

2. That appropriate measures be taken to encourage the use of resources, systems, and services external to provincial government equipment and staff through:
   - the development of administrative policies and procedures
   - the improvement of user capabilities in analysis of information requirements

3. That an information management perspective be developed in each provincial government and for the region as a whole by:
   - developing and implementing a user charging mechanism based on services provided
   - conducting feasibility studies for major studies prior to any further systems development
   - that technical expertise be developed and shared to maintain a surveillance on external developments in computer and communications technology
   - that sound management control practices such as systems performance and auditing be performed on all existing systems and system development projects

VII. CONCLUSIONS

The harmonization of computing resources within the three Maritime provincial governments or, for that matter, within a single government, federal or provincial, is not a simple matter. The key to achieving results is effective planning and management.

The harmonization of computing resources within the three provincial governments cannot be achieved by technical or administrative means alone. The organization and management of these computing resources has a straight-forward technical solution but conflict arises over the availability and use of information systems and services. Considerations clearly apply within each provincial government in setting priorities and allocating scarce resources. Harmonization, however, involves the accommodation or rationalization of each of the three provincial governments and thus raises policy issues which preclude solely a technical or administrative solution.

The purpose of harmonizing computing resources is to make information more readily available and to use it more effectively to improve government services to the public. Information is an essential element in management decision-making at all levels including the policy-making level. The harmonization of computing resources thus raises policy considerations and the decisions made will have an impact on all other provincial government programs, plans and priorities.

The information management base study has shown clearly that joint efforts restricted solely to the management and operations of computing facilities and

equipment is of marginal value only. The major problems and benefits lie in the clear definition of information requirements and the effective use of information by the users. The information management approach responds to this need through the creation of new organizational structures and functions and the introduction of improved administrative policies, plans, and controls. These mechanisms are essential for the co-ordination of joint efforts and for the improvement of information and information processing systems through which improved government services to the public will result.

The information management base project has determined that the technical and management dimensions of computing hardware and software resources are reasonably well in hand. Some serious problems exist in the scarcity of experience in the use of more powerful systems development techniques and in scientific, engineering and statistical experience but these problems can be overcome through appropriate training and career development programs. The critical problem, however, rests in the development of an increased mutual awareness by both the information systems designers and the information end-users as to what information is required and its relative importance or priority. Certain technical problems such as improvements in system development standards, practices and documentation and the selection, improvement, and operation of complex computing and communications facilities and equipment also exist and will continue to require further attention.

The cost and feasibility survey project has clearly demonstrated the benefits and cost savings in joint developments. The gap between "agreement in principle"

and "motivation and commitment to act" has also been demonstrated. The shift from the survey phase to the action phase cannot be made at the technical or administrative levels. The cost and feasibility survey has shown very clearly that the decision to act in a situation which contains policy considerations must be made at the policy level. The decision to proceed with the implementation phase will require that the policy considerations involved be addressed at the ministerial and inter-governmental level.

The three provincial governments currently face both serious challenges and major opportunities. The growing requirements for scientific programming and data-base management applications will challenge and test the existing system development staffs. The increasing awareness and accessibility of provincial government information users to other computing resources, systems and services combined with more careful selection of system development priorities and projects are all steps in the right direction. The recent Dataroute announcements and the Canunet, Metanet, etc. proposals in the area of computer communications can be viewed either as challenges or opportunities with respect to the harmonization of computing resources within the three provincial governments. These developments in technology can lead either to the centralization of computing facilities or to the development of distributed resource-sharing networks and both have rapidly decreasing total costs. The implications of these technological possibilities at the administrative and policy levels of government can, however, only be assessed, at this time, in a very general way.

The harmonization of computing resources depends sooner or later on the willingness and capacity of the people involved to deal systematically with the complex issues that have been identified in the overall Study. The Study has assisted by providing a catalyst to increase the willingness and capacity of the people involved to share and exchange scarce technical resources and information. This was achieved through exposure to new perspectives and information; by using systematic methods and approaches to produce a broad outline of further plans and organization for continuing improvements; and finally, by identifying the complex issues and their relation to each other in such a way that they can be separately understood and resolved yet take into account the interactions that exist.

This final report and the reports prepared by DCF Systems Limited and Urwick, Currie & Partners Ltd. provide an information base on which decisions can be made. The working papers used by the Consultants are available and should prove useful in implementing the decisions. It should be recognized, however, that the absence of any direct decision will itself impose its own imperatives on the future.

In summary, the development of an organizational framework proposed by the information management base project is an immediate critical task. This proposal is consistent with the development of a master plan that was suggested as the second phase in the original study paper prepared in response to the Council's request for assistance. The information management base project has recommended that the appropriate approach to the three provincial governments should be effective information management. The concept of

information management when implemented through the proposed organizational framework and combined with technical and financial resources can achieve the harmonization objective.

MOTOR VEHICLE DRIVER LICENSING PROJECT

The objectives of this cost and feasibility study in the computer application area of motor vehicle and driver licensing were:

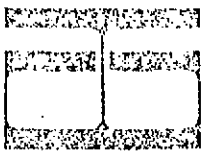
1. to determine the economic and practical feasibility of a common approach to motor vehicle registration and driver licensing in the Maritime provinces;

2. to demonstrate the feasibility of a common approach to computer/communication services and applications in the Maritimes;

3. to demonstrate a methodology by which computing resources and applications may be studied in order that they may be used to better advantage.

The Consultant's interim report documented the existing systems and demonstrated that a uniform system is technically feasible and that significant benefits to the motor vehicle registries would result.

The Consultant's final report provided a comprehensive three year development plan leading to a uniform system in this application area.



THE COUNCIL OF MARITIME PREMIERS

MOTOR VEHICLE - DRIVER LICENSING PROJECT

FINAL REPORT

DCF SYSTEMS LIMITED
74 Victoria Street, Toronto 210, Ontario

February 10, 1973

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SUMMARY

This report describes the development plans for a computer-based, uniform motor vehicle registration and licensing system for the Maritime provinces. The system is intended to be a pilot project in harmonizing the use of computer/communications resources in the Maritimes. The feasibility of this system is described in the DCF Interim Report of November, 1972, where we concluded that the uniform system is technically feasible and that significant benefits to the motor vehicle registries would result. These include improvement in service to the public, increased flexibility in meeting new requirements and an ability to support the growth of registrations at low cost.

The development costs of the system will be about $407,000 over the next three years. These costs will be offset by cost savings in the motor vehicle registries of $253,000 during the same period and, over an eight year period, all of the development costs can be recovered.

In the Interim Report, we recommended that task forces be established in each province to improve the operating condition of each motor vehicle system to provide a sound foundation for further development work. This effort will be the first phase of a three-phase uniform system development which, if begun March 1, 1973, will be completed by November 1, 1973.

The second phase of the development is a computer-based demerit point system and information retrieval system which will serve the needs of each registry. It will be a single set of computer programs designed to operate on all three computers presently used by the Maritime governments. Phase II will begin in January, 1974, and be completed in October, 1974.

The uniform motor vehicle system will be completed in its third phase with the development of an on-line inquiry system. The computer and communications equipment required for such a

system is not justified by the motor vehicle application alone. Other applications requiring an on-line capability may be required to share the cost.

Also planned for Phase III is the conversion of the three separate motor vehicle computer systems to a centralized computer facility. The uniform motor vehicle system developed in New Brunswick during the first two phases will be moved to the central facility, to be followed by the motor vehicle operations in Nova Scotia and Prince Edward Island. At the end of this phase, all of the motor vehicle registries will be served by the same computer system. Phase III will begin January, 1975, and will be completed by November, 1975.

The relatively long three-year development period planned for the uniform system is needed to allow the motor vehicle registries time to adapt to the administrative changes that such a system will bring. This is particularly true of New Brunswick where little change has taken place in fifteen years and where the greatest adjustment to motor vehicle operations will take place.

To prepare for the changes that will occur in the motor vehicle registries, the management in each registry must plan for changes in the organizations, procedures and operations. To do this planning effectively and to ensure that the computer systems designed for the registries are used properly, we recommend that senior registry management be trained in the management of computer systems. This can be done during the first phase of system development.

A top level commitment is necessary to ensure the pilot project will develop as planned. Without this commitment, local priorities within each province will deflect the purposes of the pilot system and it may become unworkable.

To effectively manage the uniform system development, we recommend that the Phase I task forces and the design teams in Phases II and III be headed by an independent system co-ordinator. During Phase I, the development will be done by individual task forces in each province. In Phases II and III, the development will be done by one team with members from each data processing and motor vehicle organization.

The development team members will report to their respective superiors on the Motor Vehicle and Computing Resources Committees. The coordinator will be responsible to the Maritime Council Secretariat and will have the necessary authority to resolve conflicting issues among the provinces. This authority is required to ensure that the project objectives are met.

INTRODUCTION

This report describes the plans for the development of a uniform vehicle registration and driver licensing system which will provide service to the motor vehicle registries in the Maritime provinces. The report is the final stage of a cost and feasibility study requested by the Council of Maritime Premiers and conducted by Communications Canada and DCF Systems Limited.

The study began October 5, 1972, and was conducted in two phases. The first phase was an approximate analysis of the cost and technical feasibility of a common approach, and the second phase was to be a detailed evaluation if the first phase demonstrated that the common approach had significant advantages.

The results of the cost and feasibility study are contained in the Interim Report prepared by DCF Systems in November, 1972. In the report, we concluded that the costs of a common approach would exceed the expected savings during the initial three-year development period, but that net savings would result thereafter. Over an eight-year period, the total cost of a common approach would equal the combined costs of the present systems in the three provinces. The cost savings in each administration result from the mechanization of more of the registration and licensing operations and by using a common computer facility. Although some savings come from a reduction in clerical labour during the early stages of the common system, the bulk of the savings result from the elimination of the manually maintained files in each registry. This can only be done if an on-line inquiry facility is developed for the common system.

Although cost savings cannot be realized in the short-term, the benefits of a common approach were shown to be significant. In particular, a uniform motor vehicle operation serving all three provinces would provide considerable improvement in service to the public, increased flexibility for new

requirements and would accommodate growth requirements over the next several years.

The Uniform System

We have defined a uniform motor vehicle system to consist of a single set of computer programs which provide:

- computer-produced driver renewals and licenses;
- computer-produced motor vehicle renewals and registrations;
- computer-based statistical analyses of accidents, convictions, vehicle inspections and driver examinations;
- computer-based fee accounting and filing of vehicle registrations and driver licenses;
- computer-assigned demerit points and computer-produced warning letters, suspension notices, reinstatement notices and suspension lists; and
- on-line retrieval of driver records through computer terminals.

This system includes the registration of all snow vehicles and commercial vehicles and would require a master number to identify drivers and owners of vehicles. Individual differences among provinces, such as the presence of a photograph on driver licenses in Prince Edward Island, would be accommodated by changing transaction forms or computer programs where necessary.

In view of the similarities which now exist between the motor vehicle registration and driver licensing functions, the development of a common system by combining resources is technically feasible. However, the cost of a uniform system will not be justified unless the provinces combine computing resources in the next two to three years. Because of the growth experienced by the data processing departments in Nova Scotia and New Brunswick, additional computing capacity will be necessary within a three-year period.

If computing resources are combined, the three existing motor vehicle systems can be replaced by a new uniform system within the three-year period. The combined system could then take advantage of the reduced unit costs for expansion of new registrations and licenses, and could also take advantage of the power and flexibility of a large computer system in providing improved service within each motor vehicle administration.

Interim Report Recommendations

Before a uniform system is developed, improvements are required in each motor vehicle administration. These improvements are necessary to provide a sound basis for further coordinated development among the three provinces. Because of the benefits of continuing the development of a common approach, we recommended in the Interim Report that steps be taken to achieve a common system within three years. Several recommendations were made:

1. A data processing, motor vehicle task force should be established in each province to examine current problems and recommend improvements within each administration.

2. The Motor Vehicle and Computing Resources Committees of the Council of Maritime Premiers should approve plans for development of a uniform system.

3. The Council should consider combining computer resources in the three provinces when either the Nova Scotia or the New Brunswick computer system is outgrown.

4. DCF Systems should prepare development plans for the uniform system in the second phase of the feasibility study.

The plans for the development of the uniform system are contained in this report. Descriptions of current problems facing each administration, future requirements within each administration,

plans and management responsibilities to meet these problems and requirements are included. Improvement plans for the next year will be Phase I of the uniform system development. In addition, the basis of the uniform system will be developed in New Brunswick during this phase. Phase II includes the development of a computer-based demerit point system and Phase III, the development of an on-line inquiry system.

Study Activities and Methods

The first activity in the second phase of the DCF study was to determine the required improvements in each motor vehicle administration. Some of these improvements were identified from the initial set of interviews conducted during the preliminary feasibility study. After the preparation of the Interim Report, further interviews were conducted with the supervisors responsible for the operations of the motor vehicle systems. These key people are the most knowledgeable about the internal operations of each administration and will be responsible for making the improvements work.

After the problems were identified, and plans developed to solve these problems, the data processing divisions were consulted to obtain their support and concurrence with the plans. With the agreement of data processing personnel, a development schedule was established for a three-year period. This schedule includes the resources required to develop a uniform system, a critical path network of activities to be performed, the time durations of these activities and the decision points within each phase of the development.

To assess the methods by which other motor vehicle administrations in Canada conducted their operations, visits to three jurisdictions were made. The main features of their operations are described in the next section.

OTHER MOTOR VEHICLE SYSTEMS

Ontario

The province of Ontario has developed a fully automated driver licensing system which produces driver licenses and maintains driver control records for some 2,500,000 drivers. A limited on-line inquiry facility enables terminal operators to retrieve the name, address and status of each driver. Renewal transactions and insurance abstracts are processed when the magnetic tape containing the master file is read each night. For reasons of economy, the on-line driver file is a subset of the master file and does not contain all driver control information. If a complete history of the driver is required, a print request is entered through the on-line facility and the request is processed at night, using the master file.

Driver license renewal applications are printed on pre-punched computer cards and mailed to each driver the month before his present license expires. The driver is required to return his signed application together with the fee before his old license expires. If he fails to send in his application before the expiry date, he can take his old license to any driver examination centre to have it stamped and validated for a sixty day period.

Approximately 80% of driver license renewals require no change. For these, pre-punched applications are entered directly into the system and the renewal indication is placed upon the master file. New driver applications and renewals requiring a change are keypunched before entering the system. All applications are microfilmed and keypunched with a microfilm sequential index number for later retrieval.

The computer is used for automatic assignment of demerit points and accumulation of these points in the driver records. This permits the automatic printing of complete driver records for

insurance companies and law enforcement agencies, and the production of warning letters, suspension notices and re-instatement notices.

Ontario currently uses a decentralized method of registering motor vehicles. The filing of these registrations is centralized and is maintained manually. The motor vehicle registry is currently planning to mechanize vehicle registrations over a two-year period. The conversion of the existing manual records will be done by the R.L. Polk Company at a cost of $17.56 per 1,000 registrations. This was the least expensive method found available.

Although Ontario experiences problems with the filing of registrations during the peak registration period in the spring, a staggered registration system was rejected because renewing registrations into the next fiscal year would result in permanent loss of $4,000,000 of revenue. In addition, they have not adopted a full vehicle inspection program. Inspections are carried out selectively for a small percentage of vehicles in the province. Comprehensive inspection was considered to be too costly for the anticipated benefits.

The planned motor vehicle master file will be accessible both by the plate and serial number of the vehicle. The master file will be separate from the driver master file but the vehicle file will include the driver master number of the vehicle owner. The major justification for placing the vehicle master file on-line is the benefit to the police that will result by allowing them to inquire directly into the system and obtain rapid response.

The Ontario system will be moved to a larger computer during 1973. Although this larger machine will have available large, low-cost disc equipment, there is no plan to place the entire driver master file on the disc equipment. Only the subset currently used for on-line inquiry will be placed on discs.

Quebec

Vehicle registrations and driver licenses in the province of Quebec are handled by about 150 agencies throughout the province. Transactions are mailed to the central office in Quebec City for processing and filing. Transaction processing is done on an IBM System/370, Model 155 dedicated to motor vehicle work. Renewal transactions are processed in a batch mode every night and transactions requiring change, either in vehicle ownership or addresses, are processed through an on-line update operation.

All vehicle and driver files are maintained on directly accessible disc files on the computer. The system contains about 2,500,000 driver records and about the same number of vehicle records. Vehicle files can be searched according to vehicle plate number, serial number and the name of the owner. Driver records are accessible either by the name of the driver, or the driver license number. About 550,000 vehicle transfers occur each year. These are entered into the system through one of 65 on-line terminals in Quebec City. Two offices in the province have terminals which are used to service transfers at the time that the transaction is initiated.

A demerit point system is not currently used in Quebec. However, all records concerning accidents and convictions under the Criminal Code and Highway Traffic Acts are maintained in the computer. Documents relating to these records were, until recently, microfilmed and stored. There is a trend now to file the paper documents since microfilm may not be legally acceptable in the courts.

Manitoba

Over the past year, the motor vehicle system used in Manitoba has been integrated with a comprehensive system of government insurance. The combined operation is called AUTOPAC and is now operational throughout the province. Government insurance

is compulsory with the registration of each vehicle and the premiums depend upon the number of demerit points accumulated by the drivers.

The motor vehicle registration and licensing operation is currently operating on an IBM System/360, Model 50 computer. The system supports fourteen on-line video terminals which are used internally by motor vehicle staff. All renewal and transfer transactions are processed in a batch mode with all changes keypunched. All driver and vehicle information is listed on computer output microfilm (COM). This microfilmed output is used both by the police and the motor vehicle administrations for inquiry into driver records. All driver records and accident reports have been or are currently being converted to microfilm.

Fee accounting is currently being processed by the computer. However, when the system was designed, no audit trail was included and as a result, shortages in revenue have been difficult to correct.

Approximately 400,000 drivers are registered in the Manitoba system. The decision to provide an on-line inquiry facility was justified solely by cost savings inside the motor vehicle administration. The police are not contributing to the cost of the operation and because the government is now sponsoring automobile insurance, there is a decreasing number of insurance abstract inquiries from private companies.

DEVELOPMENT PLANS

The operations of the motor vehicle administrations are documented in the DCF Interim Report as a basis for further development. There are a number of differences in the way each administration is currently organized and in the character of the operations. The Nova Scotia and Prince Edward Island administrations are highly centralized and have similar operating characteristics. However the Prince Edward Island Motor Vehicle Division has taken advantage of its smaller size in its use of data processing services. For example, complete lists of vehicles and licensed drivers can be produced frequently and at reasonable cost.

New Brunswick uses a decentralized registration approach and although the filing systems are centralized, they are manually maintained and are out-growing the space provided for them. In addition, documents are misfiled and the shortage of clerical staff during peak activity periods has created a filing backlog.

A well planned uniform system designed to meet the operational requirements of the three motor vehicle registries will provide better service, both to the public and to the individual motor vehicle organizations. The system will be responsive to inquiries by users, it will accurately record the status of drivers and vehicles and it will allow a wide range of information to be reported. It will also reduce the problems of growth experienced by all three administrations and can eventually result in lower operating costs by sharing computer and communications resources among the three provinces.

Because of the large amount of work required to develop a uniform system, we recommend that the system be developed and installed gradually. In particular, we recommend that the system be implemented in phases with major management review milestones scheduled at the completion of each phase. Such an approach has several advantages:

1. Scheduling the development in separate phases provides the opportunity for management review of further development without commitment to this development. If a decision is taken not to proceed, little will have been lost because improvements to the motor vehicle systems will have been achieved.

2. Developing the system in phases allows the motor vehicle organizations to adapt to the changes in their administration during each phase, and allows them time to plan properly for later developments. It also provides the opportunity to pause and resolve any difficulties that may have occurred in the operations during the present phase.

3. Development of the on-line portion of the uniform system can be deferred until the additional equipment required for the system is economically justified. Even a combined on-line motor vehicle operation serving all three provinces will not alone justify the cost. It will be necessary to share the cost with other applications that require an on-line capability.

4. A fully developed uniform system, able to process batches of vehicle registration and driver license transactions from all provinces, can be run on a single machine. If the present computer resources are later centralized as a common facility, the uniform motor vehicle systems can then be easily operated on this facility in a later phase.

The development of the uniform system is scheduled to take place over three years, a relatively long period of time. However, there are several reasons why this time cannot be lessened:

1. The changes to the motor vehicle operations, particularly in New Brunswick, are significant and require time to be absorbed.

2. The registration workload is already heavy and the introduction of a uniform system at an increased pace may unduly disrupt operations within each registry.

3. An orderly change to the operations will foster acceptance of the new systems within each registry and will provide time to include suggested improvements.

The first development phase will focus on the present motor vehicle systems so that they provide equivalent, improved services and operate soundly. For example, Nova Scotia will register snow vehicles and collect taxes for vehicle transfers, Prince Edward Island will incorporate commercial vehicle registrations into its system and New Brunswick will convert to a driver master number uniquely identifiable with the driver. In addition, we recommend that the basic uniform system be developed in New Brunswick to:

1. Mechanize the New Brunswick motor vehicle operation to a level equivalent to the levels of Nova Scotia and Prince Edward Island.

2. Accommodate the present requirements of Nova Scotia and Prince Edward Island so that their operations can be converted later to the uniform system.

This approach will permit the development of a more effective operation of benefit to all provinces, reduce duplication of effort by making use of experience already gained and will include improvements needed in all three provinces.

During the second phase, a computer-based demerit point system will be developed for all provinces. Although differences exist in the assignment of demerit points for specific

infractions and the administration of suspensions, these can be accommodated by suitable programming. An improved information retrieval system will also be developed during this phase. This will include, for example, the ability to find vehicle records based upon vehicle serial number, partial plate numbers and owner master number. At the end of this phase, the batch processing system will be ready for later conversion to a common facility and all three systems will be compatible.

The third, and final, phase will be the development of the on-line inquiry system and the conversion of the uniform system to a centralized computer facility. These two separate activities are both planned for this phase since an on-line operation is unlikely to be justified unless all the data processing work for all provinces is done on a common facility.

Management Responsibility

The terms of reference of the DCF study did not include the feasibility of the three provinces moving toward standard legislation in the motor vehicle area, and did not extend to the evaluation of overall motor vehicle administrative functions and organizations. However, since good management is important for the successful operation of the uniform motor vehicle systems, we believe that a discussion of the responsibility of management is essential.

Up to the present time, a spirit of cooperation has existed among the three motor vehicle registrars in the area of standard licensing and registration codes, standard load limits and methods of assessing demerit points and fees. However, little discussion has taken place about the internal operations of the registries and much closer cooperation is required for development of a uniform operation. To this end, senior motor vehicle officials should begin to plan the changes that will

occur in their organizations and should plan to use the new systems effectively. In our opinion, this planning should be done jointly, where possible, among all three provinces.

Any new system, such as the one described in this report, must be planned carefully and the organization using the system must be able to adapt to the changing environment. Little change has taken place in the New Brunswick motor vehicle administration since 1957, and in the Nova Scotia registry since 1966. In addition, little planning has been done to cope with changes to legislation and the pressures to maintain or reduce expenditure levels. As a result, the current systems are not being used effectively.

In Nova Scotia, for example, the frequency of computer runs for the motor vehicle transactions was reduced from a daily to a weekly cycle. This has caused many problems in providing adequate service and maintaining proper information on the motor vehicle files. As a result, solutions have been sought which would not increase the cost to the motor vehicle registry but, instead, would require changes to the system at increased cost to the data processing division.

In New Brunswick, the ineffective use of the existing computer systems has caused filing backlogs and inefficiencies in the motor vehicle administration and these, in turn, have fostered a distrust of the use of the computer.

By contrast, in Prince Edward Island the flexibility of the computer systems has steadily improved with the phasing out of the punched card systems and the introduction of magnetic tape files. The motor vehicle registry has been working with the data processing division to take advantage of the improved computer resources and has been planning effectively in improving internal operations within the motor vehicle administration.

The registrars in these provinces have a primary responsibility to respond to the needs of the public. To do this job well they have had little time to devote to planning or day-to-day administration. Other senior officials in the registries have not had adequate training or experience in systems and as a result have not been able to effectively administer the use of existing systems. Because strong planning and administrative capabilities are necessary for the project to succeed, action is required to improve the capabilities of management in these areas. This can be done, either through training existing staff, or adding qualified administrators.

We recommend that a training program in systems management be given to managers in the registries to raise the level of administrative skills. Such a program can be presented during the latter half of 1973 to prepare the staff for system changes in Phase I.

Although standardized legislation would make the development of a uniform system easier, it is not essential. Differences now existing among the legislative requirements of each province can be accommodated by carefully planning the programming of the uniform computer system. For example, commitments to standard license codes, load limits and demerit point systems would reduce the development effort and if further widespread standardization of legislation is adopted, simpler and less costly motor vehicle operations will result.

A major commitment is necessary, however, for the success of the pilot project. The project should be given sufficient priority within the government departments responsible for data processing and motor vehicles to proceed without interference from activities local to each province. Without a top-level commitment these local influences will deflect the aims and priorities of the project and an unworkable system may result.

Resource Requirements

During Phase I, the initial improvement phase, Nova Scotia requires the services of a full-time analyst to do the necessary studies of the present system and to implement the suggested changes. The additional development work in New Brunswick will require two analysts to make the improvements to the present motor vehicle system.

A large amount of work is required to develop a mechanized motor vehicle system in New Brunswick equivalent to those existing in Nova Scotia and Prince Edward Island. The opportunity exists to include the requirements of Nova Scotia and Prince Edward Island in addition to those from New Brunswick. We therefore recommend that the Phase I development in New Brunswick be done with support and advice from Nova Scotia and Prince Edward Island.

A system coordinator with responsibility and authority to make design decisions will also be required. The system coordinator will be needed approximately two days per month during Phase I. Also, the services of an analyst for 1/2 time will be required in Prince Edward Island to implement the planned changes in that province.

During the second phase, 1-1/2 analysts will be required from Nova Scotia, 2 from New Brunswick and 1/2 from Prince Edward Island. These people will work together as a single design team with coordination and leadership supplied by a system coordinator on the same basis as in Phase I.

Phase III will require 3 analysts from Nova Scotia since the on-line system is recommended to be developed on the Nova Scotia machine. New Brunswick will need to supply 2 analysts and Prince Edward Island, one. A system coordinator will be required an average of four days per month during this phase.

Throughout the development of the uniform system, the motor vehicle administrations must assign a supervisor for 1/2 of his time to establish operational requirements, provide system design guidance and accept the systems. Estimated costs for each phase of the development are included in Table 1, page 21, of this report. Annual expenditures and cost savings over an eight-year period are presented in Graph 1, page 22. Expected savings exceed operating expenses during the fourth year of the system and, after eight years, development costs are recovered.

The costs presented in Graph 1 are approximate. Further financial analysis is required to take into account the cost of money, growth of operating expenses and the changes to expected savings. We suggest that this be done at the completion of each phase as part of the management review.

Project Organization

The organizations of the development teams for each phase are described in Appendix B, page 43. The Phase I organization will consist of the task forces recommended in the DCF Interim Report and led by the system coordinator responsible to the Council Secretariat. Individual task force members will be assigned by the members of the Motor Vehicle and Computer Resources Committees and will be responsible to the Committees. Design decisions will be made by the task forces themselves and, where conflicts among jurisdictions arise, these will be resolved by the system coordinator. For this reason, the coordinator should be independent of the motor vehicle and data processing organizations.

During Phases II and III, the development organization will consist of one team, managed by the system coordinator and made up of individuals from each of the three data processing organizations. Part-time assistance will be required from each motor vehicle registry. The team will be functionally responsible

to the Council Secretariat, although individuals on the team will be responsible to their respective members on the Motor Vehicle and Computing Resources Committees.

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TABLE 1

UNIFORM SYSTEM DEVELOPMENT COSTS

PHASE I COSTS

	Manpower	Computer (Development)	Computer (Additional Production)	Additional Supplies & Equip.	Total
N.S.	$15,000	$ 1,500	$ ---	$ 1,000	$ 17,500
N.B.	25,000	3,500	500	100*	29,100
P.E.I.	3,500	500	500	100	4,600
System Co-ordination	5,000	---	---	---	5,000
				TOTAL	$ 56,200
				Anticipated Savings Phase I	37,000
				Total Net Cost - Phase I	$ 19,200

PHASE II COSTS

N.S.	$22,000	$ 3,000	$ 1,000	$ 1,000	$ 27,000
N.B.	30,000	3,000	26,000	1,000	60,000
P.E.I.	7,000	1,000	1,000	100	9,100
System Co-ordination	5,000	---	---	---	5,000
				TOTAL	$101,100
				Anticipated Savings Phase II	47,000
				Total Net Cost - Phase II	$ 54,100

PHASE III COSTS

N.S.	$45,000	$13,000	$ 2,000	$73,200	$133,200
N.B.	35,000	---	26,000	21,600	82,600
P.E.I.	15,000	---	1,000	8,400	24,400
System Co-ordination	10,000	---	---	---	10,000
				TOTAL	$250,200
				Anticipated Savings Phase III	169,000
				Total Net Cost - Phase III	$ 81,200
				TOTAL SYSTEM COSTS	$407,500
				TOTAL NET COST	$ 154,500

* Assumes no mark-sense equipment purchased but rented at $6.00/hour

TABLE 1

UNIFORM SYSTEM DEVELOPMENT COSTS

PHASE I COSTS

	Manpower	Computer (Development)	Computer (Additional Production)	Additional Supplies & Equip.	Total
N.S.	$15,000	$ 1,500	$ ---	$ 1,000	$ 17,500
N.B.	25,000	3,500	500	100*	29,100
P.E.I.	3,500	500	500	100	4,600
System Co-ordination	5,000	---	---	---	5,000
				TOTAL	$ 56,200
				Anticipated Savings Phase I	37,000
				Total Net Cost - Phase I	$ 19,200

PHASE II COSTS

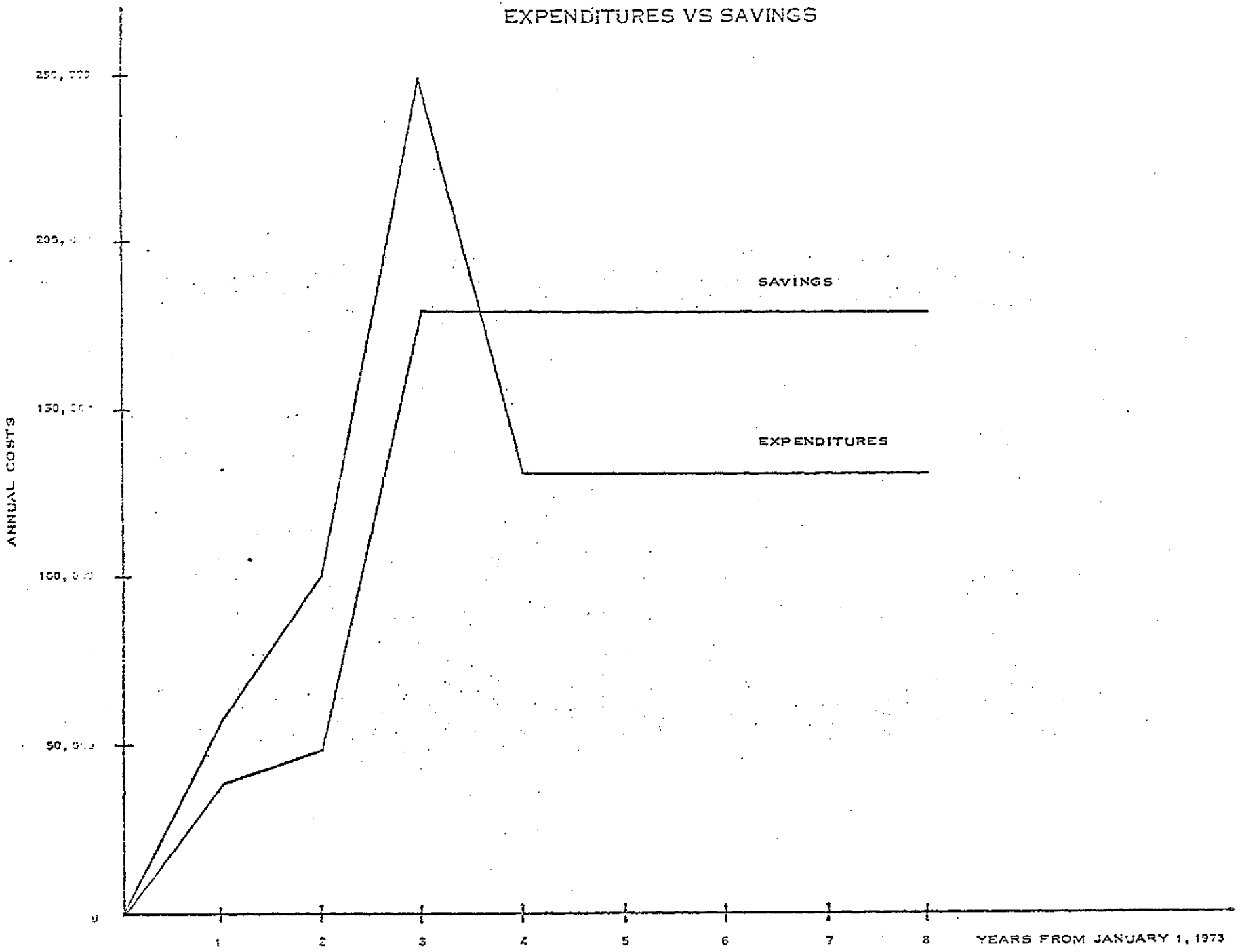
N.S.	$22,000	$ 3,000	$ 1,000	$ 1,000	$ 27,000
N.B.	30,000	3,000	26,000	1,000	60,000
P.E.I.	7,000	1,000	1,000	100	9,100
System Co-ordination	5,000	---	---	---	5,000
				TOTAL	$101,100
				Anticipated Savings Phase II	47,000
				Total Net Cost - Phase II	$ 54,100

PHASE III COSTS

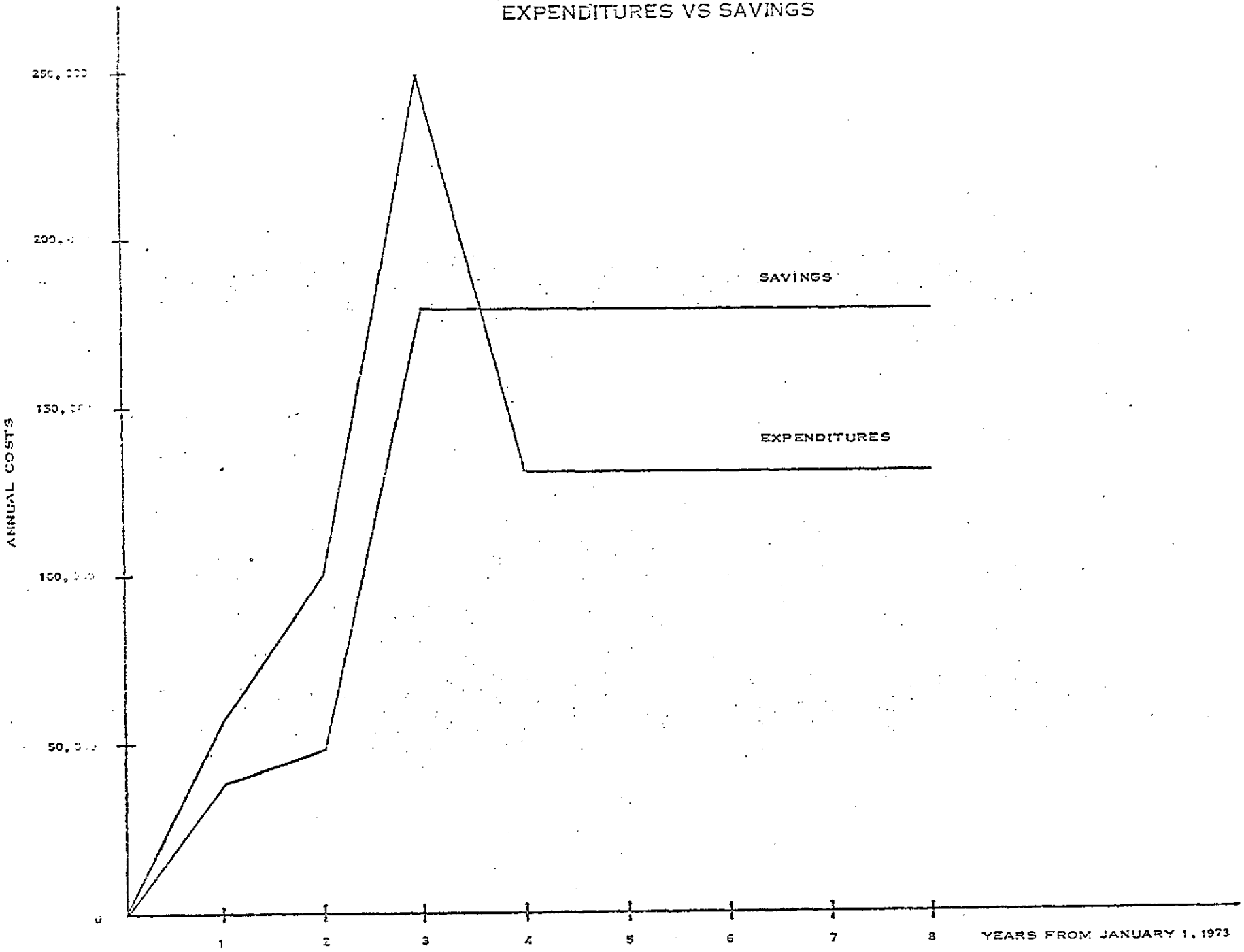
N.S.	$45,000	$13,000	$ 2,000	$73,200	$133,200
N.B.	35,000	---	26,000	21,600	82,600
P.E.I.	15,000	---	1,000	8,400	24,400
System Co-ordination	10,000	---	---	---	10,000
				TOTAL	$250,200
				Anticipated Savings Phase III	169,000
				Total Net Cost - Phase III	$ 81,200
				TOTAL SYSTEM COSTS	$407,500
				TOTAL NET COST	$156,500

* Assumes no mark-sense equipment purchased but rented at $6.00/hour

GRAPH 1
EXPENDITURES VS SAVINGS



GRAPH 1
EXPENDITURES VS SAVINGS



PHASE I - MOTOR VEHICLE SYSTEM IMPROVEMENT

This section contains a description of the current problems experienced in each motor vehicle administration together with plans designed to solve these problems.

Nova Scotia

The major operational problem facing the motor vehicle registry in Nova Scotia is the increased workload on clerical staff due to the peaking of motor vehicle registrations during the months January to March of each year. This increase in clerical workload is compounded by the high rejection rate of transactions which add information to the vehicle registration and driver license files. This error rate is about 15% during normal periods and reduces to 5% during the peak three-month period. Although the rate reduces during the peak period, the number of transaction rejections is high enough to cause significant delays in the processing of vehicle registrations.

The underlying reason for the high transaction error rate is the length of time between issuing the vehicle registration renewal notices and the deadline for sending in the application. The notices are mailed to the public in October to provide sufficient time to receive the renewal applications by the legal deadline of December 31. However, the delays in processing applications has caused a 90-day extension to March 31 for renewing registrations. This causes the public to delay until March and, because it is unlikely that the application forms have been kept since the previous October, a large number of these applications must be filled out by Registry staff. This creates an opportunity for error and it defeats the purpose of producing renewal applications by computer.

A second problem is that the Provincial Hospital Tax is not collected on all vehicle transfers within the province. A change to the system is required to ensure that all of the

tax revenue is collected on newly purchased and transferred vehicles.

A third problem related to vehicle transfers is the loss of transfer information when a multiple transfer takes place between updates of the vehicle master file. In these circumstances, information on previous owners is being lost and, to correct this condition, either a change to the system is required or the master file must be updated daily as it was originally in 1966.

Other problems in the registry are that snow vehicles are not registered, and the fact that titles are issued on vehicle ownership but that liens are not recorded. In addition, due to the delay in processing permanent licenses, temporary driver licenses are issued. This problem is also related to the weekly processing of the master file.

To solve these problems, approval has been given to launch a feasibility study conducted by the Division of Management Consulting Services in the Province of Nova Scotia to investigate the present system and recommend a course of action to the motor vehicle registrar.

In providing solutions to current problems, the study team will investigate the overall motor vehicle administration and consider the following alternatives:

1. A system of staggered registration to equalize the motor vehicle registration load over all months of the year. To this end, a system of integrating vehicle registrations with vehicle inspections will be examined.

2. Collection of Hospital Tax on vehicle purchases and transfers, by making the Hospital Tax payment a prerequisite to vehicle registration. This system is compatible with the system currently used in Prince Edward Island and, if chosen, will provide a common element in a uniform Maritime system.

3. A change to the transaction editing programs to ensure that all ownership information related to vehicle transfers is captured and maintained on the vehicle master file.

4. A method for registering snow vehicles.

In addition to these measures, we suggest that the clerical procedures and forms used to enter transaction information into the system be examined with a view to reducing the errors on these transactions. Items that should be considered in this study are:

1. Examining the number of transaction codes to determine if certain codes can be combined or eliminated. There are twelve transaction codes, each having twenty-five class codes for motor vehicles and there are nine classes within seven transactions for drivers. All of these codes represent a large number of combinations.

2. Making more extensive use of preprinted forms for renewals and transfer applications. A prepunched application form should be considered to reduce the amount of keypunching required.

3. Training clerical staff in the proper preparation of input data for the computer.

4. Reducing the length of time between the mailing of reminder notices and the deadline for applications.

We also suggest that the temporary driver license system be examined to determine if these temporary licenses can be eliminated. Approaches to be considered are:

1. Reducing the time to capture application information in the data processing area.

2. Providing suitable lead time on the production of permanent licenses before the old licenses expire.

Of the problems discussed in this section those falling into the area of system improvements should be addressed first. These include the reduction of transaction entry error rates and ensuring that all master file information is captured for vehicle transfers.

The elimination of temporary licenses should be considered an improvement activity. It will likely result in the restructuring of the transaction edit and master file update programs.

Because the registering of snow vehicles and staggering of vehicle registrations will require major changes to the data processing portions of the operation, a detailed and complete study of all operations is required. Several alternatives must be considered before a final design is chosen. This will require a feasibility study that can be conducted while improvements are made to the existing system. Only when the improvements are completed and the feasibility study recommendations are made should detailed plans be developed for further work. We have not planned these activities in this report. They will require additional resources.

Prince Edward Island

The major problems existing currently in the Prince Edward Island motor vehicle division are the peak activity that occurs January to March of each year and the organization of records in the drivers' records section. A work simplification study recently conducted has shown that filing time within the motor vehicle division could be reduced if the alphabetic and numeric files could be eliminated.

Beginning in January, 1973, changes to motor vehicle registrations, such as vehicle transfers, will be submitted to data processing on a daily basis. Source documents will be keypunched, edited by the computer and returned to the motor vehicle division for filing. During the peak months January

to March the vehicle master file will be updated weekly. At the same time, a list of all registered vehicles will be produced and forwarded to the motor vehicle division for inquiry purposes. Changes which will have been kept in the motor vehicle division until the lists are produced will then be discarded. It is anticipated that lists will be produced bi-monthly during non-peak times.

Currently, information on vehicle inspections is handled separately within the system. Beginning in January, 1973, vehicle inspection information will be added to the vehicle master file. This will provide information for inquiry purposes and will be a first step toward the integration of vehicle registration and inspection information.

Few problems are anticipated in the control of data for transactions submitted to data processing. Currently, most information on both the vehicle registration and driver license applications is preprinted on the application cards, and by preprinting this information, only the sticker, plate and fee information must be keypunched. However, because transaction rejections will occur, a data control clerk must be trained in the motor vehicle division.

A work simplification study will be conducted in the driver records section of the motor vehicle division. The objective of the study is to improve the quality of the information and to eliminate the duplication of suspension notices which arise under multiple convictions for a single traffic offence. This will be done by examining the methods by which driver records are currently organized.

Another alternative being considered is to simplify the recording of conviction information by recording all such information on a single form.

Finally, to ease the problem of retrieving records in their current location, all records will be relocated to a more [illegible] area within the division offices.

New Brunswick

The problems experienced by the motor vehicle branch in New Brunswick are of a different nature than those experienced by Nova Scotia and Prince Edward Island. Because the registration of vehicles and licensing of drivers is carried out on a decentralized basis through thirty-nine revenue offices, good service is being provided to the public. The problems within the branch occur in filing systems in Fredericto A peak activity exists in January to March, as in the other provinces, and this results in a backlog of filing of registration applications. In addition, the province is entering the period in the two-year cycle of driver license renewals when the volume doubles.

In addition to peaking of activity, problems are being experienced with the manual maintenance of vehicle and driver license files. Little of the motor vehicle administration work is done by computer and of the functions that are being handled by the computer, only the driver renewal program is of real benefit to the motor vehicle registry. For example, the fee accounting system is done manually as well as on the computer, but the compute results are not used to balance the accounts. In another exampl the computer is not being used to check for driver suspensions even though the necessary information is contained in the comput master file.

In the motor vehicle registration operation the major problem is relating owner names to vehicles. A different spelling of the same owner name can appear on the renewal application for a given vehicle and this causes confusion when the application is filed or enquired against.

A significant problem in the driver licensing operation, aside from the backlog of filing, is the search for a previously assigned driver number to a particular individual. The driver license number used in New Brunswick is assigned sequentially from a list of numbers each time a new driver submits an

application. Because drivers may have allowed their licenses to expire, a search of old license numbers is required before a new license number is assigned. This procedure presents a problem in filing and retrieving information. New Brunswick does not use a system whereby the driver license number is related to name and birth date as is used in other Canadian provinces.

Transactions which update the driver license master file are edited by the computer and rejection reports are returned to the motor vehicle registry. There is currently little commitment on the part of the registry to correct these rejections and, as a result, a four-month backlog exists. Although the error rate of these transactions is about 2.5%, improvement can be achieved through a redesign of the input forms. Currently about fifteen different forms are used to input information into the driver licensing system.

The increase in driver license renewal volume from 6,000 per month in 1972 to 12,000 per month in 1973 will require an additional clerk in the driver licensing section. Also, changes in driver license codes are scheduled for January, 1973 and this will add further work to the driver licensing operation.

To solve the filing and searching problems associated with the use of the current driver license number in New Brunswick and to make the New Brunswick system compatible with the other Maritime motor vehicle systems, we suggest that the driver license number be changed to a number related to the name and birth date of the driver. For convenience, this number could be the same as the number chosen in Nova Scotia, but with a feature to distinguish between residents of Nova Scotia and New Brunswick. Such a number would eliminate the problem of searching for assignments of old numbers to new drivers and would simplify the filing of licenses and the production of renewal applications.

A computer program could be written to change the driver numbers on the existing driver license master file to the new numbers. The conversion would be gradual, extending over the two-year cycle of driver license renewals and could be done automatically by the computer. Because a high percentage of all drivers, either suspended or having existing licenses, are retained on the computer master file, all such driver numbers could be converted with one update of the file. At the same time, the current unbalanced number of driver license renewals between odd and even numbered years could be eliminated by leveling the load of renewal applications over the two-year cycle period. To prevent loss of revenue, those drivers requiring reassignment of renewal from an odd numbered year to an even numbered year could be issued one-year licenses.

By changing the numbers for all suspended and active drivers within the computer system, each time a new application is received, the computer could detect if the individual previously held a license. No change would be required in the manual driver license file which is already arranged in alphabetic sequence and no change would be required in driver records which are also indexed alphabetically.

The statistical analysis of voluntary prosecutions is currently done manually. This requires two clerks, and significant savings in clerical time could be achieved if the voluntary penalties were analyzed by computer. A mark-sense coding system could be used to capture the prosecution information in a similar way to the system used in Nova Scotia. If this step is taken, one clerk could be reassigned to other duties.

To make effective use of computer resources within the motor vehicle registry, a commitment must be made to monitor and control information submitted to the data processing organization. We recommend that a small staff of data control clerks be established to:

1. Correct and resubmit rejected transactions.

2. Balance batches of transaction fees rejected by the computer.

3. Enter suspension notices into the driver license file when these notices are produced by the computer.

Reinstatement notices which are prepared at the end of a fixed suspension period are currently produced manually. With the suspension information properly maintained in the computer file, these reinstatement notices could be produced automatically by the computer on a weekly basis. This would require the inclusion of more information related to the suspension, in addition to the suspension indication that is currently contained in the master record.

With these improvements, a reduction in the workload of clerical staff will take place and savings in filing space will result. Furthermore, the motor vehicle registry will achieve greater flexibility in its system through the added information available in the computer files.

Phase I Schedule

The schedule of Phase I development is presented in Appendix A, page 37. If work begins March 1, 1973, and the necessary commitments are made, the improvement activities and the basic uniform system can be completed by October 31, 1973. This will allow time for each of the motor vehicle registries to prepare for the peak registration period during the first quarter of 1974 and will allow the motor vehicle staff to evaluate the system changes and correct deficiencies.

PHASE II - THE DEMERIT POINT SYSTEM

The improvement activities planned for Phase I of the motor vehicle system development are designed to make the level of mechanization of motor vehicle operations equal among all provinces. These activities are also designed to make the present motor vehicle system operate well and, in the case of New Brunswick, to lay the foundation for the development of a uniform system.

Phase II activities will be focused on extending the improved systems to include a jointly developed mechanized demerit point system and a selective information retrieval system. These extensions, together with the mechanization of vehicle registrations in New Brunswick, will provide all of the components of the uniform system except for on-line inquiry. If it is then decided to combine computer resources into a common facility during Phase III, the motor vehicle operations in Nova Scotia and Prince Edward Island can be converted to the New Brunswick system on a single machine.

Although some of the effort in adapting the common demerit point system to the Nova Scotia and Prince Edward Island systems will be redundant, all three provinces will have the use of this feature if Phase III is deferred. The demerit system will be operating on the three existing computers and will be usable by the three motor vehicle registries.

In summary, the development strategy is to build the basic uniform system in New Brunswick during Phase I, add to all three systems a jointly developed demerit point and information retrieval system during Phase II, and then convert first New Brunswick then Nova Scotia and Prince Edward Island to a single machine during Phase III. The demerit point system will be delivered to the Nova Scotia Motor Vehicle Registry first while New Brunswick is mechanizing its vehicle files.

The on-line system will be developed at the same time as the Phase II systems are being converted to a single machine. It will be integrated later into the uniform system as one of the last activities of Phase III.

Phase II Activities

The demerit point system will be similar to the system used in Ontario. That is, demerit points will be assigned and accumulated into driver records as the driver master file is processed each night. At the end of master file processing, warning letters, suspension notices and reinstatement notices will be printed by the computer for delivery the following day. Input to the system will consist of conviction and voluntary penalty transactions which have been recorded on mark-sense cards.

A selective inquiry system which is more powerful than inquiry systems in use currently in the Maritimes will be developed at the same time as the demerit point system. Search facilities will include:

- vehicle identification based upon a partial plate number;
- vehicle identification by vehicle serial number;
- vehicle owner by vehicle plate and serial numbers; and
- vehicle identification by make, year and colour.

The search programs will be activated by transactions requesting the information as the master files are processed each night.

A plan to equalize vehicle registration activity by staggering registrations was not considered by the DCF study. Methods of equalizing the workload, including linking registrations to vehicle inspections, have been considered by Nova Scotia but other jurisdictions, such as Ontario, have found disadvantages to staggered registrations. The Nova Scotia registry, because

of its size and the centralized nature of its operation, experiences a more serious peak in registration activity than New Brunswick or Prince Edward Island. Most other jurisdictions do not stagger vehicle registrations and, in our opinion, it is not required in New Brunswick or Prince Edward Island. These provinces should, therefore, wait until Nova Scotia has studied the matter before agreeing to include it in the uniform system.

To prepare for an integrated motor vehicle system serving all three provinces, New Brunswick must mechanize its vehicle registration filing operation. This will not save filing space or clerical labour since police inquiries must be handled quickly and cannot wait overnight for the master file to be processed. There is some merit, therefore, in delaying this activity until Phase III when it is required but, because of the already heavy workload planned for Phase III, we suggest it be done during Phase II. We also suggest that the R.L. Polk Company be considered to convert the registration records to machine-readable form on magnetic tape.

Phase II Schedule

The initial planning and definition of system requirements for Phase II are scheduled to begin January 1, 1974. Phase II can be completed October 15, 1974.

PHASE III - THE ON-LINE SYSTEM

The uniform system developed in New Brunswick during Phase II will be designed to be adapted to any computer now used by the Maritime Governments and can be operated on a central facility. If all data processing is to be done on one machine, the motor vehicle system developed in New Brunswick will initially be placed on this machine. Later, the Nova Scotia and Prince Edward Island motor vehicle operations will be supported by this system. At this point, all motor vehicle registries will be serviced by the one computer system.

Assuming that an on-line inquiry system has been authorized for motor vehicle operations, we suggest that all of the vehicle and driver master files not be placed on randomly accessible disc storage. Instead, the Ontario approach, where the active portion of the master record is placed on-line, should be used. This will allow the terminal operators to inquire into driver status, vehicle status and vehicle ownership without requiring the complete histories of the driver or vehicle. This will reduce the cost of on-line file space considerably.

The on-line system can be used to request abstracts of driver records for insurance companies. These requests should be processed as batched transactions during the nightly pass of the master file.

We also suggest that the legal implications of microfilming driver records for court evidence be investigated. If microfilmed copies prove to be acceptable for legal evidence the existing driver records can be microfilmed as they are converted to machine-readable form.

The major advantage of the on-line inquiry facility is that all manually maintained license files, registration files and computer-produced listings can be eliminated. All police

and other inquiries requiring rapid response can be serviced quickly with the on-line facility. This will result in considerable savings in clerical manpower and filing space.

Phase III Schedule

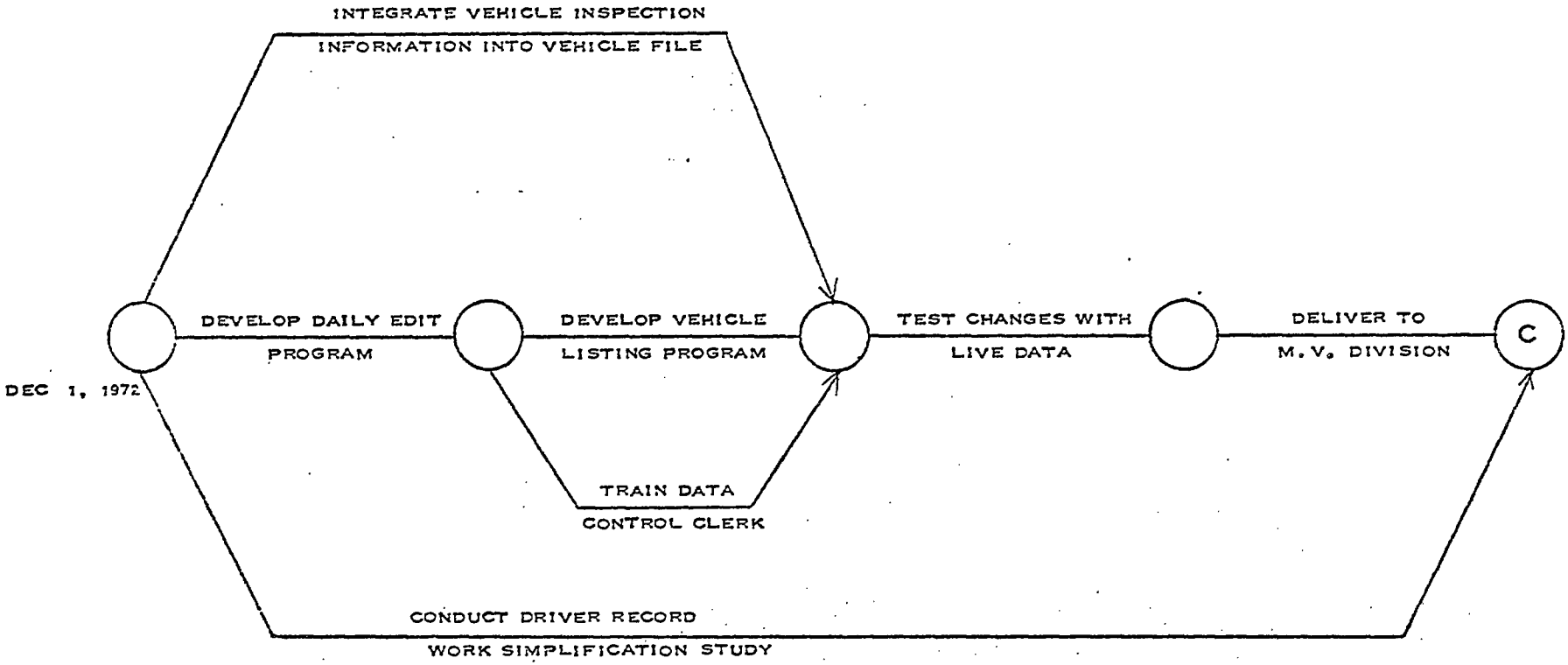
The Phase III period is scheduled to begin January 1, 1975. It is scheduled to be completed November 15, 1975; however, these dates must remain flexible because they are affected by the decision to place all data processing for the three governments in a central facility. The Phase III schedule should be included in the conversion schedule of other data processing applications to a common facility.

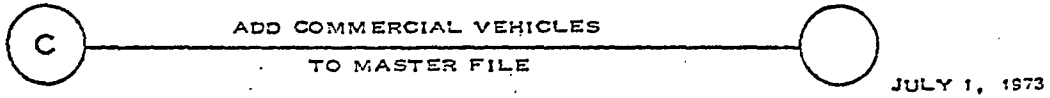
APPENDIX A

UNIFORM MOTOR VEHICLE SYSTEM

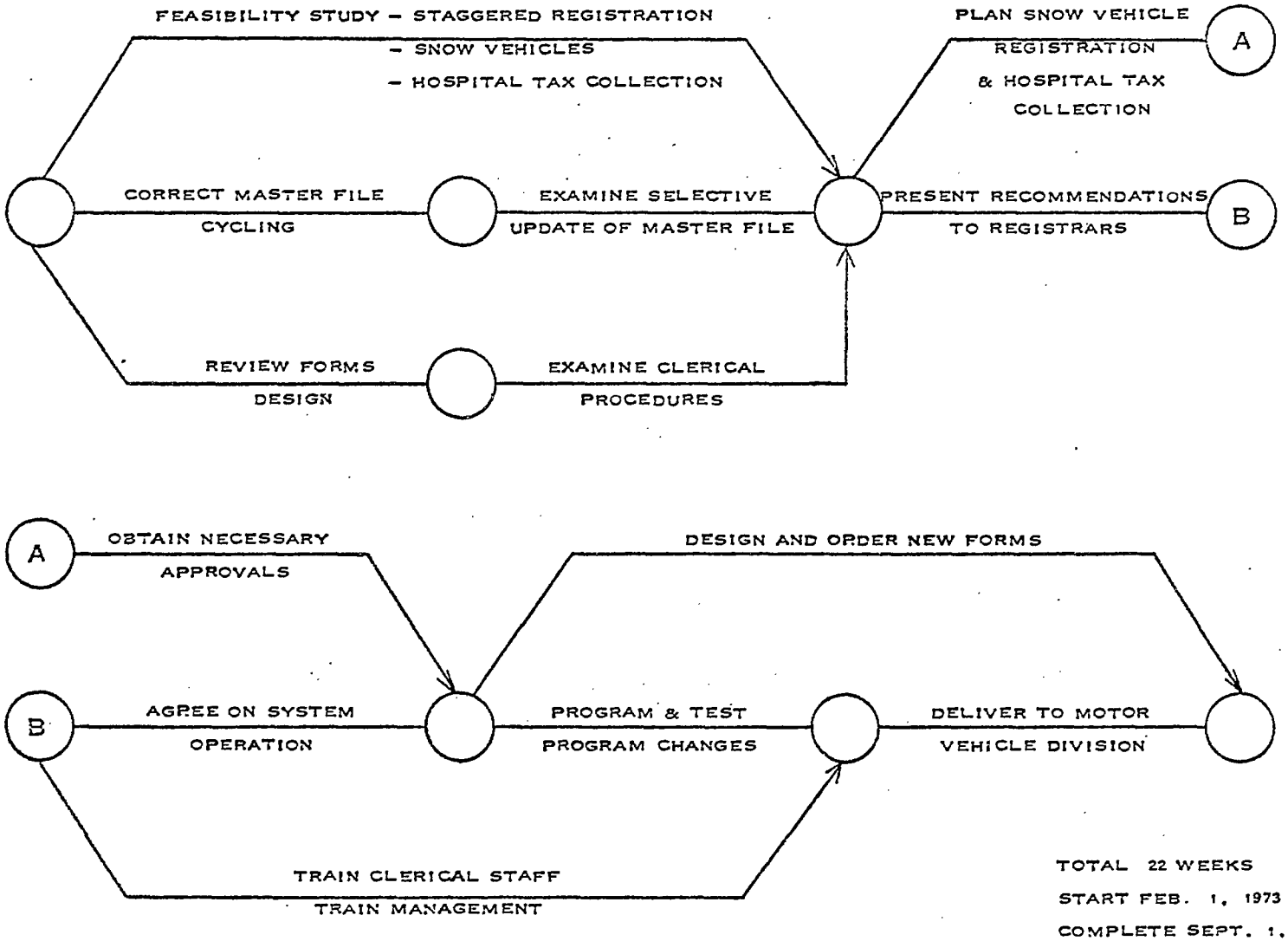
DEVELOPMENT SCHEDULE

PHASE I — DEVELOPMENT
PRINCE EDWARD ISLAND



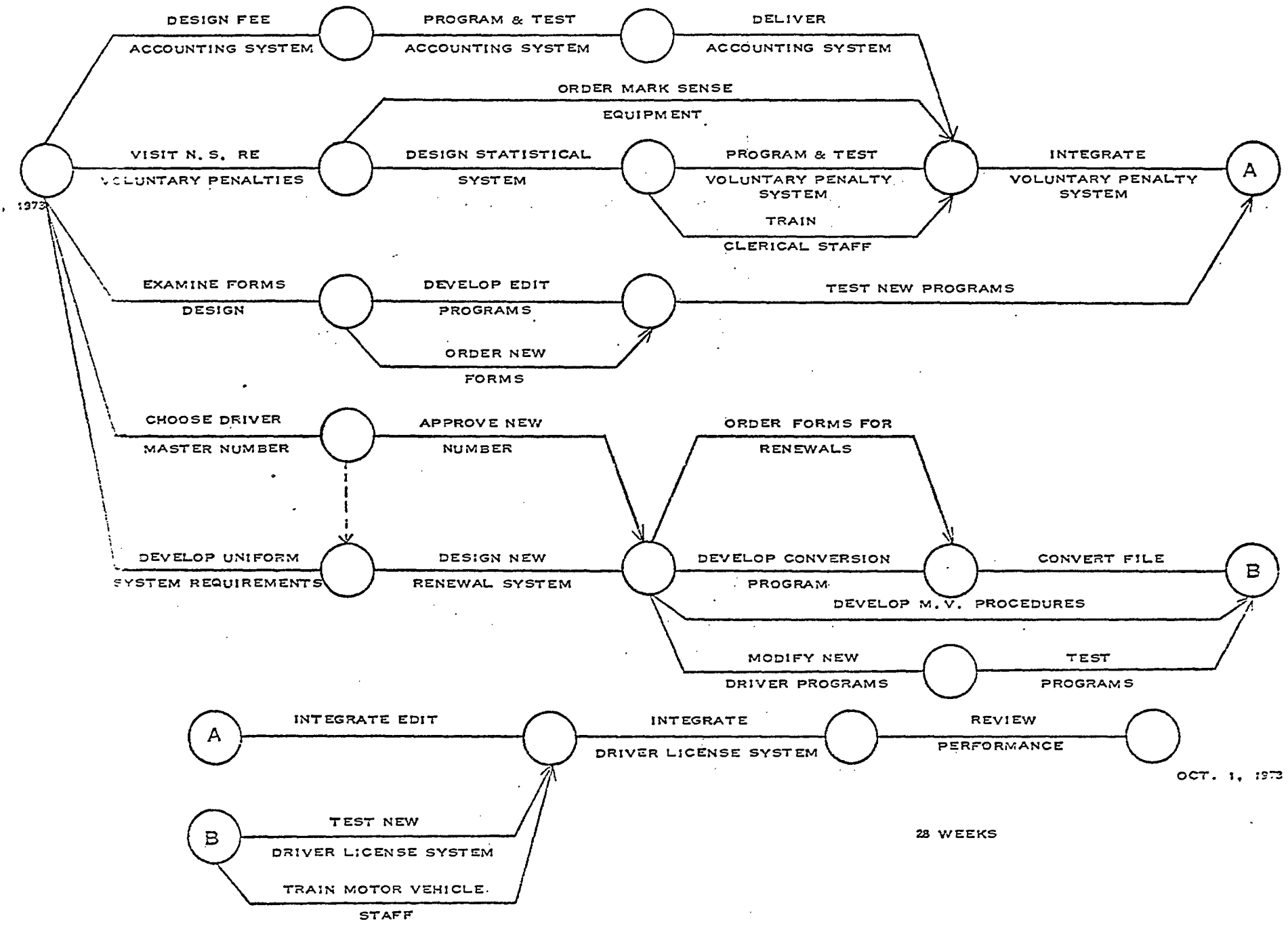


PHASE I — DEVELOPMENT
NOVA SCOTIA

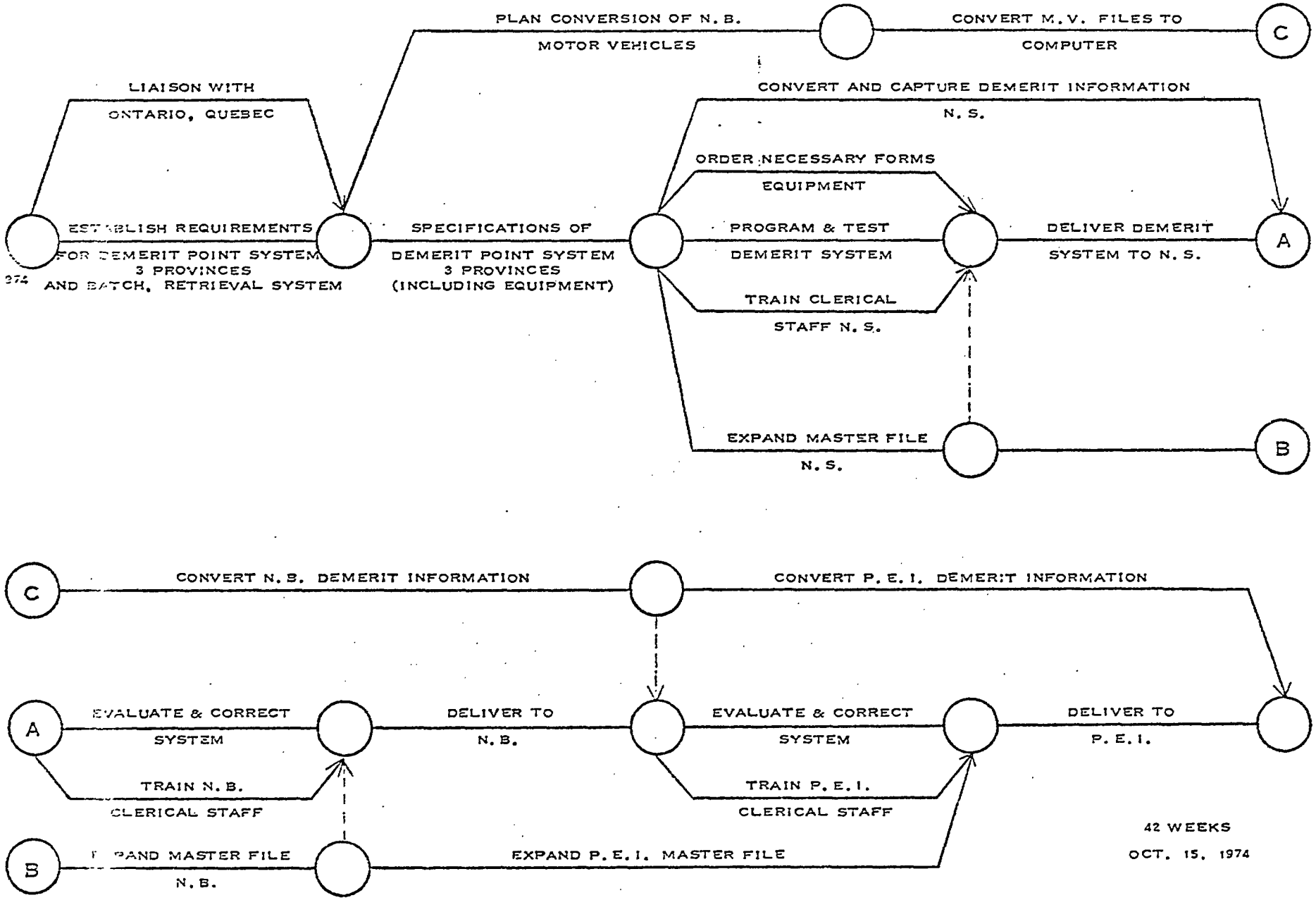


TOTAL 22 WEEKS
START FEB. 1, 1973
COMPLETE SEPT. 1, 1973

PHASE I — DEVELOPMENT
NEW BRUNSWICK



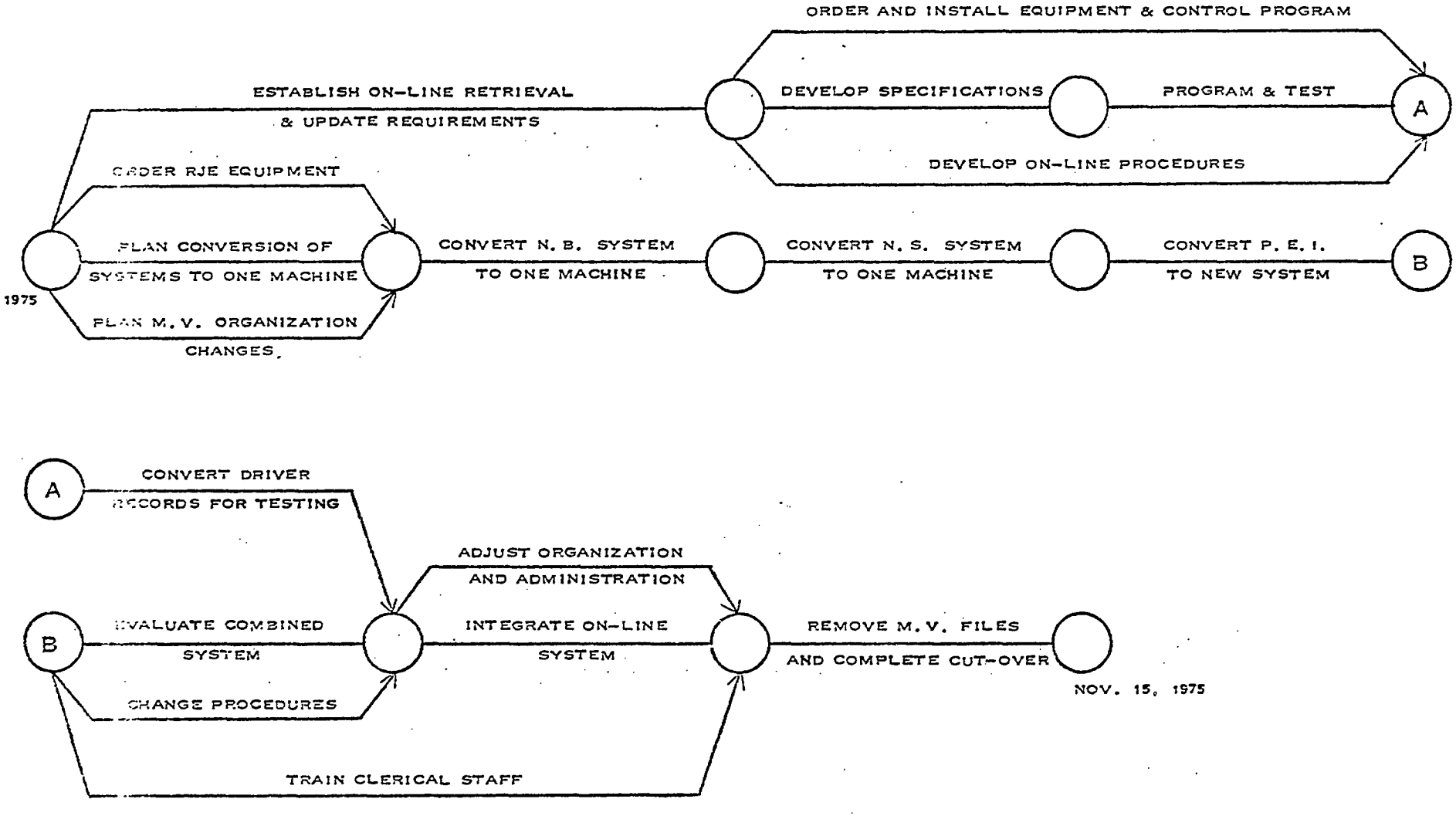
PHASE II – DEVELOPMENT



42 WEEKS

OCT. 15, 1974

PHASE III' — DEVELOPMENT

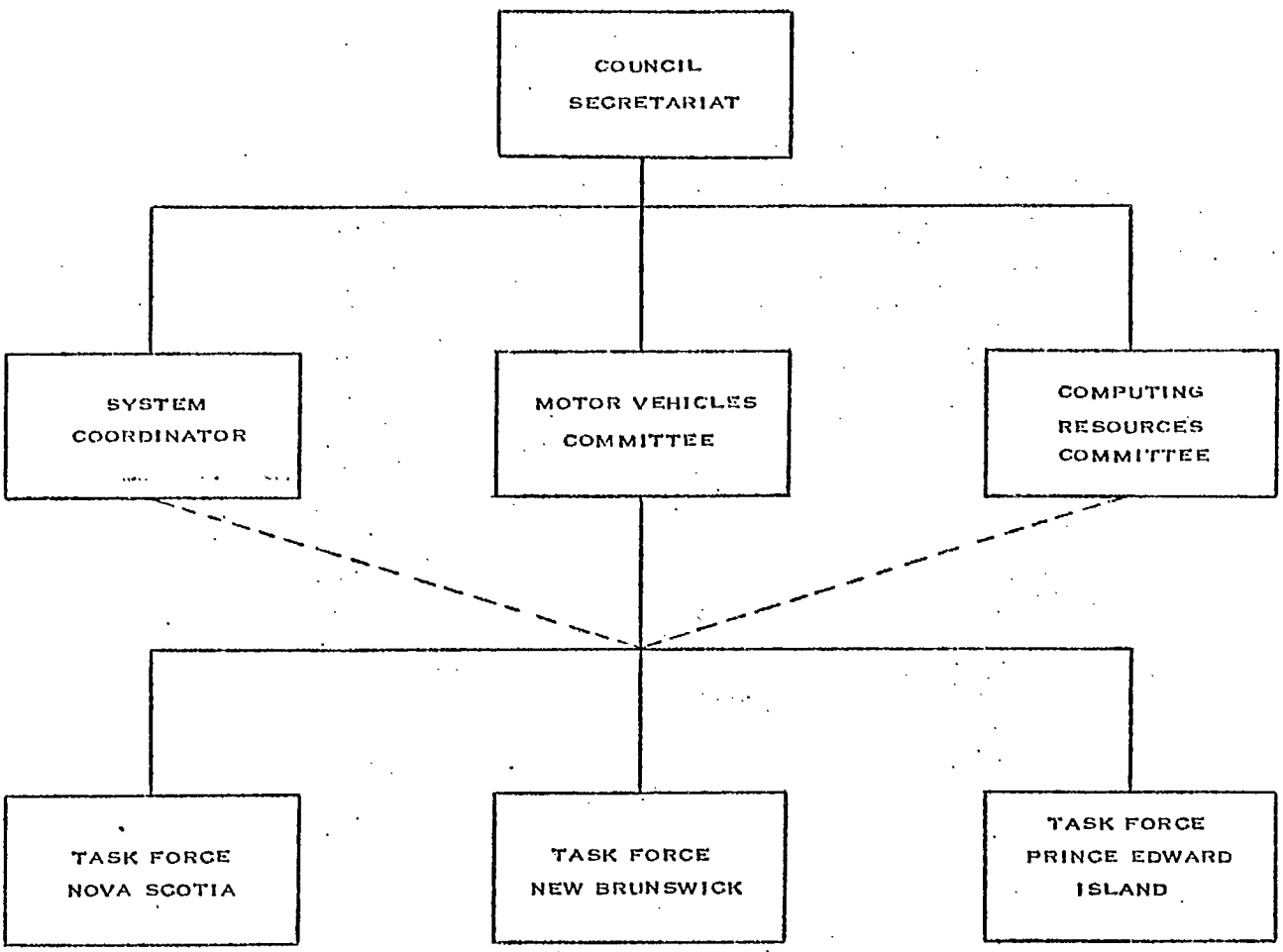


APPENDIX B

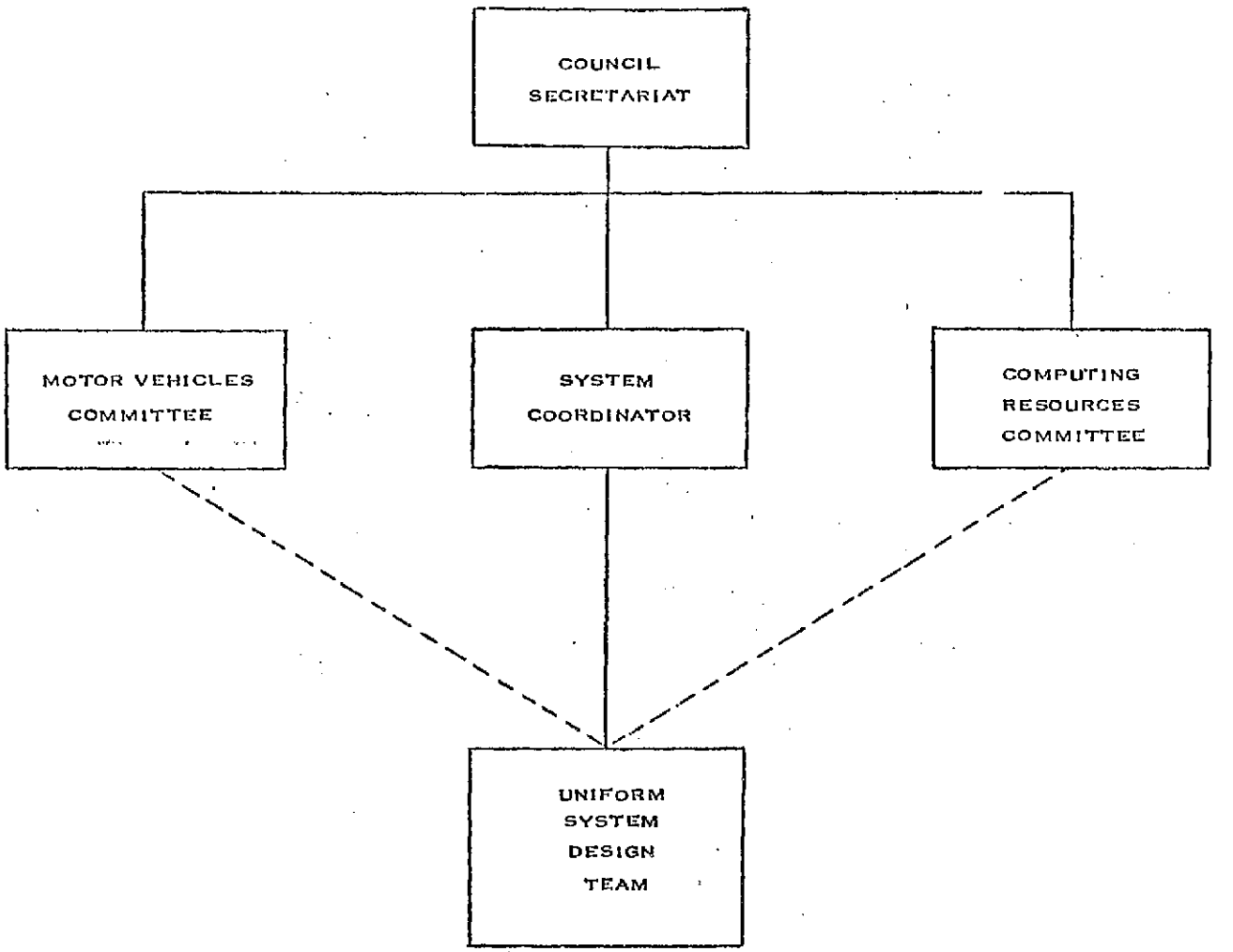
SYSTEM DEVELOPMENT ORGANIZATIONS

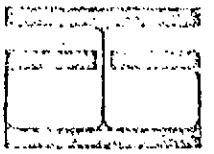
SUGGESTED ORGANIZATION

PHASE I



SUGGESTED ORGANIZATION
PHASES II, III





DEPARTMENT OF COMMUNICATIONS

MOTOR VEHICLE -
DRIVER LICENSING PROJECT

INTERIM REPORT

VOLUME I

DCF SYSTEMS LIMITED
74 Victoria Street, Toronto 210, Ontario

November, 1972

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VOLUME I

VOLUME II

SUMMARY

The Department of Communications was asked by the Council of Maritime Premiers to examine the cost and feasibility of a regional approach to motor vehicle registration and driver licensing systems in the Maritimes. The Department subsequently invited proposals for the study and DCF Systems Limited was awarded the contract.

DCF proposed to conduct the study in two phases. This report describes the results of the first phase - an assessment of the economic and practical feasibility of a common approach to motor vehicle administration. The findings are based on interviews conducted with key personnel and on documents collected in the motor vehicle and data processing divisions in each province.

The ultimate objective of a harmonized motor vehicle system is a common licensing and registration operation. A common system has the potential to improve service to the public and to achieve cost savings through economies of scale of the joint use of computer resources. Elements of a harmonized system would be common legislative requirements, a uniform systems design and a common administrative system leading to eventual organizational integration.

In the examination of the feasibility of a common approach, the similarities and differences of the present motor vehicle systems were identified. In all three provinces, driver license renewals are produced by computer. Each province maintains manual files of vehicle registrations, driver licenses and driver records. Inquiries into these files are made by law enforcement agencies, insurance and credit companies and the courts. Peak activity for vehicle registrations occurs during January to March of each year. This activity causes some inconvenience to the public and requires the use of casual labour to process applications and cope with the backlog of filing.

New Brunswick prepares vehicle registrations and driver licenses manually and has 39 revenue offices where they may be obtained. Prince Edward Island uses the computer in the preparation of registrations and licenses, has 5 revenue offices and uses a photograph on the driver license. Nova Scotia uses the computer to prepare registrations and licenses, has only 2 offices where they can be obtained and issues temporary permits and licenses until the permanent documents are prepared. All provinces use a different driver license number format.

New Brunswick and Prince Edward Island data processing administrations have installed computers from the same manufacturer and program their systems in the same widely used, high level language. Nova Scotia operates a computer of the same size as New Brunswick, although the manufacturer is different, and uses a programming language which is incompatible with the machines in the other provinces. All data processing administrations store their files on magnetic tape.

Suggested future developments in the motor vehicle divisions include combining motor vehicle inspections with registrations and developing a method for staggering registrations throughout the year. In addition, each division is investigating methods for retrieving more selective information on vehicles for law enforcement agencies and other users.

The major obstacles to the development of a common approach are resistance to the changes that increased uses of the computer would bring, and a loss of control of staff and resources within existing organizations that would result from a centralized system. The existing motor vehicle operations and the communications between motor vehicle and data processing administrations require improvement. There is also some feeling among staff in all motor vehicle administrations that they are not receiving adequate service from the data processing divisions. As a result of the 10 to 15% annual growth rate in each data processing

administration, the motor vehicle administrations will be competing with other new data processing applications for the necessary resources to further develop the motor vehicle application.

A number of alternative systems were identified. These ranged from the retention of the existing motor vehicle systems to the development of a uniform system designed specifically to meet current and future requirements. Several arrangements of computer installations were considered, including a dedicated computer satisfying all of the data processing requirements.

The dedicated computer systems were shown to be operationally impractical and the uniform system yielded significant benefits to the motor vehicle administrations. No alternative demonstrated a significant cost advantage over the present systems, until one of the existing computer installations is outgrown. At current growth rates, this will occur in three to four years.

Some problems now experienced in motor vehicle administrations can be solved by making more effective use of their existing computer resources. However, before a common approach to motor vehicle operations can be developed, the existing systems must be improved to provide a sound basis for further development work.

The uniform system described in the report is technically feasible; however, due to the amount of work involved, it should be developed in stages. The first stage should be the improvement of existing operations.

Several recommendations resulted from the study:

1. A data processing, motor vehicle task force should be established in each province to examine current problems and recommend improvements within each administration. This should be the first phase in developing a uniform system for all three provinces.

2. The Motor Vehicle and Data Processing Committees of the Council of Maritime Premiers should approve plans for development of a uniform system. These plans, which will be prepared in phase II of the DCF study, will provide guidance to the task forces established in each province.

3. The Council should consider combining computer resources in the three provinces when either the Nova Scotia or the New Brunswick computer system is outgrown. Because this situation could occur in three years, planning should begin immediately.

4. The terms of reference of phase II of the study should be changed to reflect the first two recommendations.

INTRODUCTION

The motor vehicle registration and driver licensing systems in the Maritime provinces were selected by the Council of Maritime Premiers as a pilot study of the feasibility of regional operations among the three Maritime provinces. The federal Department of Communications was asked by the Council to assist in the pilot study. The Department of Communications subsequently assigned a project leader, Mr. Alan G. Ross, and invited several consulting companies to bid for the study.

On the basis of a proposal submitted on September 8, 1972, DCF Systems Limited was awarded the study. DCF proposed to conduct the study in two phases. The first phase would assess the approximate costs and technical feasibility of a common approach to motor vehicle systems in the Maritimes. The second phase would be conducted if a common approach was determined to be feasible. This second phase would analyze the selected alternatives in detail and prepare a budget and set of plans for further systems development.

The objectives of the study in the Invitation to Tender are:

1. To determine the economic and practical feasibility of a common approach to motor vehicle registration and driver licensing systems in the Maritime provinces.

2. To demonstrate the feasibility of a common approach to computer/communications services and applications in the Maritimes.

3. To demonstrate a method by which these resources and applications may be studied and used to better advantage.

The purpose of this Interim Report is to describe the results of the first phase of the study. The report addresses the first of the objectives and includes a description of the methodology employed.

During the course of the study, we met with managers and supervisors in the motor vehicle and data processing divisions in each of the three provinces. We obtained information about work flows, paper work volumes, and clerical and administrative costs in each of the motor vehicle administrations. We also obtained total data processing volumes and costs in each data processing division.

Phase I of the study was restricted to those functions of the motor vehicle administration which made most use of computer resources; the driver licensing, motor vehicle registration, driver records and accounting functions. In the data processing divisions, the motor vehicle application was studied in detail. Only total printing and processing volumes were studied for the other applications.

We examined how effective the use of the computer would be in the motor vehicle administration. This examination enabled us to identify possible obstacles to the development of a common approach for the three provinces.

Study Methods Used

Interviews of key personnel in the motor vehicle administration and data processing divisions were conducted. Joint interview sessions were conducted initially in each province to obtain information about the history and current condition of each motor vehicle system. These interviews were followed by individual interviews of supervisors in each of the four sections listed above.

A large number of documents were made available to us and were helpful in describing the operations of the motor vehicle administrations. Each administration provided us with an organization chart, a set of cost figures, and a description of the work flows.

The interview notes were analyzed and where work flow descriptions did not exist, flow charts were prepared. Alternative common systems were identified and evaluated against criteria developed

jointly by the personnel assigned to the study by each province. Each criterion was selected to reflect the objectives of the motor vehicle administrations identified during the interviews.

Cost estimates were prepared for the selected alternatives which yielded high scores in the analysis. Because a system of cost recovery is not employed in every province, selected cost figures in the motor vehicle registrations were added to total data processing costs and the results compared.

Finally, each selected alternative was evaluated for its possible extension to other data processing applications.

Everyone interviewed during the study was most co-operative and we thank them for their time and effort.

MOTOR VEHICLE REGISTRATION AND DRIVER LICENSING HARMONIZATION

The ultimate objective of a harmonized motor vehicle system in the Maritimes is a common licensing and registration operation. The common system would consist of a mutually compatible set of computer programs which satisfies the requirements of each of the individual provinces. The degree of harmonization would be determined by the ability of a common system to meet the objectives of each motor vehicle administration. These objectives are:

1. To improve highway safety through:
   - provision of information related to driving records;
   - provision of a source of statistical information on accidents, convictions and thefts;
   - inspection of motor vehicles on a regular basis.
2. To promote and control safe driving practices through:
   - driver examinations;
   - advertising to promote safe driving practices.
3. To collect fee revenue as established by government policy, in an orderly and timely manner.
4. To promote reciprocity of driver licenses, driver records and vehicle registrations.
5. To provide a level of service which is convenient for the public and users of administration records.

Additional objectives internal to each administration are:

1. To perform the administrative functions efficiently.
2. To have a set of plans for the future which are consistent with government policy.

A common operation meeting these objectives would reduce costs through minimizing duplication of effort and improving current

operations. A common system would improve service to the public by making use of experience already gained in the development of computer-based motor vehicle systems. Furthermore, a common system has the potential to achieve cost savings through the economies of scale of joint use of computer resources. A common system would provide room for growth by reducing the incremental cost of expansion of files. The system could also be designed to provide the flexibility necessary to meet anticipated and unforeseen future requirements.

Elements of a harmonized system would include common legislative requirements and a common administrative system, leading to eventual organizational integration. A common operation could consist of operating an existing system on one or all of the three existing computers, or of operating a uniform system which would serve the needs of the motor vehicle administrations in each of the provinces. We have considered these and other alternatives in this study.

To assess the effectiveness of a uniform system design, we have defined a uniform operation to consist of:

- computer-produced driver renewals and licenses;
- computer-produced motor vehicle renewals and registrations;
- computer-based statistical analyses of accidents, convictions, inspections and driver examinations;
- on-line retrieval of driver records through computer terminals;
- computer-based fee accounting and filing of vehicle registrations and driver licenses;
- computer-assigned demerit points and computer-produced warning letters, suspension notices, reinstatement notices and suspension lists.

FEASIBILITY OF A COMMON APPROACH

In assessing the ability of a common operation to meet the requirements of each motor vehicle administration, we identified the common features of each system and related these to present and future requirements.

Driver licenses in all provinces are renewed in the birth month of the driver on a two or three-year cycle. To produce these renewals, each province has a computer program which prepares driver license applications each month. The program uses information contained on a driver master file stored on magnetic tape.

Law enforcement agencies, insurance companies, and the courts use the files of each motor vehicle administration to obtain information on drivers and vehicles. Each province also provides information about vehicles to R.L. Polk, a market research firm which uses the information for vehicle recalls, war amputee tags and other applications.

To provide information to the users, each motor vehicle division maintains files of driver licenses and vehicle registrations. These files are maintained manually by clerks who add new registrations and changes, and retrieve information for law enforcement agencies and insurance companies. The driver licenses are arranged in alphabetic sequence according to the driver's name and the vehicle registrations are arranged in vehicle plate number sequence. Although driver licenses are actually filed by driver license number, each province uses a number in which the first few digits relate directly to the alphabetic sequence of the driver's surname.

Driver records containing details of demerit point accumulations, convictions, suspensions and reinstatements, are kept in file folders in each province. Nova Scotia and Prince Edward Island maintain a card index system arranged alphabetically to provide summary information on each driver record, together with a cross index to the file folders. New Brunswick includes the summary on

the file folder itself and cross indexes the folders through an index file containing cardboard strips with the driver's name and file folder number. In each province, there is no direct relationship between the driver's name and the sequence of the folder in the driver record file.

A computer is used to produce statistical summaries of accidents, inspections and driver examinations. Nova Scotia produces statistical summaries in all three areas; New Brunswick uses the computer for vehicle inspections and driver examinations only; Prince Edward Island uses the computer for information on accidents.

Each motor vehicle administration is experiencing a 5% growth in new registrations and driver licenses. This growth has caused a shortage of space for the manual files.

Because vehicle registrations take place annually and must be completed by March 31st in each province, a peak registration period exists for the three months, January to March. This causes a delay in producing permanent registrations in Nova Scotia and Prince Edward Island, but because New Brunswick issues the permanent registration at the time of the fee payment, there is no inconvenience to the public. All provinces are experiencing a backlog of filing of registrations lasting into April or May in some cases.

Driver licenses are cycled on a two or three-year basis, and the licensing activity does not peak to the same extent as registrations. Prince Edward Island is currently changing the cycle time of driver license renewals from a two-year to a three-year term and this will cause occasional monthly peaks until all licenses have been converted in 1975. New Brunswick did not equalize renewal activity over its two-year cycle and as a result, volume is double during odd-numbered years.

There are several features of each motor vehicle administration which are different. Each province uses a different driver

license number, although each number is derived from the surname and month of birth of the driver. Prince Edward Island includes a photograph on the driver license. The permanent license is produced when the photograph is taken and the fee is paid. The other provinces provide a temporary driver's license at the time of fee payment until the permanent registration can be checked for suspensions and mailed to the applicant.

New Brunswick handles vehicle registrations and driver licenses through 39 revenue offices in the province. Because these offices contain clerical staff who serve the motor vehicle division as well as other government agencies, there is enough staff to produce licenses and registrations without the use of a computer. Because Nova Scotia has only two offices that can be used for vehicle registrations and license applications, a mailing system is used and a computer is required to produce the large volume of applications and registrations. Prince Edward Island has five branch offices which are used to produce driver licenses and handle motor vehicle registrations. Because there is insufficient clerical staff in these five offices to handle the annual volume of applications, the computer is used to produce registration and license application forms.

Monthly lists of suspended drivers are produced by computer in Nova Scotia and New Brunswick. A similar list is maintained manually in Prince Edward Island.

Data Processing

To further assess the commonality among the provinces, we examined the similar and dissimilar features in the data processing divisions. Each system uses magnetic tapes to store master files for each data processing application. All data processing installations have recently been converted to new computing equipment. Nova Scotia uses IBM equipment; New Brunswick and Prince Edward Island use Univac equipment. All provinces now

have an ability to access files directly by means of magnetic disk files on the new machines.

Each provincial government in the Maritimes has centralized computing into one facility. This is in contrast to some of the other provinces in Canada where several installations exist within each government. The Maritimes are, therefore, accustomed to centralization of computer resources and are able to use the excess capacity now existing in the present equipment to provide data processing services to municipal governments and other users.

Differences in the operations of the data processing divisions appear in the system development area. Both Prince Edward Island and New Brunswick use a computer language which is widely used in the computer industry, whereas Nova Scotia uses a language which depends on IBM equipment. Although similarities exist between the machine language of the Univac computer in Prince Edward Island and the IBM computer in Nova Scotia, a conversion effort is required to run Nova Scotia programs on the Prince Edward Island computer.

Data processing users are not charged for system development work or computer time in New Brunswick or Prince Edward Island. Nova Scotia charges users for computer time only. Prince Edward Island is planning to recover machine and development costs from the users starting in the 1973 fiscal year.

Future Requirements

Each of the motor vehicle divisions will be evaluating methods of staggering motor vehicle registrations to reduce the peak activity during the months of January to March, and thus equalize the load throughout the year. Some provinces have investigated the possibility of integrating vehicle registrations with vehicle inspections. The volume of inspections is currently equalized because they are done on the anniversary of purchase of the vehicle.

The motor vehicle administrations all recognize the need for a more flexible information retrieval system. Currently, the driver records and vehicle master files are used to provide information for all inquiries. Nova Scotia has developed a specialized computer program to retrieve certain vehicle information for law enforcement agencies and has received requests for other selective information on vehicles. The current systems in each province are unable to provide the flexibility of information retrieval which will be required by users in the future.

The growth in registrations and changes in legislation are causing increased work loads in all motor vehicle divisions. These overloads are causing backlogs in the processing of licenses and registrations and filing backlogs in the manual files. Some consideration is being given to improving the procedures within the administrations, although no firm plans have yet been developed. Prince Edward Island is currently training staff to conduct a work simplification study for its division. To cope with new legislation and growth, all divisions will be required to improve their existing systems within the next few years.

Obstacles to a common approach were identified in interviews with personnel in the motor vehicle and data processing administrations. The underlying difficulty to combining resources in the Maritimes will be the loss of control of people and equipment within existing organizations when they are combined into regional entities.

Some concern was expressed by motor vehicle staff in New Brunswick and Prince Edward Island about the use of the computer for licensing, registration and driver records. The belief was expressed that a computer could not improve the service times already existing in each department. This feeling is based upon delays in processing transactions that the Nova Scotia motor vehicle division has experienced. There is also a human reaction

to change if a computer is used more extensively in motor vehicle administrations.

Another obstacle to developing a common approach is the considerable improvement that is necessary in the existing licensing and registration operations. Little change has taken place in New Brunswick over the past fifteen years to respond to growth and new legislative requirements. In all provinces, data processing solutions to motor vehicle administration problems have not been adequately implemented to ensure their efficient and accurate operation.

One of the reasons that improvements have not taken place in the motor vehicle administrations is a lack of co-operation between the data processing and motor vehicle administrations. There is a feeling in all motor vehicle divisions that data processing is not providing adequate service, although in Nova Scotia, there is considerable enthusiasm in the motor vehicle division about using computers.

Differing legislative requirements in each province impede the development of a common system. These differing requirements may continue while a common or uniform system is being designed so that a reasonable degree of flexibility must be built into whatever common approach is taken.

With the 10 to 15% annual growth rate in the data processing divisions in all three provinces, priorities are being assigned to the use of application development staff. Large systems are currently being developed in the health, welfare and taxation areas. Further development of the motor vehicle application will compete with these applications and it will be difficult to commit the necessary resources to develop a uniform system.

Alternative Common Approaches

A number of alternative common approaches to the harmonization of computer resources within the motor vehicle administrations were identified. The existing operation with no change was included as one of the alternatives for comparison purposes.

The alternatives are:

1. Retain the existing system with no change to current operations.

2. Operate the existing motor vehicle systems on a separate computer. This machine would be dedicated to the motor vehicle application.

3. Transfer all current data processing work to a single machine, replacing the three existing computers. This single installation would service all provinces and would include no major changes to existing applications.

4. Develop a uniform motor vehicle system, servicing all motor vehicle divisions and operating on the three existing computers.

5. Develop a uniform motor vehicle system, operating on a separate machine dedicated to the motor vehicle application. This machine would be separate from the three existing computers.

6. Develop a uniform system to operate on a single computer which replaces the three existing installations.

7. Develop a uniform system to operate on one of the existing computers but serving all motor vehicle divisions. For the purposes of this report, the current Nova Scotia installation was selected.

8. Modify the current Nova Scotia motor vehicle system to meet New Brunswick and Prince Edward Island requirements. This system would operate separately on the three existing computers.

9. Modify the Nova Scotia motor vehicle system to operate on the current Nova Scotia computer and serve all three motor vehicle divisions.

ANALYSIS OF THE ALTERNATIVES

In evaluating the ability of each of the nine alternatives to meet the requirements in the Maritime provinces, the cost of each alternative was compared to the existing cost as represented by Case 1. Also, the alternatives were assessed according to a set of criteria established jointly by motor vehicle and data processing officials in the three provinces.

Because cost recovery to data processing users is not currently practiced in New Brunswick or Prince Edward Island, it was necessary to compare total data processing costs for each alternative. Selected costs in the motor vehicle administrations were chosen in the licensing, registration, driver record and accounting functions as best representing the use of the computer. Because individual cost elements of the above four functions of the motor vehicle divisions were not separated in any province, it was necessary to estimate cost figures for floor space, materials and equipment. Savings realized from a common system were estimated on the basis of reduction in clerical manpower and space. We assumed no changes in transactions or documents seen by the public. There were, therefore, no changes in the cost of mailing or materials in any of the alternatives.

Details of the technical feasibility of each alternative are included in Appendix D, page 52. Case 1, the existing system, has a limited growth capability due to a shortage of filing space. In addition, high error rates on computer input are causing delayed responses to transaction processing and a filing backlog. During peak periods, clerical staff are required to work near peak efficiency and casual labour is required.

Cases 2 and 5 require the installation of a fourth machine in addition to the three existing machines in the provinces. Dedicating a fourth machine to the motor vehicles application is not operationally practical because of the additional personnel required and the investment already made in existing computers.

Case 3 represents the combination of all current data processing applications to operate on one computer, replacing the existing machines. To handle the combined processing load, an IBM System 370, Model 155, is required. This machine would be operated one shift per day, allowing substantial capacity for handling a growing workload. The effort required to convert New Brunswick and Prince Edward Island computer programs to the new machine would be about one-half of the effort required for the conversions currently in progress. No conversion would be required for Nova Scotia.

Because an investment in data communications equipment is required to support remote submission of computer work (remote job entry) in New Brunswick and Prince Edward Island, the incremental cost of data communications equipment for applications using terminals would be less than if remote job entry were not used. A disadvantage of this alternative is that no improvement to existing motor vehicle operations would result.

Case 4, a uniform motor vehicle system on existing equipment, requires separate programming efforts in each province. Consequently, no truly uniform system is likely to result. For these reasons, this alternative is not practical.

Case 6, a uniform system on a single central computer, has all of the advantages of Case 3, including centralized operations and capacity for handling more work in the future. The incremental cost of expanding files and data communications equipment is low once the initial investment would have been made. The system requires five slow-speed terminals; two each in New Brunswick and Nova Scotia, and one in Prince Edward Island. Different motor vehicle requirements in each of the provinces can be handled through provision of separate programs in the uniform system. This alternative is technically feasible, but a complete system, including all of the on-line inquiry facilities, is expensive. Approximately 17 man-years of development effort would be required.

Case 7, a uniform system operating on the IBM System 370, Model 145, in Nova Scotia, has all the advantages of the uniform system of Case 6. In processing motor vehicle applications for the three provinces, a substantial increase in workload would occur on the Model 145, limiting its capacity for growth. This alternative could be used as a basis for developing a uniform system to ultimately operate on a larger machine that would serve all three provinces. The experience already gained in developing a mechanized motor vehicle registration system in Nova Scotia would be valuable for this alternative.

Case 8, modifying the existing Nova Scotia motor vehicle application to operate on the three machines, requires a substantial amount of reprogramming. The programs currently used in the motor vehicle application are not able to operate on the Univac computer in New Brunswick because the IBM language that is used is not compatible with the New Brunswick computer. This alternative is, therefore, not practical.

In Case 9, a modified Nova Scotia motor vehicle system operating on the Model 145, substantial improvement to the system is required before modification can take place. Approximately four man-years of modification effort would be required to adapt the system to New Brunswick and Prince Edward Island requirements.

All cases were evaluated according to a set of criteria established jointly by motor vehicle and data processing officials in the three provinces. The relative importance of each criterion was assigned by DCF Systems on the basis of interviews with staff in each province. The results of the scoring indicate that the uniform system of Cases 6 and 7 will meet current and future requirements and will solve current problems in each motor vehicle division.

The scoring results, detailed in Appendix C, page 47, fell into three groups:

high scores	-	Cases 6, 7
intermediate scores	-	Cases 1, 3, 4, 5, 9
low scores	-	Cases 2, 8

Cost estimates were developed for the alternatives with the highest scores.

Cost comparisons were based on total motor vehicle and data processing costs as represented in Case 1. Changes in personnel and equipment required for each of the alternatives were reflected in changes from the base costs in Case 1. The resulting totals are summarized in Table 1, page 22, where it is shown that the costs of all the alternatives are approximately equal.

The operational cost of the 39 revenue offices in New Brunswick are not charged to the motor vehicles division. These costs were, therefore, not included in the motor vehicle cost totals in New Brunswick. However, because a large proportion of the clerical work in the revenue offices is represented by motor vehicles activity, substantial savings in these offices are possible through the use of computer-produced motor vehicle registrations and driver licenses. The uniform system, Cases 6 and 7, would realize these savings.

TABLE 1

SUMMARY OF COSTS	Case 1	Case 3	Case 4	Case 6	Case 7	Case 9
Data Processing Costs						
1. Nova Scotia	90.1	53.1	98.4	55.2	97.8	90.3
2. New Brunswick	89.6	73.4	102.8	77.1	93.3	92.4
3. Prince Edward Island	24.0	20.2	29.7	22.6	26.4	26.0
4. Combined Central Computer		58.0		64.3		
SUB-TOTAL	203.7	204.7	230.9	219.2	217.5	208.7
Motor Vehicle and Driver Licensing Costs						
1. Nova Scotia	57.8	57.8	50.5	50.5	50.5	57.8
2. New Brunswick	32.4	32.4	26.4	26.4	26.4	31.6
3. Prince Edward Island	9.1	9.1	7.8	7.8	7.8	8.7
SUB-TOTAL	99.3	99.3	84.7	84.7	84.7	98.1
TOTAL	303.0	304.0	315.6	303.9	302.2	306.8

CONCLUSIONS

The results of scoring the alternative common approaches indicate that significant benefits to each motor vehicle administration can be realized through a uniform system serving all motor vehicle divisions. The uniform system would provide flexibility to meet new requirements, improved service to the public, and significant room for expansion.

The scoring indicated little difference between operating the uniform motor vehicle system on one of the existing computers in Nova Scotia or New Brunswick (Case 7), or operating the uniform system on a single machine serving all of the data processing requirements of the three provinces (Case 6). The benefits would be the same in either case.

The results of the cost analysis indicate no significant cost differences among any of the selected cases. There will be no cost advantage to any of the alternatives until the capacity of either the computer in Nova Scotia or New Brunswick is reached. At the current annual rates of growth of 10 to 15%, this will occur in three to four years.

Although improved efficiency of the existing computers is possible through the use of faster magnetic tapes, additional memory, and larger and faster disks, these improvements will not be sufficient for any one machine to process all of the data processing work of the three provinces. Currently, both Nova Scotia and New Brunswick are operating each machine two shifts per day. Since each machine is comparable in size and speed, four shifts on one of the existing machines would be required. Therefore, if computer resources are to be combined, a larger machine, in particular, an IBM System 370, Model 155, would be required.

Some of the problems currently experienced in the motor vehicle divisions can be solved by making more effective use of existing computer resources. Changes in forms design, data control methods and computer file structures can provide better service to the

motor vehicle divisions and ease the workload of motor vehicle staff. In addition, some functions which are currently handled manually, such as the statistical analysis of accidents, can be done by the computer.

Development of a uniform motor vehicle system is technically feasible, but because of the large amount of work required, it should be developed gradually, in stages. The first phase of a uniform development should be the improvement of the existing systems. It is essential that systems in good working order be used as a basis for developing a common approach.

RECOMMENDATIONS

A data processing, motor vehicle task force should be established in each province to examine current problems in the administration of motor vehicle registries. This task force should be responsible for recommending improvements as the first stage in developing a uniform system for all three provinces.

To provide guidance to the individual task forces in each province, the Motor Vehicle and Data Processing Committees of the Council of Maritime Premiers should approve the detailed plans to develop a uniform system that will be prepared in phase II of the study. These plans will provide guidance to the task forces established in each province.

The development of a uniform system should be planned for operation on a single computer. Since cost savings will not be realized until all data processing resources are combined among the provinces, the development of the system should be planned for a three-year period. Development can be done on the existing IBM System 370, Model 145, in Nova Scotia and converted later to the common computer.

The Council of Maritime Premiers should consider combining the computer resources in the three provinces when either the Nova Scotia or the New Brunswick computer system is outgrown. Planning for this combination should begin immediately since no common direction for development of computer applications now exists among the provinces. At present, there is no plan to convert the programs running on the Nova Scotia machine to a computer language usable by all provinces.

Because of the benefits to be obtained from a uniform system, further planning should be carried out in phase II of the DCF study. Because there is no immediate cost advantage to developing the uniform system, the terms of reference of phase II of the current study should be changed to:

1. Establish improvements to be made in each of the motor vehicle administrations.

2. Plan the improvements as the first stage of a uniform system development to take place over the next three years.

3. Develop detailed plans, including functional requirements, manpower requirements and a system development budget.

STUDY METHODOLOGY

The study methodology outlined here was used by DCF in the study of the feasibility of harmonizing the computer/communications resources of the motor vehicle registration and driver licensing systems in New Brunswick, Nova Scotia and Prince Edward Island. This methodology is not unique to motor vehicle registration and driver licensing systems and can be extended to other application areas.

We usually perform feasibility studies in two stages. The first stage is to perform a preliminary feasibility study to obtain an analysis of the approximate costs and benefits. If this first phase indicates that the proposed project is definitely feasible and desirable, then a more detailed analysis is undertaken to complete the feasibility study.

The following list is meant to serve as a checklist of the methodology used in performing feasibility studies. Most of the tasks are performed in both the preliminary and second stages of the feasibility study, the basic difference being the degree of detail included in the tasks.

The major phases in the methodology are management of the project, data collection, analysis and report writing. These phases are carried out in approximately the above sequence, but there is always overlap and some activities are performed in parallel.

Management of the Project

1. Plan the study

   - conduct preliminary meetings with client
   - define the problems and terms of reference
   - establish objectives
   - write a preliminary table of contents for final report
   - develop a detailed task list
   - select the project team
   - identify the information needed
   - schedule the study.

2. Control the project

   - decide on a project control system
   - analyze the project status and predict the future status
   - prepare progress reports for the client.

Data Collection

1. Interview the key people

   - develop an interview questionnaire
   - plan the interviews
   - conduct the interviews
   - write (dictate) the interview notes
   - review and edit the interview notes

- conduct the follow-up interviews.

2. Collect, read and abstract important documents

   - determine the information to be collected
   - establish priorities for the information required
   - develop the method of collecting data (statistical sampling, work measurement)
   - identify the sources of data
   - collect the data or conduct a sampling
   - review and validate the data collected
   - assemble the data into a presentable form
   - copy and distribute the information.

3. Conduct research in relevant areas and prepare abstracts

   - identify areas of interest
   - identify potential sources of information (similar organizations or groups)
   - schedule interviews and collect data from outside sources
   - document the findings and references
   - copy and distribute information.

Analysis

1. Identify the findings

   - review the objectives and scope of the study
   - examine and interpret the information collected

- determine the validity and importance of the information collected
- determine if sufficient information has been collected
- identify the missing information
- collect the missing information
- determine the work flows, information flows, characteristics of decision-making and organizations involved
- determine the current costs and estimate the future expenditures.

2. Determine the issues or problems
   - identify the key problems based on documents examined and interviews conducted
   - express the problem in a neutral way and not as a solution
   - attempt to identify the real problem and not just the symptom of the problem.

3. Identify alternative solutions
   - suggest as many different ways as possible to solve the problem (excluding real options indicates an incomplete analysis of the facts).

4. Develop criteria for evaluation of options
   - identify the factors which should be used to evaluate the alternatives
   - review the criteria with the client
   - rank the criteria in order of importance, possibly by assigning weights.

5. Select the best alternative

   - develop the basic solution and recommendations with the team members
   - ensure that the facts support these recommendations
   - document the basic solution
   - examine and document the alternative solutions
   - review the basic solution and alternatives with the team members and other experts
   - modify the basic solution
   - present the basic solution and alternatives to the client
   - modify the basic solution and develop the final solution
   - expand and refine the solution
   - document the results
   - develop the plan (schedule and estimates) to implement the solution.

One method to select the best alternative is to use a chart approach (Appendix C, page 47). List the alternative solutions across the top, the criteria down the left side and list the weight assigned to each criterion next to the "criteria column" in a "weight column". For each criterion, assign a value of 10 to the best solution and assign lower numbers to the other solutions based on their relative ability to meet the criterion. Then take the weighted total for each alternative. The alternative with the highest score is the best solution to the problem.
(NOTE: This is not a scientific answer. The alternatives, criteria, weights, and scores are all subjective. The

chart just serves as an aid in the thinking process. Much of the value of this approach is derived from the exercise of choosing the alternatives and the criteria.)

Report Writing

1. Prepare a draft report
   - review the table of contents of the report
   - write a draft report
   - have someone edit the report.
2. Prepare the final report
   - revise the draft
   - have someone proof-read the report
   - have the report printed.
3. Present the report
   - prepare a presentation
   - present the findings and report to the client.

APPENDIX A

LIST OF PEOPLE INTERVIEWED

APPENDIX A

LIST OF PEOPLE INTERVIEWED

New Brunswick

H.H.D. Cochrane
G.F. Henry
H.W. Kirk
D. McCallum
V. McIntyre
W. Nicholson
D. Seeley
G.R. Staples
T.C. Walton

Nova Scotia

D. Beaulieu
H.J. Cheesman
A. Condy
R.C. Dowell
G. Duff
H. Fairclough
E.B. Hessian
C.E. Pass
M. Redgrave
J.J. Thibault
D.J. Tully

Prince Edward Island

P. Bolger
J.I. Gallant
J.T. Gallant
M. Jones
G. MacNeil
K. Mollison
P. O'Neill

APPENDIX B

MVR-DLS FEASIBILITY STUDY

Proposed Interview Questionnaire

APPENDIX B

MVR-DLS FEASIBILITY STUDY

Proposed Interview Questionnaire

System Background

1. What is the history of the installation? What variations in personnel and equipment have there been?

2. What is the history of the MVR and DLS systems? What are the current and projected conditions? What has influenced the development of the application; have the concepts been used elsewhere?

3. What is the organization of the MVR-DLS application? Who has the systems responsibility, programming responsibility, and responsibility for administrative procedures? How does this area fit into other data processing organizations?

4. What staff are required for this application, including development, operation and administrative? What are the costs of staff?

5. What is the equipment configuration that MVR-DLS is running on? How does billing take place and how are costs assessed?

6. Who are the users of MVR-DLS and how many are there?

7. What have been the objectives of MVR-DLS and how have these changed today?

8. What are the growth plans of the system over the next five years? What changes are anticipated in terms of services, requirements, and organization structure?

9. What changes are anticipated to the system?

10. What are the objectives of management? What needs are foreseen in terms of user service levels and future budgets?

System Objectives

1. What performance criteria do you have for the system (i.e. operating costs, flow times for information, report production, user response times)?

2. What systems or procedures are being processed by the computer?

3. Do the computer systems objectives fit the overall objectives of the MVR-DLS application?

4. Who operates the computer services organization? Is it a department or data processing division, and how is it related to the MVR-DLS system?

5. How satisfied are you with the service provided by the computer services organization?

6. Is the computer system accepted and fully understood by the users? Do users participate in the design or enhancement of the MVR-DLS application? Is there any resistance to change on the part of the operating personnel?

7. Is the morale and attitude of the employees good, and do the employees have a high degree of respect for the management group and other employees?

8. What are the MVR-DLS objectives, long and short-term?

9. How well were they defined when the manufacturers proposed equipment, and how much influence did they have in the selection of equipment?

10. Which manufacturers proposed? Why were they asked?

11. What criteria were used for the selection decision?

12. Have the system objectives changed often?

13. Is a fundamental change in the system envisaged? Does this include a common approach among the three provinces? If so, does management appreciate this?

14. What was the economic justification for this project, and how was it determined?

15. What are the key transaction volumes and file sizes?

Administrative Procedures

1. What paperwork procedures are associated with the MVR-DLS application?

2. What is the typical clerical time required to process each procedure? What is the maximum acceptable delay for each procedure?

3. What volume of transactions do you process daily, weekly, or monthly? How does this volume vary (peak times, peak days)?

4. What use is made of data capture equipment?

5. What are the clerical labour costs of your present procedures?

6. What management reports do you receive? Do you summarize any of the reports? Do you transcribe data from one report to another?

7. What changes would you like to see in the existing reports (content, format, timing)?

8. What additional information is needed by your staff and when is it needed? What source documents originate in your department?

MVR-DLS Characteristics

1. Are there adequate and up-to-date procedures manuals?

2. What difficulties do the clerks have in using the data collection forms? How could the forms be improved?

3. Is the right calibre of staff used? Is the right calibre of supervision exercised?

4. Are there severe peaks in input volume? If so, what is the cause and result?

5. Is the retention period of source documents correct?

6. Are computer-based files the correct size? If not, why not? How many inactive records are waiting for deletion? Is there a wide variation of activity between records?

7. Are there procedures for all types of file modifications?

8. Are file inquiry procedures simple?

9. Does the output meet the needs of the user department? Does the output meet the system objectives?

10. What reports are produced by the system? Do decisions result from the use of each report? If not, what is the use of the report?

11. Who has the responsibility for acting on exception reports produced by the system and what follow-up measures are used to insure that these responsibilities are carried out?

12. Is the output punctual? Is it noticed when it is late? Could it be produced later? Should it be produced later? What is the cause and result of tardy output?

13. Can format and content be varied easily? Can shorter outputs be designed?

14. Should the frequency of output be changed?

15. Do errors get through the system undetected? What is the cause and result? Are errors quickly corrected?

16. Are security and back-up arrangements adequate?

17. What unexpected benefits of the system have been found? Are standards adhered to?

18. Is there a need for training of staff in the use of the system?

19. Is there a good relationship between user departments and the computer operations department?

20. What are the successful and unusual features of the system?

21. What is the format of the input?

22. What is the format of the output (other than reports)?

Operations Environment

1. Is the input medium the right one? Should document reader, magnetic character, or on-line input be considered?

2. Are the files the expected size? Are files on a suitable storage device? How densely packed are the records?

3. Do records contain activity counts? Is there a wide variation of activity between records?

4. Are the programs simple to operate? Are forms line-up and forms change procedures simple?

5. Do the programs require more main memory than is available? Do the programs require additional auxiliary storage? Are the current peripheral devices adequate to meet the real needs and objectives of the system?

6. Are there bottlenecks anywhere in the data processing operations? How are computer operations scheduled?

Organization and Personnel

1. What is the organization structure of the data processing department?

2. What would be the effect of moving the MVR-DLS system to a centralized location?

3. What is the relationship with the systems and procedures department?

4. What are the experience, age, qualifications, salary, of DP personnel?

5. How were DP personnel selected? How were they trained?

6. What methods of output recording and personnel evaluation are used. What promotional incentives are there?

7. How is performance measured?

8. What has been the staff turnover, the reasons and the effect?

9. Where are staff located? How is staff morale?

10. Were DP jobs advertised? Where? What response?

Programming Management

1. What are the programming standards? Consider the following points particularly:

   - block programming
   - coding
   - testing
   - documentation.

2. How are programmers graded?

3. How many programmers have special skills (e.g. Assembler, COBOL, FORTRAN, RPG)?

4. Who developed the program strategy in terms of file organization, special software, program testing?

5. Was any software not provided by the manufacturer?

6. How was the particular programming language selected?

7. When was evaluation done last?

Installation Management

1. What is the planned or installed configuration and what are the associated costs?

2. Is the equipment rented, purchased, or mixed? If purchased, over what period?

3. How are the card, tape and disk libraries organized?

4. What are the contractual arrangements with the equipment supplier?

5. What back-up arrangements have been made?

6. What equipment accounting system is used?

7. When was the installation evaluated?

General

1. What are the future processing requirements of the MVR-DLS application? What new services are you expecting to provide in the next five years?

2. What problems can be foreseen with a common approach in the three provinces?

3. What benefits do you anticipate with a common approach?

4. How would a remote datacentre be accepted? What would be the effect of a remote processor on:

   - files
   - security
   - back-up
   - maintainability of files and programs
   - user service times
   - staff organization?

APPENDIX C

SELECTION CRITERIA

APPENDIX C

SELECTION CRITERIA

Each alternative, including the existing system, was evaluated according to a set of criteria established by the Joint Working Committee, on October 5, 1972. The criteria were chosen to reflect the objectives of motor vehicle operations.

The criteria were chosen from several points of view:

- governmental policy-making;
- motor vehicle administration;
- data processing administration.

Weights for each criterion were assigned by DCF Systems based on interviews conducted in each province. Two sets of weights were considered, reflecting a highway safety bias and a revenue collection bias. The scoring results, using the two sets of criteria, were compared and found to be approximately the same. The first set of weights, those reflecting highway safety, are included in this report.

In scoring the alternatives, each case was ranked on a scale of 10 for its ability to meet motor vehicle objectives according to each criterion. The rankings were multiplied by the weights of each criterion and the results added by case number. A percentage score was obtained by dividing the individual scores by the maximum possible score. The maximum possible score was calculated by assuming the best possible ranking, 10, for each criterion.

The criteria are:

C1 - Cost
C2 - Security
C3 - Program Maintenance
C4 - File Maintenance
C5 - Staff Quality

C6 - Privacy
C7 - Flexibility
C8 - Growth Potential
C9 - Accessibility
C10 - Response Time
C11 - Extensibility
C12 - Operational Simplicity
C13 - Ease of Development
C14 - Ability to Meet Objectives
C15 - Contribution to Co-operation.

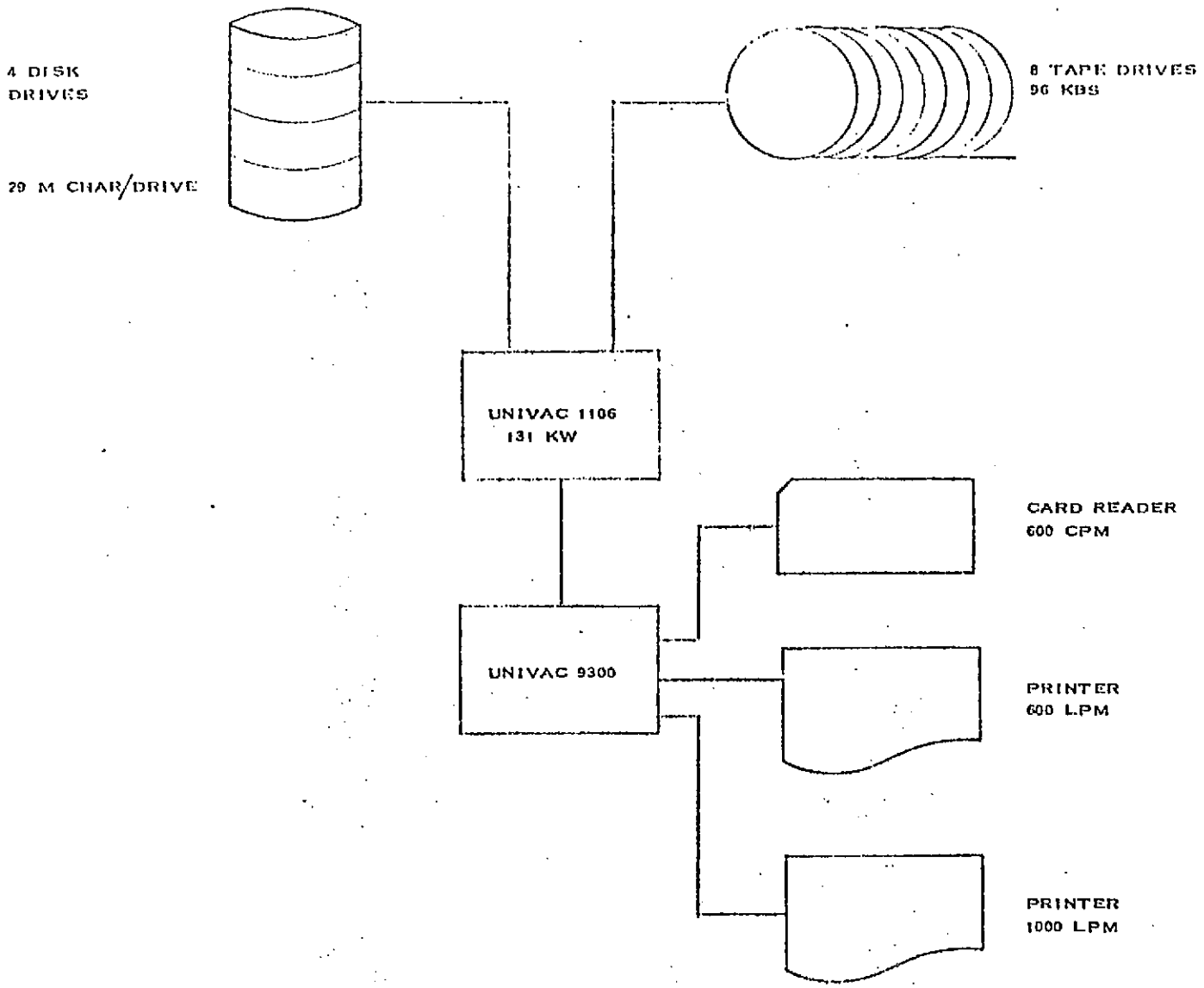
		ALTERNATIVES				
CRITERIA	RELATIVE IMPORTANCE OF EACH CRITERION	1	2	3	4	5
C1	7	9	1	3	5	0
C2	3	7	6	5	7	6
C3	5	5	4	6	7	8
C4	5	5	4	7	6	4
C5	7	5	6	7	5	6
C6	9	5	4	4	4	4
C7	7	3	2	5	6	4
C8	7	1	0	2	6	4
C9	8	2	5	1	4	9
C10	8	2	4	1	9	10
C11	3	3	0	6	7	2
C12	7	3	5	2	4	8
C13	4	10	9	8	0	3
C14	10	7	4	7	9	10
C15	8	2	5	6	7	8
WEIGHTED TOTAL	980	430	380	433	575	602
%	100	44	39	44	59	61

		ALTERNATIVES			
CRITERIA	RELATIVE IMPORTANCE OF EACH CRITERION	6	7	8	9
C1	7	3	10	3	8
C2	3	4	4	6	5
C3	5	8	8	3	8
C4	5	8	8	3	8
C5	7	8	7	7	6
C6	9	3	3	3	2
C7	7	9	8	1	2
C8	7	10	7	6	7
C9	8	7	7	2	3
C10	8	9	8	3	2
C11	3	9	8	3	4
C12	7	6	6	3	4
C13	4	2	2	1	2
C14	10	9	9	3	2
C15	8	10	9	4	5
WEIGHTED TOTAL	980	704	699	330	422
%	100	72	71	34	43

APPENDIX D

TECHNICAL FEASIBILITY

CASE 1

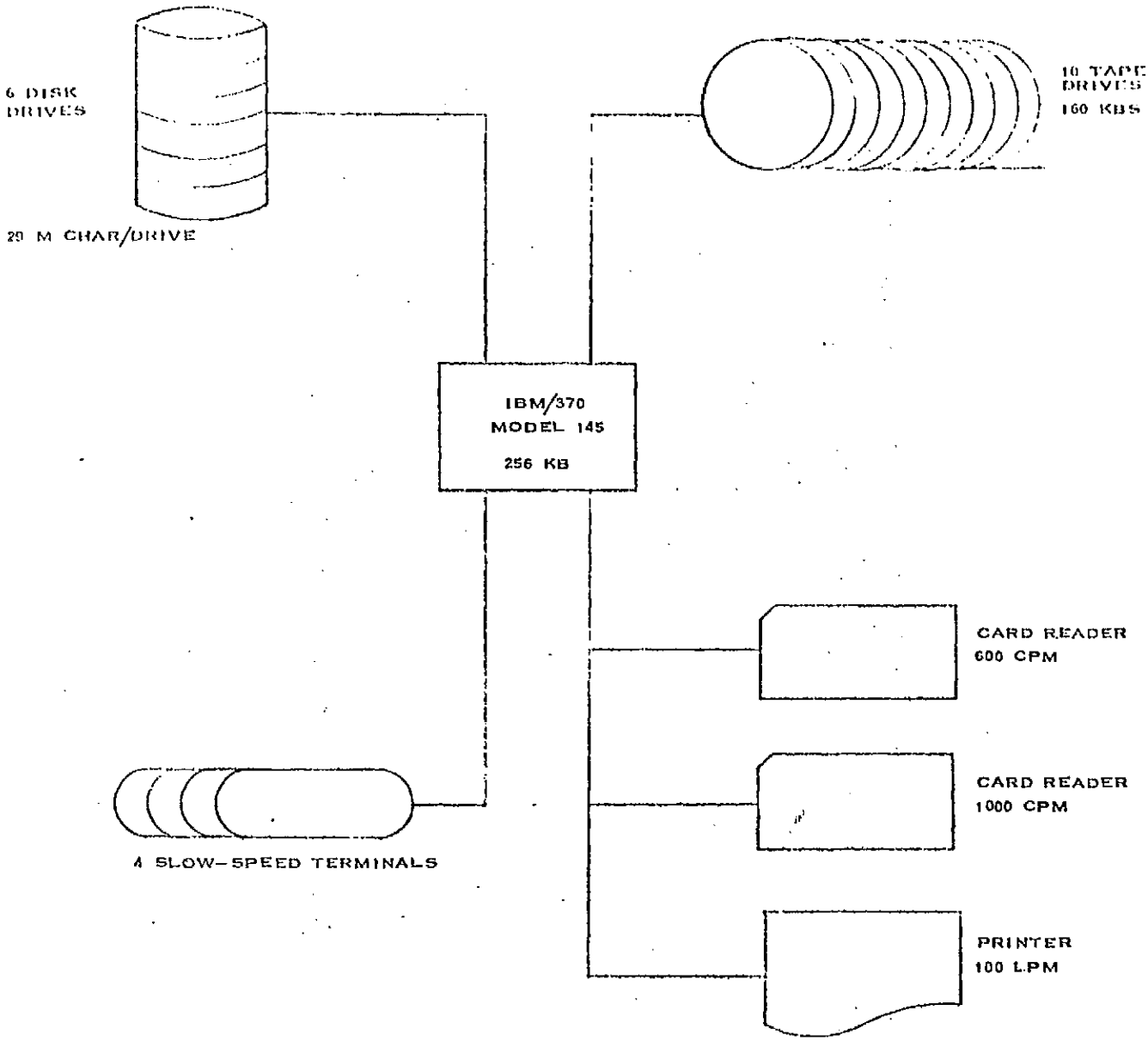


NEW BRUNSWICK COMPUTER CONFIGURATION

LEGEND

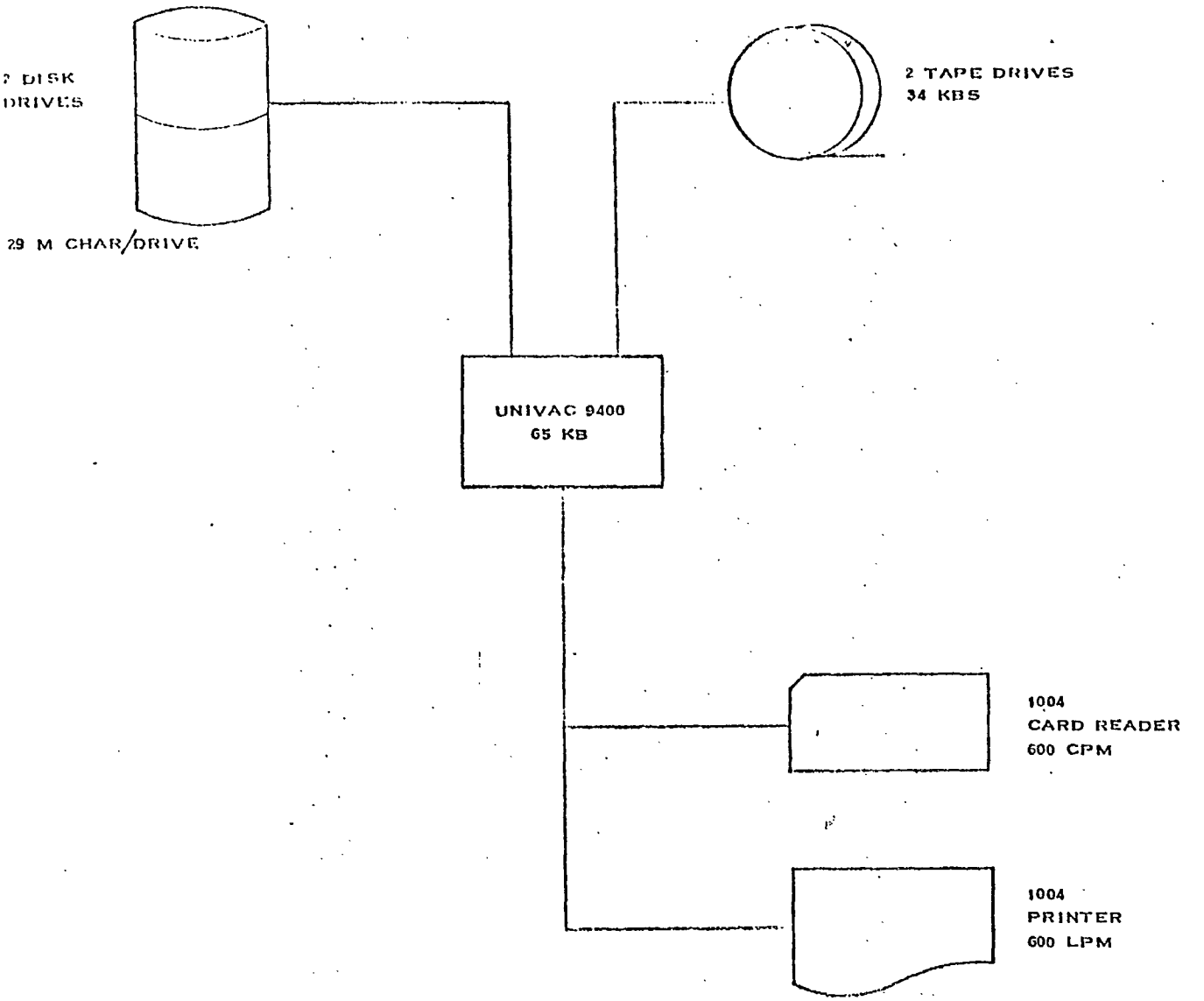
M CHAR	–	MILLION CHARACTERS
KBS	–	KILOBYTES PER SECOND
CPM	–	CARDS PER MINUTE
LPM	–	LINES PER MINUTE
KW	–	1,024 WORDS OF MEMORY
KB	–	1,024 BYTES OF MEMORY

CASE 1



NOVA SCOTIA COMPUTER CONFIGURATION

CASE 1



PRINCE EDWARD ISLAND COMPUTER CONFIGURATION

TECHNICAL FEASIBILITY

Case 1 - Existing Systems

The current systems operating in the motor vehicle administrations are included as a basis for comparing costs and benefits with those of other alternatives. All the current systems are meeting legislative requirements but they are experiencing problems in handling changes to motor legislation and growth in registrations.

Specific problems with these systems include inadequate data control of documents submitted to data processing, inadequate forms design and lack of expansion room for manual files.

Peak processing volumes of vehicle registrations are causing backlogs in filing during January to March in each province. This backlog results in a slow response in providing management vehicle registrations in Prince Edward Island. In addition, filing of registrations and licenses is delayed in New Brunswick. Permanent registrations and licenses are produced at the time of fee payment so that no inconvenience is being experienced by the public.

High error rates in data input to the computer are slowing the processing of registrations and driver license applications in Nova Scotia. The same errors are slowing the processing of driver licenses in New Brunswick and currently a four-month backlog of errors exists.

Service levels to users of motor vehicle records in all provinces are satisfactory. Because of misfilings of driver records, about 5% of inquiries receive delayed responses in New Brunswick

Problems existing in each of the motor vehicle administrations are causing all staffs to work near peak efficiency. Casual labour is required during periods of high activity.

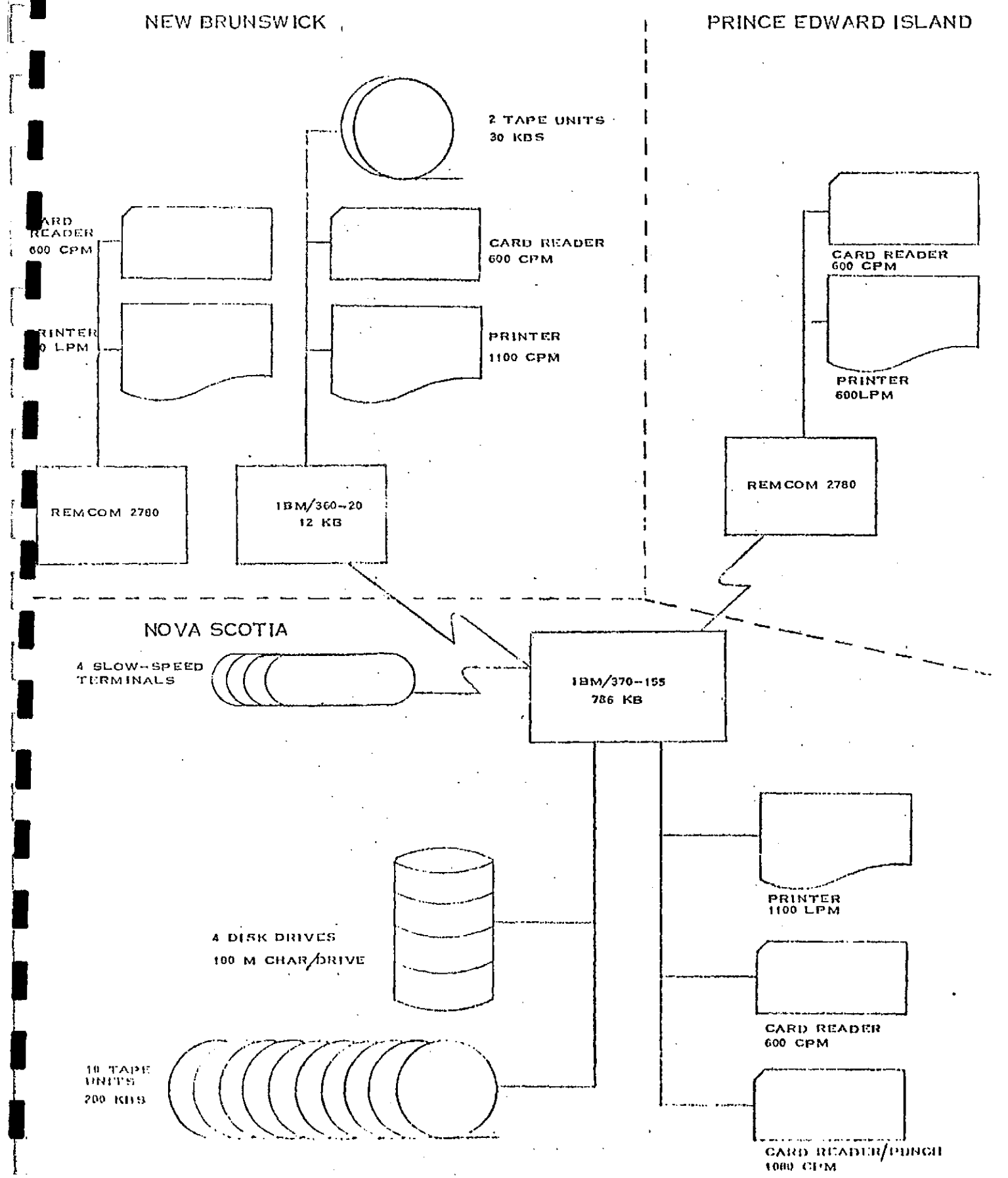
Case 2 - Dedicated System

To process all existing motor vehicle applications on a separate machine requires a separate computer operation and system support organization. The total costs of the installation would be added to the current costs of each of the three data processing organizations.

To process the current volumes for all provinces, an IBM System 360, Model 25, computer is required. The processing volume would be about twice the current volume in Nova Scotia and would require about 20% of an IBM System 360, Model 40, computer. This volume could be handled on a Model 25.

The additional costs over current levels would be at least $15,000 a month for equipment, including the cost of support staff. Because of the additional resources required, this alternative is not practical.

CASE 3


NEW BRUNSWICK
PRINCE EDWARD ISLAND
2 TAPE UNITS
30 KBS
CARD READER
600 CPM
PRINTER
1100 CPM
CARD READER
600 CPM
PRINTER
600LPM
REMCOM 2780
IBM/360-20
12 KB
REMCOM 2780
NOVA SCOTIA
4 SLOW-SPEED
TERMINALS
IBM/370-155
786 KB
PRINTER
1100 LPM
4 DISK DRIVES
100 M CHAR/DRIVE
CARD READER
600 CPM
10 TAPE
UNITS
200 KBS
CARD READER/PUNCH
1080 CPM

Case 3 - Combined System

The computers in Nova Scotia and New Brunswick are approximately the same size and speed. Each computer is being used two shifts per day. The Prince Edward Island machine is being used slightly more than one shift per day. If the computing resources were combined to operate on one machine, the total processing requirements would be approximately four shifts per day on either the Nova Scotia or the New Brunswick machine. Even if improvements were made to speed up the processing through replacement of tapes and disks with faster devices, one machine could not handle all the work for the three provinces.

In addition, because most of the programs operating on the Nova Scotia machine are written in a language closely related to the structure of the machine itself, these programs cannot run on the New Brunswick machine which has an entirely different logical structure. Programs operating on the New Brunswick and Prince Edward Island computers are written in a language which can be used on all of the machines and require a minimum conversion effort in moving from one machine to the other. To combine all data processing in the three provinces on a single machine would, therefore, require a larger model of the IBM line which is compatible with the existing computer in Nova Scotia. The choices are a System 370, Model 155 or Model 158. The Model 158 contains all the features currently present on the Model 145 in Nova Scotia but is more expensive than the Model 155. Because the Model 155 can process all the programs in the three provinces, it was chosen for consideration in this alternative.

Most data processing programs in the three provinces are limited in the speed of their execution by printing of output. The total printing per month in New Brunswick is 13 million lines. To accommodate this volume of printing, two high-speed printers are required. In addition, many of the data input stations in New Brunswick are key-to-tape machines. Therefore, to process

computer work remotely from Fredericton, a terminal is required which includes a high-speed printer and a magnetic tape unit, as well as card reading equipment. In the configuration shown, therefore, a Model 20 computer terminal with a high-speed printer, a magnetic tape drive and a card reader is specified, together with a Remcom remote job entry terminal which includes a printer and a card reader. Because of the data volumes processed by the Model 20, a 9600 bit per second data communication circuit is required to communicate with the central Model 155. The Remcom unit requires a 4800 bit per second data communication circuit.

Prince Edward Island requires a printing and card reading capacity equal to that of their current installation. This can be satisfied by a Remcom remote job entry station which includes a printer and card reading unit. A 4800 bit per second communication circuit is required to communicate between Charlottetown and Halifax.

The conversion of New Brunswick programs to the Model 155 requires the same effort as the conversion currently underway. Prince Edward Island requires less conversion effort since it was necessary to convert languages as well as machines to move to their present system. The programs now running on their computer can be converted easily to the Model 155. The conversion effort for Nova Scotia is negligible since the Model 155 is directly compatible with the existing Nova Scotia installation.

With current processing volumes in all three provinces, only one shift of Model 155 time is required. This provides capacity for substantial growth in the future. Also, a basis for data communications among the provinces is established. The basic data communication facility for this configuration would be adaptable at small additional cost for other terminal-based applications, such as the welfare system planned for New Brunswick.

The training of operations personnel in the use of remote computer terminals is minimal. There is no increase in training

required for existing operators in Prince Edward Island or in New Brunswick and little additional training of Nova Scotia personnel to operate a central computer is required.

It is assumed that no change would occur to data processing staff other than computer operators in each province. The same number of keypunch operators, data entry stations and systems design personnel is required.

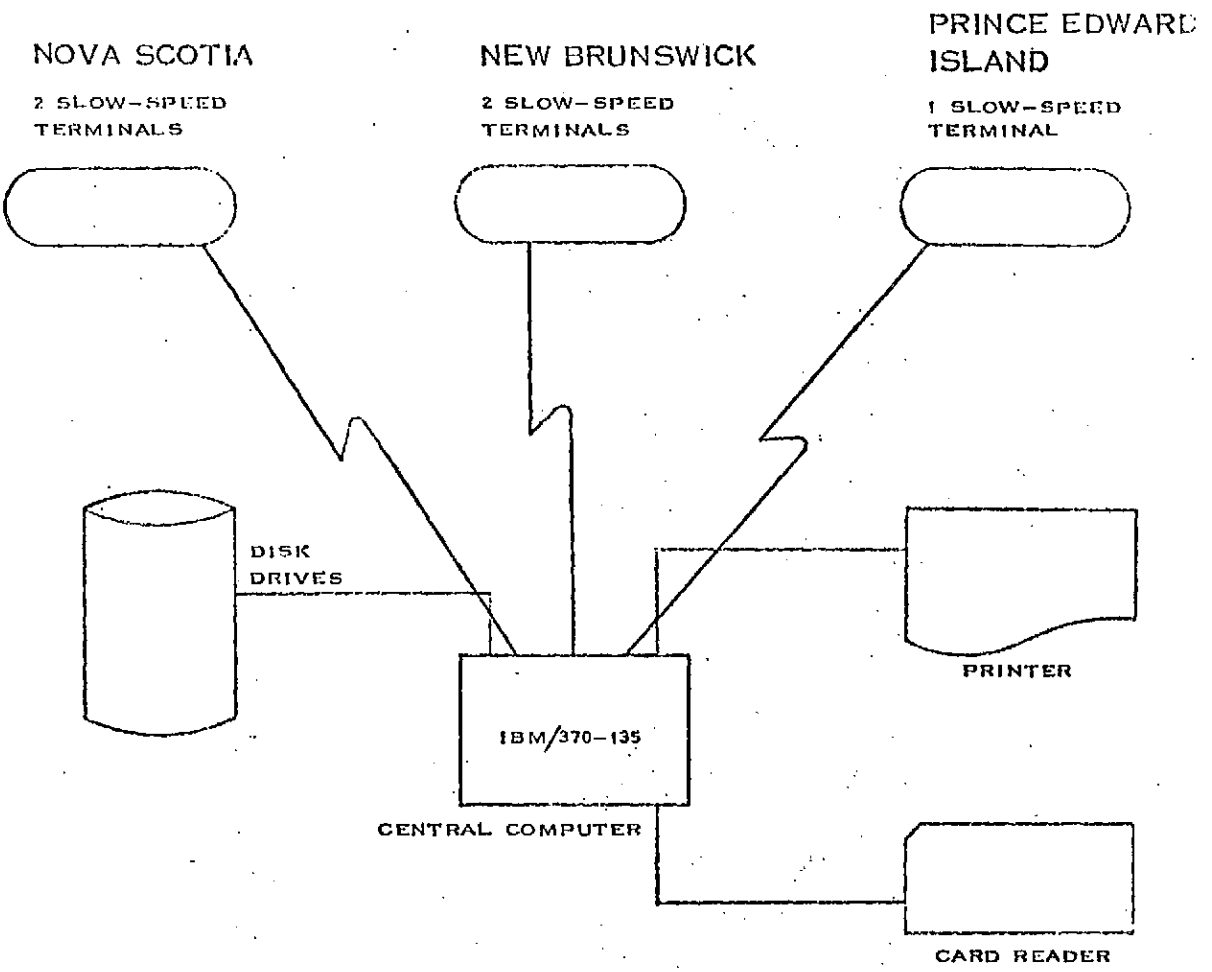
Disadvantages of this alternative are that no improvement to existing administrative functions in the motor vehicle organizations would occur. In addition, users of data processing equipment may be concerned about having their master files resident outside the province.

Case 4 - Uniform System on Three Existing Machines

A uniform motor vehicle system operating on the three existing computers would require no changes to the current configurations. Significant improvements in motor vehicle operations would occur with a properly designed uniform system, but because the machines on which the uniform systems would operate are differently structured, three separate sets of programs for the uniform system must be developed. The developments would occur separately in each province resulting in considerable redundancy. Also, eventual combining of the three systems to operate on a single machine would be difficult.

Because of the overlapping of effort in system development and the differing requirements of the individual computers, a truly uniform system would not result. Great co-operation would be required among the provinces to develop a system which truly fits the requirements of all three provinces. This alternative is not practical.

CASE 5


NOVA SCOTIA
2 SLOW-SPEED TERMINALS
NEW BRUNSWICK
2 SLOW-SPEED TERMINALS
PRINCE EDWARD ISLAND
1 SLOW-SPEED TERMINAL
DISK DRIVES
PRINTER
IBM/370-135
CENTRAL COMPUTER
CARD READER

Case 5 - Uniform System on a Separate Machine

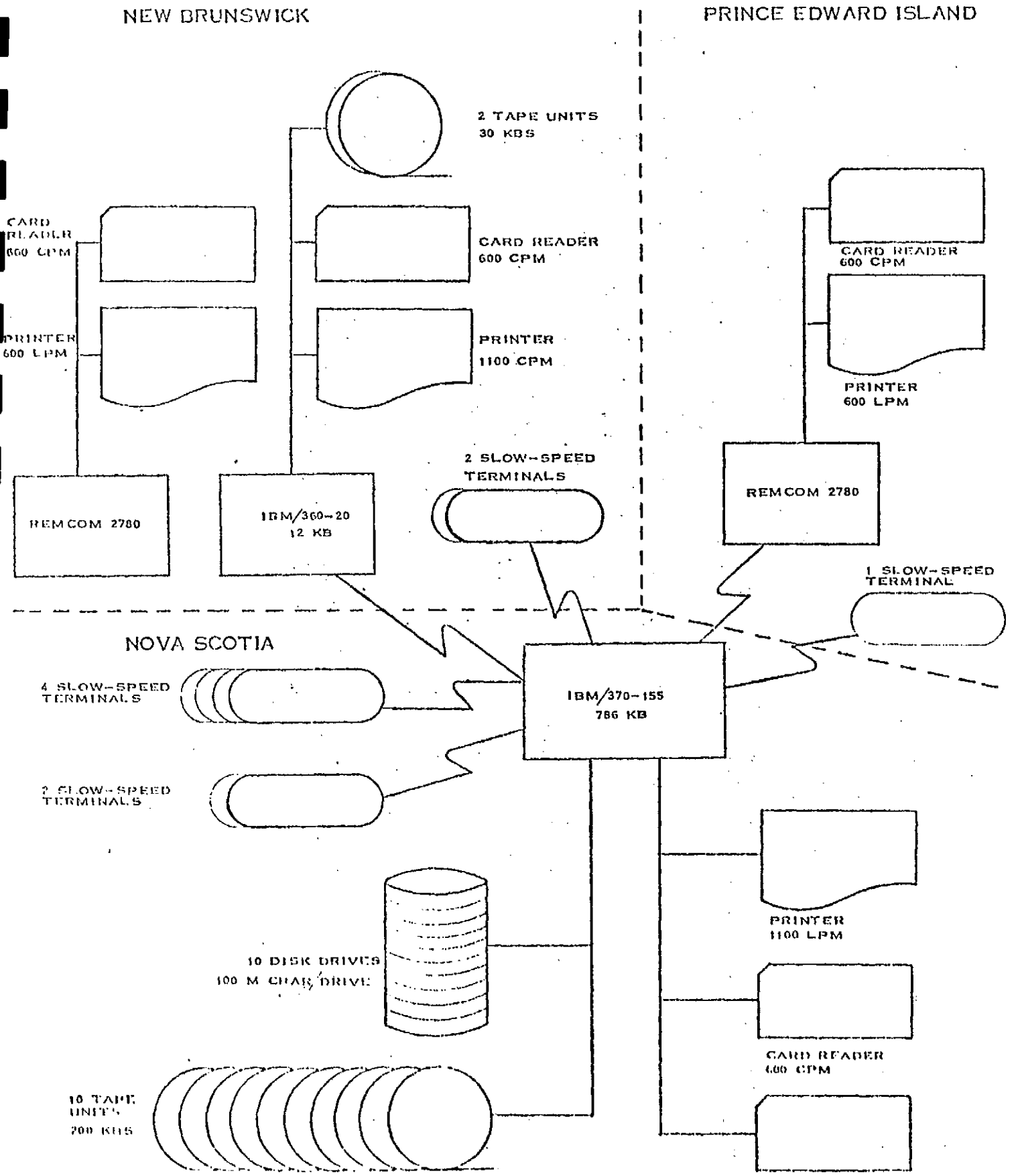
A computer such as an IBM/370-135 is necessary to process the data for a uniform motor vehicle and driver licensing system. In this case, no other applications will be run on the machine. The master files must be kept on disks to service the inquiries from the five slow-speed terminals located in Halifax, Fredericton and Charlottetown.

In this alternative, each province retains its present data processing equipment. Since only the motor vehicle application operates on the separate computer, the users have full control of the operation. They can determine what modifications and extensions to the system are necessary and set the priorities for implementing them. In addition, the data processing staff will develop expertise in motor vehicle applications and will be able to respond quickly to requests for changes.

Although this alternative is technically feasible, it is impractical. The operating costs for a separate machine, such as an IBM/370-135, are prohibitive for only one application.

No economies of scale are possible and expansion to any other application is impossible since the machine is almost fully utilized at the outset. In addition, system development costs are high.

CASE 6


NEW BRUNSWICK
PRINCE EDWARD ISLAND
2 TAPE UNITS
30 KBS
CARD READER
600 CPM
CARD READER
600 CPM
PRINTER
600 LPM
PRINTER
1100 CPM
CARD READER
600 CPM
PRINTER
600 LPM
2 SLOW-SPEED
TERMINALS
REMCOM 2780
IBM/360-20
12 KB
REMCOM 2780
1 SLOW-SPEED
TERMINAL
NOVA SCOTIA
4 SLOW-SPEED
TERMINALS
IBM/370-155
786 KB
2 SLOW-SPEED
TERMINALS
PRINTER
1100 LPM
10 DISK DRIVES
100 M CHAR/DRIVE
CARD READER
600 CPM
10 TAPE
UNITS
200 KBS

Case 6 - Uniform System on a Single Machine With All Other Data Processing Applications

Case 6 requires the same basic computer configuration as Case 3; namely, an IBM/370-155 in Nova Scotia, an IBM/360-20 and Remcom 2780 in New Brunswick, and a Remcom 2780 in Prince Edward Island. However, since a uniform system will also run on the computer, additional equipment is needed.

Currently, Nova Scotia prepares about 50,000 driver record abstracts annually and responds to a similar number of inquiries for motor vehicle and driver licensing information. Many of these latter inquiries do not require a hard copy print. On this basis, we estimate that two slow-speed terminals are necessary in Nova Scotia and New Brunswick and one in Prince Edward Island. Because of the volume of inquiries, dedicated communication lines between the terminal and the computer are necessary.

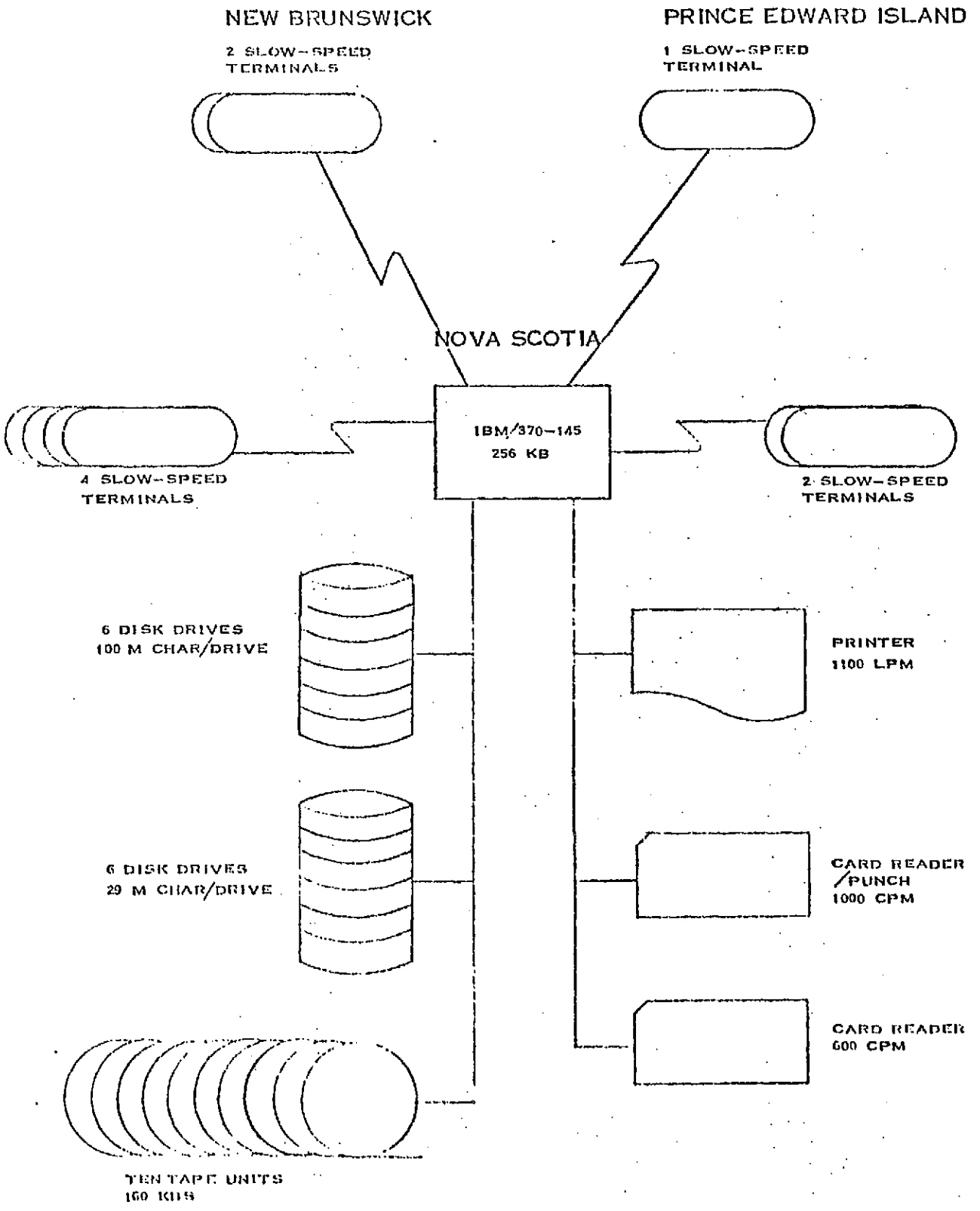
To support on-line inquiry, the driver licensing and motor vehicle files must use disk storage. Based on current volumes for the three provinces and the size of the Nova Scotia master file, we estimate that six large capacity disk units are necessary.

A uniform system for the three provinces can be developed. The basic functions of driver license renewals, vehicle registrations, accounting and driving record maintenance are similar in the three provinces. Variations in forms design, fee structures, demerit point rates, and other requirements can be accommodated through the use of separate programs. A uniform system with on-line inquiry facilities would answer many of the needs of the motor vehicle and driver licensing organizations in each province.

However, a uniform system which includes on-line inquiry facilities is expensive to develop. We estimate that it would require about 17 man-years of effort. (See Appendix E, Note 5, page 82, for more details.)

As indicated in Case 3, an IBM/370-155 is necessary as a common machine to run the three provinces' data processing applications. Even when we include the uniform motor vehicle system with the other applications, only one shift of an IBM/370-155 is required.

CASE 7


NEW BRUNSWICK
2 SLOW-SPEED TERMINALS
PRINCE EDWARD ISLAND
1 SLOW-SPEED TERMINAL
NOVA SCOTIA
IBM/370-145
256 KB
4 SLOW-SPEED TERMINALS
2 SLOW-SPEED TERMINALS
6 DISK DRIVES
100 M CHAR/DRIVE
6 DISK DRIVES
29 M CHAR/DRIVE
TEN TAPE UNITS
PRINTER
1100 LPM
CARD READER /PUNCH
1000 CPM
CARD READER
600 CPM

Case 7 - A Uniform System on the Nova Scotia Machine

In this alternative, a uniform system would be developed to run on the IBM/370-145 located in Halifax. To support on-line inquiry, six large capacity disk units to store the driver licensing and motor vehicle master files must be added to the present Nova Scotia computer configuration.

The other provinces would retain their present equipment and add slow-speed terminals for on-line inquiry purposes.

This alternative provides the advantages of a uniform system on one machine as discussed in Case 6. However, the addition of the uniform motor vehicle system to the Nova Scotia computer would add about one shift of processing work to the IBM/370-145. The Nova Scotia machine which is used for almost two shifts now would be reaching its capacity. If Nova Scotia continued to develop new applications, a new computer system would soon have to be considered.

Case 8 - Modified Nova Scotia System on Three Machines

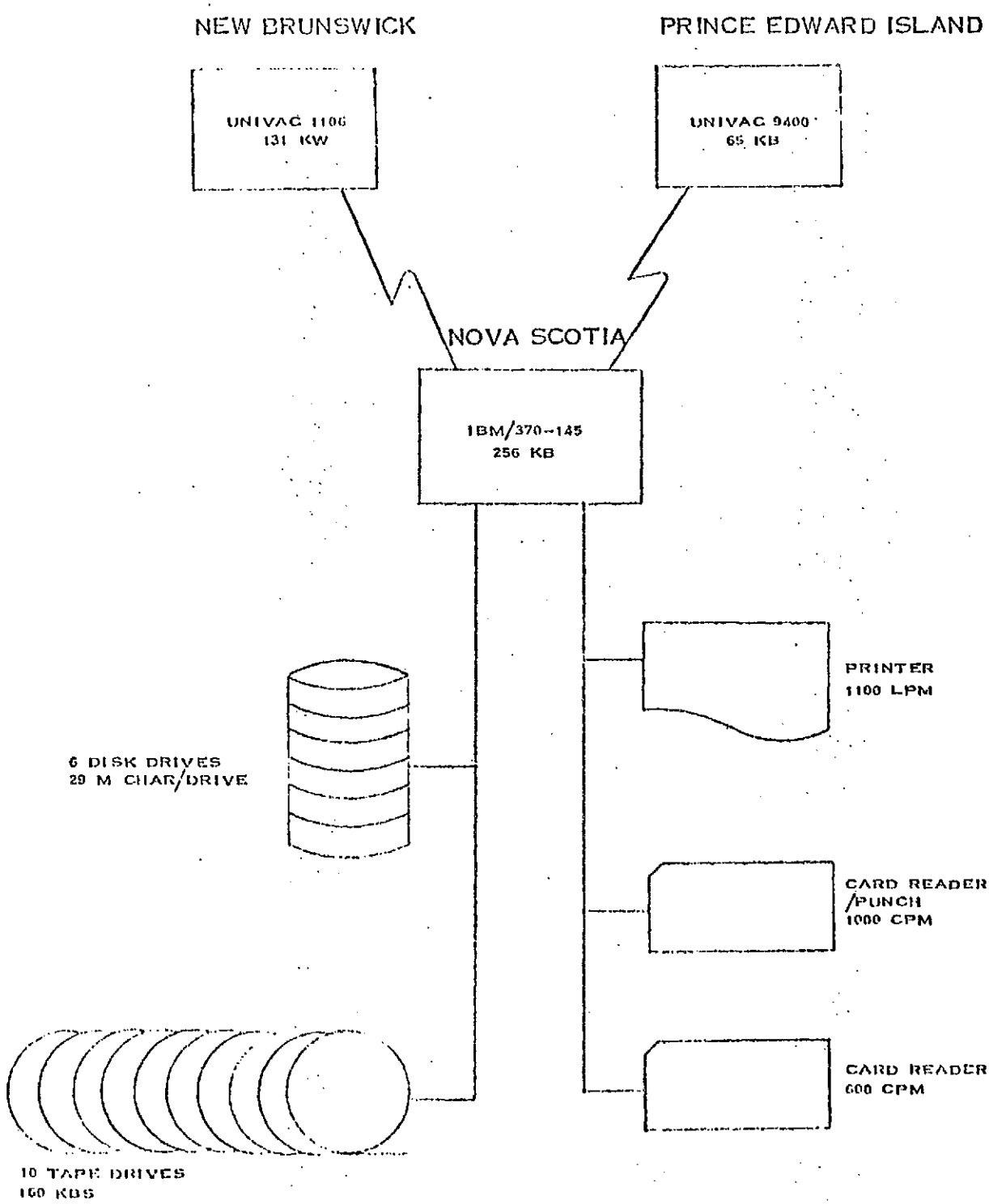
In this alternative, no equipment changes are required for any one of the three existing systems. A modified version of the present Nova Scotia motor vehicle system would be developed to run on each of the machines individually. No communication equipment is necessary.

The existing Nova Scotia system must be improved before modifications can be considered. Since the system was originally designed to operate on a daily basis and is currently running once a week, certain time delays in issuing permits and licenses have occurred. These delays are not acceptable to the other two provinces. The Nova Scotia system, in its current state, is not flexible enough to allow modifications to meet New Brunswick and Prince Edward Island requirements.

In addition to extensive systems changes to the Nova Scotia system, the system would need to be converted to run on Univac equipment. The Nova Scotia motor vehicle system is written in a computer language closely related to the structure of the machine. Conversion to Univac equipment would be time-consuming and expensive. The other alternative is to rewrite a modified version in a high level language common to all three machines. Conversion to Univac equipment would then not be as difficult, but the development of a modified system would be expensive.

Running a similar system on three machines means that three separate groups of people are required to maintain the computer programs and that changes initiated in one province may not be implemented in another province's system for some time. The problems associated with maintaining an identical system for three different computers make this alternative operationally impractical.

CASE 9


NEW BRUNSWICK
PRINCE EDWARD ISLAND
UNIVAC 1106
131 KW
UNIVAC 9400
65 KB
NOVA SCOTIA
IBM/370-145
256 KB
PRINTER
1100 LPM
6 DISK DRIVES
29 M CHAR/DRIVE
CARD READER
/PUNCH
1000 CPM
CARD READER
600 CPM
10 TAPE DRIVES
160 KBS

Case 9 - A Modified Nova Scotia System on One Machine

In this alternative, a modified system as described in Case 8 would be developed for one machine, the IBM/370-145 in Nova Scotia. The Univac 1106 in New Brunswick and the Univac 9400 in Prince Edward Island would require certain changes to allow them to communicate with the Nova Scotia machine. Since communication with the Nova Scotia computer is not required continuously, switched communication lines are suitable.

This case has an advantage over Case 8 since it can be implemented on one machine. However, as mentioned in Case 8, extensive modifications to the Nova Scotia system are necessary to incorporate New Brunswick and Prince Edward Island requirements. We estimate that four man-years of work are required. (See Appendix E, Note 5, page 82, for more details.) Also, a modified system does not achieve all the requirements of the three motor vehicle and driver licensing organizations.

APPENDIX E

COST ANALYSIS OF ALTERNATIVES

APPENDIX E

COST ANALYSIS OF ALTERNATIVES

This appendix contains a chart of estimated costs for six of the alternatives and notes explaining the details of these costs.

Cost estimates for computer hardware were obtained from two sources. If the hardware is currently operating in any of the provinces, we have used the actual costs. When additional hardware is required for an alternative, we estimated the rental price as follows:

1. We used the manufacturer's U.S. prices as a basis.

2. If a long-term lease is available, we used the price quoted in the lease. IBM offers a two-year, fixed term plan lease on peripherals only. Univac gives a 25% reduction on all 1106 hardware and a 15% reduction on all 9400 hardware if a five-year lease is taken. In addition, for Univac, maintenance charges are then added to the price whereas IBM includes the maintenance charges in their quoted prices.

3. To this total we have added 11% to obtain Canadian prices. The manufacturers indicated that the price differential from the U.S. to Canada is normally 15 - 20%, depending on the hardware. Since a federal tax rebate of 4.1% is given to provincial governments, we have used 11% as an approximation to the conversion factor.

COST ANALYSIS OF ALTERNATIVES

NOVA SCOTIA	Case 1	Case 3	Case 4	Case 6	Case 7	Case 9
Data Processing Costs						
1. Computer IBM/370-145 (Note 1)	29.2		29.2		29.2	29.2
2. Computer operations	7.8		7.8		7.8	7.8
3. Computer support	24.7	24.7	24.7	24.7	24.7	24.7
4. Space	2.0	2.0	2.0	2.0	2.0	2.0
5. Supplies and equipment	9.9	9.9	9.9	9.9	9.9	9.9
6. Data preparation and control	16.5	16.5	16.5	16.5	16.5	16.5
7. Additional hardware and disk storage (Note 2)			4.4		5.6	
8. Two terminals IBM 2741 and corresponding data communication equipment (Note 3)			.5	.5	.5	
9. Hardware to facilitate U1106-/370-145 and U9400-/370-145 communications (Note 4)						.2
10. Conversion and development costs (Note 5)			3.4	1.6	1.6	
SUB-TOTAL	90.1	53.1	98.4	55.2	97.8	90.3
Motor Vehicle and Driver Licensing Costs						
1. Data preparation, data control, filing and inquiry cost (Note 6)	27.5	27.5	20.2	20.2	20.2	27.5
2. Supplies & equipment (Note 6)	26.5	26.5	26.5	26.5	26.5	26.5
3. Space (Note 6)	3.8	3.8	3.8	3.8	3.8	3.8
SUB-TOTAL DIRECT COSTS	57.8	57.8	50.5	50.5	50.5	57.8
TOTAL	147.9	110.9	148.9	105.7	148.3	148.1

NEW BRUNSWICK	Case 1	Case 3	Case 4	Case 6	Case 7	Case 9
Data Processing Costs						
1. Computer Univac 1106 (Note 7)	24.0		24.0		24.0	24.0
2. Computer operations (Note 8)	9.6	7.6	9.6	7.6	9.6	9.6
3. Computer support	16.5	16.5	16.5	16.5	16.5	16.5
4. Space	2.0	2.0	2.0	2.0	2.0	2.0
5. Supplies and equipment	8.7	8.7	8.7	8.7	8.7	8.7
6. Data preparation and control	28.8	28.8	28.8	28.8	28.8	28.8
7. Additional hardware, core and disk storage (Note 9)			8.4			
8. Additional hardware to communicate with /370-145 (Note 10)						1.5
8a. Data lines and data sets (Note 10)						.4
9. Two terminals - IBM/360-20 and Remcom (Note 11)		5.2		5.2		
9a. Two data lines, Fredericton - Halifax (Note 11)		1.6		1.6		
9b. Data communication equipment (Note 11)		1.6		1.6		
10. Two terminals Univac DCT 500, corresponding data communication equipment and data lines (Note 3)			1.1	1.8	1.8	
11. Conversion and development costs (Note 5)		1.4	3.7	3.3	1.9	.9
SUB-TOTAL	89.6	73.4	102.8	77.1	93.3	92.4
Motor Vehicle and Driver Licensing Costs						
1. Data preparation, data control, filing and inquiry cost (Note 12)	21.1	21.1	16.1	16.1	16.1	20.3
2. Supplies & equipment (Note 12)	8.8	8.8	8.8	8.8	8.8	8.8
3. Space (Note 12)	2.5	2.5	1.5	1.5	1.5	2.5
SUB-TOTAL DIRECT COSTS	32.4	32.4	26.4	26.4	26.4	31.6
TOTAL	122.0	105.8	129.2	103.5	119.7	124.0

PRINCE EDWARD ISLAND	Case 1	Case 3	Case 4	Case 6	Case 7	Case 9
Data Processing Costs						
1. Computer Univac 9400 (Note 13)	6.0		6.0		6.0	6.0
2. Computer Operations (Note 14)	1.0	.5	1.0	.5	1.0	1.0
3. Computer support	10.0	10.0	10.0	10.0	10.0	10.0
4. Space	1.1	1.1	1.1	1.1	1.1	1.1
5. Supplies and equipment	0.5	0.5	0.5	0.5	0.5	0.5
6. Data preparation and control	5.4	5.4	5.4	5.4	5.4	5.4
7. Additional memory and disk capacity (Note 15)			1.8			
8. Additional hardware and core to communicate with /370-145 (Note 16)						1.1
8a. Data lines and data sets (Note 16)						.3
9. One terminal - Remcom (Note 17)		1.2		1.2		
9a. One data line Charlottetown to Halifax (Note 17)		.7		.7		
9b. Data communication equipment (Note 17)		.5		.5		
10. One terminal IBM 2741, corresponding data communication equipment and data lines (Note 3)			.4	.7	.7	
11. Conversion and development (Note 5)		.3	3.5	2.0	1.7	.6
SUB-TOTAL	24.0	20.2	29.7	22.6	26.4	26.0
Motor Vehicle and Driver Licensing Costs						
1. Data preparation, data control, filing and inquiry cost (Note 18)	6.0	6.0	4.7	4.7	4.7	5.6
2. Supplies & equipment (Note 18)	2.0	2.0	2.0	2.0	2.0	2.0
3. Space (Note 18)	1.1	1.1	1.1	1.1	1.1	1.1
SUB-TOTAL DIRECT COSTS	9.1	9.1	7.8	7.8	7.8	8.7
TOTAL	33.1	29.3	37.5	30.4	34.2	34.7

CENTRAL COMPUTER	Case 1	Case 3	Case 4	Case 6	Case 7	Case 9
Data Processing Costs						
1. Computer IBM/370-155 (Note 19)		48.7		48.7		
2. Computer operations (Note 19)		9.3		9.3		
3. Additional hardware and disk storage (Note 20)				6.3		
TOTAL		58.0		64.3		

NOTES ON COST ANALYSIS OF ALTERNATIVES

Note 1

The IBM/370-145 has the following characteristics and peripheral equipment:

- 262,114 bytes of main storage
- 1 console printer keyboard
- 2 2319 disk storage
- 6 2420 magnetic tape drives (160KB)
- 1 card reader/punch (1,000 CPM read and 300 CPM punch)
- 1 card reader (600 CPM)
- 1 1100 LPM printer and train cartridge
- 1 tape control unit
- 1 control unit for printer and card reader/punch
- 1 transmission control unit
- 4 terminals IBM 2741

Note 2

The IBM/370-145 requires the following additional hardware and disk storage if a uniform system is developed for it:

	Case 4		Case 7	
	Qty	Price	Qty	Price
6983 Selector Channel	1	$ 243	1	$ 243
1423 Block Multiplexor Channel Feature	1	No Chge	1	No Chge
3345 Model 3 Disk Storage Control Frame	1	1,250	1	1,250
3333 Disk Storage and Control	1	1,385	1	1,385
3330 Disk Storage	1	1,092	2	2,184
		$3,970 (U.S.$)		$5,062 (U.S.$
Add 11% to convert to Canadian prices =		$4,407/month		$5,619/month

Note 3

Slow-speed typewriter communication terminals, such as the IBM 2741 or Univac DCT 500, are required for inquiries into a uniform system (Case 4, Case 6 and Case 7). On the basis of 50,000 requests annually in Nova Scotia for abstracts of driver records plus a similar number of inquiries to determine the status of a driver or vehicle, we estimate that five terminals are needed - one for Prince Edward Island and two each for Nova Scotia and New Brunswick.

The following data communication equipment, terminals, and data lines are required for a uniform system:

Case 4

Nova Scotia

2 Terminals IBM 2741	$ 230
4 103F Data Sets	120
2 Line Adapters for /370-145	100
	$ 450/month

New Brunswick

2 Terminals Univac DCT 500, including Modems	$ 350
1 Communication Terminal Module Controller and 1 CTM Low Speed Modem for Univac 1106	719
	$1,069/month

Prince Edward Island

1 Terminal Univac DCT 500, including Modems	$ 175
1 Communication Adapter and 1 Line Terminal Control for 9400	154
1 103F Data Set	30
	$ 359/month

Case 6, Case 7

	Nova Scotia		New Brunswick		Prince Edward Island	
	Quantity	Price	Quantity	Price	Quantity	Price
Schedule 4 Circuit Data Lines			2 Fredericton to Halifax	$1,374	1 Charlottetown to Halifax	$ 502
103F Data Sets	4	$ 120	4	120	2	60
Line Adapters	2	100	2	100	1	50
IBM 2741 Terminals	2	230	2	230	1	115
TOTALS		$ 450		$1,824		$ 727

Note 4

The IBM/370-145 requires the following configuration changes in order to communciate with the Univac 1106 and Univac 9400:

3705 Communications Controller Model A1	$ 980
1302 Attachment Base	15
1541 Channel Adapter	85
1642 Communication Scanner	150
4701 Line Interface Base	35
4711 Line Set Type 1A (2)	30
4714 Line Set Type ID	50
	$1,345
Add 11% to convert to Canadian prices =	$1,493
Less current 2702 Transmission Control charges	1,340
Increase in Monthly Charges	$ 153

Note 5

Development Costs

Case 4, Case 6, Case 7

A uniform system will consist of a minimum of the following programs or modules:

- 1 major edit
- 1 update for driver license master
- 1 update for vehicle history master
- 1 update for accident master, inspections master, convictions master and driver examination master
- 1 update for fee accounting master
- 12 report modules to produce the statistical analysis reports, fee accounting reports, master lists, renewals and permanent licenses and permits
- 8 inquiry modules to respond to the queries into the system.

We estimate that a minimum of 17 man-years are needed to design the data base, analyze and design the system, program, test and implement the system if it is to run on one machine (Case 6 and Case 7). This is divided into 8 man-years for the on-line inquiry modules and 9 man-years for the remainder of the system. Using analyst costs of $75 per day, the development effort will amount to $320,000. If the development is amortized over eight years, the per month cost is $3,300. In addition, one person will be required to maintain the system throughout its life at a cost of $1,000 per month. We have allocated the development cost equally among the three provinces at about $1,400 per month.

If the uniform system is to be implemented on three machines (Case 4), the development costs for programming will be increased. The analysis and design phase will not change. Since the inquiry modules will be programmed in a language closely related to the computer itself, the programming time for this phase will triple.

If a high level language is used for the other programs and these programs are developed by a single group, the time necessary to convert them to the other two machines will be minimal. We estimate that the development time will be 33 man-years at a cost of $620,000 or $6,500 monthly (on an 8-year amortization). In addition, one person in each province will be required to maintain the system. The development cost for Case 4 amounts to $3,200 monthly for each province.

Case 9

The first phase in modifying the Nova Scotia system to meet the requirements of New Brunswick and Prince Edward Island will include a thorough analysis of the differences among the systems. Until this phase is complete, it is difficult to determine the development cost accurately. However, we estimate that the modification will require four man-years at a cost of $75,000. We have allocated this cost, amortized over 8 years, to New Brunswick and Prince Edward Island equally at a rate of $400 per month.

Conversion Costs

The estimated conversion costs are listed, under the various alternatives below. These costs are computed on a basis of $75 per man-day and are amortized over three years for non-motor vehicle applications and over eight years for the motor vehicle application.

Case 3

In this alternative, conversion consists of converting all existing programs from the three provinces to the IBM/370-145. Nova Scotia will not have any conversion costs. Since most of the programs in New Brunswick and Prince Edward Island are written in a common, high-level language, the conversion should amount to about one and one-half man-days per program. For New Brunswick, this amounts to about $50,000 or $1,400 monthly, and for Prince Edward Island, the estimated cost is $10,000 or $300 monthly.

Case 4, Case 6, Case 7

Conversion to a uniform system includes the following:

- develop a system in each province to capture and edit the existing motor vehicle, driver licensing, driver record, accident, convictions and driver examination data, to create a new driver license number and to create a master file acceptable to the new system;
- prepare the data in machine-readable format;
- run the system with the data to be converted.

Since most of the data in New Brunswick is in manual files, the conversion costs for data preparation will be higher than in the other two provinces. If we assume that the Nova Scotia driver license number forms the basis of the new system and that the Nova Scotia master file contains most of the data to be included on the new master, Nova Scotia conversion costs will consist primarily of preparing the driver record and associated files for entry into the system.

The estimated conversion costs are as follows:

Nova Scotia	$20,000 ($210/month)
New Brunswick	$50,000 ($520/month)
Prince Edward Island	$30,000 ($310/month)

For Case 6, all existing programs must be converted to run on the IBM/370-155 as well. The costs for this part of the conversion are the same as outlined in Case 3.

Case 9

Conversion for New Brunswick and Prince Edward Island to a modified Nova Scotia system includes the following:

- develop a system to capture and edit the existing motor vehicle and driver licensing data, to create a driver

license number master file acceptable to the Nova Scotia system;

- prepare the data in machine-readable format;
- run the system with the data to be converted.

The estimated conversion costs are:

Nova Scotia	0
New Brunswick	$45,000 ($450/month)
Prince Edward Island	$20,000 ($200/month)

Summary of Development and Conversion Costs

	Case 3	Case 4	Case 6	Case 7	Case 9
NOVA SCOTIA					
- Development	-	3.2	1.4	1.4	-
- Conversion	-	.2	.2	.2	-
TOTAL	-	3.4	1.6	1.6	-
NEW BRUNSWICK					
- Development	-	3.2	1.4	1.4	.4
- Conversion	1.4	.5	1.9	.5	.5
TOTAL	1.4	3.7	3.3	1.9	.9
PRINCE EDWARD ISLAND					
- Development	-	3.2	1.4	1.4	.4
- Conversion	.3	.3	.6	.3	.2
TOTAL	.3	3.5	2.0	1.7	.6

Note 6

The data preparation, data control, filing and inquiry cost consists of salaries for the people performing those functions in the motor vehicle registration, driver licensing and driver records areas in Nova Scotia. This includes supervisors, part-time help, part of the Director's office and the records section, the data control input section, the data control rejects section, the correspondence and investigation section and the chief supervisor's section.

For the uniform system alternatives, the following clerical savings are possible:

- 6 general office clerks in the correspondence and investigation section can be reduced to 2 data control clerks (inquiries will be made on-line);
- 9 general office clerks in the data control rejects section can be reduced to 3 (fewer errors will result in a uniform system which has better forms design);
- elimination of all part-time help (with a uniform system and staggered registration, peaks in work will be eliminated);
- 12 general office clerks in the records section can be reduced to 8 (inquiries will be made on-line).

The net decrease is 14 full-time employees plus the part-time help resulting in a cost reduction of about $7,300 per month.

The supplies and equipment charges relate to the Licenses and Registration Division and include equipment and maintenance (excluding data processing charges), postage, telephone and telegraph, advertising, and miscellaneous.

Space charges are based on an estimated 9,000 square feet at $5.00 per square foot annually.

Note 7

The Univac 1106 has the following characteristics and peripheral equipment:

- 131,072 36 Bit Words of Unitized Memory
- 4 8414 Disk Drives
- 8 Uniservo VIII C Magnetic Tape Unit (7 track)
- 1 Card Reader
- 2 Printers (600 LPM and 900 - 1100 LPM)
- Univac 9300 Computer Interface between 1106 and Printers and Reader.

Note 8

Since in Case 3 and Case 6 the only hardware in New Brunswick consists of two terminals connected to a central computer, the operating staff required will reduce from 6 operators on 2 shifts, to 2 operators on 1 shift. The net reduction in cost will be $2,000 per month.

Note 9

The Univac 1106 requires the following additional memory and disk capacity if a uniform system is developed for it:

1 5033 Disk Control	$1,800
3 8440 Disk Drives	1,827
Unitized Storage: 131,072 words to 262,144 words	4,505
	$8,132
Deduct 25% re 5-year lease and add maintenance	(533)
Add 11% to convert to Canadian prices	836
	$8,435/month

Note 10

The Univac 1106 requires the following communications equipment in order to communicate with the IBM/370-145:

F0900-06	Communication Terminal Module Controller	$ 598
F0903-02	CTM - High Speed	89
F0905	Automatic Dialing Module	15
F1019-03	High Speed Interface Module	36
F0615	Communication Terminal Sychronous Module	199
8552	CTS Basic Cabinet	199
F0614	Power Supply	84
F0617	Unattended Answering	5
F0618	Automatic Dialing	43
		$1,268
Deduct 25% re 5-year lease and add maintenance		71
		$1,339
Add 11% to convert to Canadian prices =		$1,486/month

A multicom II data line is also required. Based on an annual volume of 1.2 million lines printed and cards read over this line, the estimated monthly usage is 500 minutes.

1	Multicom II Data Lines for 500 Minutes	$ 175
2	201A3 Data Sets	220
Monthly Line Charges		$ 395

Note 11

The terminals recommended for New Brunswick are a Remcom 2780 and an IBM/360-20. The IBM/360-20 has the following characteristics and peripheral equipment:

2020	Processing Unit Sub-Model 6 BC6 (12,288 bytes)	$ 800

2415	Magnetic Tape Unit and Control Model 4 (800/1600 bpi)	$ 760
7135	Seven and Nine Track Compatibility	130
2501	Card Reader Model A1 (600 CPM)	195
8090	2501 Attachment	20
1403	Printer Model N1 (1100 LPM)	735
4448	1403 Model N1 Attachment	275
2152	Printer Keyboard	131
8070	2152 Attachment	87
2074	Binary Synchronous Communications Adapter	410
		$3,543
	Add 11% to convert to Canadian prices =	$3,933/month

The Remcom has a 600 CPM card reader and a 600 LPM printer and rents for about $1,240 per month. Tapes are required on the Model 20 to accept data prepared on the key-to-tape machines.

Two dedicated data lines from Fredericton to Halifax cost $1,600 per month. Two 9600 bps modems are required at $1,100 per month as are two 4800 bps modems at $500 monthly. The IBM 3705 is now not capable of transmitting at 9600 bps, but this is expected to change within two years.

Note 12

The estimated salary cost for the data preparation, data control, filing and inquiry functions related to motor vehicle registration, driver licensing and driver records in New Brunswick is $21,100 per month. With a uniform system, nine clerks can be replaced by two data control clerks and four filing clerical positions can be eliminated. This results in a net decrease of eleven clerks, and $4,500 to $5,000 per month. In addition, less space is required to maintain the files. These savings are directly related to the machanization of driver licensing, motor vehicle registration and driver records. For the modified Nova Scotia system (Case 9), driver records are not mechanized

but 2 clerical positions accumulating accident statistics can be eliminated at about $800 per month.

Supplies and equipment costs include direct costs of Licensing, Registration and Accounting but do not include plates and decals.

Note 13

The Univac 9400 has the following characteristics and peripheral equipment:

- 65,536 Bytes of Memory
- Printer (600 LPM)
- Card Reader (600 CPM)
- 2 Tape Drives (34KB)
- 2 8414 Disks.

Note 14

In Case 3, and Case 6, the only operations staff necessary in Prince Edward Island is one operator to run the Remcom terminal ($500 per month).

Note 15

The following additional memory and disk storage are necessary to run a uniform system on the Univac 9400:

2 8414 Disk Drives	$ 820
Additional Memory (65,536 bytes to 98,304 bytes)	803
	$1,623
Deduct 15% for 5-year lease and add maintenance	30
	$1,653
Add 11% to convert to Canadian prices =	$1,835/month

Note 16

The Univac 9400 requires the following communications equipment and additional memory in order to communicate with the IBM/370-145:

F1093 Communications Adapter	$ 47
F1000 Line Terminal Control	110
Additional Memory (65,536 bytes to 98,304 bytes)	803
	$ 960
Deduct 15% for 5-year lease and add maintenance	21
	$ 981
Add 11% to convert to Canadian prices =	$1,089/month

A multicom II line will be required between Charlottetown and Halifax to transmit the data. The cost of the line is estimated at $115 monthly (based on 20% of New Brunswick volume). Two 201A3 data sets are also necessary at $220 monthly.

Note 17

A Remcom 2780 data communication terminal with a 600 CPM card reader and a 600 LPM printer is recommended to transmit Prince Edward Island data to a central computer facility at a cost of $1,240 per month.

One dedicated data line from Charlottetown to Halifax is necessary at a cost of $700 monthly. Two 4800 bps modems will cost $500 monthly.

Note 18

For the uniform system alternatives, four clerical positions can be eliminated as filing and maintenance of driver records will be reduced. One data control clerk will be required. The net savings are three clerical positions and $1,300 monthly.

If the modified Nova Scotia system is adopted, two filing clerks can be replaced by one data control clerk. The net decrease in monthly clerical costs is $400.

Note 19

The central computer IBM/370-155 has the following characteristics and peripheral equipment:

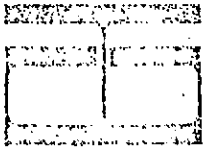
		Qty	
3155	Processing Unit Model IH	1	$20,520
3360	786,432 Bytes of Memory	1	9,000
1433	Third Block Multiplexer Channel	1	405
7844	Adapter for 3210 Printer	1	162
3210	Console Printer-Keyboard	1	175
3830	Disk Storage Control	1	1,723
3333	Disk Storage and Control	1	1,385
3330	Disk Storage (2 Drives)	1	1,092
3803	Magnetic Tape Control Unit	2	1,134
3420	Model 5 Tape Units (1600 bpi)	10	3,990
6407	7-Track Feature for 3420	2	142
3550	Dual Density Feature	2	184
2821	Model 1 Control Unit for Printer and Reader	1	815
2540	Card Read/Punch 1000/300 CPM	1	710
2501	Card Reader Model B1 (600 CPM)	1	260
1403	Printer Model N1	1	735
1416	Print Train Cartridge	1	97
3705	Model A1 Communications Controller	1	980
1301	Channel Attachment Base	1	15
1541	Channel Adapter	1	85
1642	Communication Scanner	1	150
4701	Line Interface Base	1	35
4714	Line Set Type 1D	1	50
			$43,844
	Add 11% to convert to Canadian prices =		$48,667/month

Three more operators than currently run the /370-145 will be required at a cost of $1,500 monthly.

Note 20

The following additional hardware and disk storage for the IBM/370-155 is required in order to implement a uniform system on a common computer:

	Qty	
1433 Block Multiplexer	1	$ 405
3830 Disk Storage Control	1	1,723
3333 Disk Storage and Control	1	1,385
3330 Disk Storage	2	2,184
		$5,697
Add 11% to convert to Canadian prices =		$6,324/month



DEPARTMENT OF COMMUNICATIONS

MOTOR VEHICLE -
DRIVER LICENSING PROJECT

INTERIM REPORT

VOLUME II

DCF SYSTEMS LIMITED
74 Victoria Street, Toronto 210, Ontario

November, 1972

APPENDIX F

MOTOR VEHICLE SYSTEM DESCRIPTIONS

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MOTOR VEHICLE SYSTEM DESCRIPTIONS

NEW BRUNSWICK - MOTOR VEHICLE BRANCH

Organization

The Motor Vehicle Branch in New Brunswick reports to the Provincial Secretary. The head office is located in Fredericton and there are 39 revenue offices spread throughout the province.

The Motor Vehicle Branch is composed of six divisions, all reporting to Mr. G.R. Staples, Motor Vehicle Director. The Motor Vehicle Licensing Division is responsible for the registration of motor vehicles. It is headed by the Motor Vehicle Licensing Supervisor and has a staff of 18 clerk-typists.

The Driver Licensing and Registration Division operates the driver licensing system and maintains the motor vehicle records. It is directed by the Driver Examination and Licensing Co-ordinator and has a staff of 22 clerks and clerk typists, and 5 trainees.

The Highway Safety Division reports to the Highway Safety Supervisor. It is responsible for driver examinations and for compiling statistics based on accident reports. There is a head office staff of 4 plus 9 driver examiners in Fredericton, 6 in Saint John, 6 in Moncton and 5 in Bathurst.

The Accounting Division is responsible for the cash receipts system and has a head office staff of 5 reporting to an accountant.

An accountant, 3 clerks and 4 claims investigators are involved in processing unsatisfied judgement claims.

General Description

The current manual system of the Motor Vehicle Administration was introduced in 1956 and has operated since then with little change. The only automated functions are license renewal notices, a number of statistical reports and an accounting report. Currently, there are no plans for major changes to the system or for further automation.

The users of motor vehicle records include law enforcement agencies, insurance companies and R.L. Polk. The R.C.M.P. and city police have 24-hour access to the numerical files of the registry only. They would like to see improvement in the present system pertaining to the selective retrieval of information. Insurance companies, oil companies, credit agencies and lawyers, are responsible for about 5,000 inquiries each month. R.L. Polk receives a copy of every registration certificate issued in the province.

Requests for information submitted either through the mail or by telephone are handled on a 24 hour basis, with response times of 45 to 60 seconds for most inquiries. Users appear to be satisfied with this service.

There are no current plans to transfer manual files to the computer. Some suggested future enhancements include: combined vehicle inspection and registration, processed on a staggered basis; centralization of the issuance of licenses and vehicle registrations; and improvement of inquiry services by selective information retrieval.

There are two major problems in the current system. A 2.5% error rate in the preparation of data for the computer has resulted in a five month backlog of errors in the Driver Licensing and Registration Division.

The second problem is a shortage of floor space for files. At present, 6,500 square feet of floor space is devoted to driver licensing and registration files, with no further room for expansion.

Motor Vehicle Registration

Motor vehicles must be registered annually. License plates are issued once every three years with registrations in the second and third year indicated by a decal attached to the license plate.

The existing motor vehicle system is almost entirely manual. Files of registered vehicles and licensed drivers are maintained in the 39 regional offices and the head office in Fredericton. Vehicle records are filed according to plate number and these are cross-referenced by an alphabetic file (owner name) in Fredericton.

When a vehicle is registered, four copies of the application are prepared:

1. The first copy goes to the applicant.
2. A copy is sent to the head office in Fredericton.
3. A copy is retained in the issuing office.
4. A copy is retained and sent to R.L. Polk.

All vehicles registered at regional offices are issued with permanent registration certificates at the time of registration.

Copies 2 and 4 are forwarded to head office along with the original application. After being processed by accounting, copy 4 is sent to the R.L. Polk agency, copy 2 is pasted into a book kept in numerical sequence and the application is filed alphabetically in a Diebold file (4 units). After one year, the applications are removed from the Diebold files and stored in cabinets for one year. They are then microfilmed and destroyed. Although legally they must be retained for only five years, the microfilm records currently date back to 1960. The registration books are kept for three years corresponding to the permanent

license plate cycle. The books are then stored for two or three years and destroyed.

An abstract from this file may be obtained for a fee of $2.00. The primary users are the police (35,000 inquiries a year) and insurance, oil and credit companies (10,000 inquiries a year). A further estimated 3,000 inquiries a year are received by telephone. Inquiries are usually processed within 24 hours and the maximum response time is 7 days.

Vehicle registration renewals are processed between January 1 and March 31 each year, resulting in a severe workload peak between February 1 and April 30. Due to the lack of space and the nature of the work, few temporary workers can be hired to assist during this peak. The bulk of the work must, therefore, be done by permanent employees working overtime.

The main advantage of the present system is that the applicant receives his plates and registration immediately upon payment. The main problem is the workload peak. The simplest solution to this is more space, thereby allowing more temporary staff to be hired. A staggered registration system is not currently planned.

Driver Licensing

The driver license number consists of eight digits. The first six are chosen from a book of already-used-numbers and the last two are the driver's month of birth.

Driver licenses are issued once every two years in the month of birth of the driver. A notice of renewal is issued by the computer one month before the renewal date. The $10.00 fee may be paid at any revenue office or may be mailed directly to head office. The applicant receives his new license by mail.

A person requesting a driver's license without having held one previously must successfully complete the required tests. He may then be issued a permanent permit by any revenue office upon payment of the appropriate fee.

Changes in license information must be submitted within 10 days of the date of change, to head office (by mail) or to any revenue office. When the change has been processed, the new license is mailed to the applicant.

Inquiries against the driver license files occur at a rate of 100 urgent (telephone) interruptions a day plus 100 accident reports and 100 traffic tickets daily. Delays in responding to inquiries have been experienced due to overloading of the Diebold files.

All driver license application forms are sorted into numerical sequence and filed. This file is referenced to correct errors detected on renewals and to determine the old license code when new applications are being processed. The sorting and filing has about a one-month backlog and the average search time is 30 minutes. This file is retained for one year, then micro-filmed and destroyed.

One copy of the license is filed alphabetically by surname in the Diebold file. This file is used for inquiries concerning driver license information.

The volume of driver license renewals at present is about 6,000 a month in even-numbered years and 12,000 a month in odd-numbered years. The average annual growth rate is 5%.

Driver Records

Driver records are maintained under the jurisdiction of the Driver Licensing and Registration Division. About 166,000 file folders are maintained for drivers who have a record, either for

suspensions or demerit points. The file is purged of records which have had no activity for the past five years. This work is backlogged due to staff shortage and the file records are removed from the file only in response to inquiries.

The file is in sequence according to a code consisting of 6 digits prefixed by a two-character alphabetic code. It is referenced by an index file containing driver name and file folder code. The index file is arranged alphabetically by surname and birth date of the driver. Summaries of demerit point accumulation, suspensions and convictions are handwritten on the left-hand side of the file folder.

The insurance industry submits an average of 4,000 inquiries a month (5,800 a month, peak). A further 1,000 telephone inquiries and 1,000 written inquiries are handled each month. The responses to written inquiries are usually in the mail on the same day, although a longer response time may result from misfiling or incorrect data. Correspondence is filed by date and retained for two or three years as space permits.

Suspensions and reinstatements are also processed against the master file. These amount to 50 on a peak day. There is also a computer file of suspensions which is updated monthly and used to produce a current list of suspensions (monthly). Reinstatements may be initiated either by the driver inquiring into his status by telephoning the Motor Vehicle Office, or automatically from a file of reinstatement dates. The reinstatement file is checked weekly and about 85 automatic reinstatements are issued each week.

Voluntary penalty tickets are recorded in the driver's master record. These amount to about 29,000 a year or 500 on a peak day. When the prosecution slip is received, it is analyzed for statistical purposes and then sorted. This sorting can require up to two days. The record is obtained and the appropriate action taken with respect to point totals, warnings and suspensions. Because of low priority, delays of ten to fourteen

weeks are not unusual in mailing warning letters. There is, at times, a backlog of four to six weeks in processing prosecution slips, although the average time is about two weeks.

The driver master file is obtained for all accident reports to assign points and to determine whether a suspension notice is required. The volume of accident reports is about 12,000 a year. The master file is also accessed for 1,800 unsatisfied judgement fund claims a year.

The major problems in this area, backlogs in filing and slow response times, occur because the level of inquiries cannot be adequately handled by the present staff using the existing filing system. A severe shortage of space has made it difficult to increase staff levels and file sizes to meet current needs.

Fee Accounting

The Accounting Division of the Motor Vehicle Branch is responsible for processing voluntary penalty payments, applications for partial refund of license plate fees, and registration and drivers' license fees.

Daily reports, money and copies of certificates are received from the 39 revenue offices. These reports are summarized daily in the Distribution of Cash Receipts report which is posted to the Cash Receipts journal. The Branch Office Return reports are forwarded to data processing and returned with a batch detail printout.

The certificates for mailed driver license applications are prepared in the mail room. These certificates, together with the certificates from the revenue offices, are checked for correctness. The certificates are then forwarded to the appropriate division and the cash is sent to the bank with the daily deposit.

The following manual files are maintained in this division:

- voluntary penalty tickets for snowmobiles (DPS 425) are filed numerically;

- the summary list of voluntary penalty remittances (DPS 370) is filed by date;

- applications for partial refund of license plate fees cause four files to be updated:

  a list of refunds (DPS 347) is created and filed by voucher number;

  a card index of refunds is maintained in license plate number sequence;

  a card index of refunds is maintained in sequence by surname of applicant;

  when the refund voucher (DF 369) has been authorized, it is filed with the refund list in date sequence;

- snow vehicle branch office returns (DPS 367) are filed in alphabetic sequence;

- motor vehicle branch office returns (DPS 330) are filed alphabetically when returned from data processing;

- authorized refund vouchers (DF 369) for overpayment of fees are filed with a copy of the list of overpayments, in date sequence.

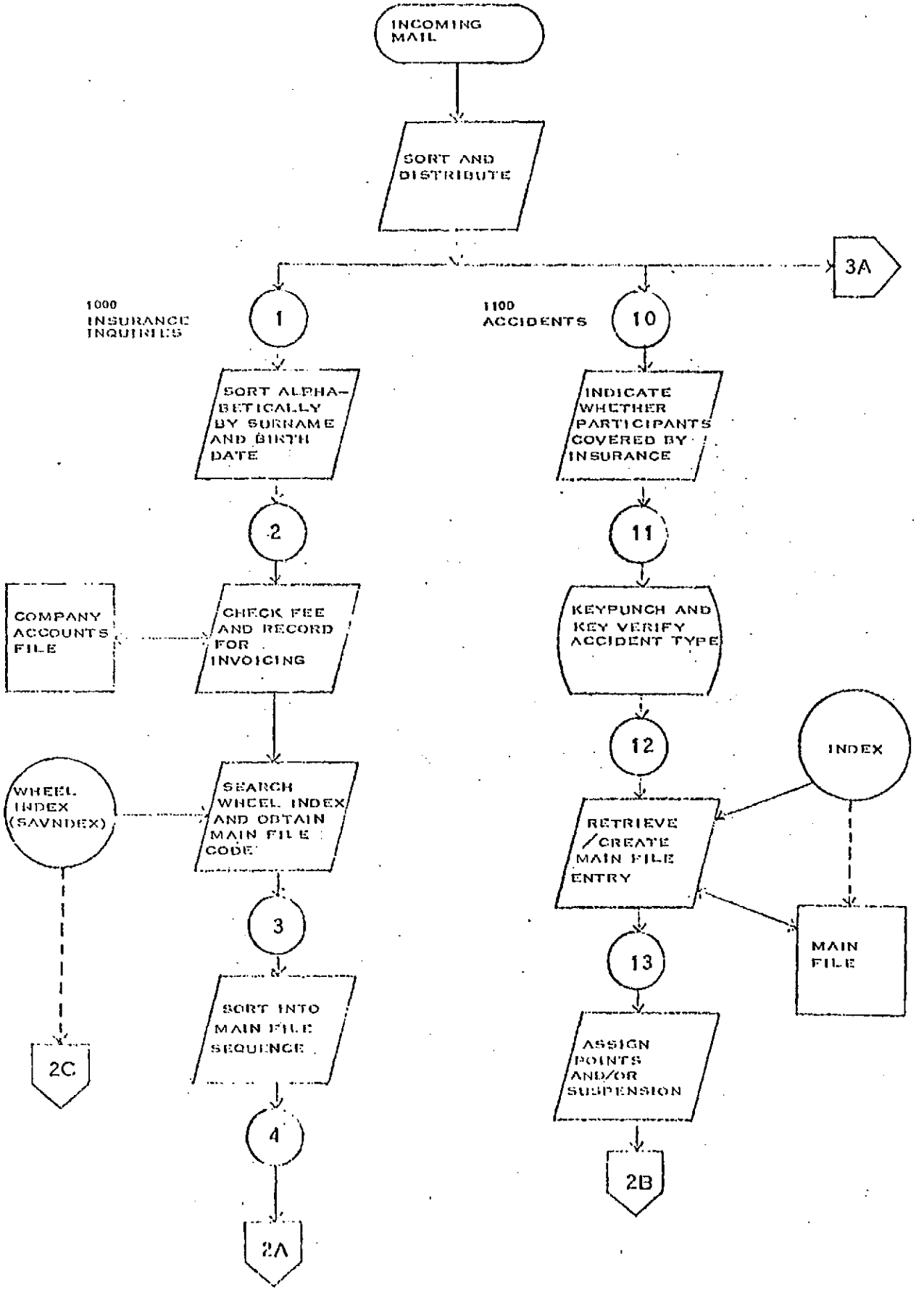
The Motor Vehicle Branch Office Returns are balanced to the Computer Batch Detail Report on a daily basis. The Cash Receipts journal is balanced monthly with the computer-produced report of registration by vehicle class and municipality. A journal voucher is created at this time for the Comptroller. The journal is balanced semi-annually with the Comptroller's General Ledger account.

NEW BRUNSWICK MOTOR VEHICLE RECORDS

KEY:	1000
INPUT:	Insurance Inquiries
VOLUME:	4,000/month, average
	300/day, peak
FREQUENCY:	Daily
STAFF:	2 clerk typist II
OUTPUT:	Insurance company acknowledgments

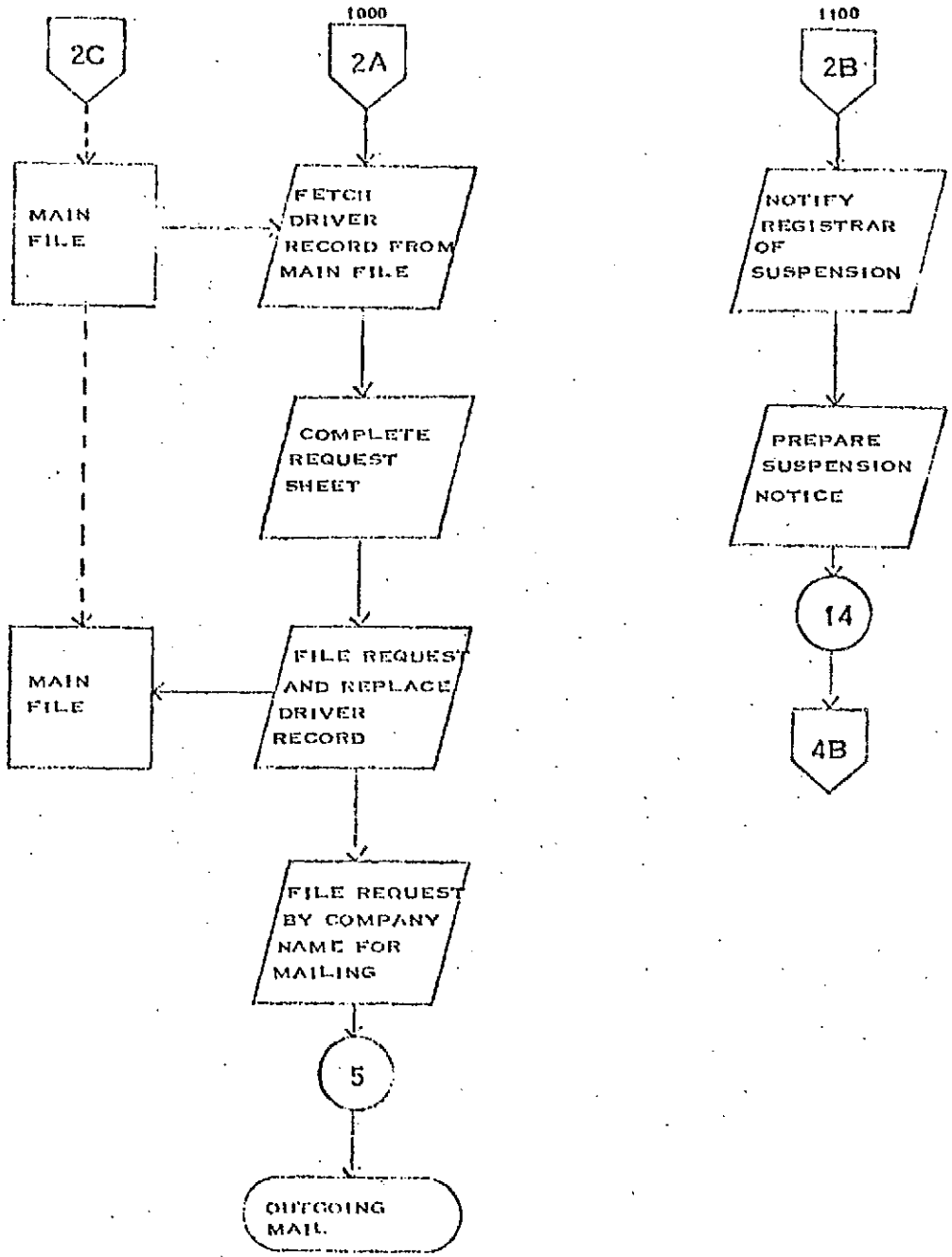
KEY:	1100
INPUT:	Accident Reports
VOLUME:	12,000/year
FREQUENCY:	Daily
STAFF:	1 clerk typist I
OUTPUT:	Suspension notices
ELAPSED TIME:	
1 - 2:	25 minutes
2 - 3:	60 minutes
3 - 4:	30 minutes
10 - 11:	60 minutes
11 - 12:	5 days
12 - 13:	60 minutes

NEW BRUNSWICK MOTOR VEHICLE RECORDS



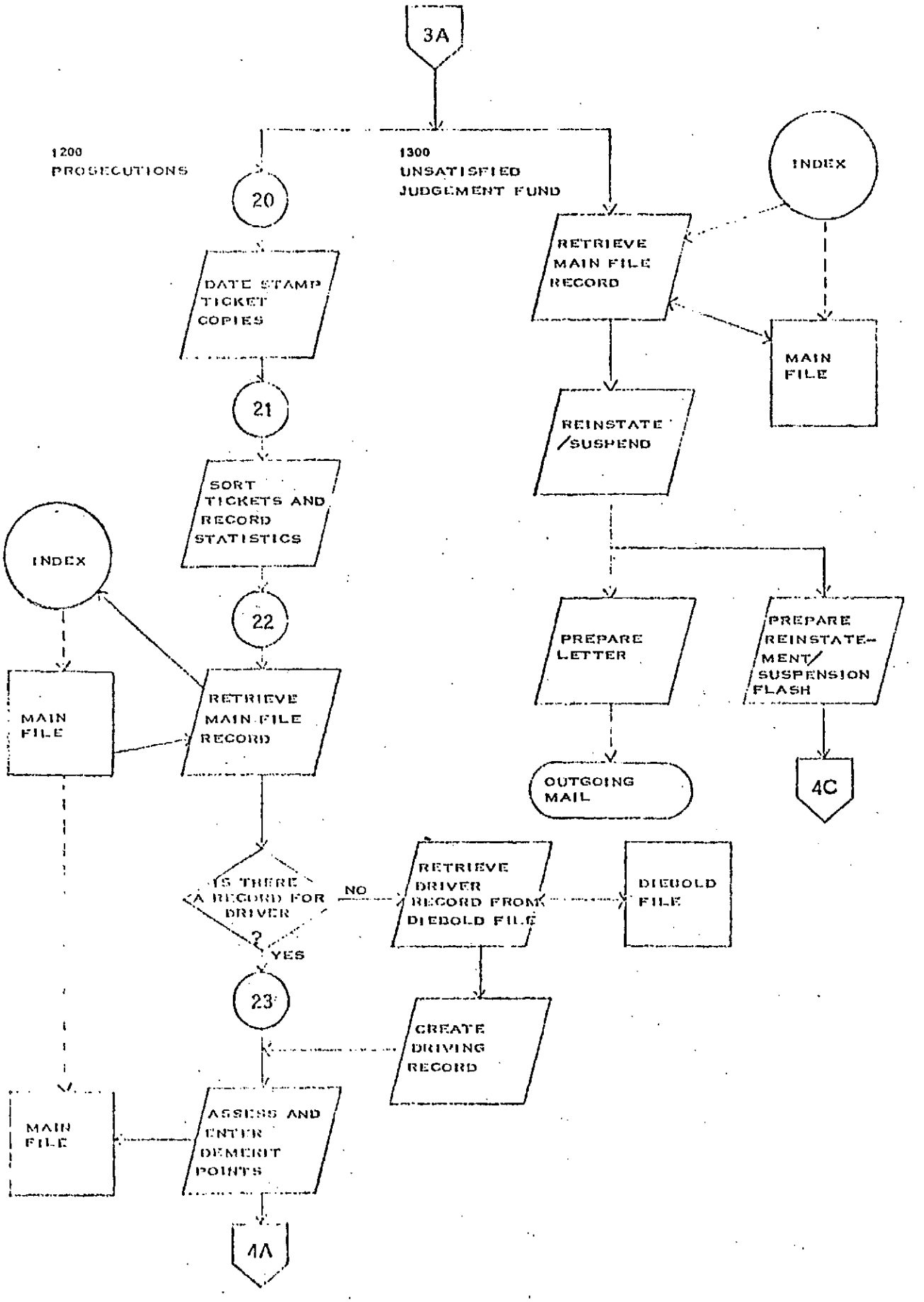
ELAPSED TIME:

4 - 5:	3 hours
13 - 14:	4 hours


2C
1000
2A
1100
2B
MAIN FILE
FETCH DRIVER RECORD FROM MAIN FILE
NOTIFY REGISTRAR OF SUSPENSION
COMPLETE REQUEST SHEET
PREPARE SUSPENSION NOTICE
14
MAIN FILE
FILE REQUEST AND REPLACE DRIVER RECORD
4B
FILE REQUEST BY COMPANY NAME FOR MAILING
5
OUTGOING MAIL

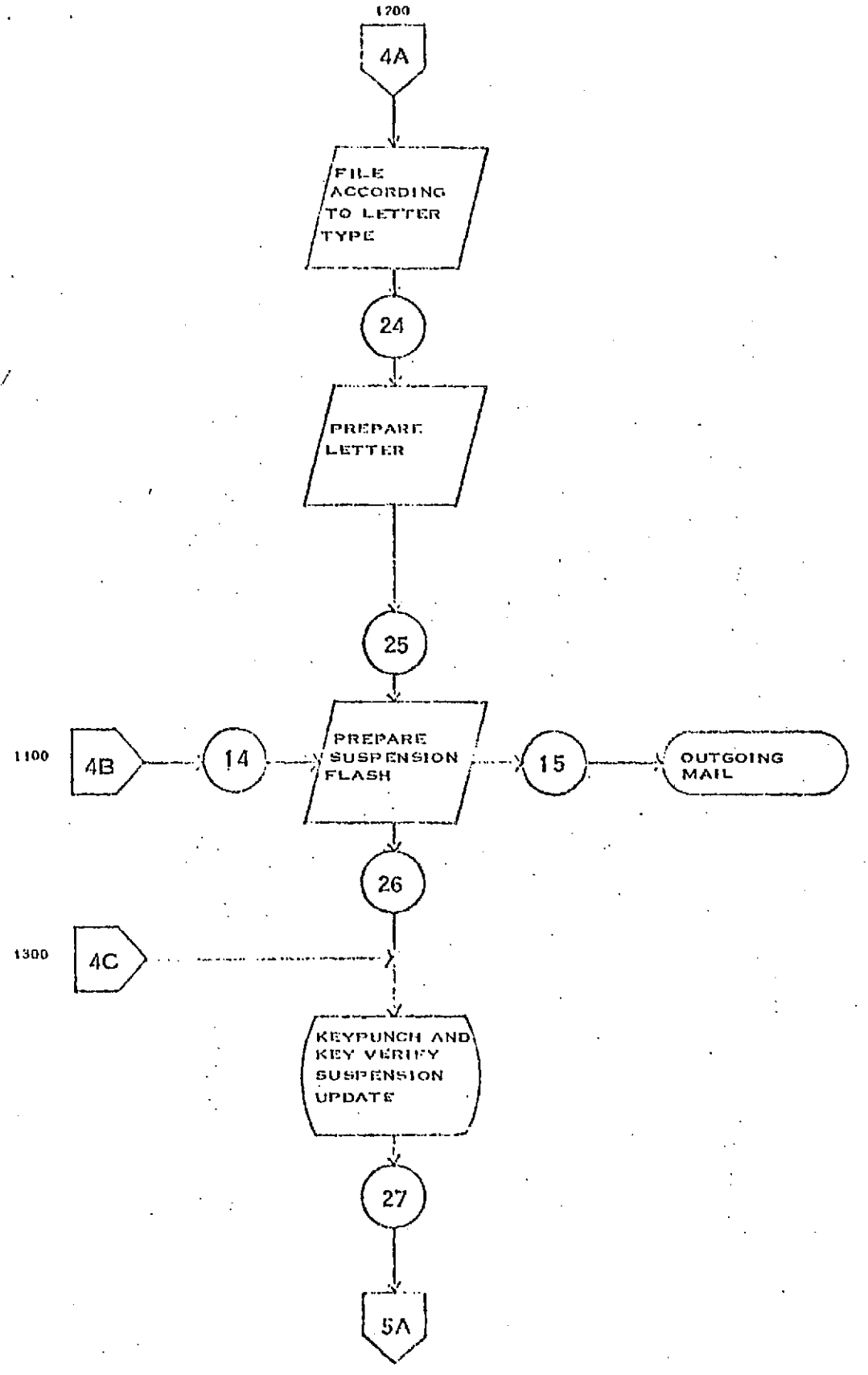
KEY:	1200
INPUT:	Prosecutions
VOLUME:	30,000/year, average
	500/day, peak
FREQUENCY:	Daily
STAFF:	2 clerk typist I
OUTPUT:	Warning letter - 13,000/year
	Interview notice - 1,700/year
	Suspensions - 7,500/year

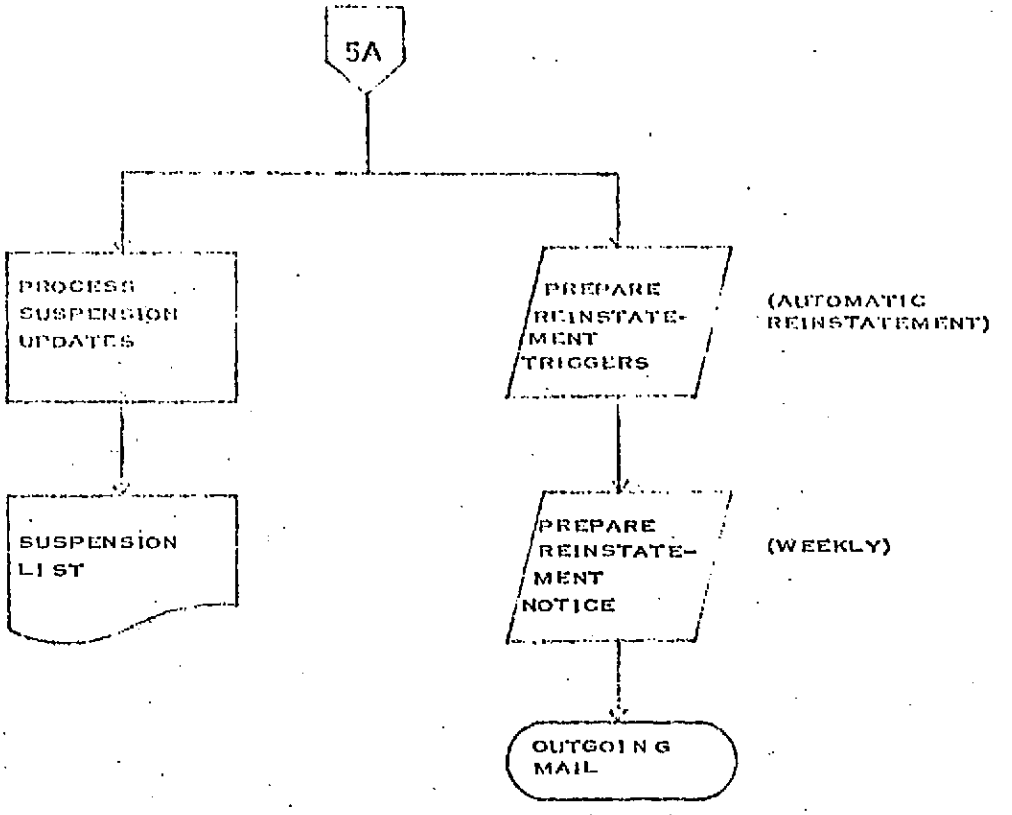
KEY:	1300
INPUT:	Unsatisfied Judgement Fund Claim
VOLUME:	1,800/year, average
FREQUENCY:	Daily
STAFF:	1 steno/receptionist
ELAPSED TIME:	
20 - 21:	2 hours
21 - 22:	2 days
22 - 23:	3 hours


3A
1200
PROSECUTIONS
1300
UNSATISFIED
JUDGEMENT FUND
INDEX
20
DATE STAMP
TICKET
COPIES
RETRIEVE
MAIN FILE
RECORD
MAIN
FILE
21
REINSTATE
/SUSPEND
SORT
TICKETS AND
RECORD
STATISTICS
INDEX
22
PREPARE
LETTER
PREPARE
REINSTATE-
MENT/
SUSPENSION
FLASH
MAIN
FILE
RETRIEVE
MAIN FILE
RECORD
OUTGOING
MAIL
4C
IS THERE
A RECORD FOR
DRIVER
?
NO
RETRIEVE
DRIVER
RECORD FROM
DIEBOLD FILE
DIEBOLD
FILE
YES
23
CREATE
DRIVING
RECORD
MAIN
FILE
ASSESS AND
ENTER
DEMERIT
POINTS
4A

ELAPSED TIME:

23 - 24:	2 weeks, average
	6 weeks, maximum
14 - 15:	1 hour
25 - 15:	1 hour
14 - 26:	1 to 30 days
25 - 26:	1 to 30 days
26 - 27:	5 days

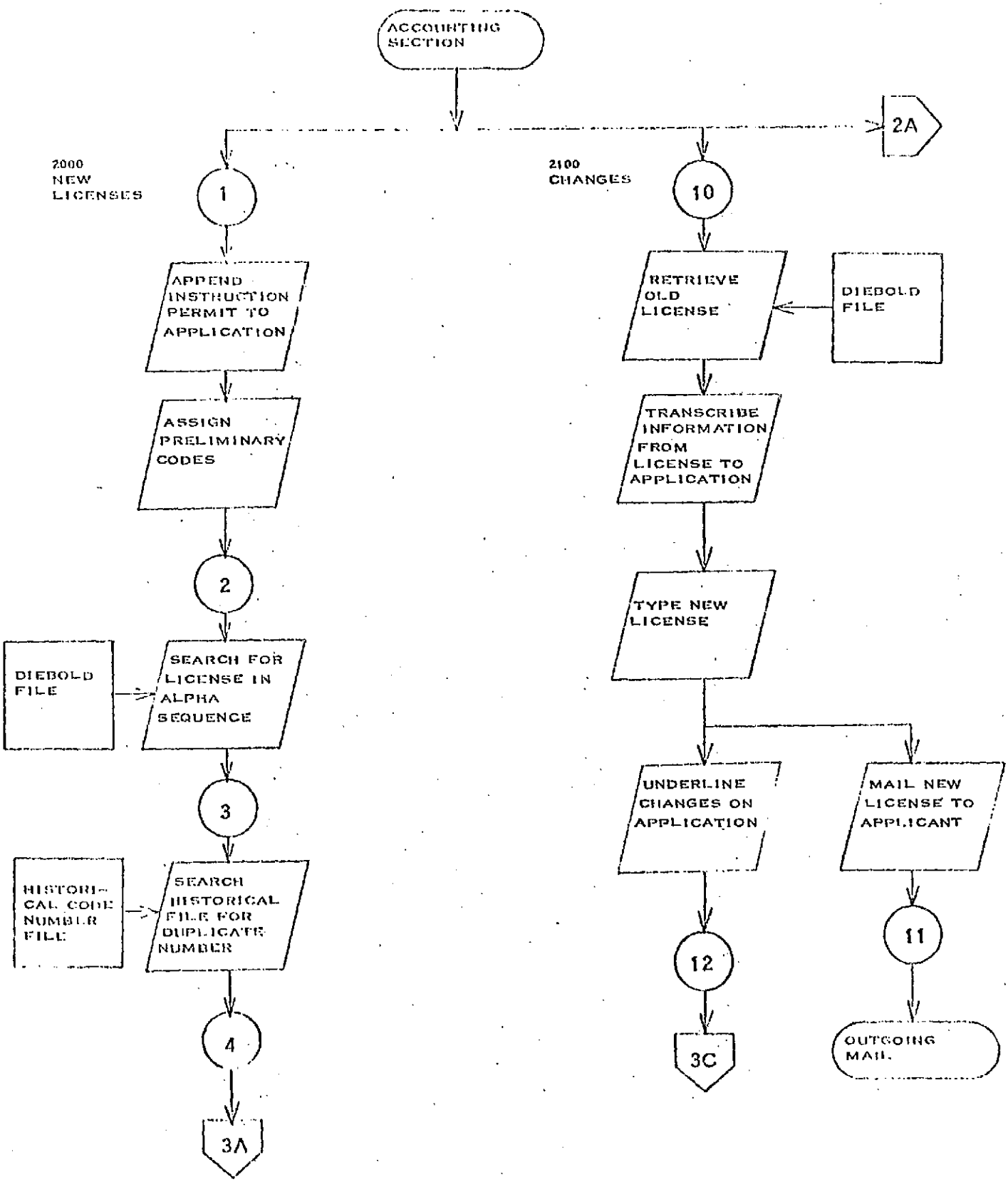

1200
4A
FILE ACCORDING TO LETTER TYPE
24
PREPARE LETTER
25
1100
4B
14
PREPARE SUSPENSION FLASH
15
OUTGOING MAIL
26
1300
4C
KEYPUNCH AND KEY VERIFY SUSPENSION UPDATE
27
5A


5A
PROCESS SUSPENSION UPDATES
SUSPENSION LIST
PREPARE REINSTATE-MENT TRIGGERS
(AUTOMATIC REINSTATEMENT)
PREPARE REINSTATE-MENT NOTICE
(WEEKLY)
OUTGOING MAIL

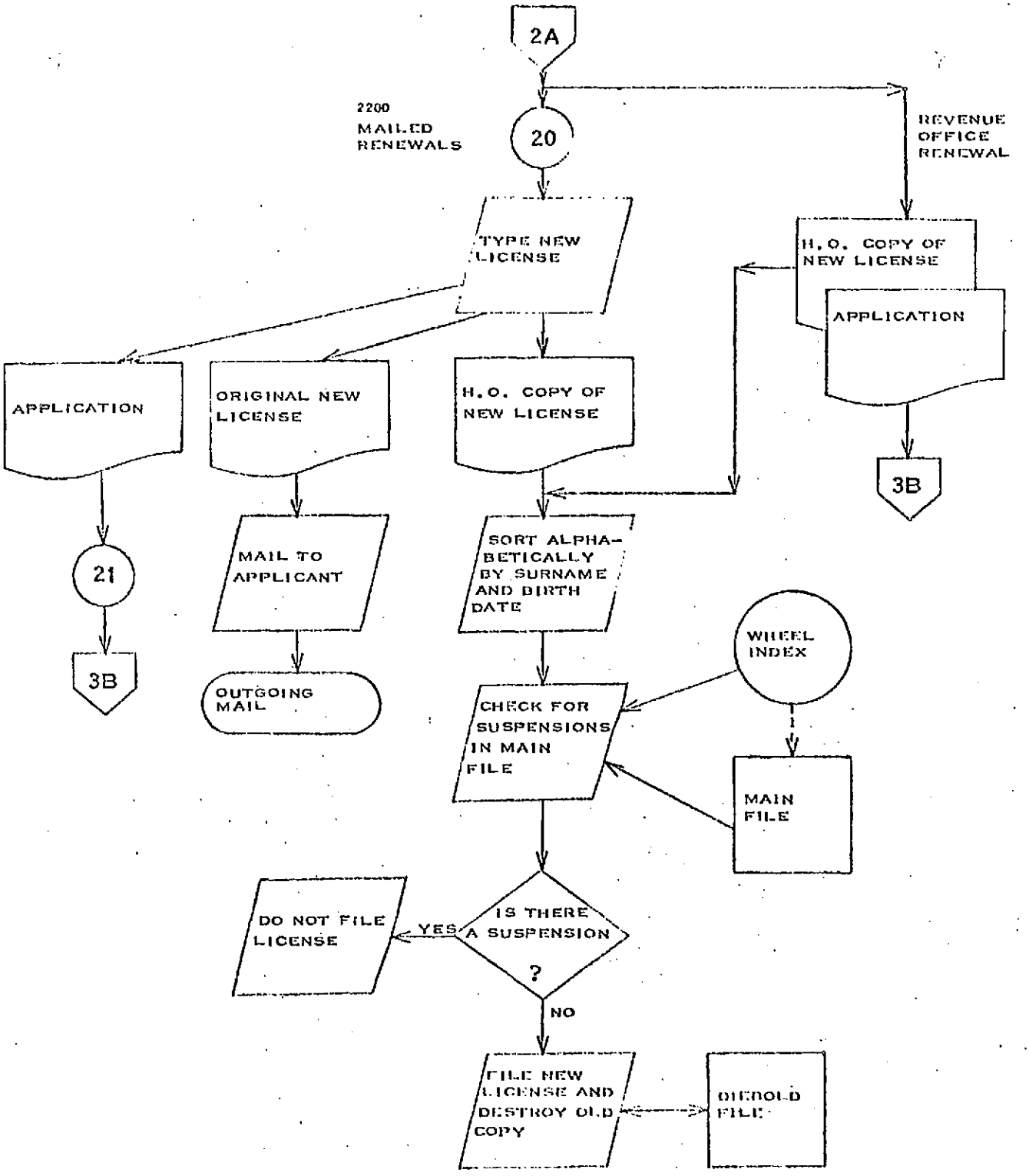
NEW BRUNSWICK DRIVER LICENSING SYSTEM

KEY:	2000
INPUT:	New License Applications
VOLUME:	25,000/year
FREQUENCY:	Daily
STAFF:	1 clerk II
OUTPUT:	Driver's license - orginal to applicant
	Driver's license - head office copy filed alphabetically
	Application form - filed numerically
KEY:	2100
INPUT:	Change Applications
VOLUME:	1,500/month
FREQUENCY:	Daily
STAFF:	1 clerk III
OUTPUT:	Driver's license - original to applicant
	Driver's license - head office copy filed alphabetically
	Application form - filed numerically
ELAPSED TIME:	
1 - 2:	30 minutes
2 - 3:	10 minutes
3 - 4:	30 minutes
10 - 11:	6 hours

NEW BRUNSWICK DRIVER LICENSING SYSTEM

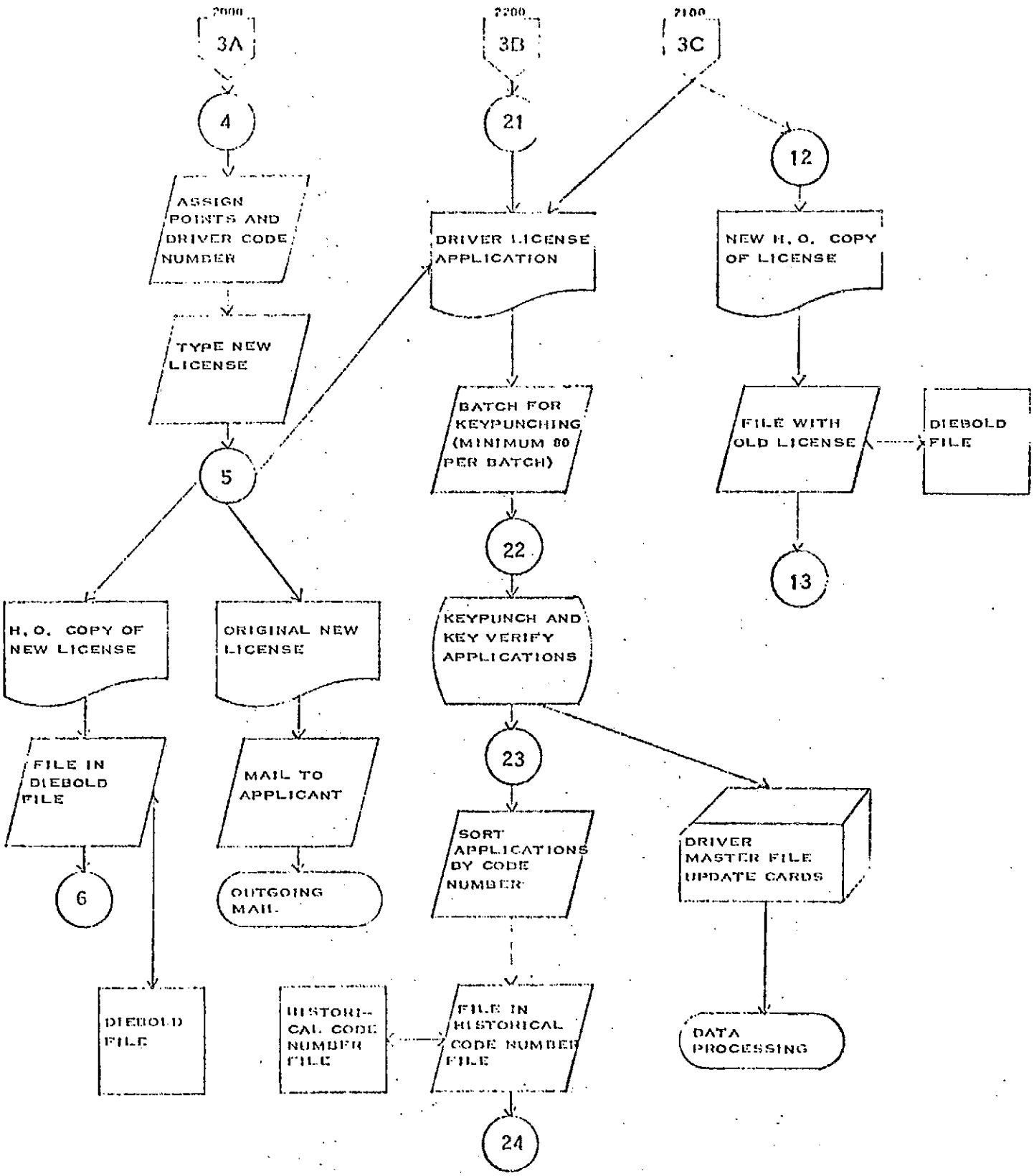


KEY:	2200
INPUT:	Renewal Applications
VOLUME:	6,000/month, low
	12,000/month, high
FREQUENCY:	Daily
STAFF:	3 clerk I
	2 clerk II
OUTPUT:	Driver's license - original to applicant
	Driver's license - head office copy filed alphabetically
	Application - filed numerically
ELAPSED TIME:	
20 - 21:	2 hours


2A
2200
MAILED
RENEWALS
20
REVENUE
OFFICE
RENEWAL
TYPE NEW
LICENSE
H.O. COPY OF
NEW LICENSE
APPLICATION
3B
APPLICATION
ORIGINAL NEW
LICENSE
H.O. COPY OF
NEW LICENSE
21
3B
MAIL TO
APPLICANT
SORT ALPHA-
BETICALLY
BY SURNAME
AND BIRTH
DATE
WHEEL
INDEX
OUTGOING
MAIL
CHECK FOR
SUSPENSIONS
IN MAIN
FILE
MAIN
FILE
DO NOT FILE
LICENSE
YES
IS THERE
A SUSPENSION
?
NO
FILE NEW
LICENSE AND
DESTROY OLD
COPY
DIEBOLD
FILE

ELAPSED TIME:

4 - 5:	4 hours
5 - 6:	3 weeks
12 - 13:	3 weeks
21 - 22:	30 minutes
22 - 23:	2 - 3 days
23 - 24:	1 month


2000
3A
3B
3C
4
21
12
ASSIGN POINTS AND DRIVER CODE NUMBER
TYPE NEW LICENSE
5
DRIVER LICENSE APPLICATION
BATCH FOR KEYPUNCHING (MINIMUM 80 PER BATCH)
22
KEYPUNCH AND KEY VERIFY APPLICATIONS
23
SORT APPLICATIONS BY CODE NUMBER
NEW H. O. COPY OF LICENSE
FILE WITH OLD LICENSE
DIEBOLD FILE
13
H. O. COPY OF NEW LICENSE
ORIGINAL NEW LICENSE
FILE IN DIEBOLD FILE
MAIL TO APPLICANT
6
OUTGOING MAIL
DIEBOLD FILE
HISTORICAL CODE NUMBER FILE
FILE IN HISTORICAL CODE NUMBER FILE
24
DRIVER MASTER FILE UPDATE CARDS
DATA PROCESSING

NEW BRUNSWICK - MOTOR VEHICLE REGISTRATION

KEY:	3000
INPUT:	Motor Vehicle Registration Applications

VOLUME:

	1970	1971
Feb:	17,000	30,000
Mar:	80,000	78,000
Apr:	91,000	84,000
May:	17,000	39,000
June:		27,000

STAFF: 4 clerk II, 6 clerk I

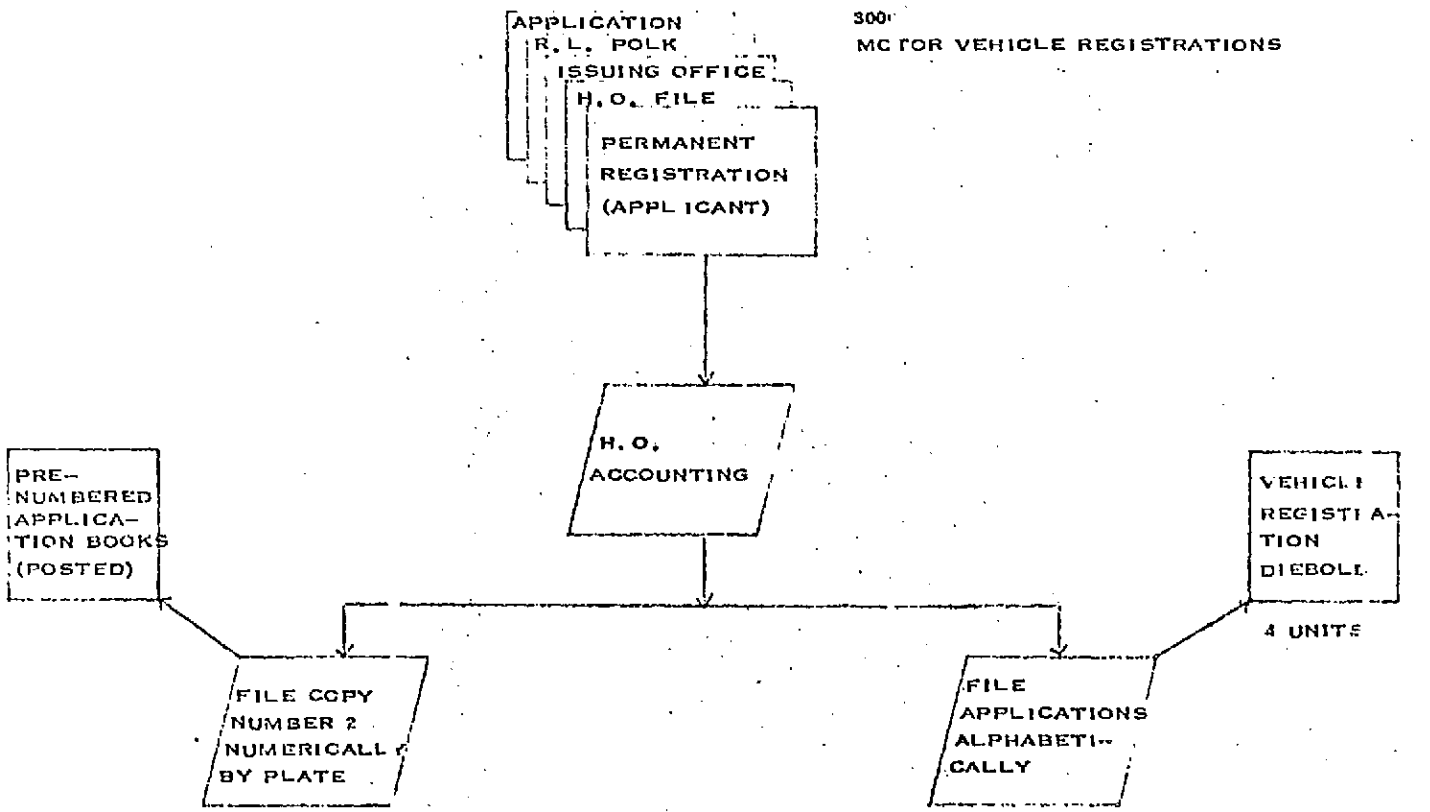
FREQUENCY: Daily

ELAPSED TIME: 1 day to 3 months

INQUIRIES:

1. Police - all hours in numeric files 35,000/year.
2. Other written - 1 to 7 days response 10,000/year.
3. Telephone - 3,000/year.

NEW BRUNSWICK – MOTOR VEHICLE REGISTRATION

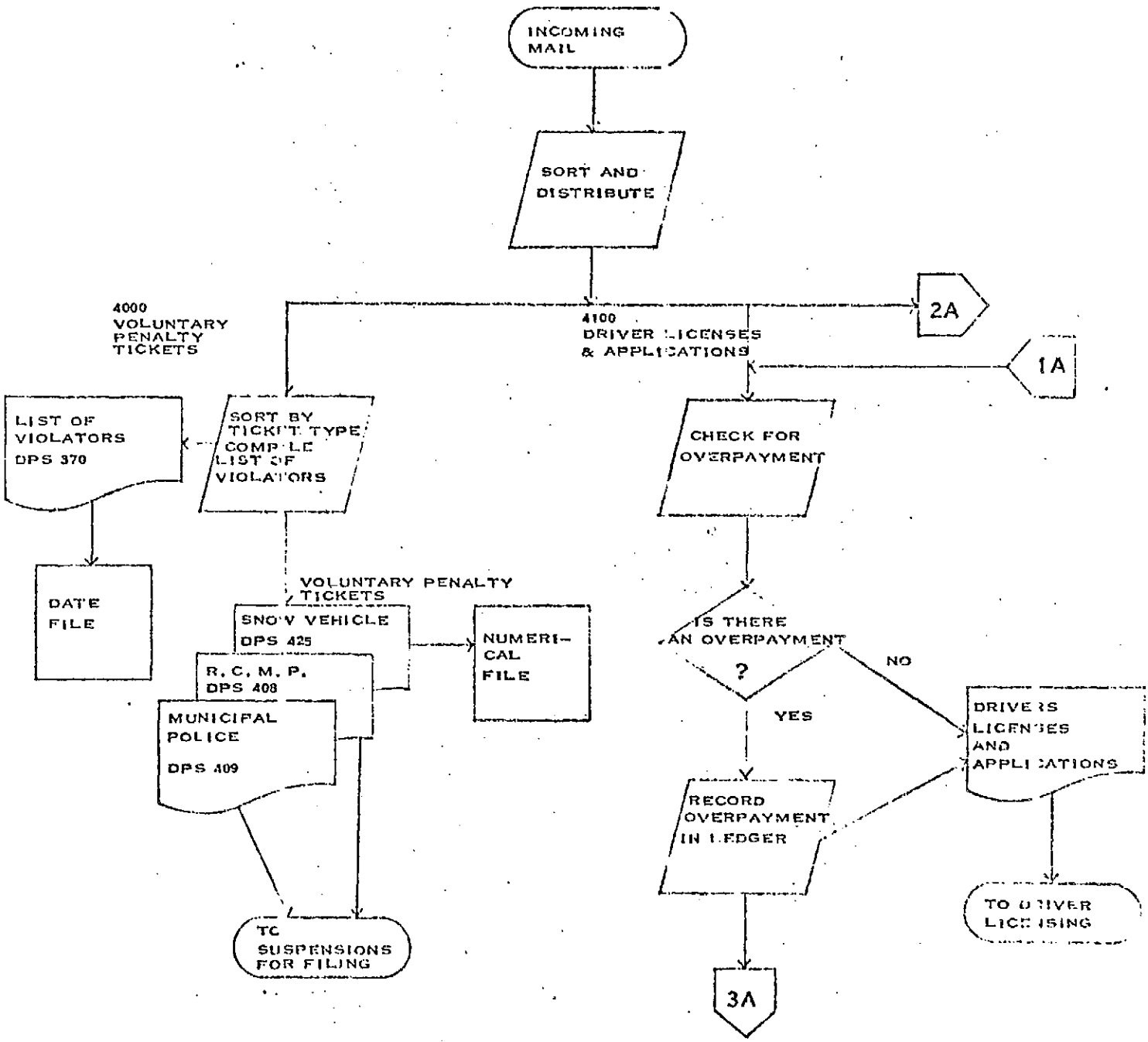


NEW BRUNSWICK MOTOR VEHICLE BRANCH ACCOUNTING SYSTEM

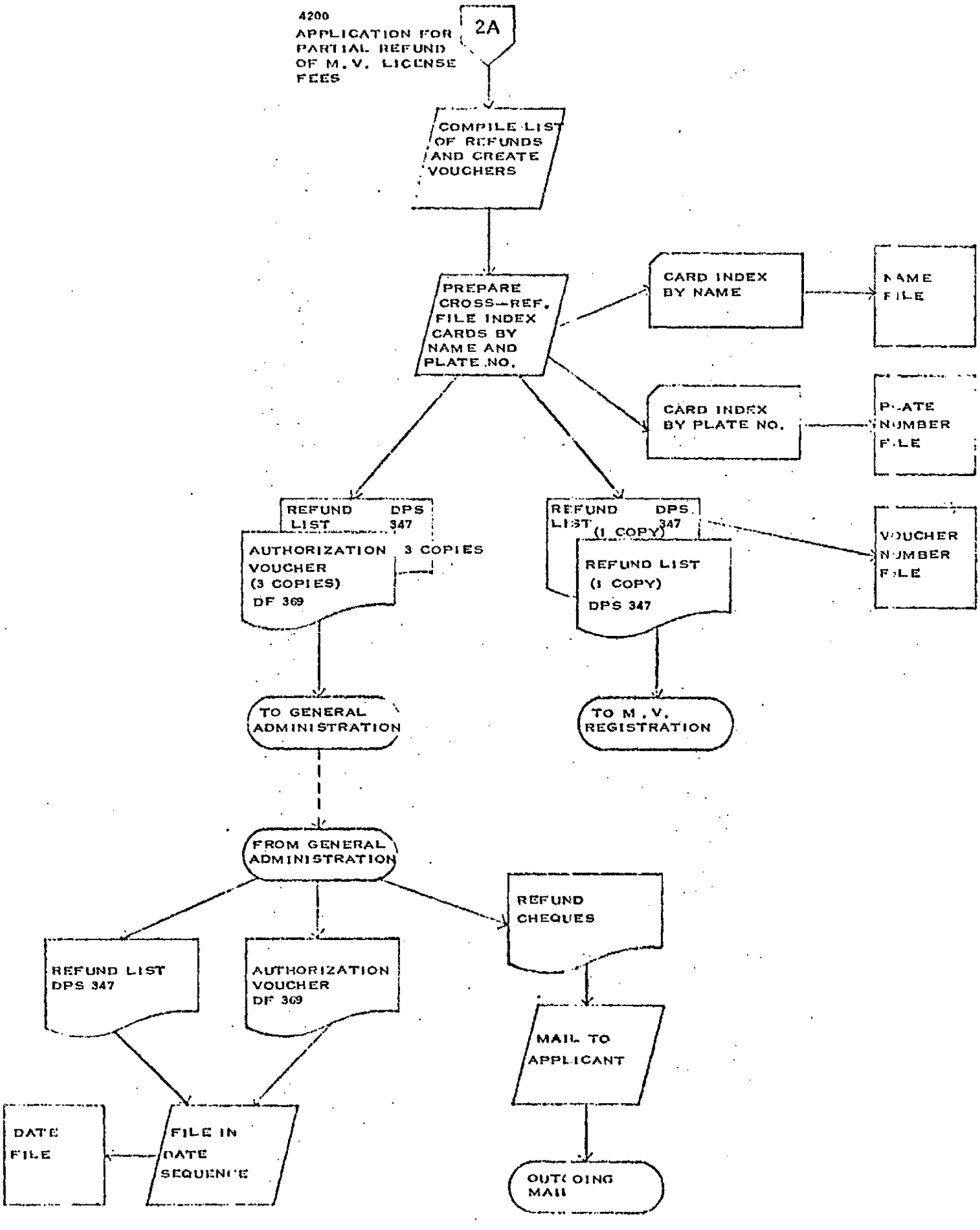
KEY:	4000
INPUT:	Voluntary Penalty Tickets
VOLUME:	27,500 annual (1971)
FREQUENCY:	Daily
OUTPUT:	List of violations (DPS 370)

KEY:	4100
INPUT:	Driver Licenses and Applications
VOLUME:	180,000 annual (1971) 90,000 annual (1972 est.)
FREQUENCY:	Daily
OUTPUT:	For overpayments: Authorization vouchers (DF 369) List of overpayments Cheques

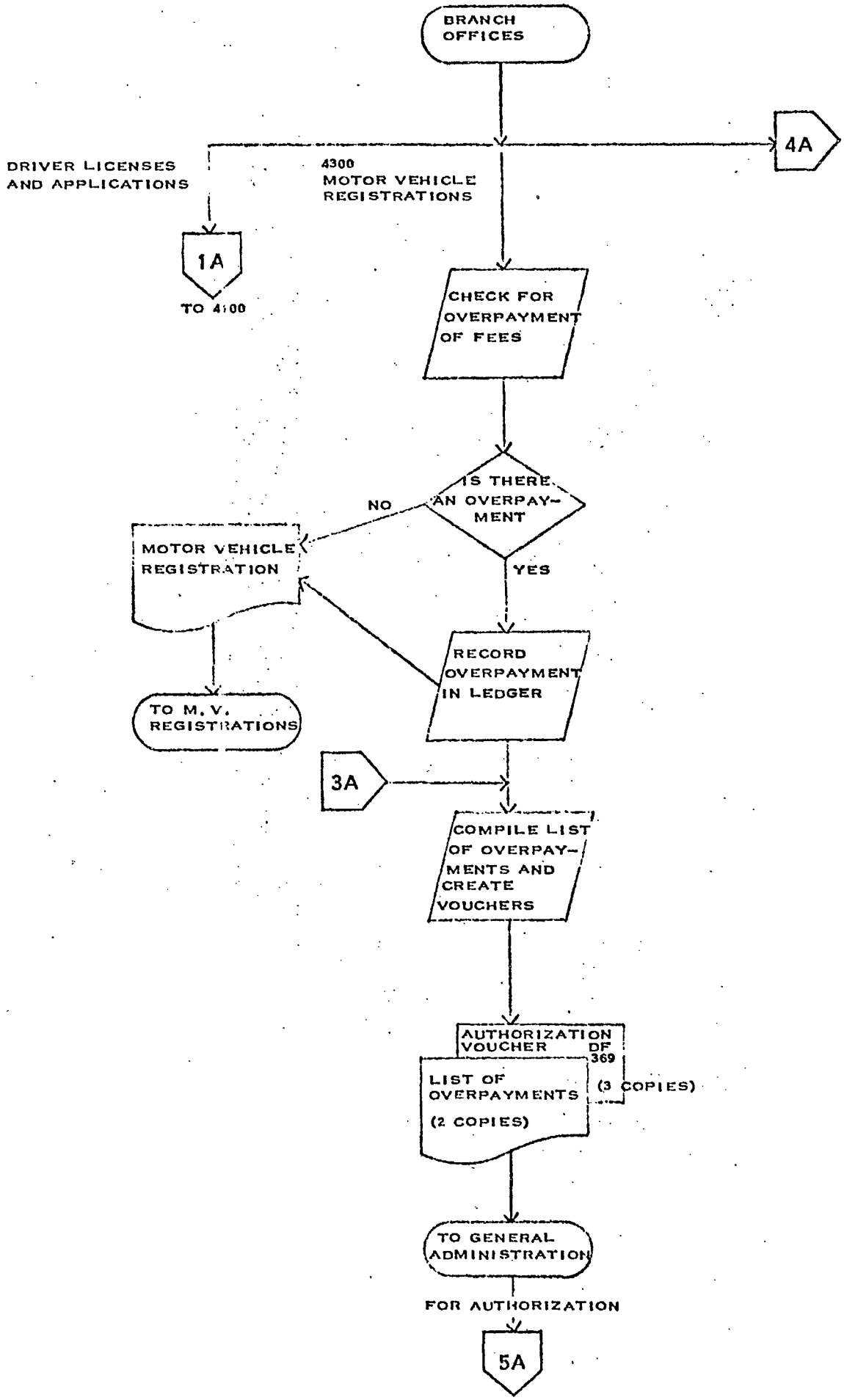
NEW BRUNSWICK MOTOR VEHICLE BRANCH ACCOUNTING SYSTEM



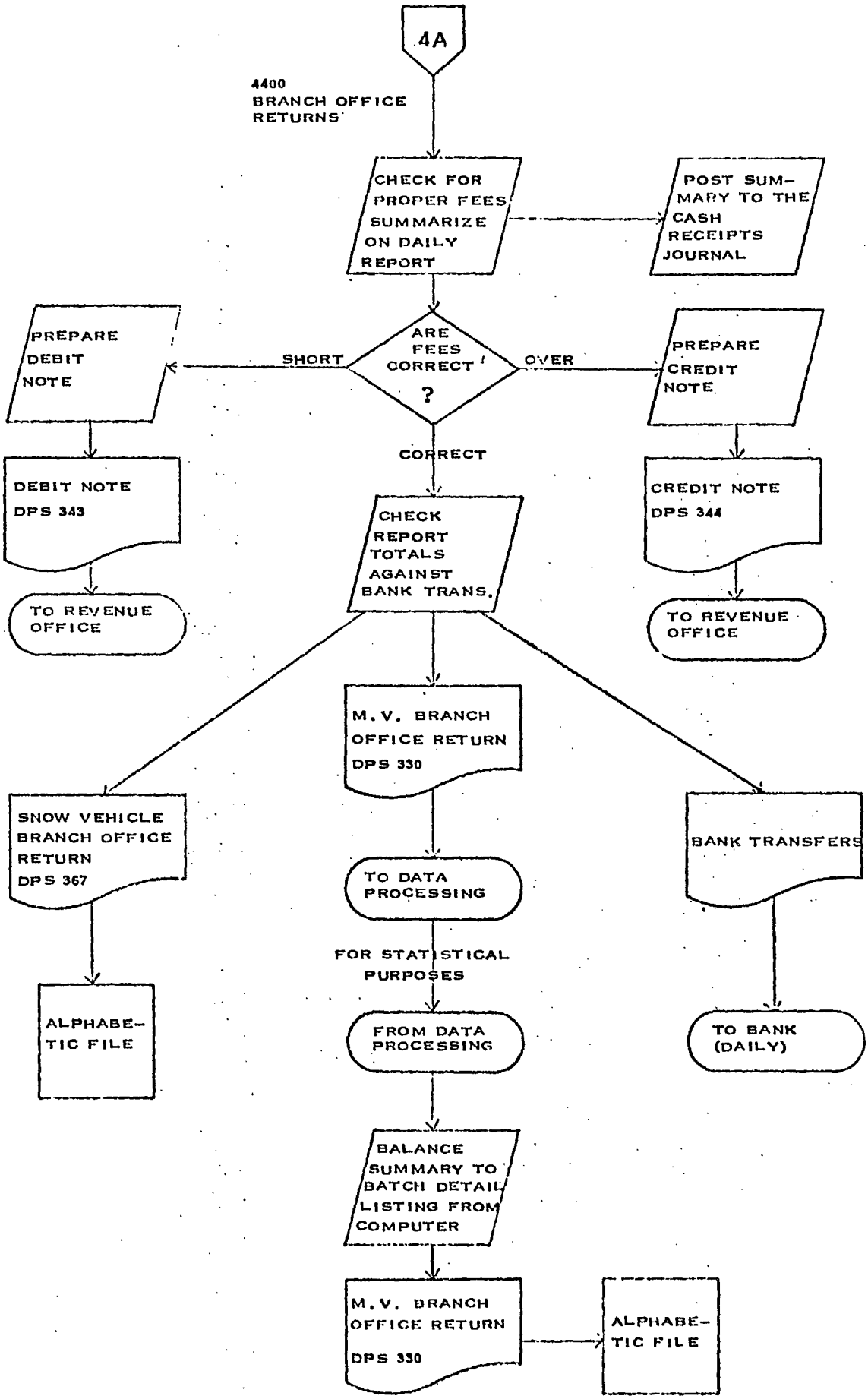
KEY:	4200
INPUT:	Application for Partial Refund of Motor Vehicle License Fees
FREQUENCY:	Daily
OUTPUT:	Card index by plate number
	Card index by name
	Refund List (DPS 347)
	Authorization Voucher (DF 369)
	Cheques

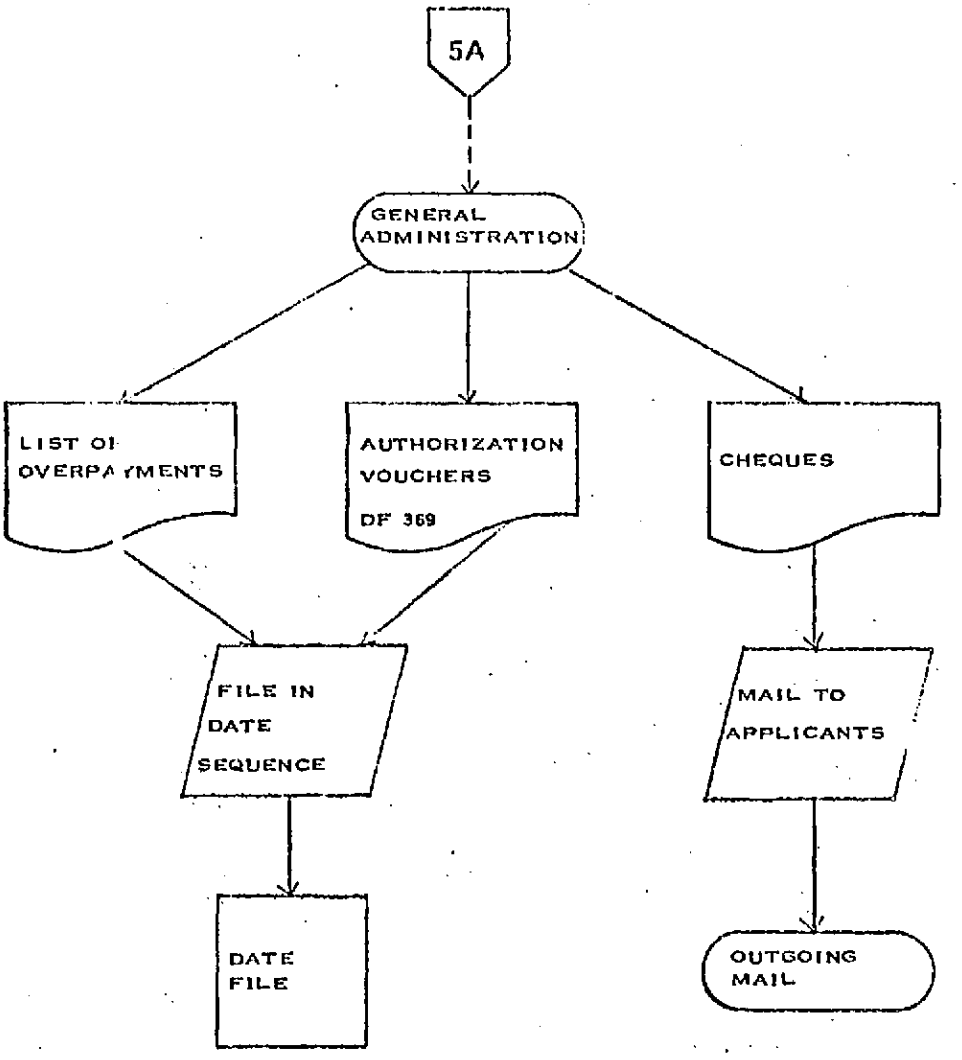

4200
APPLICATION FOR PARTIAL REFUND OF M.V. LICENSE FEES
2A
COMPILE LIST OF REFUNDS AND CREATE VOUCHERS
PREPARE CROSS-REF. FILE INDEX CARDS BY NAME AND PLATE NO.
CARD INDEX BY NAME
NAME FILE
CARD INDEX BY PLATE NO.
PLATE NUMBER FILE
REFUND LIST DPS 347
AUTHORIZATION VOUCHER (3 COPIES) DF 369
3 COPIES
REFUND LIST DPS 347 (1 COPY)
REFUND LIST (1 COPY) DPS 347
VOUCHER NUMBER FILE
TO GENERAL ADMINISTRATION
TO M.V. REGISTRATION
FROM GENERAL ADMINISTRATION
REFUND LIST DPS 347
AUTHORIZATION VOUCHER DF 369
REFUND CHEQUES
MAIL TO APPLICANT
DATE FILE
FILE IN DATE SEQUENCE
OUTGOING MAIL

KEY:	4300
INPUT:	Motor Vehicle Registrations
VOLUME:	226,000/year (1971)
FREQUENCY:	Daily
OUTPUT:	For overpayments:
	Authorization voucher (DF 369)
	List of overpayments
	Cheques


BRANCH OFFICES
4A
DRIVER LICENSES AND APPLICATIONS
4300 MOTOR VEHICLE REGISTRATIONS
1A
TO 4100
CHECK FOR OVERPAYMENT OF FEES
IS THERE AN OVERPAY-MENT
NO
YES
MOTOR VEHICLE REGISTRATION
RECORD OVERPAYMENT IN LEDGER
TO M.V. REGISTRATIONS
3A
COMPILE LIST OF OVERPAY-MENTS AND CREATE VOUCHERS
AUTHORIZATION VOUCHER DF 369
LIST OF OVERPAYMENTS
(2 COPIES)
(3 COPIES)
TO GENERAL ADMINISTRATION
FOR AUTHORIZATION
5A

KEY:	4400
INPUT:	Branch Office Returns
FREQUENCY:	Daily
OUTPUT:	Distribution of cash receipts
	Credit notes
	Debit notes


4A
4400
BRANCH OFFICE RETURNS
CHECK FOR PROPER FEES SUMMARIZE ON DAILY REPORT
POST SUMMARY TO THE CASH RECEIPTS JOURNAL
ARE FEES CORRECT ?
SHORT
OVER
CORRECT
PREPARE DEBIT NOTE
PREPARE CREDIT NOTE
DEBIT NOTE DPS 343
CREDIT NOTE DPS 344
TO REVENUE OFFICE
TO REVENUE OFFICE
CHECK REPORT TOTALS AGAINST BANK TRANS.
M.V. BRANCH OFFICE RETURN DPS 330
SNOW VEHICLE BRANCH OFFICE RETURN DPS 367
BANK TRANSFERS
TO DATA PROCESSING
FOR STATISTICAL PURPOSES
ALPHABETIC FILE
FROM DATA PROCESSING
TO BANK (DAILY)
BALANCE SUMMARY TO BATCH DETAIL LISTING FROM COMPUTER
M.V. BRANCH OFFICE RETURN DPS 330
ALPHABETIC FILE


5A
GENERAL ADMINISTRATION
LIST OF OVERPAYMENTS
AUTHORIZATION VOUCHERS DF 369
CHEQUES
FILE IN DATE SEQUENCE
MAIL TO APPLICANTS
DATE FILE
OUTGOING MAIL

NOVA SCOTIA - REGISTRY OF MOTOR VEHICLES

Organization

The Registry of Motor Vehicles in Nova Scotia is under the jurisdiction of the Minister of Highways. The Registry consists of the Licenses and Registration Division, the Highway Safety and Field Programmes Division and the Motor Vehicle Inspection Division. All divisions report to the Registrar's office consisting of the Registrar, Mr. D.J. Tully, and the Deputy Registrar, Mr. H.J. Cheesman.

The Licenses and Registration Division is responsible for issuing drivers' licenses and for registering motor vehicles. In addition to the head office in Halifax, the Division operates a branch office in Sydney. The Division is divided into a mail transaction section, counter and dealer transactions section, Sydney branch office, data control input section, correspondence and investigation section, data control rejects section and accounting section. The accounting section is responsible for the accounting activities of the entire Registry. The Division consists of one director, one chief supervisor, one chief accountant and 102 people in clerical support activities.

The Highway Safety and Field Programmes Division is principally responsible for the control and regulation of drivers. This includes the maintenance of the driver record and demerit point system and the education of drivers. The Division is divided into a records section, driver qualifications section, driver control section, financial responsibility and accident statistics section, weights and loads section and safety programmes section. The motor carrier section has recently been moved from this Division to another department. The Division consists of 136 employees, with 20 of these responsible for the maintenance of the driver record and point system.

The Motor Vehicle Inspection Division is responsible for the control of inspection stations. Motor vehicle inspections are conducted once per year on a staggered basis with each vehicle being inspected on the anniversary of its purchase. The computer system provides statistical analyses used for monitoring the performance of individual inspection stations. This Division has 17 employees, including the director, inspectors and clerks.

General Description

The original motor vehicle and driver licensing application was run on IBM Series 50 equipment until 1965. Because of growth problems, it was decided to convert to an automated system. The system was improved and modified to a computer-based system designed for an IBM System 360, Model 30. The computer system integrated the motor vehicle registration and driver licensing applications. The change-over to the new system began in May 1966. Since then, several improvements have been made to the system and currently, it is running on an IBM System 370, Model 145.

The original system was designed to run daily but is currently run once a week with daily edit runs. The weekly computer update has caused delays of two to three weeks in issuing licenses and permits. To ease this problem, temporary licenses and permits are issued immediately for counter transactions and within 48 hours for mail transactions. Refunds for registrations have been incorporated into the system and are based on quarterly and half-yearly periods. Recently, the system has been modified to process registrations for snow vehicles.

The growth rate for motor vehicle registration and driver licensing has been 5% per year. This trend is expected to continue.

The primary users of motor vehicle and driver licensing records are law enforcement agencies, insurance companies, R.L. Polk, the legal profession, tax assessors of municipal governments and the health services tax department. Law enforcement agencies are provided with information on a 24-hour basis and have access to the files. Insurance companies request copies of driver records and accident reports. R.L. Polk obtains a tape of the names and addresses of vehicle owners. The legal profession requires information, such as vehicle registration date for court purposes. Tax assessors of municipal governments request a list of owners of trailers in their municipalities. The sales tax related to transferred vehicles is collected by the Registry of Motor Vehicles and lists of all transferred vehicles are produced for the health services tax department.

The Highway Safety and Field Programmes Division plans to use microfilm for storing the documents collected in the maintenance of driver records. The Division is also considering implementing a system to analyze demerit points.

Other possible changes to the system which are being considered include staggered vehicle registration, integrated inspection and registration, and changing the master files from tape to disk to allow more flexible inquiry facilities at the same operating cost.

Motor Vehicle Registration

The Nova Scotia motor vehicle registration system provides a title to the ownership of a vehicle in addition to the registration information. However, the title system is not used in practice because there is no means of registering liens against motor vehicles. Motor vehicle officials believe that the legal nature of the title document inhibits illegal registrations and improves the accuracy of transfer information.

License plates are issued for a three-year period, with annual renewals indicated by a sticker. The peak registration period

is from January until the end of March each year. March 31st is the last date for registration of passenger vehicles.

Motor vehicle registration renewals are prepared by the computer system in October and sent to the public. These renewals, as well as initial applications, foreign applications, and transfers, can be processed either by mail or at the Sydney or Halifax office. The application form is a two-part form and the second copy is used as a temporary permit. For applications delivered directly to the office, the second copy is detached and given to the applicant immediately. For mail applications, it is detached and sent out with the license plate usually within 24 hours of receipt of the application. The temporary permit has no short-term expiry date on it and could be used for the entire year if the permanent permit was not issued.

The application forms are keypunched and prepared for the daily computer system edit run. Once a week, the output from the daily edit runs is used to update the master files and produce the motor vehicle registration permits. These permits are mailed to the applicants.

Transfers are handled somewhat differently as they require two computer update runs to be processed. On the first run, information about the transferred vehicle is deleted from the seller's file and a transaction is set up to add it to the new owner's file and produce the permit on the second run. Special move permits, such as overweight moves, are handled manually.

In addition to the computer master file, two complete master file lists exist in the Licenses and Registration Division. One in plate number sequence contains information about the vehicle and owner. The other is produced in driver license sequence and includes information about the driver and all vehicles owned by the driver. Both lists are updated with supplementary cards which are produced each time a permit or license is issued. These supplementary card files require 150

to 200 large file drawers. The master file listings are printed every six months and the old supplementary cards and lists are microfilmed afterwards.

Inquiries into the plate number file come primarily from law enforcement agencies. However, others do come from the public, the government, insurance and other companies. Licenses and Registration Division staff respond to an average of 100 police and 50 other inquiries daily. Most of the inquiries are answered by checking the master file lists and the supplementary cards. If this fails to provide a satisfactory reply, the source documents of the transactions currently being processed are referenced. If further checking is necessary, a master file print request is prepared to interrogate the system. A recent survey indicated that 95% of inquiries are satisfied within 15 minutes.

Approximately 380,000 vehicles are registered annually. In addition, about 415,000 permits are issued, including transfers and changes of address. Over 50% of the permits are issued during the January to March period, and in a peak week, 26,000 are issued.

One of the major problems with the system is the high percentage of computer input which is rejected. Currently, 6 to 10% of all transactions are rejected. This includes both driver licensing and motor vehicle transactions.

A second problem is the delay in processing transfers. Since transfers require a two-run process at least, it is often four weeks before the permanent registration is issued. Because of the peak periods in the year for motor vehicle registration, temporary help must be hired to handle the volume and this adds to the input errors.

Another problem is the maintenance of the supplementary card file. This file is referenced constantly for both filing and retrieval purposes. Because of the size and activity of the file, misfiling is a problem.

Associated with the supplementary card file is the problem of responding to inquiries quickly. Although most inquiries are answered within 15 minutes, the Registry wants quick, accurate replies to all inquiries. At present, the supplementary card file is not up-to-date because of the delay from the entry of a transaction into the computer system on the first edit until the production of the supplementary card. This time delay ranges from one week to one month.

Driver Licensing

The Nova Scotia driver license number consists of fourteen characters. The first five are the first five letters of the surname, followed by six digits for the date of birth. Two digits follow to resolve synonyms and the last character is a check-digit.

Driver licenses are on a three-year cycle by birth month. Reminders are produced by the computer system at the beginning of the month before the license is due to expire. A reminder is sent to the applicant and he can renew his license at either the Halifax or Sydney office, or he can mail it into the Halifax office. In either case, the second copy of the two-part application form is returned to him as the temporary license until the permanent one is produced by the computer system. Temporary licenses are also issued for initial, foreign and beginner applicants.

The application forms are keypunched and prepared for the daily computer edit run. Once a week, the output from the daily edit runs is used to update the driver license master file and produce the permanent license. The licenses are mailed to the applicants.

A hard copy listing of driver license information and the cars the driver owns is produced twice a year. Then, for each new license issued, a supplementary card is prepared and is filed

in driver license sequence. The Highway Safety and Field Programmes Division provides the necessary master file amendments to suspend or reinstate a driver. A suspension list is prepared monthly at the time of the reminder run and sent to this Division.

There are about 342,000 registered drivers in Nova Scotia. About 204,000 licenses were produced last year. These include renewals, initial licenses, beginners' licenses, and changes to any of the previous categories.

Inquiries into the driver license file for driver license information are few. The main inquiries are to determine the status of the driver; that is, whether he is suspended or reinstated.

Similar problems exist for driver licensing as do for motor vehicle registration. These problems include the edit reject rate and the maintenance and retrieval of information from the supplementary card file.

Driver Records

The records section of the Highway Safety and Field Programmes Division is responsible for maintaining driver records and answering inquiries. It consists of 18 clerks, a supervisor and stenographer.

Two main files are maintained in this section, one on driver records and the other on accidents. The driver record file is cross-referenced by driver record cards which contain the summary information concerning the drivers. There are 296,000 files on drivers at the present time. There is a file for each driver who has had a conviction or accident, and for all drivers who are registered to operate chauffeured vehicles. The summary driver record card file is maintained in master number sequence (driver license number) and the driver record file is maintained in year sequence. If a file is dormant for five years, it is

purged. It is estimated that there are two million documents in the active files. Accident reports are maintained in the department for two years and then microfilmed.

Approximately 30,000 certificates of conviction and voluntary convictions are sent to the records section annually. The driver record card is updated with any demerit points accumulated and the certificate is filed in the driver record file. In addition, about 13,000 accident reports are received by the records section each year. These reports are used to update the driver record with the appropriate accident number and any injuries or fatalities resulting from the accident, and are filed sequentially in the accident file. If a suspension or reinstatement is indicated, the appropriate master file amendment is prepared and sent to the data control section for input into the next computer edit run.

Users of driver records include insurance agencies, law enforcement agencies, the public and government. Insurance companies and the public are charged $2.00 per abstract. About 50,000 of these abstracts are requested each year. The abstracts are prepared using a photocopy machine. The records section also receives about 1,000 to 1,200 annual requests from the police for a copy of the driver's record and about 2,500 to 3,000 calls from the police for information about a driver's status.

Several statistical analysis reports are produced by the computer. These are done separately from the licensing and registration functions. One is for driver examination reports and another for accident reports. A system to analyze the demerit points has also been proposed.

Suspension lists are prepared monthly as part of the license reminder run.

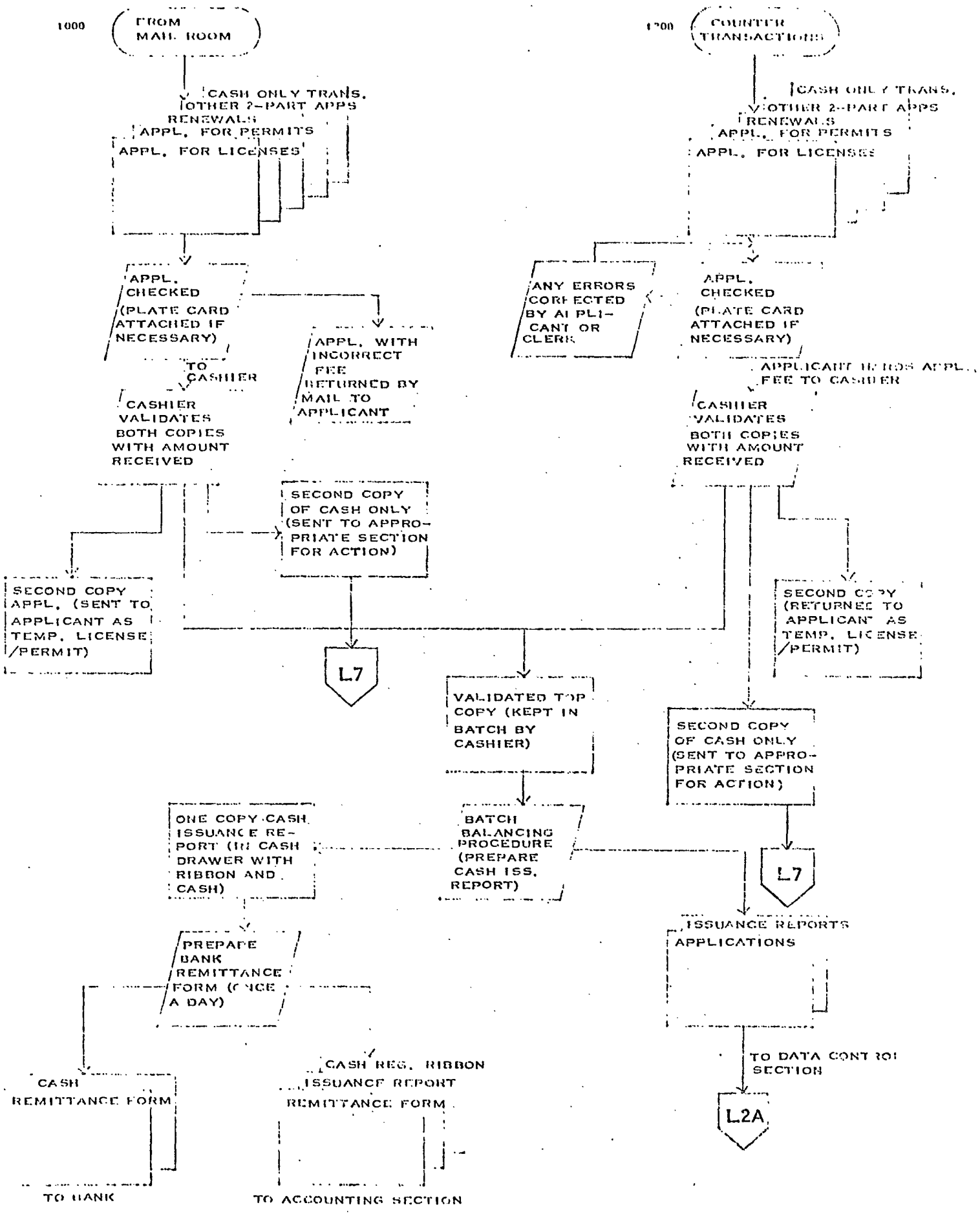
A problem in the driver records area is the maintenance, retrieval and storage of the driver record cards and files. Associated

NOVA SCOTIA LICENSING AND REGISTRATION SYSTEM

KEY:	1000
INPUT:	Mail applications for licenses, permits, renewals, transfers, duplicates, other two-part applications, cash only transactions (searches).
VOLUME:	Average 1,050/day Peak 3,000/day (occurs in January to March period)
STAFF:	18 clerks, 3 cashiers, 1 supervisor
OUTPUT:	One copy of applications, cash issuance report sent to data control section. Temporary license or permit mailed to applicant. Accounting control reports sent to accounting section. Cash sent to bank.

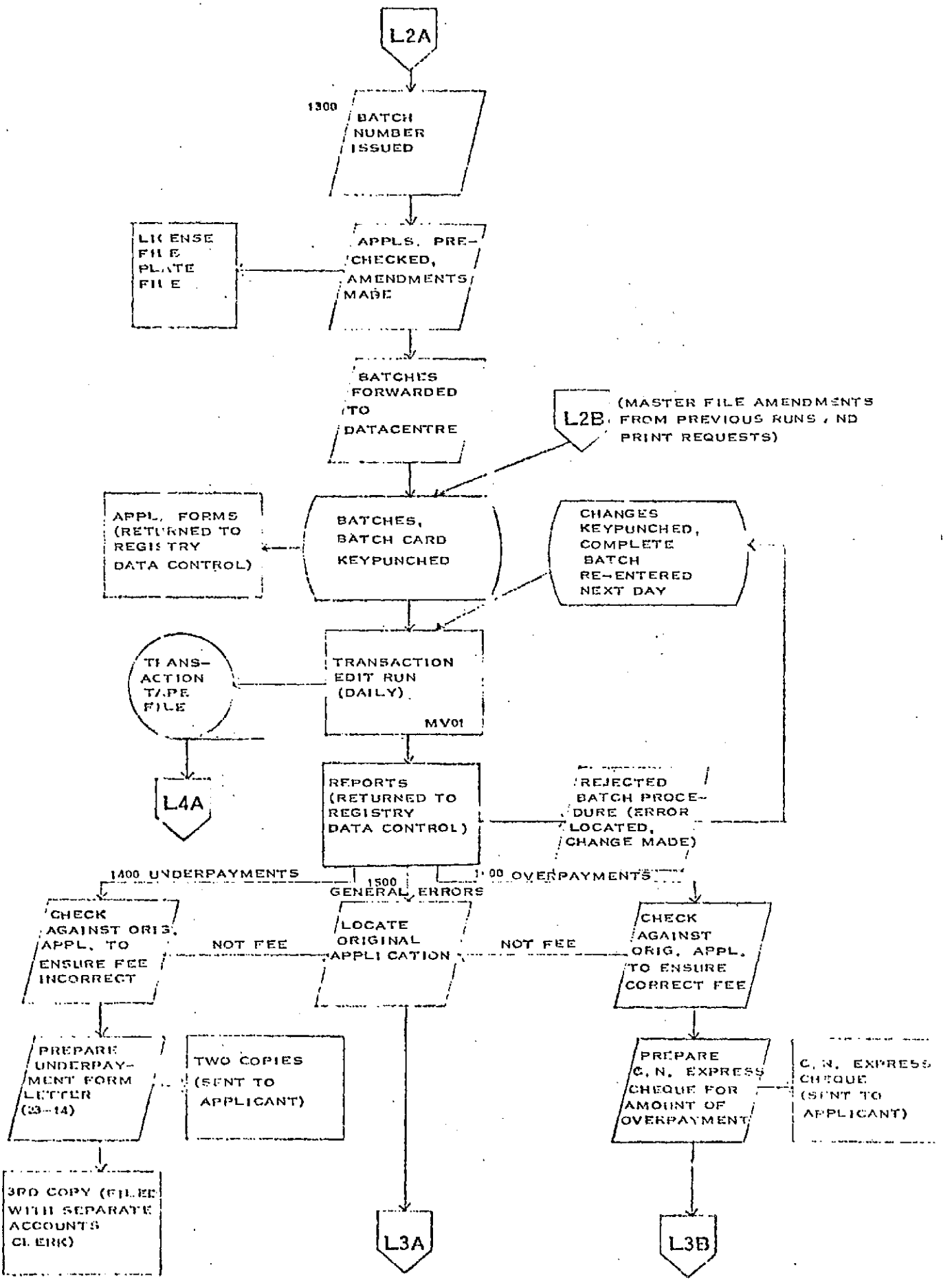
KEY:	1200
INPUT:	Counter applications for licenses, permits, renewals, transfers, duplicates, other two-part applications, cash only transactions (searches)
VOLUME:	Average 1,250/day (including Sydney office) Peak 4,000/day (including Sydney office)
STAFF:	19 clerks, 5 cashiers, 2 supervisors
OUTPUT:	One copy of applications, cash issuance report sent to data control section. Temporary license or permit mailed to applicant. Accounting control reports sent to accounting section. Cash sent to bank.

NOVA SCOTIA LICENSING AND REGISTRATION SYSTEM



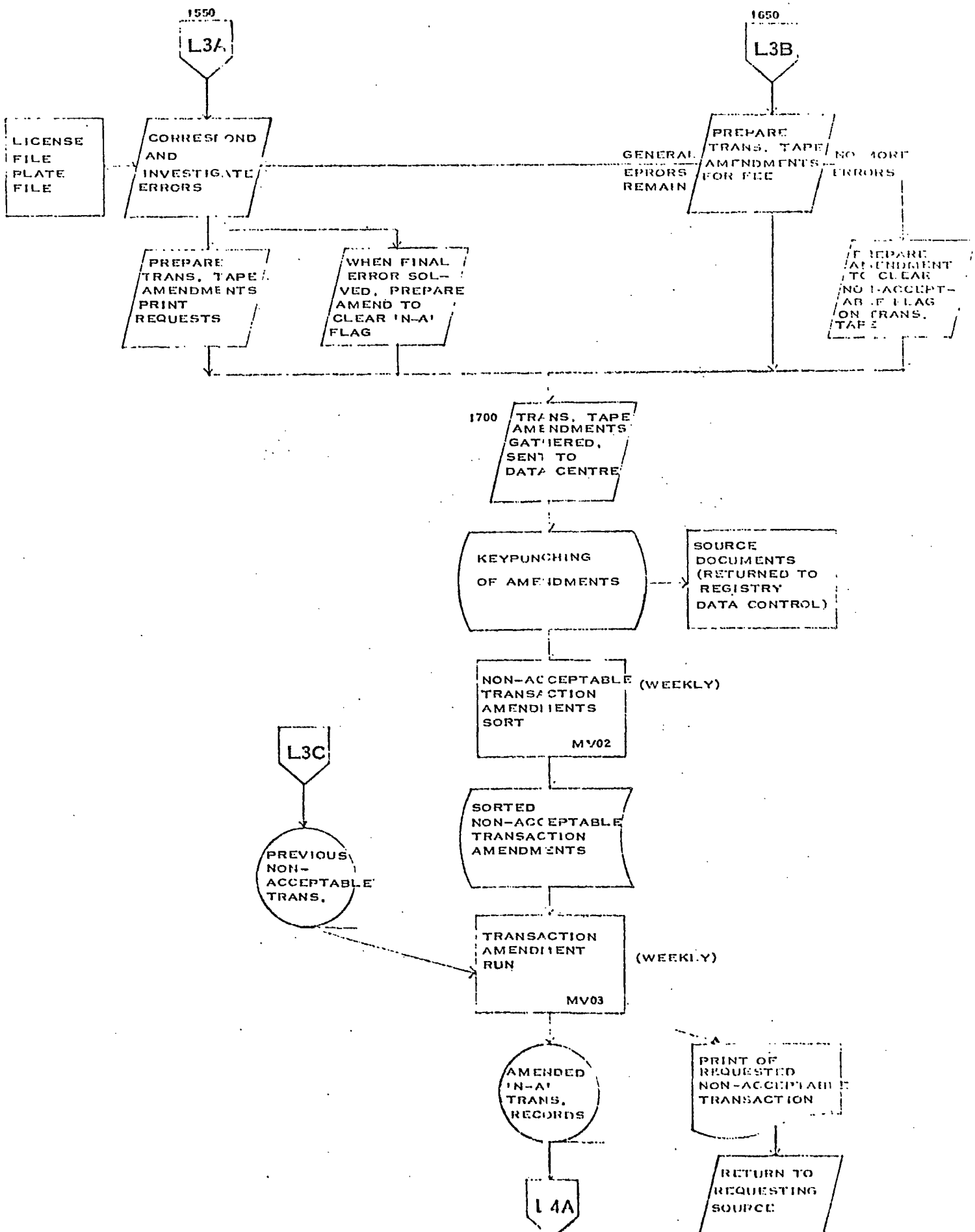
KEY:	1300
INPUT:	Batches of transactions from mail and counter transactions (about 100 transactions/batch). Master file amendments (from Highway Safety and Field Programmes Division and from Licensing and Registration Division).
VOLUME:	Average 2,500/day Peak 7,000/day
STAFF:	4 clerks
OUTPUT:	Transaction tape file containing output of daily edit run (all transactions with a balanced batch are on this file). Rejected batches (errors corrected and batches re-entered next day) Underpayments, overpayments and general error reports. Source documents (returned to Registry).
FREQUENCY:	Transaction edit is run once a day.

KEY:	1400	1500	1600
INPUT:	Underpayments Report	General Error Report	Overpayments Report
VOLUME:	Avg 15/day Pk 25/day	Avg. 115/day Pk 200/day	Avg. 10/day Pk 70/day
STAFF:	1/2 clerk	1 clerk	1/2 clerk
OUTPUT:	Letter sent to applicant		C.N. cheque sent to applicant
FREQUENCY:	Daily	Daily	Daily


L2A
1300
BATCH NUMBER ISSUED
LICENSE FILE
PLATE FILE
APPLS. PRE-CHECKED, AMENDMENTS MADE
BATCHES FORWARDED TO DATACENTRE
L2B
(MASTER FILE AMENDMENTS FROM PREVIOUS RUNS, AND PRINT REQUESTS)
APPL. FORMS (RETURNED TO REGISTRY DATA CONTROL)
BATCHES, BATCH CARD KEYPUNCHED
CHANGES KEYPUNCHED, COMPLETE BATCH RE-ENTERED NEXT DAY
TRANS-ACTION TAPE FILE
TRANSACTION EDIT RUN (DAILY)
MV01
L4A
REPORTS (RETURNED TO REGISTRY DATA CONTROL)
REJECTED BATCH PROCEDURE (ERROR LOCATED, CHANGE MADE)
1400 UNDERPAYMENTS
1500 GENERAL ERRORS
1600 OVERPAYMENTS
CHECK AGAINST ORIG. APPL. TO ENSURE FEE INCORRECT
NOT FEE
LOCATE ORIGINAL APPLICATION
NOT FEE
CHECK AGAINST ORIG. APPL. TO ENSURE CORRECT FEE
PREPARE UNDERPAYMENT FORM LETTER (13-14)
TWO COPIES (SENT TO APPLICANT)
PREPARE C.N. EXPRESS CHEQUE FOR AMOUNT OF OVERPAYMENT
C.N. EXPRESS CHEQUE (SENT TO APPLICANT)
3RD COPY (FILED WITH SEPARATE ACCOUNTS CLERK)
L3A
L3B

KEY:	1550	1650
INPUT:	General Error Report Source Documents	Overpayments Report Source Documents
VOLUME:	Average 115/day Peak 200/day	Average 10/day Peak 70/day
OUTPUT:	Transaction tape amendments	Transaction tape amendments

KEY:	1700
INPUT:	Transaction Tape Amendments Average 600/week, peak 1,200/week Previous Non-acceptable Transaction Amendments Average 15,000 records, peak 25,000 records
OUTPUT:	Amended non-acceptable transactions Report of non-acceptable transactions (5,000 lines)
FREQUENCY:	Weekly


1550
L3A
1650
L3B
LICENSE FILE PLATE FILE
CORRESPOND AND INVESTIGATE ERRORS
GENERAL ERRORS REMAIN
PREPARE TRANS. TAPE AMENDMENTS FOR FEE
NO MORE ERRORS
PREPARE TRANS. TAPE AMENDMENTS PRINT REQUESTS
WHEN FINAL ERROR SOLVED, PREPARE AMEND TO CLEAR IN-A FLAG
PREPARE AMENDMENT TO CLEAR NON-ACCEPTABLE FLAG ON TRANS. TAPE
1700
TRANS. TAPE AMENDMENTS GATHERED, SENT TO DATA CENTRE
KEYPUNCHING OF AMENDMENTS
SOURCE DOCUMENTS (RETURNED TO REGISTRY DATA CONTROL)
NON-ACCEPTABLE TRANSACTION AMENDMENTS SORT MV02
(WEEKLY)
L3C
SORTED NON-ACCEPTABLE TRANSACTION AMENDMENTS
PREVIOUS NON-ACCEPTABLE TRANS.
TRANSACTION AMENDMENT RUN MV03
(WEEKLY)
AMENDED IN-A TRANS. RECORDS
PRINT OF REQUESTED NON-ACCEPTABLE TRANSACTION
RETURN TO REQUESTING SOURCE
L4A

KEY: 1800

INPUT: Amended Non-acceptable Transactions File
Average 2,500 records, peak 4,000 records
Daily Transaction Tape Records File
Average 12,000 records, peak 35,000 records
Driver License and Vehicle Master File
Average 950,000 records, peak 975,000 records
Year-to-date Completed Transactions File
Average 12,000 records, peak 30,000 records

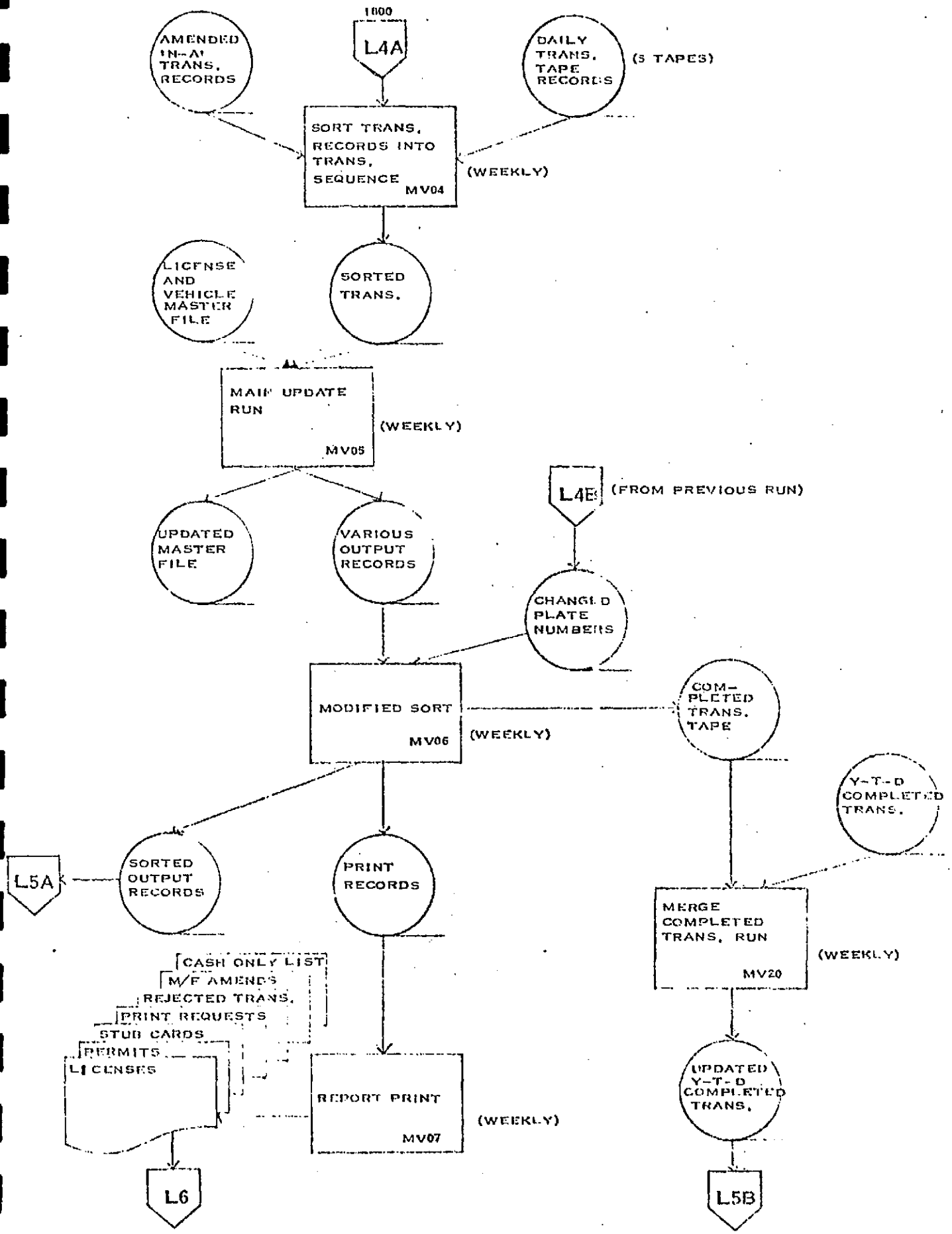
OUTPUT FILES FROM ONE RUN AND INPUT TO ANOTHER:

Various Output Records File
Average 35,000 records, peak 70,000 records
Completed Transaction Tape File
Average 3,000 records, peak 15,000 records

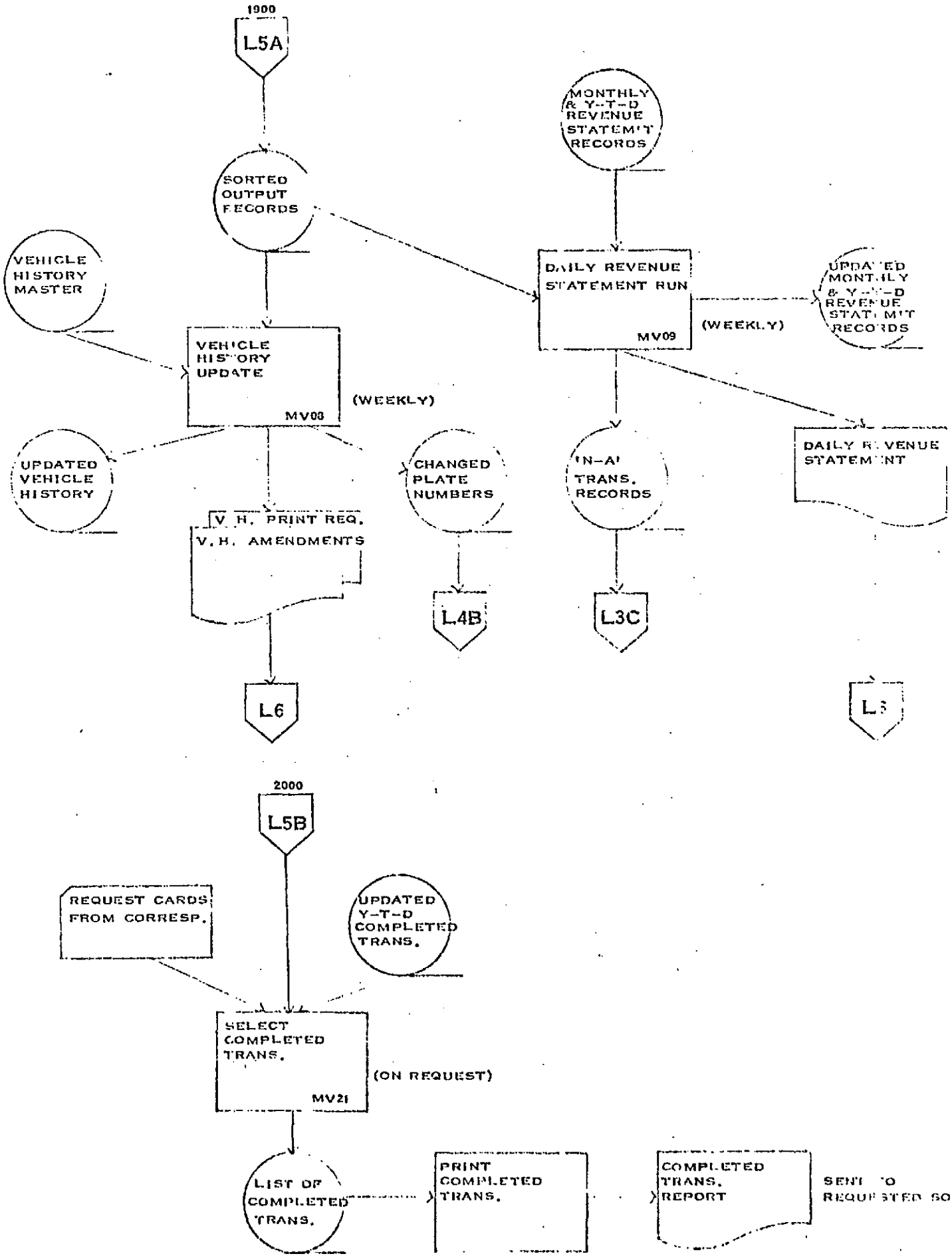
OUTPUT REPORTS:

Licenses	- Average	4,700
	- Peak	7,900
Permits	- Average	6,000 (May to December)
	- Peak	12,000-30,000 (January to April)
Supplementary (stub) Cards	- Average	12,000
	- Peak	36,000
Rejected Transactions	- Average	3,000
	- Peak	5,400
Master File Amendments	- Average	2,500
	- Peak	5,000
Cash Only List	- Average	3,000

FREQUENCY: Weekly


1600
L4A
AMENDED IN-AT TRANS. RECORDS
DAILY TRANS. TAPE RECORDS
(5 TAPES)
SORT TRANS. RECORDS INTO TRANS. SEQUENCE
MV04
(WEEKLY)
LICENSE AND VEHICLE MASTER FILE
SORTED TRANS.
MAIN UPDATE RUN
MV05
(WEEKLY)
L4E
(FROM PREVIOUS RUN)
UPDATED MASTER FILE
VARIOUS OUTPUT RECORDS
CHANGED PLATE NUMBERS
MODIFIED SORT
MV06
(WEEKLY)
COM-PLETED TRANS. TAPE
Y-T-D COMPLETED TRANS.
L5A
SORTED OUTPUT RECORDS
PRINT RECORDS
MERGE COMPLETED TRANS. RUN
MV20
(WEEKLY)
CASH ONLY LIST
M/F AMENDS
REJECTED TRANS.
PRINT REQUESTS
STUB CARDS
PERMITS
LICENSES
REPORT PRINT
MV07
(WEEKLY)
UPDATED Y-T-D COMPLETED TRANS.
L6
L5B

KEY:	1900
INPUT:	Vehicle History Master File - 475,000 records Monthly and Y-T-D Revenue File - 240 records Sorted Output Records - 20,000 records
OUTPUT FILES:	Non-Acceptable Transaction Records File Average 15,000 records, Peak 25,000 records Changed Plate Numbers
OUTPUT REPORTS:	Vehicle History Amendments and Print Requests (7,000 to 30,000 lines) Daily Revenue Statement (250 lines)
FREQUENCY:	Weekly
KEY:	2000
INPUT:	Y-T-D Completed Transaction File Average 12,000 records, Peak 30,000 records Request Cards - up to 40 requests monthly
OUTPUT:	Completed Transaction Report (The output for each request depends on how many transactions have been processed for the driver license number)
FREQUENCY:	On request

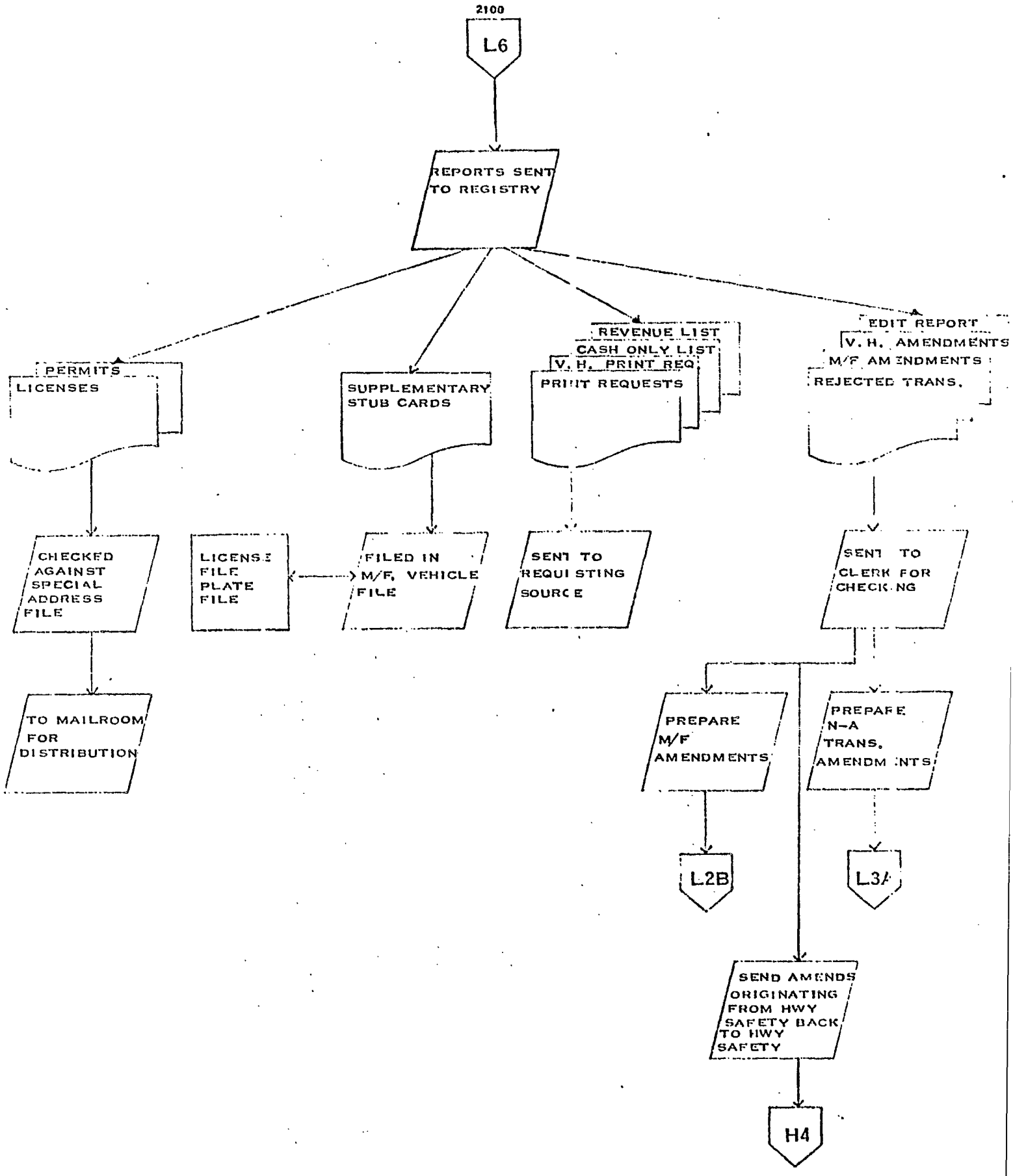

1900
L5A
SORTED OUTPUT RECORDS
MONTHLY & Y-T-D REVENUE STATEMENT RECORDS
VEHICLE HISTORY MASTER
DAILY REVENUE STATEMENT RUN
MV09
(WEEKLY)
UPDATED MONTHLY & Y-T-D REVENUE STATEMENT RECORDS
VEHICLE HISTORY UPDATE
MV08
(WEEKLY)
UPDATED VEHICLE HISTORY
V.H. PRINT REQ.
V.H. AMENDMENTS
CHANGED PLATE NUMBERS
IN-A TRANS. RECORDS
DAILY REVENUE STATEMENT
L4B
L3C
L6
L3
2000
L5B
REQUEST CARDS FROM CORRESP.
UPDATED Y-T-D COMPLETED TRANS.
SELECT COMPLETED TRANS.
MV21
(ON REQUEST)
LIST OF COMPLETED TRANS.
PRINT COMPLETED TRANS.
COMPLETED TRANS. REPORT
SENT TO REQUESTED SOURCE

KEY: 2100

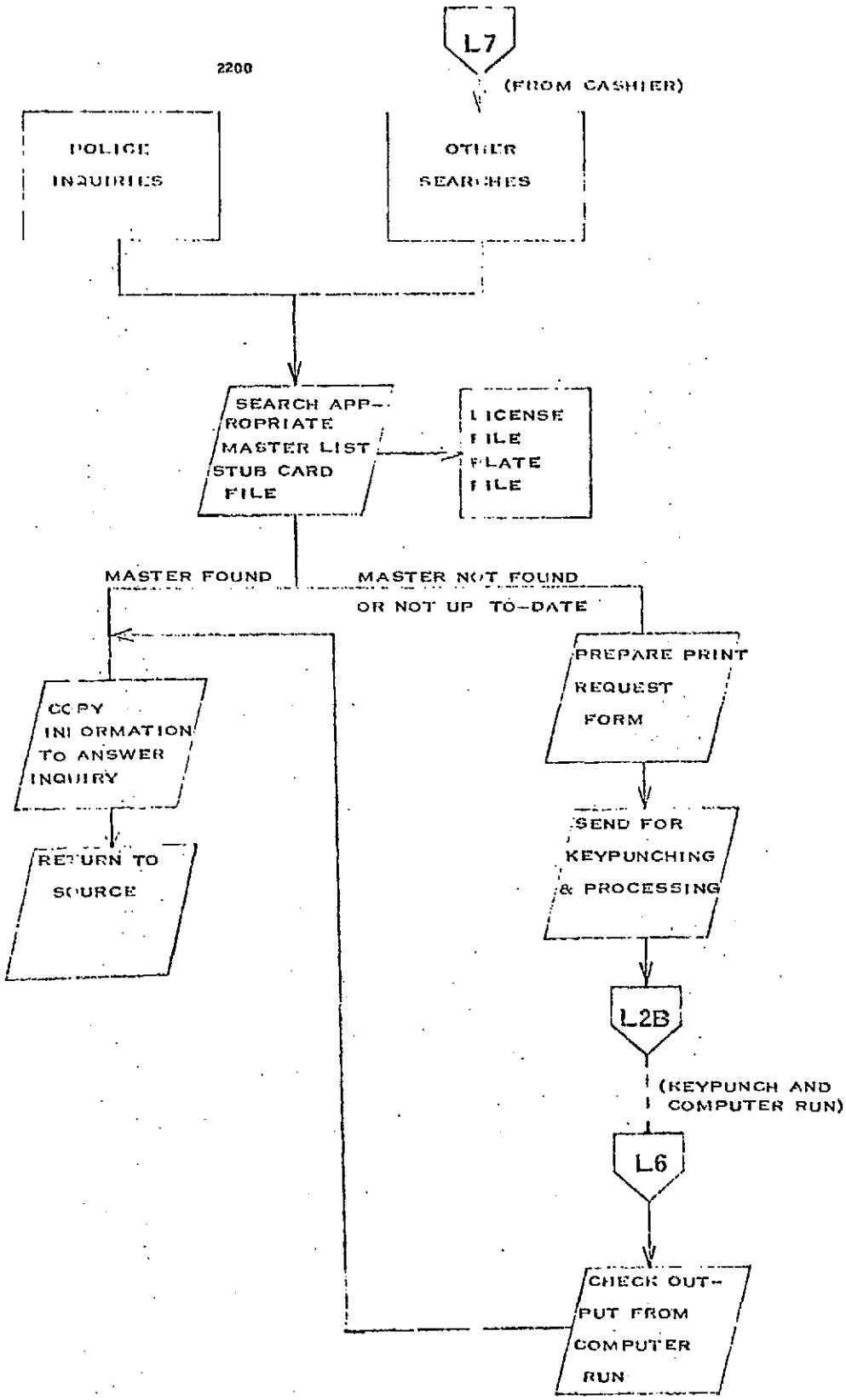
INPUT: All Reports to be Distributed by Registry

OUTPUT: Distributed Reports

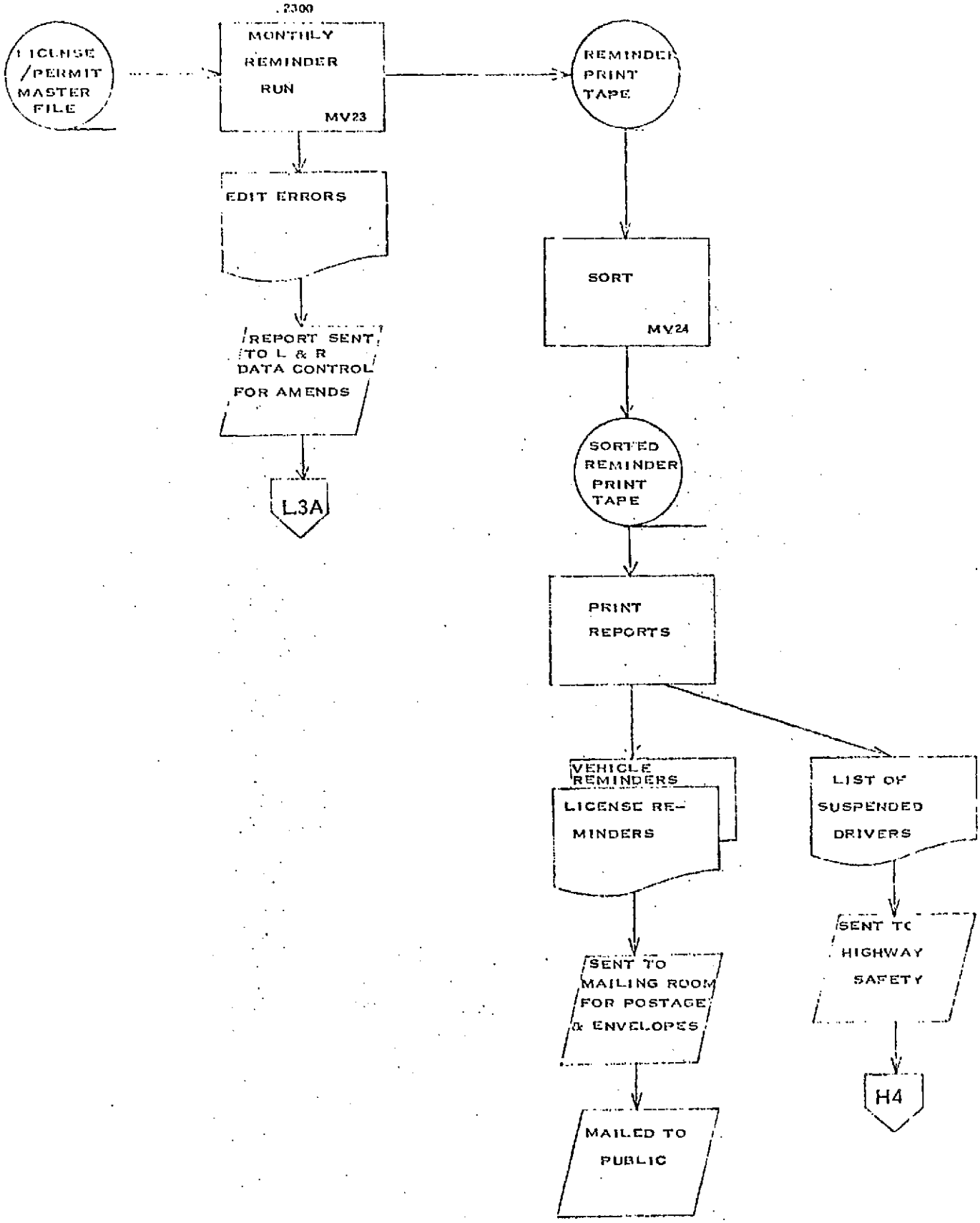
FREQUENCY: Weekly


2100
L6
REPORTS SENT TO REGISTRY
PERMITS
LICENSES
SUPPLEMENTARY STUB CARDS
REVENUE LIST
CASH ONLY LIST
V. H. PRINT REQ
PRINT REQUESTS
EDIT REPORT
V. H. AMENDMENTS
M/F AMENDMENTS
REJECTED TRANS.
CHECKED AGAINST SPECIAL ADDRESS FILE
LICENSE FILE PLATE FILE
FILED IN M/F, VEHICLE FILE
SENT TO REQUISTING SOURCE
SENT TO CLERK FOR CHECKING
TO MAILROOM FOR DISTRIBUTION
PREPARE M/F AMENDMENTS
PREPARE N-A TRANS. AMENDMENTS
L2B
L3A
SEND AMENDS ORIGINATING FROM HWY SAFETY BACK TO HWY SAFETY
H4

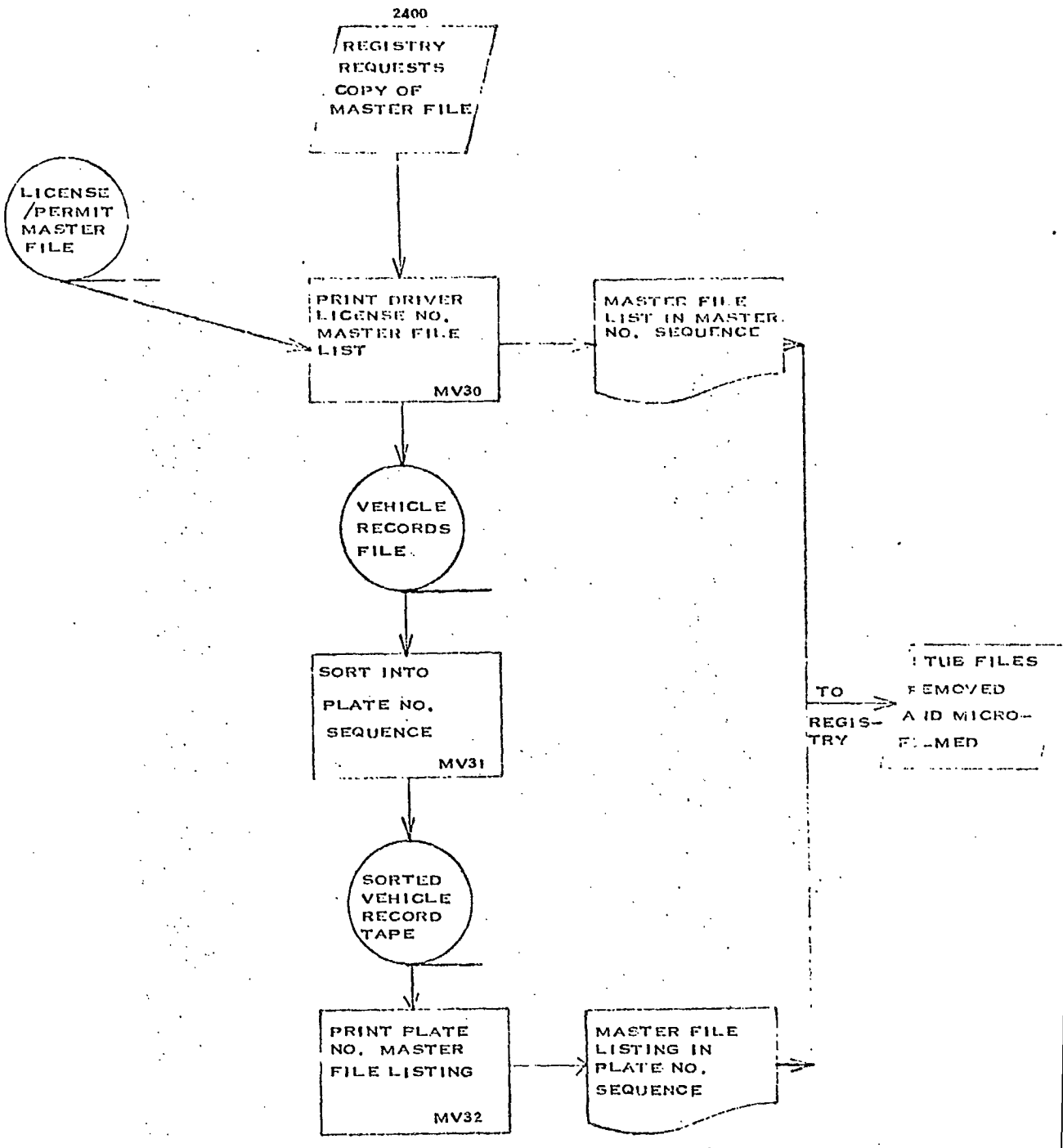
KEY:	2200
INPUT:	Police inquiries - 100/day
	Searches and other inquiries - 80/day
OUTPUT:	Copy of vehicle or driver record returned to source of request
STAFF:	2 clerks during evening
	1 clerk during day (if time permits)
FREQUENCY:	24 hour coverage


2200
L7
(FROM CASHIER)
POLICE INQUIRIES
OTHER SEARCHES
SEARCH APPROPRIATE MASTER LIST STUB CARD FILE
LICENSE FILE PLATE FILE
MASTER FOUND
MASTER NOT FOUND OR NOT UP TO-DATE
COPY INFORMATION TO ANSWER INQUIRY
RETURN TO SOURCE
PREPARE PRINT REQUEST FORM
SEND FOR KEYPUNCHING & PROCESSING
L2B
(KEYPUNCH AND COMPUTER RUN)
L6
CHECK OUTPUT FROM COMPUTER RUN

KEY:	2300
INPUT:	Driver License/Permit Master File
OUTPUT:	Driver license reminders (10,000 - 15,000 reminders monthly)
	Vehicle permit reminders (360,000 in October (1.7 million lines))
	Suspended drivers (1,000 per month)
FREQUENCY:	Monthly computer run

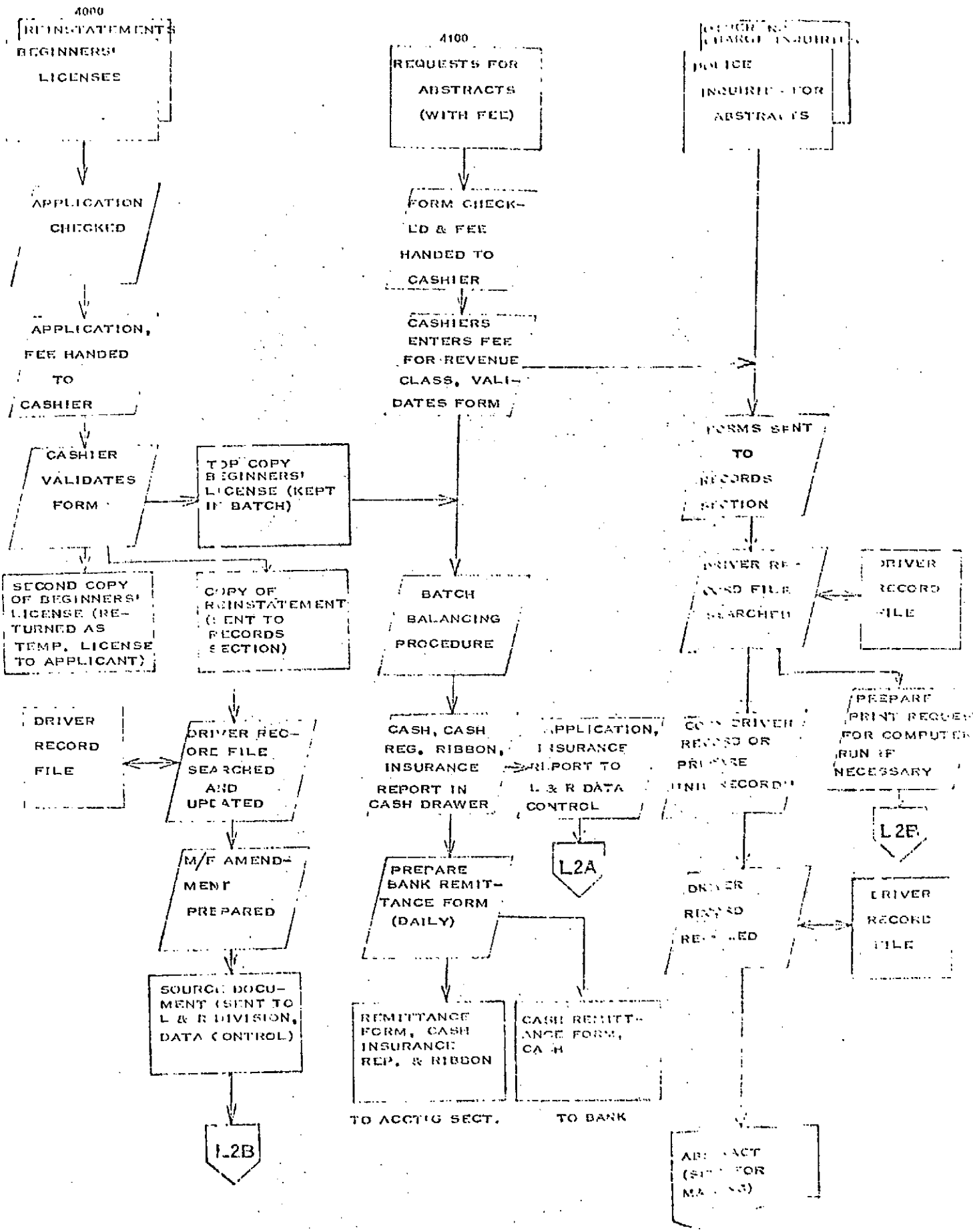

2300
LICENSE /PERMIT MASTER FILE
MONTHLY REMINDER RUN
MV23
REMINDER PRINT TAPE
EDIT ERRORS
SORT
MV24
REPORT SENT TO L & R DATA CONTROL FOR AMENDS
SORTED REMINDER PRINT TAPE
L3A
PRINT REPORTS
VEHICLE REMINDERS
LICENSE RE-MINDERS
LIST OF SUSPENDED DRIVERS
SENT TO MAILING ROOM FOR POSTAGE & ENVELOPES
SENT TO HIGHWAY SAFETY
H4
MAILED TO PUBLIC

KEY:	2400
INPUT:	License/Permit Master File
OUTPUT:	Master file listing in driver license sequence (750,000 lines)
	Master file listing in plate number sequence (380,000 lines)
FREQUENCY:	Twice a year on request

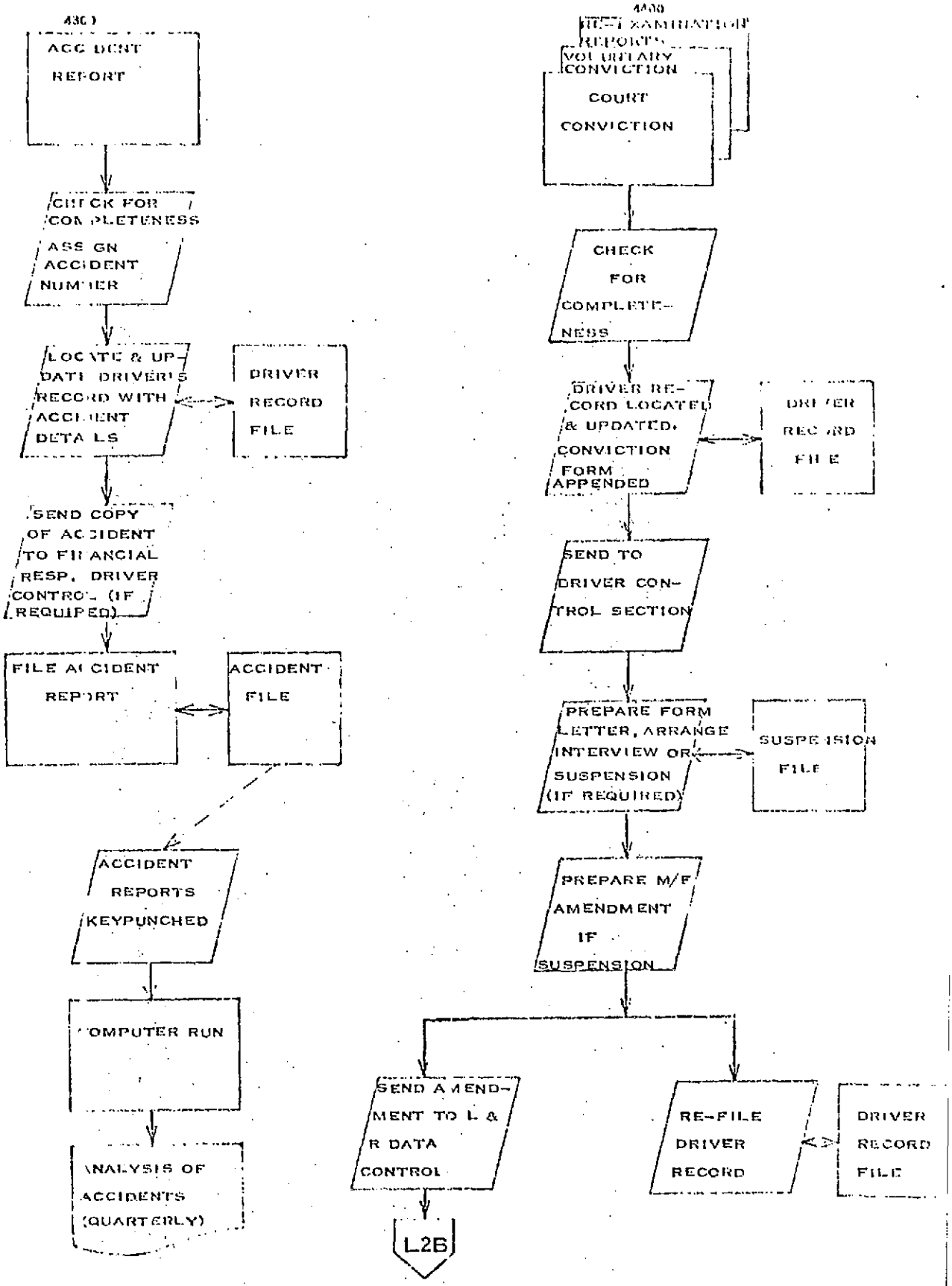

2400
REGISTRY REQUESTS COPY OF MASTER FILE
LICENSE /PERMIT MASTER FILE
PRINT DRIVER LICENSE NO. MASTER FILE LIST
MV30
MASTER FILE LIST IN MASTER NO. SEQUENCE
VEHICLE RECORDS FILE
SORT INTO PLATE NO. SEQUENCE
MV31
SORTED VEHICLE RECORD TAPE
PRINT PLATE NO. MASTER FILE LISTING
MV32
MASTER FILE LISTING IN PLATE NO. SEQUENCE
TO REGIS-TRY
TUE FILES
EMOVED
A ID MICRO-
FILMED

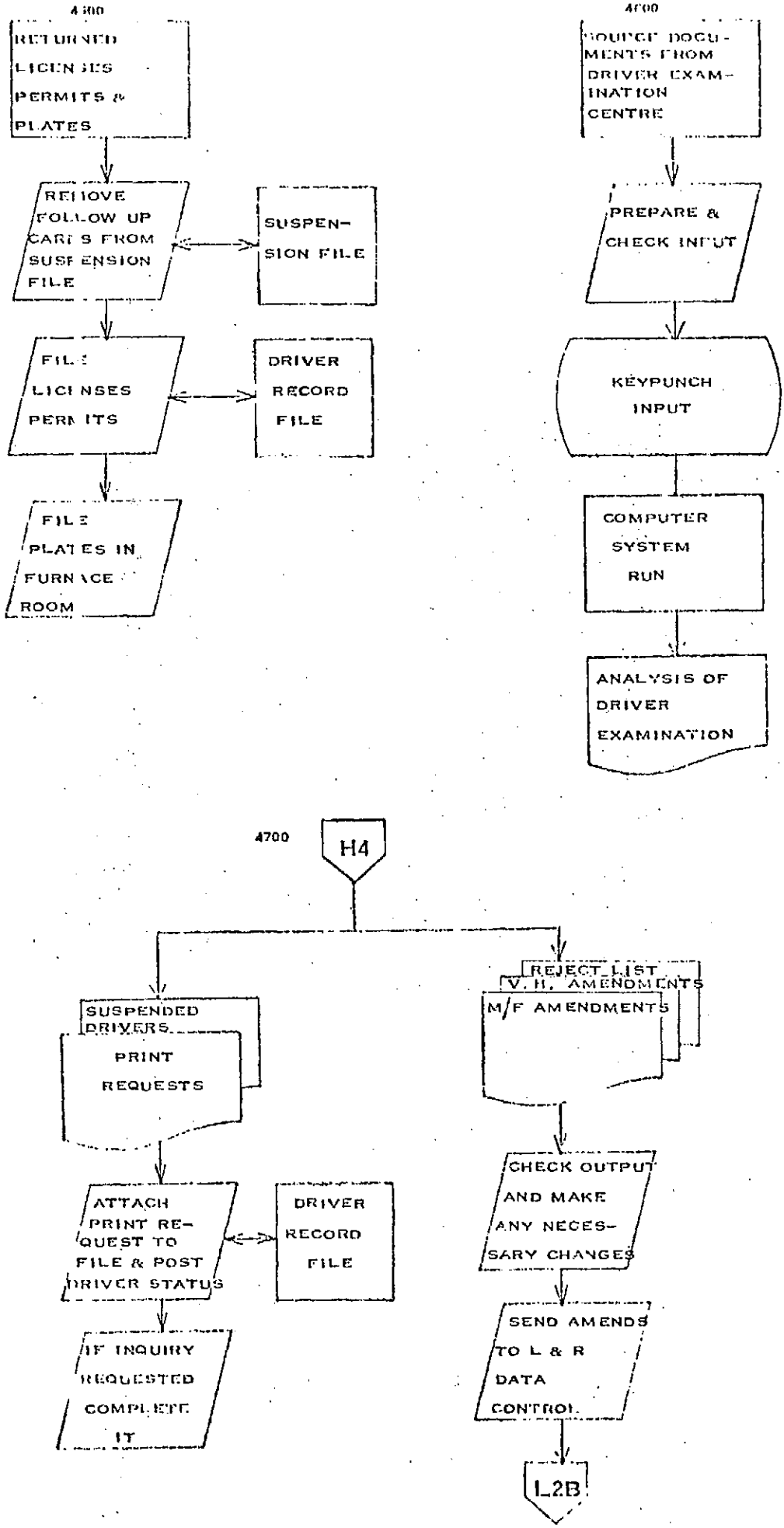
KEY:	4000
INPUT:	Re-instatements, beginners' licenses
VOLUME:	Average 1700/month Peak 3200/month
OUTPUT:	Master file amendment and beginners' licenses applications sent to data control
FREQUENCY:	Daily
KEY:	4100
INPUT:	Requests for driver record abstracts
VOLUME:	4200/month
OUTPUT:	Completed abstract
FREQUENCY:	Daily
KEY:	4200
INPUT:	Police requests for driver record abstracts Other "no-charge' requests for driver record abstracts Police inquiries for driver record information
VOLUME:	1200 abstract requests/year 3000 requests for information/year
OUTPUT:	Completed abstract
FREQUENCY:	Daily

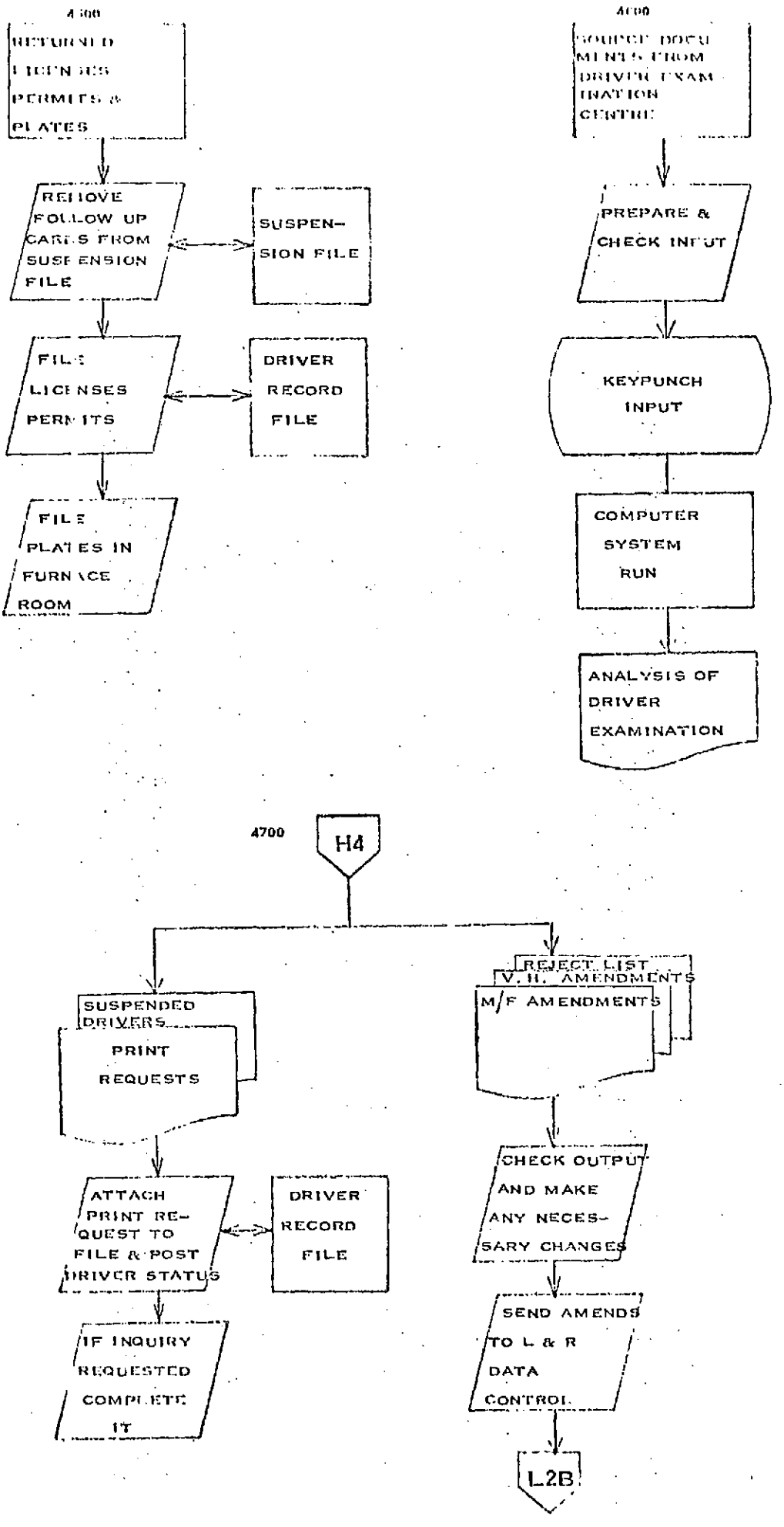
NOVA SCOTIA DRIVER RECORD SYSTEM



KEY:	4300
INPUT:	Accident reports
VOLUME:	13,000/year
OUTPUT:	Updated driver record file and filed accident report analysis of accidents (produced quarterly)
FREQUENCY:	Daily except computer run which is quarterly
KEY:	4400
INPUT:	Court convictions, voluntary convictions, re-examination reports
VOLUME:	30,000/year
OUTPUT:	Update driver record file and master file amendments (if suspension)
FREQUENCY:	Daily

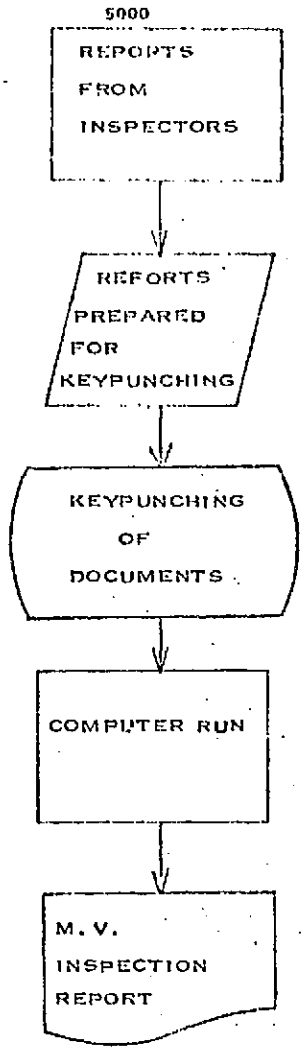

4300
ACCIDENT REPORT
CHECK FOR COMPLETENESS
ASSIGN ACCIDENT NUMBER
LOCATE & UPDATE DRIVER'S RECORD WITH ACCIDENT DETAILS
DRIVER RECORD FILE
SEND COPY OF ACCIDENT TO FINANCIAL RESP. DRIVER CONTROL (IF REQUIRED)
FILE ACCIDENT REPORT
ACCIDENT FILE
ACCIDENT REPORTS KEYPUNCHED
COMPUTER RUN
ANALYSIS OF ACCIDENTS (QUARTERLY)
4400
RE-EXAMINATION REPORTS
VOLUNTARY CONVICTION
COURT CONVICTION
CHECK FOR COMPLETE-NESS
DRIVER RE-CORD LOCATED & UPDATED, CONVICTION FORM APPENDED
DRIVER RECORD FILE
SEND TO DRIVER CON-TROL SECTION
PREPARE FORM LETTER, ARRANGE INTERVIEW OR SUSPENSION (IF REQUIRED)
SUSPENSION FILE
PREPARE M/F AMENDMENT IF SUSPENSION
SEND AMEND-MENT TO L & R DATA CONTROL
L2B
RE-FILE DRIVER RECORD
DRIVER RECORD FILE


4300
RETURNED LICENSES PERMITS & PLATES
REMOVE FOLLOW UP CARDS FROM SUSPENSION FILE
SUSPENSION FILE
FILE LICENSES PERMITS
DRIVER RECORD FILE
FILE PLATES IN FURNACE ROOM
4600
SOURCE DOCUMENTS FROM DRIVER EXAMINATION CENTRE
PREPARE & CHECK INPUT
KEYPUNCH INPUT
COMPUTER SYSTEM RUN
ANALYSIS OF DRIVER EXAMINATION
4700
H4
SUSPENDED DRIVERS PRINT REQUESTS
ATTACH PRINT REQUEST TO FILE & POST DRIVER STATUS
DRIVER RECORD FILE
IF INQUIRY REQUESTED COMPLETE IT
REJECT LIST V. H. AMENDMENTS M/F AMENDMENTS
CHECK OUTPUT AND MAKE ANY NECESSARY CHANGES
SEND AMENDS TO L & R DATA CONTROL
L2B


4700
RETURNED LICENSES PERMITS & PLATES
REMOVE FOLLOW UP CARDS FROM SUSPENSION FILE
SUSPEN-SION FILE
FILE LICENSES PERMITS
DRIVER RECORD FILE
FILE PLATES IN FURNACE ROOM
4700
SOURCE DOCUMENTS FROM DRIVER EXAMINATION CENTRE
PREPARE & CHECK INPUT
KEYPUNCH INPUT
COMPUTER SYSTEM RUN
ANALYSIS OF DRIVER EXAMINATION
4700
H4
SUSPENDED DRIVERS
PRINT REQUESTS
ATTACH PRINT REQUEST TO FILE & POST DRIVER STATUS
DRIVER RECORD FILE
IF INQUIRY REQUESTED COMPLETE IT
REJECT LIST
V. H. AMENDMENTS
M/F AMENDMENTS
CHECK OUTPUT AND MAKE ANY NECESSARY CHANGES
SEND AMENDS TO L & R DATA CONTROL
L2B

KEY:	5000
INPUT:	Reports from inspection stations
OUTPUT:	Motor Vehicle Inspection Report
FREQUENCY:	Reports from inspection stations are sent weekly; computer output on request

NOVA SCOTIA INSPECTIONS



PRINCE EDWARD ISLAND - MOTOR VEHICLE DIVISION

Organization

The Motor Vehicle Division in Prince Edward Island reports to the Provincial Secretary. Licensing and registration branch offices are located in Summerside, Montague, Souris, and Alberton. The head office is located in Charlottetown and includes the administration, driver control section, highway safety section and the Charlottetown licensing and registration office.

All of the sections within the Division report to the Registrar, Mr. J.T. Gallant. The driver control section is responsible for the administration of driver records. It includes an administration officer and three clerk-typists.

The highway safety section is headed by the motor vehicles safety coordinator, a clerk and seven driver qualification and motor vehicle inspection officers.

The licensing and registration sections consist of four clerks in Charlottetown, four in Summerside, and one each in Montague, Souris, and Alberton.

The administration section consists of a clerk responsible for the cash receipts system and three clerk typists.

General Description

Motor vehicle registration and driver licensing systems were operated manually until 1965. At that time, an IBM 405 unit record system was used which was subsequently changed for an IBM 1130 card system, and more recently, a Univac 9400 system. Driver and vehicle files used for production of renewal applications are processed by computer.

Prince Edward Island is currently converting from a two-year cycle driver license system to a three-year cycle. A system

of placing the driver's photograph on the permanent license was introduced recently. This system is now in operation in all five branch offices.

The users of the motor vehicle records include law enforcement agencies, insurance companies, taxation departments, and R.L. Polk. The R.C.M.P. and city police have access to records at all hours of the day. The inquiries are primarily related to the status of the motor vehicle or driver. A $2.00 fee is charged insurance companies for driver record abstracts and investigations. Some problems have been experienced with R.L. Polk in Prince Edward Island, in the use of driver names for commercial purposes.

The Motor Vehicle Division collects sales tax on new registrations and transfers of vehicles. The tax revenue is accounted for separately within the system.

Proposed changes within the Division include placing the colour of the vehicle on the vehicle registration application form, moving to a staggered vehicle registration system, and integrating registrations with vehicle inspections.

There are no current plans to convert manual files to the computer. Service to the users is adequate under the current system although some delays are occurring in the filing of documents. Because the data processing division is moving to a magnetic tape operation, some changes related to the file updates within the Motor Vehicle Division will be necessary. There is a proposal by the Division to eliminate the alphabetic index file for drivers. It is felt that this list could be produced by computer from the numerical driver license file.

Inquiries into driver records are normally processed the same day that they are received. Warning messages must be produced within 24 hours. Because of the small number of files, misfiling is not a problem.

The Motor Vehicle Division is currently evaluating medical disabilities of drivers. There is pending legislation to create a medical advisory board to provide expert medical advice on drivers suspended for medical reasons.

Motor Vehicle Registrations

Vehicles are registered in Prince Edward Island every year between January 1st and March 31st. Temporary registrations are issued for a fourteen-day period until a permanent registration can be mailed. The cash register receipt for the fee payment is used for the temporary registration. Registrations are processed in any one of the five branch offices on the island.

License plates are issued for a three-year period, with annual renewals indicated by markers or decals.

The five branch offices are not equipped to complete the registration applications because of the large volume of annual registrations. Therefore, the computer is used to produce registration renewals. When the application is submitted, the remaining information is entered by the applicant and the application form is signed. Certain motor vehicle dealerships are authorized to handle applications.

Forms control on the issuing of plates and decals is done through validation numbers within each branch office. Reports are prepared daily indicating the validation numbers issued for each day. Validation numbers are printed on the decal.

The validation number is placed on the application before forwarding it to head office. The applications are then keypunched and filed in validation number sequence. The transactions are then entered into a master file update program and the permanent registrations are produced. The alphabetic copy of the permanent registration is filed alphabetically and the numeric copy is filed according to plate sequence.

Law enforcement agencies inquire into the alphabetic file and the numeric file on a daily basis. The application file containing the validation numbers is kept for the internal auditors. A list of all registered vehicles is produced every three months in alphabetic sequence. This list is used by the motor vehicle administration for insurance inquiries.

Approximately 33,000 vehicles are registered per year. Sixty percent of these are registered between March 15th and April 15th. There are approximately 8,300 transfers per year. Inquiries by police and other agencies requesting information on transferred vehicles amount to 50 per day. Insurance inquiries into motor vehicle files amount to 10 per day.

Because of the peak activity during the first three months of the year, a backlog of production of permanent registrations occurs. The delay during this period can be four weeks. There is also a delay in filing the new registrations and applications during this period. Currently, there is no method for entering changes in the motor vehicle files into the computer system. Under the card system, changes were keypunched directly from the files during the month of December. A proposal has been made by data processing to have the changes forwarded on a daily basis for weekly update of the master.

Driver Licensing

Prince Edward Island uses a photo-license prepared by reducing the computer produced application form. The applicant must appear at any one of the five branch offices to have his photograph taken and to complete the application form.

Applications are validated by the cash register and sent to head office for filing. The applicant receives his permanent driver's license, including photograph, at the time of fee payment.

Prince Edward Island is currently changing to a three-year driver license renewal period from a two-year period.

Changes in the driver license information are recorded directly on the driver license application cards and filed. A change notice is returned to the driver; however, a copy of the notice is not attached to the application. At present, changes are not forwarded to data processing for master file update.

Each month, lists of licenses due for renewal are produced by the computer and checked against applications filed in the motor vehicles administration. Changes recorded in the files are marked on the lists and returned to data processing for key-punching and master file updating. Once the master file has been updated, the new driver license applications are produced for the month. The applications are separated and forwarded to motor vehicle administration to be checked for suspensions.

Applications for suspended drivers are kept in the driver record file until the time of reinstatement. All applications which have been checked for suspension are mailed directly to the applicants.

The volume of inquiries into driver license files is low. Most inquiries concerning driver licenses are directed to the driver records section. The majority of the inquiries into licenses are concerned with changes to information. Approximately 4,800 driver licenses per month will be processed by the system during the conversion from a two-year to a three-year cycle. When the conversion is complete, approximately 1,800 renewals will be processed each month.

The renewal applications are filed by month according to driver license number sequence. Because applications representing a three-year period will be contained in these files, a problem exists in finding changes for the month of the current year.

Driver Records

The driver records section of the Prince Edward Island motor vehicles administration consists of three clerks and a supervisor.

The driver records are currently entirely manual, consisting of a master file arranged by the nature of the driving offense and an index of driver records in alphabetic sequence.

Records maintained in this section include unsatisfied judgement fund (UJF) claims, impaired driving, accidents, and other highway safety code infractions. The UJF records are kept three years and purging occurs annually. Approximately 100 UJF records are maintained.

Users of the driver records include insurance companies and law enforcement agencies. Approximately 4,600 requests for insurance abstracts are handled each year. Other inquiries amount to 500 per year.

Approximately 3,500 records are maintained for the 1,900 accidents which occur every year. Demerit points are issued for 6,000 drivers each year. The total number of records maintained is approximately 30,000 and this total is growing at 5% per year. The impaired driving records number approximately 1,000 and have grown approximately 100% since the introduction of the breathalizer in 1970.

Driver records are maintained in file folders, arranged in sequence according to the nature of the offense. They are cross-indexed in a file containing four inch by six inch cards. These cards contain summary information concerning the data in the file folder. They are arranged alphabetically by driver's name and are used to satisfy 90% of the inquiries into driver records.

The records division maintains a list of suspended drivers in a three-ring notebook. This list is maintained manually using handwritten notations.

The main problem facing the records division is a shortage of filing space. In addition, statistics on accidents and convictions are compiled annually requiring the entire staff for a period of one week to ten days. The files are purged annually

and reinstatement notices are prepared where appropriate. There is no automatic reinstatement notice generated in Prince Edward Island.

Fee Accounting

All fees and sales taxes collected in the five branch offices are entered into a daily report of revenue. All sales are entered through the cash register and printed on the cash register tape. Each day, the receipts from the field offices are forwarded to head office and entered into the head office cash register.

Cash and revenue reports are transferred daily to the Department of Finance - Accounting Division, where all government accounting is performed. The daily records and the monthly sales distribution statement are balanced each month.

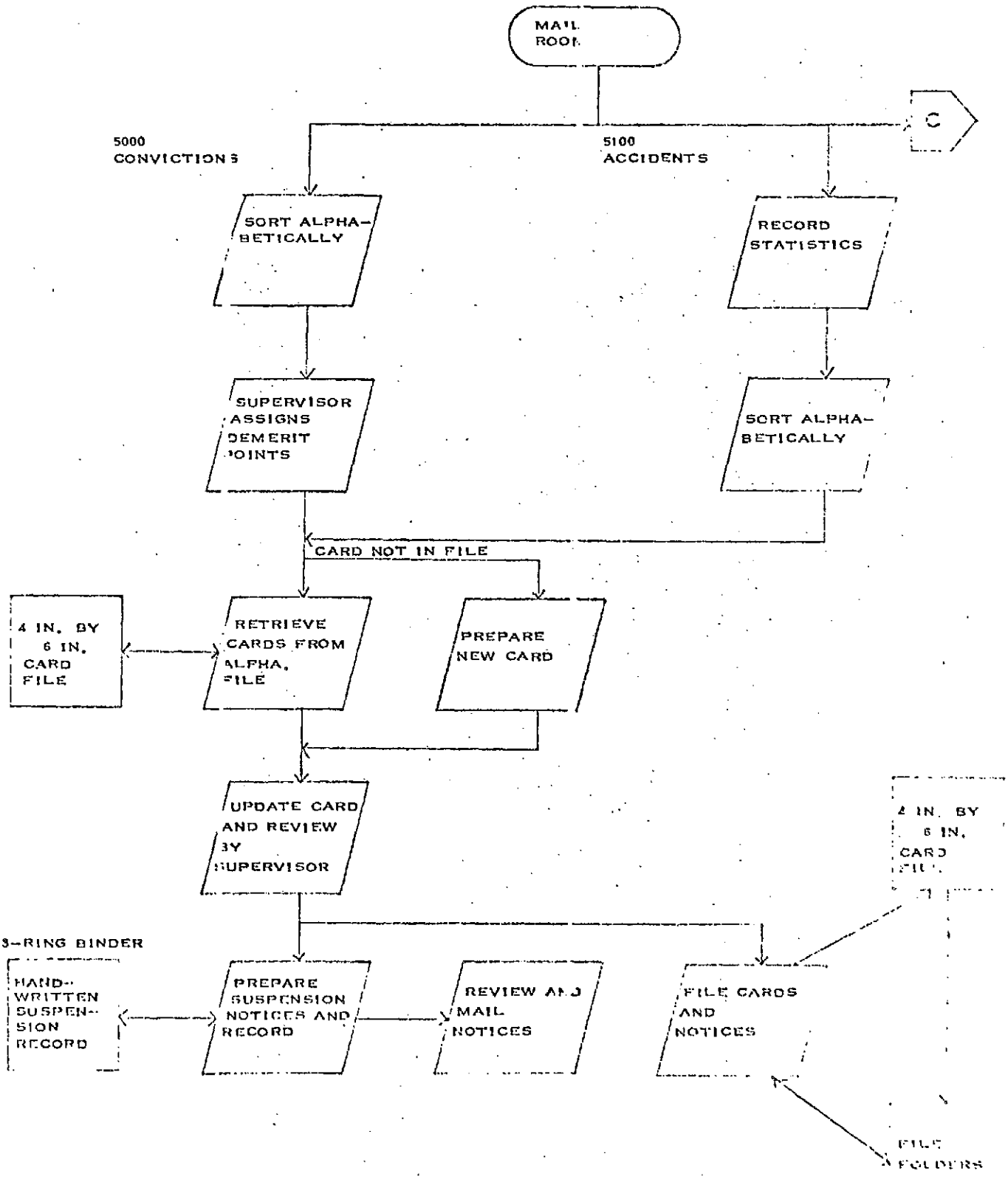
A potential problem exists in cash control because the same person may receive a driver license application and the cash. The same person can issue a license and file the application. Currently, there is no forms control over driver license applications as there is on motor vehicle registrations.

PRINCE EDWARD ISLAND - DRIVING RECORDS

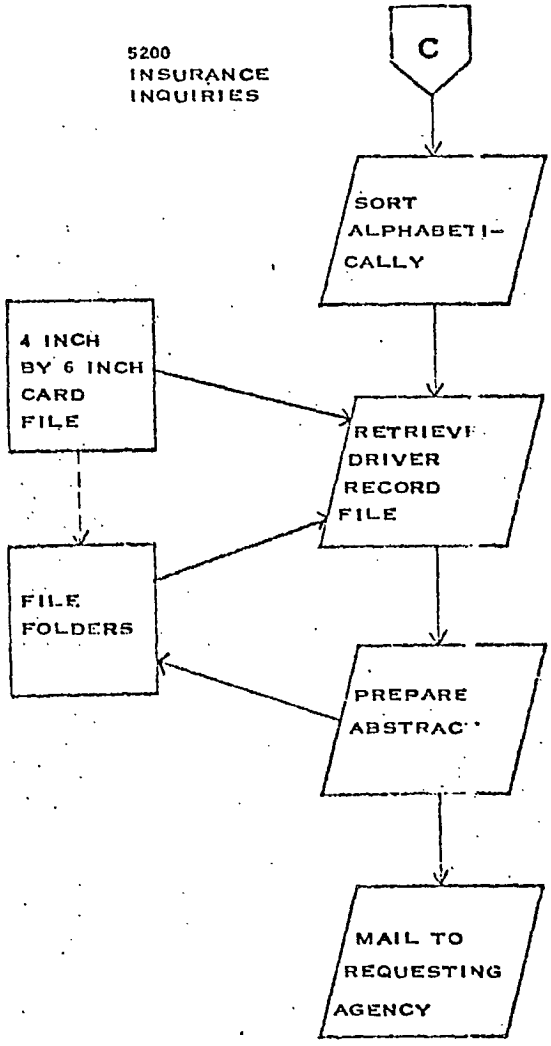
KEY:	5000
INPUT:	Conviction Notices
VOLUME:	100/day, average
	6,000/year, average
STAFF:	2 clerk typist II
FREQUENCY:	Daily
ELAPSED TIME:	6 hours
OUTPUT:	Suspension Notices

KEY:	5100
INPUT:	Accident Reports
VOLUME:	1,900/year
STAFF:	1 clerk typist I
FREQUENCY:	Daily
ELAPSED TIME:	6 hours
OUTPUT:	Statistical Accumulations
	Suspension Notices

PRINCE EDWARD ISLAND — DRIVING RECORDS



KEY:	5200
INPUT:	Insurance Inquiries
VOLUME:	4,600/year, average
FREQUENCY:	Daily
OUTPUT:	Driver Record Abstract

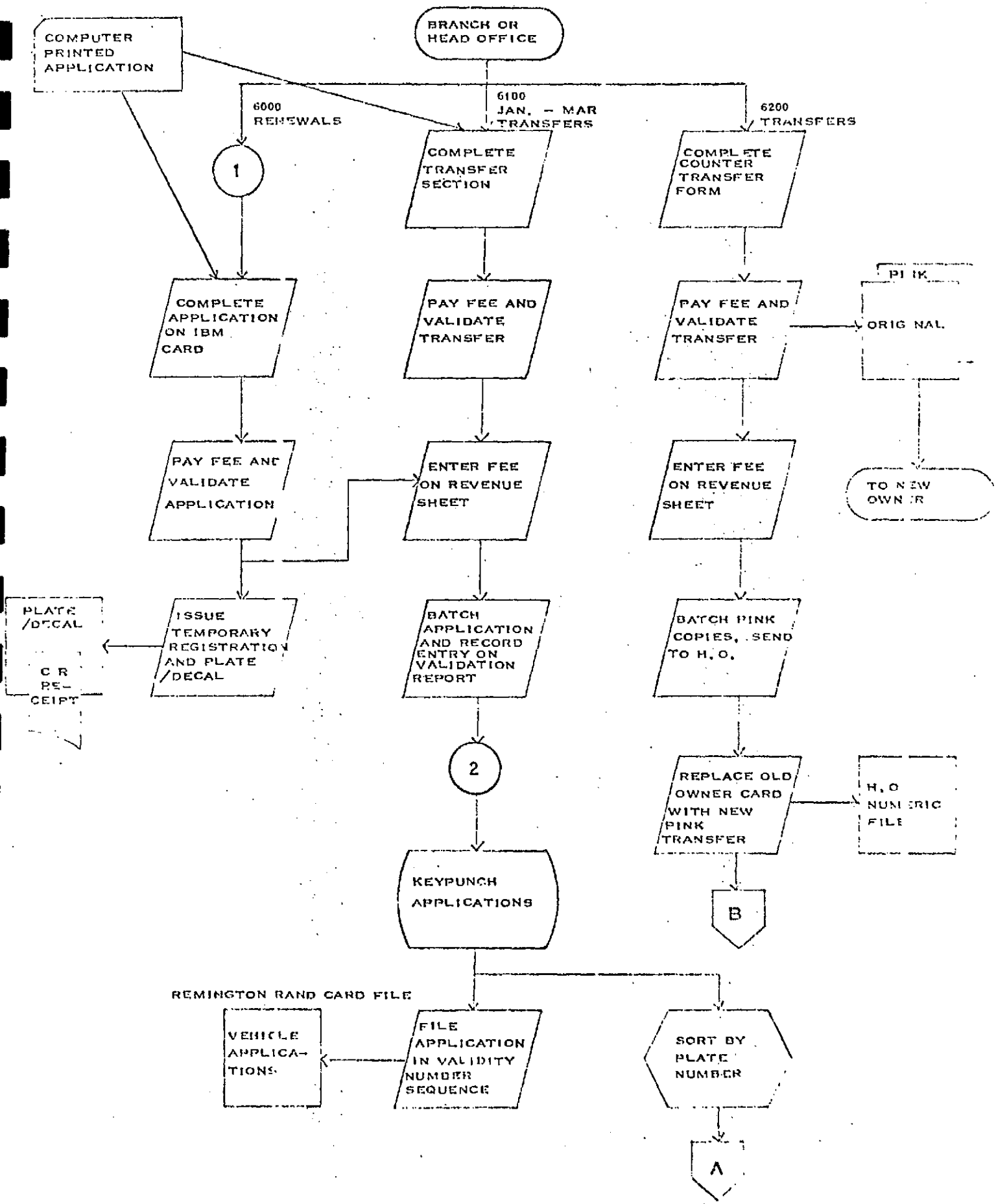

5200
INSURANCE
INQUIRIES
C
SORT
ALPHABETI-
CALLY
4 INCH
BY 6 INCH
CARD
FILE
RETRIEVI
DRIVER
RECORD
FILE
FILE
FOLDERS
PREPARE
ABSTRAC
MAIL TO
REQUESTING
AGENCY

PRINCE EDWARD ISLAND -- VEHICLE REGISTRATIONS

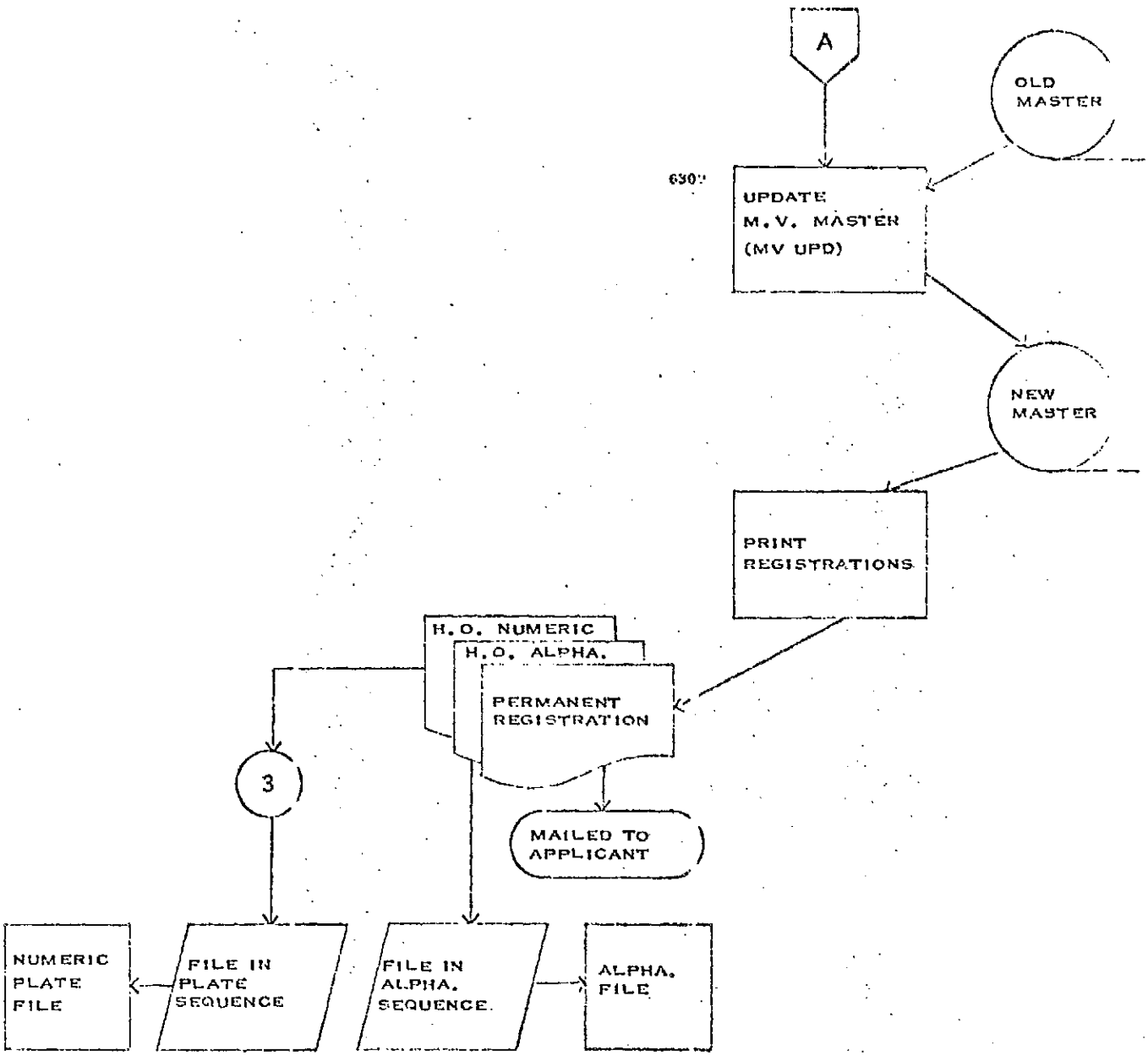
KEY:	6000, 6100
INPUT:	Registration Renewal Applications and January - March Transfers
VOLUME:	20,000/month, peak 33,000/year, average
STAFF:	5 cashiers, 2 filing clerks
FREQUENCY:	Daily
ELAPSED TIME:	
1 - 2:	1 or 2 days
2 - 3:	up to 1 month
OUTPUT:	Plates/Decals and temporary registrations Sorted applications

KEY:	6600
INPUT:	Counter Transfers
VOLUME:	8,300/year
STAFF:	1 clerk
FREQUENCY:	Daily
ELAPSED TIME:	2 or 3 days
OUTPUT:	Transfer certificates

PRINCE EDWARD ISLAND — VEHICLE REGISTRATION

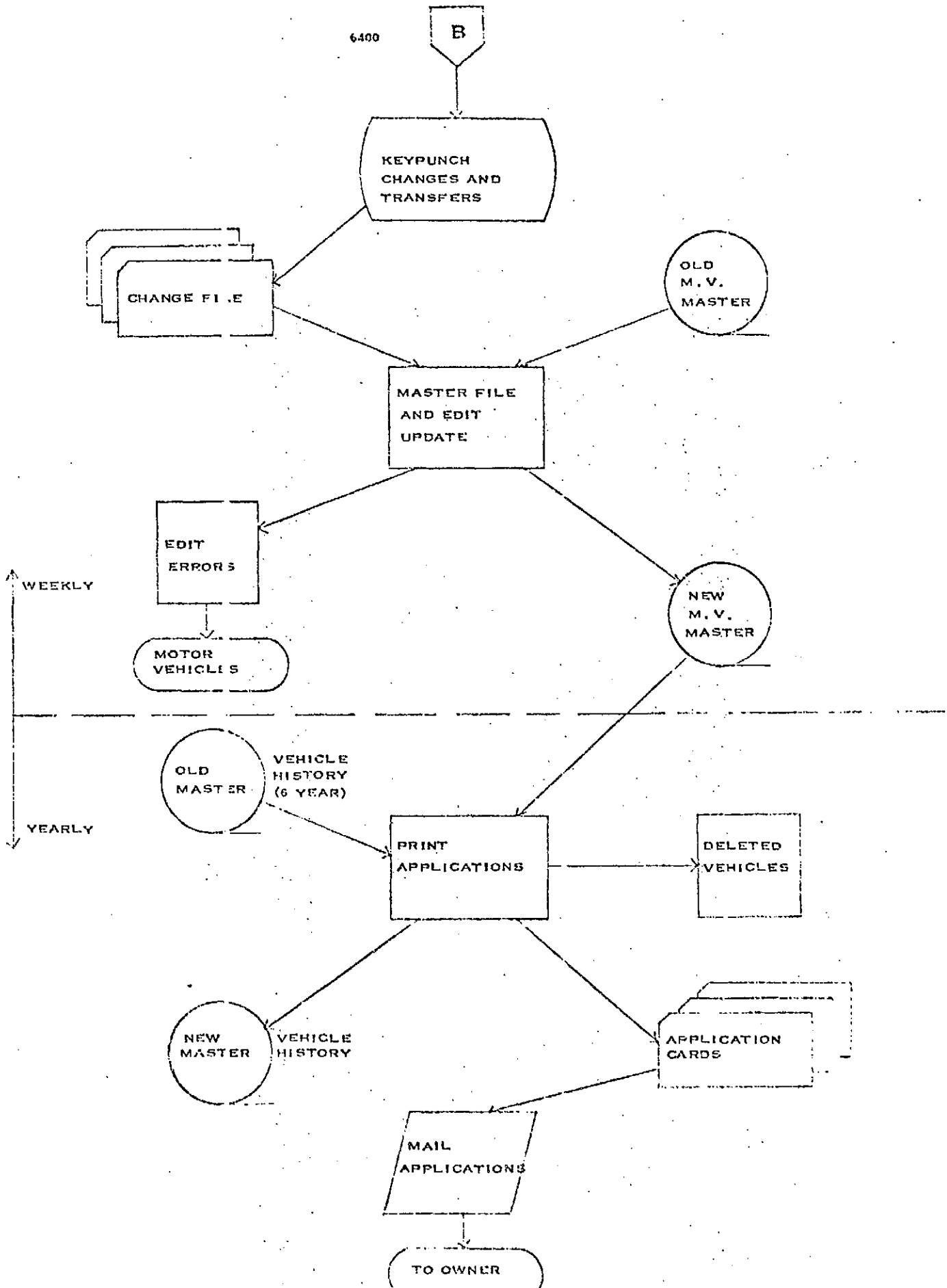


KEY:	6300
INPUT:	File of Motor Vehicle Registations in plate sequence
VOLUME:	20,000/month, peak 33,000/year, average
STAFF:	2 filing clerks
FREQUENCY:	Daily or weekly
ELAPSED TIME:	1 week to 1 month
OUTPUT:	Permanent vehicle registrations


A
OLD MASTER
630
UPDATE M.V. MASTER (MV UPD)
NEW MASTER
PRINT REGISTRATIONS
H.O. NUMERIC
H.O. ALPHA.
PERMANENT REGISTRATION
3
MAILED TO APPLICANT
NUMERIC PLATE FILE
FILE IN PLATE SEQUENCE
FILE IN ALPHA. SEQUENCE.
ALPHA. FILE

KEY:	6400
INPUT:	Motor Vehicle Master
VOLUME:	33,000 vehicles
FREQUENCY:	Annually (December)
ELAPSED TIME:	4 hours
OUTPUT:	Motor vehicle applications

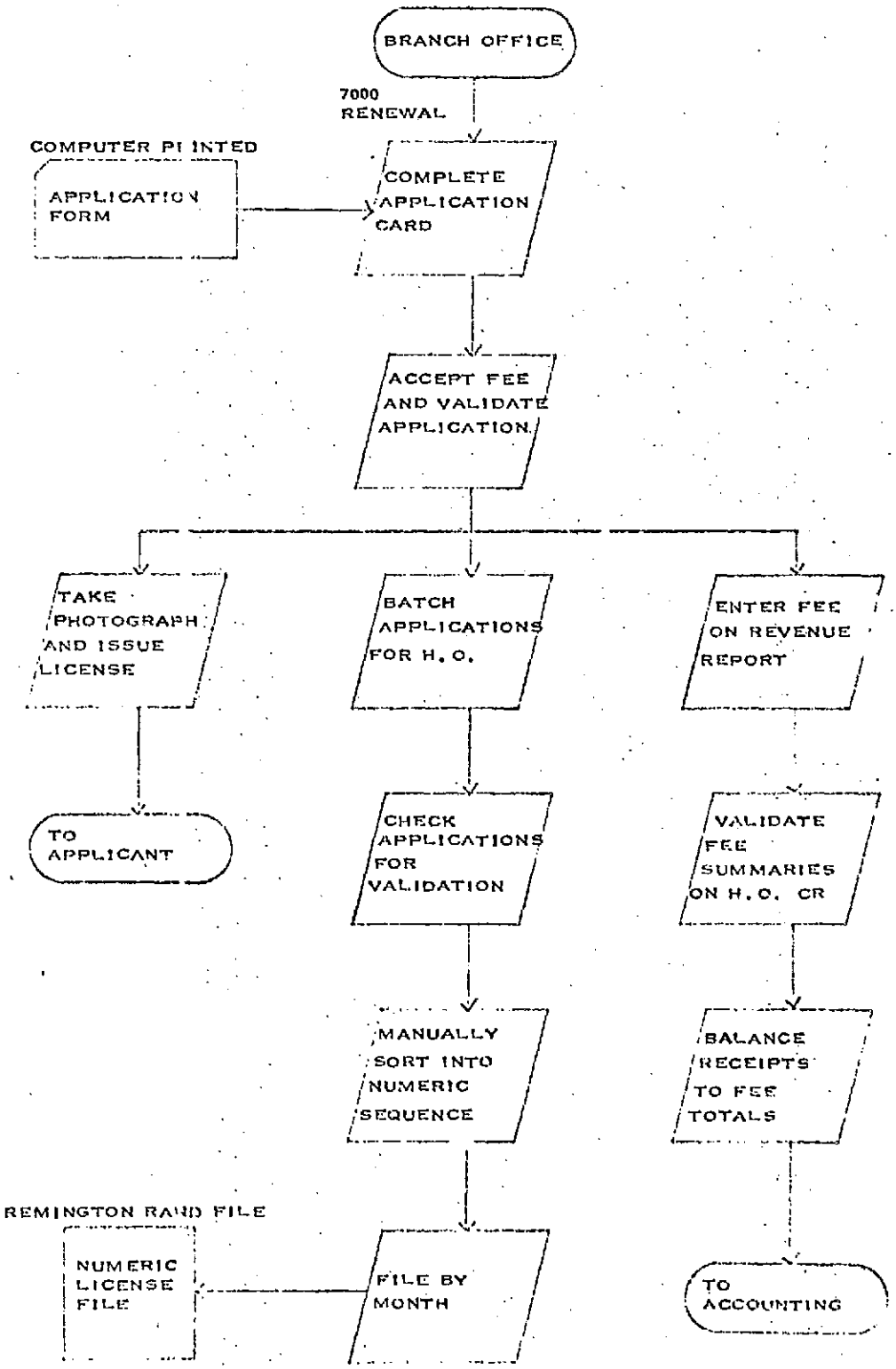
NOTE: This system is undergoing change to conform to the tape master file. The edit program will be operational in December 1972.


6400
B
KEYPUNCH CHANGES AND TRANSFERS
CHANGE FILE
OLD M.V. MASTER
MASTER FILE AND EDIT UPDATE
EDIT ERRORS
WEEKLY
MOTOR VEHICLES
NEW M.V. MASTER
OLD MASTER
VEHICLE HISTORY (6 YEAR)
YEARLY
PRINT APPLICATIONS
DELETED VEHICLES
NEW MASTER
VEHICLE HISTORY
APPLICATION CARDS
MAIL APPLICATIONS
TO OWNER

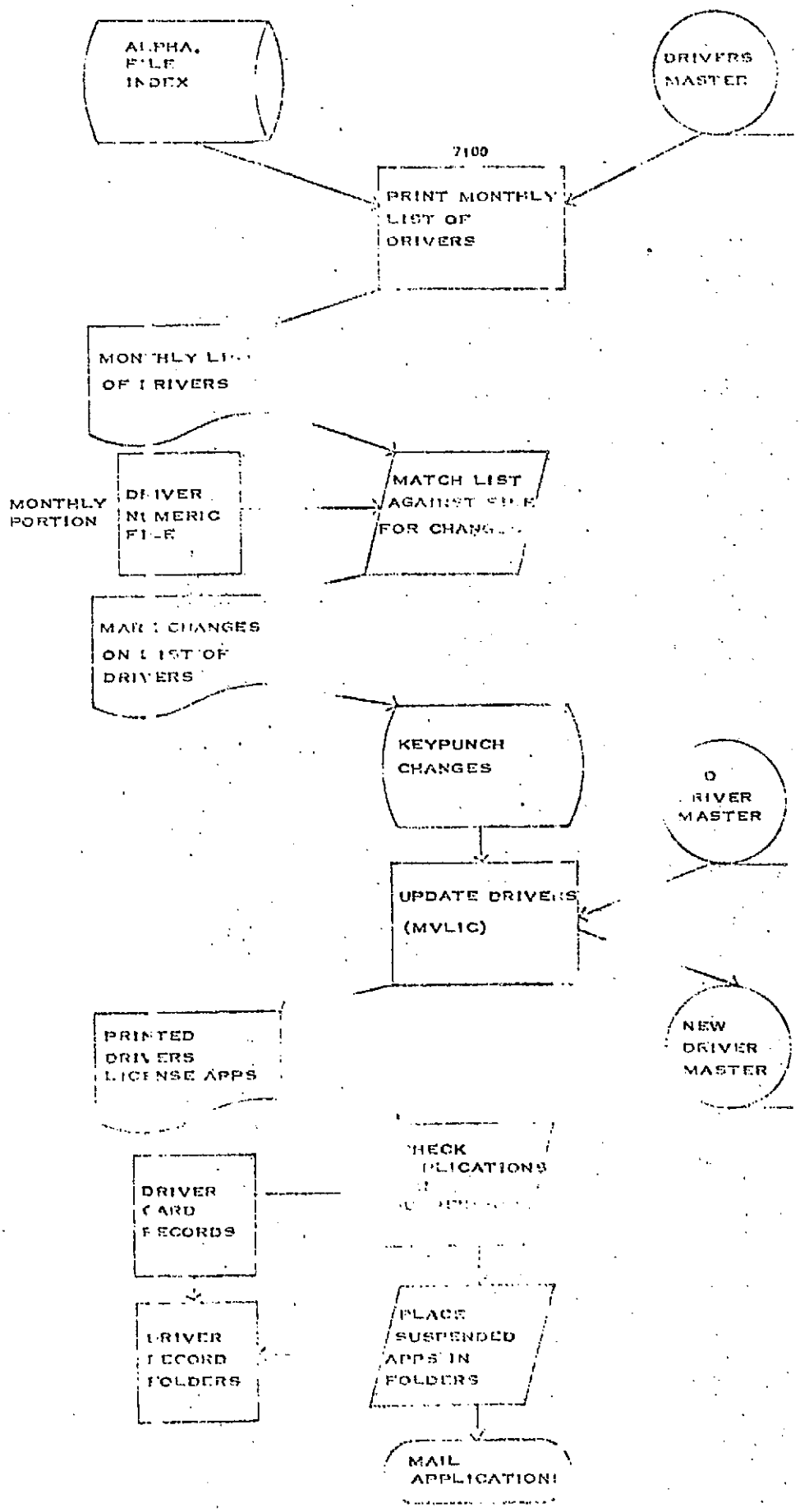
PRINCE EDWARD ISLAND - DRIVER LICENSING

KEY:	7000
INPUT:	Driver License Renewals
VOLUME:	4,800/month, peak
	1,800/month, average
STAFF:	5 cashiers, 1 clerk
FREQUENCY:	Daily
ELAPSED TIME:	2 days
OUTPUT:	Permanent driver's license
	Revenue summaries

PRINCE EDWARD ISLAND — DRIVER LICENSING SYSTEM



KEY:	7100
INPUT:	Driver License Master
VOLUME:	4,800/month, peak
	1,800/month, average
FREQUENCY:	Monthly
OUTPUT:	Driver license applications


ALPHA. FILE INDEX
DRIVERS MASTER
7100
PRINT MONTHLY LIST OF DRIVERS
MONTHLY LIST OF DRIVERS
MONTHLY PORTION
DRIVER NUMERIC FILE
MATCH LIST AGAINST FILE FOR CHANGES
MARK CHANGES ON LIST OF DRIVERS
KEYPUNCH CHANGES
DRIVER MASTER
UPDATE DRIVERS (MVLIC)
NEW DRIVER MASTER
PRINTED DRIVERS LICENSE APPS
CHECK APPLICATIONS
DRIVER CARD RECORDS
DRIVER RECORD FOLDERS
PLACE SUSPENDED APPS IN FOLDERS
MAIL APPLICATION

APPENDIX B

STUDY OF INFORMATION MANAGEMENT IN THE MARITIME PROVINCES

The purpose of this study was to examine the present and projected base of information management resources and activities within the three Maritime provinces and to recommend a course of action for the three provincial governments which would enable them individually and jointly to take advantage of developments in information technology to provide a higher level of public service to the citizens of each province and the region as a whole.

A description and assessment of the current and projected availability and use of information and information processing resources and their financial costs within each province and for the region as a whole is provided in the consultant's final report. The report defines the information management concept as a means of improving development and use of information technology resources on the one hand and more effective definition and application of information within the provincial governments on the other.

The information management concept underlies the action plan which recommends the development of an organizational and management framework to coordinate joint efforts and to use a regional approach in the development and use of information and information processing resources.

INFORMATION MANAGEMENT IN THE MARITIME PROVINCES

A Study Conducted for
The Council of Maritime Premiers

MARCH, 1973

With assistance from:

The Department of Communications, Ottawa

Urwick, Currie
& Partners Ltd

STUDY OF INFORMATION MANAGEMENT IN THE MARITIME PROVINCES

STUDY OF INFORMATION MANAGEMENT IN THE MARITIME PROVINCES

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STUDY OF INFORMATION MANAGEMENT IN THE MARITIME PROVINCES

I. PREFACE

The purpose of this study was to examine the present and projected base of information management resources and activities within the three Maritime provinces and to recommend a course of action for the three provincial governments which would enable them individually and jointly to take advantage of developments in information technology to provide a higher level of public service to the citizens of each province and the region as a whole.

The objectives behind the study and any subsequent plan of action can be summarized briefly as follows:

1. To encourage the rational and economic development of information management skills and data processing resources within the three provincial governments and their agencies.

2. To provide a practical means of identifying opportunities for joint action and to create, through a program of incentives or otherwise, a favourable environment for the joint collaboration of government departments where circumstances indicate a potential for mutual benefit.

3. To ensure the availability of appropriate information management resources in the Maritimes in order that information technology may be used to the greatest benefit of regional development programs and the Maritime economy.

This report provides a basis for future activities of the three provincial governments in the area of information management by indicating the potential for individual and joint action, by recommending an organizational framework to plan and co-ordinate the activities and by proposing an implementation program.

II. EXECUTIVE SUMMARY

As background to the study, it is desirable to assess the importance of highly developed information management resources to the Maritime governments. First, there is a need to respond quickly to new government program requirements and to provide efficient administration on an economic and controlled basis. In this regard, computerized systems are usually essential where large volumes of data or transactions are involved. Second, the shortage of financial resources makes it imperative that governments institute tight program monitoring to control abuse and maintain sensitive indicators to reflect the impacts of spending. Again, efficient information practices are essential for the large-scale collection and processing of data.

In addition, we visualize broader implications to the development of information management in the Maritimes. The technology of information processing is rapidly becoming a necessary element in any industrial development program as well as being an industry in itself. New opportunities for ventures covering national markets can present themselves in industries of heavy concentration in white collar technology (i.e. insurance, underwriting, banking, research) where transportation of goods is replaced with communication of information. Many of these opportunities are dependent on the availability of information technology resources within the Maritimes.

To put the subject of this study in financial perspective, the combined Maritime governments are spending in the order of $3,000,000 per year in direct costs for data

processing. Additional sums of an equal magnitude are incurred by users in computer-related activities, such as systems development, and in the collection, analysis, and dissemination of statistical information.

Based on historical trends and the need perceived for new systems and improved information management capabilities, the computer-related budget will increase by at least 15% to 20% per year. Within five years, at this rate of growth, data processing expenditures alone would be in excess of $6,000,000, a budget increase which has significant implications for the organization, and the demands which will be placed on technology and technical support skills.

All three governments have recently installed new computers which have sufficient capacity for user requirements in the immediate future and there appears to be no case for attempting consolidation at this point as conversion costs would far outweigh any advantages.

But in progressing toward this higher level of activity, we believe that there are substantial opportunities for financial economies and that through good planning and co-ordination as much as 50% of the total increase in budget could be saved or the equivalent productivity redirected.

This study has enabled us to review the present status of information management in the three governments of the Maritime provinces, to identify areas for improvement in the individual governments and to evaluate the means whereby joint action might be practical and beneficial. Factors which appear to be limiting in the development of information management in the Maritimes, may be summarized from three points of view:

Effectiveness to the User

- There is no mechanism for effective planning and co-ordinating of information management activities within the three governments, within the three provinces, or within the Maritime region as a whole.

- There is little standardization of terminology or classification of information within the Maritime region except where Statistics Canada requires uniformity.

- There is great reliance on the Federal Government for data collection and analysis, but frequently there are excessive delays or the detail provided is inadequate for planning needs within a province.

- The major effort in the past has been the development of systems for administrative purposes within the governments. There has been insufficient emphasis on the development of information systems for program planning and monitoring.

- While systems, after they have been developed, seem to receive good service from the government data processing facilities, obtaining resources to develop new systems is an acknowledged problem to users.

- Despite commonality of interests, the sharing of systems, techniques or even experience between governments has not developed naturally to any extent with the exception of projects sponsored by the Council of Maritime Premiers. The development of information

systems generally has proceeded independently in the three governments resulting in duplication of effort.

Effectiveness in Information Processing

- Government computer installations have been allowed to expand without the assistance of a master plan, and as a result:

  - occasions had been missed for hardware consolidation within the region.

  - incompatibilities now exist between government installations which impede the exchange of programs and data files.

  - there are indications that an uneconomical proliferation of installations could occur within governments over the long run if appropriate policies are not established.

- All three governments have experienced difficulty in obtaining staff with appropriate skills. With technology advances, the need for specialized skills is increasing in a number of areas making it even more difficult to attract or justify these for each installation.

- While staff shortages appear to be the greatest limitation to the development of information systems, users do not feel they have an effective voice in decisions relating to the budget for systems development and the deployment of these resources.

- Users are not generally aware of the potential of information technology, their own role in the systems development process or the cost implications in requesting services. All this militates against the development of efficient processing systems.

Factors External to Government

- The Maritimes are at a disadvantage with regard to external data processing resources readily available in other provinces such as time sharing services, and the variety of package programs available from commercial service bureaux.

- Little use is presently being made of computer teleprocessing facilities located outside the region. The Maritime user must pay for line costs, whereas these are often absorbed by the service bureaux in the case of other provinces.

- The trend is to large services bureaux in the Toronto, Ottawa, Montreal area capable of supplying computer power to the rest of Canada. If steps are not taken soon to provide alternatives, a decrease in the cost of communications could mean eventually that the Maritime region would be faced with an even lower base of computer specialists than it now possesses.

- There has been no stated government policy with regard to the purchase of external services. This has inhibited the activities of commercial services, and in some cases, unnecessarily restricted the users to the limited resources of the government.

In summary, we have identified three basic needs for concerted action on the part of the governments in the Maritime region. These needs are as follows:

1. Co-ordinated planning of resources.
2. Co-ordinated planning and management of information.
3. Initiative in assessing and planning the external environment.

The benefits in responding to these needs could be summarized as follows:

- While we do not believe short-run cost savings are possible at this time through co-operative action in the hardware area, co-ordinated planning initiated immediately could have substantial effect on future costs of acquisitions and modifications.

- In the area of joint staff and systems development, considerable potential for savings or increased effectiveness would appear to exist. On the assumption that systems development costs for three similar systems performed jointly are 50% of the sum of the costs for individual development, the value attached to joint action could range as high as $200,000 per year in the first year to $500,000 in the fifth year.

- Finally, by making information management practices more effective within the governments, major potential benefits are indicated in the areas of improved planning and administration of government programs.

Thus, a co-ordinated, systematic approach to information management at both the provincial and regional level can not only result in significant cost reductions, but also produce benefits to regional development and improved levels of service to the public through more effective government programs.

Our recommendations for such an approach are grouped according to the four elements concerned: the organizational framework necessary to facilitate joint action, the suppliers of services, the users of services, and external resources.

. Organizational Framework

1. That an Information Policy Advisor be appointed by the Council of Maritime Premiers with specific funds for projects for which he is held accountable.

2. That a position of information systems co-ordinator be created within each province to act as a focal point for planning and co-ordinating information management and systems development within the province. These individuals, along with the Information Policy Advisor, would act as a Regional Information Management Committee to co-ordinate joint projects and initiate programs to standardize data and information terminology and classifications within the region.

3. That the present Computing Resources Committee (comprising the directors of data processing from the three government installations) be continued with the addition of the Information Policy Advisor

as chairman. The objective of the committee would be joint planning of facilities, development of data processing personnel and standards for hardware and software compatibility, and identification of opportunities for system or program sharing.

- Internal Suppliers of Services

Under the guidance of the Computing Resources Committee (C.R.C.):

1. That methods for co-ordinated planning of hardware resources be developed and that all major equipment changes or additions be approved by C.R.C.

2. That methods for improving the skills of human resources be developed and that recruiting and appointment of professional resources be co-ordinated by C.R.C.

3. That common training requirements be assessed and a program of development be implemented.

4. That standards for compatibility between installations be developed and an implementation program be initiated.

- Users of Services

1. That each government improve the cost effectiveness of its internal information management activity by instituting:

- a user steering committee (where one does not now exist) to review priorities and cost justification for systems development and initiate the preparation of a master plan leading to a comprehensive information base for program planning and evaluation.

- a charge-back and user budgeting system whereby the user departments have annual budgets for information management services to cover systems development, maintenance and computer operations.

- a project control system which incorporates a post-implementation review to ensure that projected benefits are obtained.

- policies regarding the use of external services as an alternative source of information systems development and processing for government departments (in conformance with policies developed by the Regional Information Management Committee).

2. That a program be instituted to catalogue and standardize the terminology for information being collected and disseminated in each government.

External Resources

With input from the Computing Resources Committee, the Regional Information Management Committee and appropriate representatives from external resources:

That the three governments individually and collectively concern themselves with the problem of ensuring that adequate information management resources are available generally within the region. Besides the ready availability of computer power, this would involve:

- the development and retention of a cadre of technical specialists who can ensure that systems are designed in an efficient and economical fashion and that the implications for the region of technological findings and trends are identified promptly.

- the development of students and managers who are well informed regarding progress in information technology.

- steps to alleviate the full impact of communications costs for remote locations and to encourage computer sharing.

Implementation of these recommendations by itself will not achieve more successful individual or joint projects. However, with recognition and acceptance of the principles on which they have been based, the atmosphere and motivation essential for progress may be created and a spirit of co-operation fostored which will result in the eventual attainment of desired benefits.

III. BACKGROUND

A. HISTORICAL

To place this study in context, it is worth recalling that less than 200 years ago the Maritime region was a significant factor in the world economy. For example, one third of the world's shipping tonnage in the early to mid 1800's was produced in one province. For another province, its forest resources assured it a major role. All three jurisdictions had a strong rural farm base, a very important factor at the time. Some measure of the region's contribution can be inferred from the shipping schedules of the time which clearly showed extensive linkages with other parts of the world. Then, fairly abruptly, the technology changed to favour iron and steel at the expense of wood and the region found itself at a relative disadvantage in the shifting world economy.

Today the developed countries of the world are in the process of changing from being based upon goods to being based upon knowledge, in Peter Drucker's phrase, a *knowledge economy*. "The systematic and purposeful acquisition of information and its systematic application rather than science or technology, are emerging as the new foundation for work, productivity, and effort..."(1) Drucker states that the information industry is one of four new industries. Finally, Drucker places the role of the computer in the information industry in its

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(1) *The Age of Discontinuity: Guidelines to Our Changing Society* Peter F. Drucker, Harper & Row, pg. 266

proper context with the following analogy: "There is a great deal more to information and data processing than the computer; the computer is to the information industry roughly what the central power station is to the electrical industry." (2) It is with this perspective that the present study has been undertaken.

B. EVENTS LEADING TO INFORMATION MANAGEMENT STUDY

On March 26, 1968, the premiers of Nova Scotia, Prince Edward Island and New Brunswick agreed to sponsor a Maritime Union Study to assess the possibilities for economic and other forms of regional co-ordination and co-operation.

In considering the data processing trends relevant to Maritime Union, the study stated that:

1. Developments in electronic data processing and communication facilities have opened up new possibilities for achieving economies in the mounting volumes of governmental administrative processes.

2. The state of computer application technology has advanced to the level where an effective centralized or concentrated body of talent and facilities could serve all areas of the Maritimes from one or several locations, and at the same time provide equal service to all users.

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(2) Ibid, pg. 24

Subsequently, the Council of Maritime Premiers was formed. Committees of the Council which were later established and are relevant to this study include the following:

- Regional Data Bank Committee
- Computing Resources Committee
- Consultative Committee on Communications

As a result of discussions with the Department of Communications and the Maritime provinces, the Council of Maritime Premiers requested assistance from the Federal Department to determine the potential benefits to be derived from joint action by the three Maritime provinces in the whole field of computer use.

After the appointment of Mr. A. Kuhn to act as advisor to the Council, an action plan was proposed in June of 1972 recommending two projects to be undertaken with the assistance of consultants. One was to conduct a pilot study on the feasibility of a joint system in the three provinces for Motor Vehicle Registration and Driver Licensing; the second was the study on information management which is the subject of this report. The terms of reference are contained in Appendix I.

IV. STUDY METHODOLOGY

The study was conducted by a team of Urwick, Currie consultants and Department of Communications personnel. (See Appendix II for names of study team members.)

Interviews were held with over 170 senior members of the three provincial governments and their agencies, as well as representatives of local organizations with available data processing resources (such as service bureaux and universities). A list of those interviewed is given in Appendix III.

Several days were spent with each government data processing centre to gain an in-depth understanding of their method of operation.

A number of contacts were made with other provinces, communications specialists and representatives of commercial data banks and service bureaux to compare the availability of computer services in the Maritimes to other parts of Canada and assess the impact of trends in communication costs and technology.

Discussions were held with computer manufacturers to determine the ease with which existing government computers could be inter-connected and/or linked with local and distant service bureaux.

Reports of similar studies carried out for the governments of Canada, the United Kingdom, Puerto Rico, Ontario, Quebec and Illinois were reviewed.

In the course of the study a number of meetings were held with the Regional Data Bank Committee to discuss findings and tentative recommendations.

V. FINDINGS

In the discussion which will follow, we have differentiated between the terms *data processing* and *information management*.

Information management is used in its broadest sense to include data processing but also those activities connected with:

- The definition of the data elements.
- The design of collection mechanisms (routine reporting, special survey, acquisition from published sources, etc.).
- The quality of the data, i.e. accuracy, generality and timeliness.
- The methods of storing the data and statistical information.
- The methods of conveying the information to potential users.
- The facilities for analyzing the information.
- The use of the information and integrity of interpretation.
- The safeguards to maintain confidentiality.
- The planning of information systems to meet the above specifications.

By *data processing*, we mean those activities usually associated with the computer processing of data. These in turn can be classified into *computer* services, and *systems and programming* services.

A. INFORMATION MANAGEMENT IN THE PROVINCIAL GOVERNMENTS

1. Organization and Planning for Information Management Systems

There is no one individual or group in each provincial government with the responsibility for: (1) co-ordinating information systems planning and development, and (2) organizing the existing administrative data and statistical information resources for general use. While one province has a user steering committee to set priorities and objectives for computer systems development, the emphasis in this instance is more on the attainment of government priorities in the short term rather than the development of a comprehensive information base for program planning and evaluation. There is no general systems planning function in any of the provinces.

The results of this lack of planning and co-ordination are that systems are allowed to develop in a fragmentary fashion, each department working to meet its own priorities rather than progressing within an overall systems framework. This leads to duplication of effort but, even more important, opportunities may be missed to make some progress in meeting a longer term goal for the possible benefit of government planners or another department.

The absence of any machinery within a provincial government to encourage the standardization of

terminology and classification of statistical information can seriously restrict the general applicability of the information (when the differences in meaning are recognized) and cause misinterpretation (when they are not). There is a need for a comprehensive inventory of data and information available from special surveys and contained in administrative files.

In two provinces, externally gathered statistics on the province are maintained by, and disseminated from, a group with economics and statistics capability. Two provinces have no statistics act which would enable them to receive or collect confidential data.

The user who requires statistical expertise to design surveys or assist in statistical analysis must retain specialists on his own staff or look outside to consultants, the university, or the Federal Government, since this service is not formally available internally.

In the case of computer systems analysis and programming capability, the user will have to wait for staff to be made available from the government data processing centre. Some scientific programming skill exists in the user departments however.

2. The Role of the User in Systems Development and His Cost Accountability

Ideally, the design of a computerized system requires the close collaboration of a user who knows his information requirements and is generally familiar with the applied aspects of information technology and a systems analyst who can translate the user's requirements into detailed specifications ready for the programming phase. It is assumed that in a large project, alternative solutions to the problem would have been costed before initiation and the potential benefits identified. Further incentives to effective computer systems development are a user-charging policy whereby the user pays for services received in the development and operation of the system, and a post-implementation review in which the attainment of system objectives is assessed.

In our review, we found that many senior government officials were not fully informed regarding the potential contribution which information technology could make towards their operations, and their role and responsibility in the systems development process. While the technical depth and experience of government system analysts and programmers has been discussed in another section, users were generally satisfied with the co-operation and service they received once a project had started. Reaction was more critical on the subject of project initiation. Many complained about the apparently

arbitrary methods for setting project priorities and their lack of freedom to purchase outside data processing services. Yet government data processing staff resources were so limited that a large system like medicare would essentially bring the level of other development activity to a halt.

Only one government data processing centre charges internal users for operating costs. Development costs are not recovered in any province. Users do not realize the magnitude of the costs involved in developing and operating their systems and do not accept responsibility for them. This lack of cost accountability is usually accompanied by the absence of a strong incentive to seek more economic alternatives such as joint systems development with another province or the use of an available computer program where this would be appropriate.

The user's lack of understanding of information technology concepts may also mean that the project development process becomes one of gradual evolution in which the user is continually modifying his requirements. This makes project control difficult since, in the project's early stages, the estimated costs and benefits are unrealistic.

Another problem which is partially being overcome by generalized report generators is the lack of flexibility in report format permitted by the typical computer program. Users differ

widely in their preferences regarding report format and content, and program changes are frequently necessary after a change of manager. The costs of this individuality are rarely identified.

3. Contribution of Federal Government

The Federal Government, through Statistics Canada and other departments such as Fisheries, Energy, Mines & Resources, Environment, DREE, and Agriculture, collects and publishes much statistical information which is applicable to the region. (In fact, for Prince Edward Island, this has up to now been the major source of such information.)

Other Federal Departments mentioned as offering valuable services and programs in the information area were the Department of Justice which provides advice regarding the conversion of statutes into machine readable form, and the Department of Tourism which supports projects proposed by the committee of provincial departments of Tourism.

The region is not well organized to deal effectively with Statistics Canada. Only one province is in a position to obtain confidential disaggregated data on magnetic tapes, because it has a statistics act. The other provinces work, in the main, from published tables. Also the priorities of Statistics Canada are often different from those of the provinces. In particular, the provinces have a pressing need for *small area* data for program planning and evaluation.

4. Attitudes to Experience Sharing

The degree of experience sharing between corresponding departments in the three Maritime governments varies from a high level to none. In many cases such as Tourism, communication is fostered by a Federal-Provincial committee which meets periodically. Usually, however, the exchange of information and experience between different provinces depends on personal relationships which have developed informally over the years.

In the event that a new computerized system is to be designed, the department concerned may visit another province to learn from their experience if it is known that a similar system exists. Such visits are not of course, restricted to the Maritime provinces. Ontario, Quebec, and Maine were other governments mentioned in this connection. Occasionally, where the computer hardware is compatible, programs may be transferred and used almost without modification (e.g. student scheduling). In other cases where one province has purchased a package such as ICES which is an engineering program for highway design, the technical complexity of the package makes it desirable that this be run on one computer centre, such as a university's, where the expertise is available to support it. The program could then be run on-site or from a terminal close to the user. (This type of experience sharing has not yet been developed in the Maritimes.) See Appendix VII for a discussion of data, program and computer sharing.

When asked, "Would you make an existing system available to other provinces?", the user invariably agreed without hesitation. When the question was, "Would you use a system developed by another province?", the answer was a consistent no, on the grounds that departmental problems and practices were different.

5. Current and Proposed Systems

Although information systems need not, in theory, involve the computer, most of the larger systems summarized here will have one or more computerized stages because of the significant advantages offered in the accessing and manipulation of numerical and textual information.

To help in identifying patterns and similarities in the systems of the three governments, we have adopted the classification scheme shown in Figure 1 Appendix IV. One dimension of the classification matrix defines the type of information, i.e. resources, government programs, indicators; the second defines the use of the information, i.e. policy formulation, program design and operations, program evaluation, government administration, ad hoc enquiries; the third defines the various stages of information management, i.e. definition of data elements, collection of information, edit and quality control, processing of data, storage, access and output, data interpretation.

Appendix IV contains a description of existing and proposed systems summarized by type of information.

There are strong similarities: all provinces have devoted considerable systems effort to the areas of medicare, welfare and payrolls.

Two provinces have computerized systems for property tax, motor vehicle registration, and student scheduling. A number of smaller systems have been developed for teacher registers, motor vehicle inspections, pensions, hospital services, appropriations, highway accounting, etc. Many of these were converted directly from unit record systems and do not take full advantage of the modern computer's capabilities.

Most of the systems fall into the administrative category where the primary justification is administrative efficiency (clerical cost saving and timeliness). The data processing stage in most is commercially oriented (i.e. sorting, merging, totalling) rather than engineering (programs of computational complexity) or statistical (programs to determine correlations, trends, etc.).

Some of the data which have been accumulated, while being suitable for planning, evaluation and monitoring, lack standardization and are inaccurate. One province does not have a report generator program for easy data access and summarization. None of the three government computer centres has fully supported statistical analysis routines.

With the exception of the project, Land Registration and Information Services (LRIS), sponsored by the Council of Maritime Premiers, all major systems were developed independently at great expense.

For example, each of the three medicare systems is estimated to have cost one-half million dollars. As one senior official expressed it, "the duplication was criminal!".

A thread of commonality was detected in the list of proposed systems. Among those identified by all three provinces were:

- Personnel Information System for Government Employees.
- Commitment Control for Finance.
- Hospital Administration Systems.
- Statute Revision.
- Voters List.
- Liquor Control Board Inventory Control.

Two provinces were planning to develop systems for Municipal Affairs.

After these major systems are complete, work will probably begin again on existing systems to make them more comprehensive and efficient. Concurrently, all government computer centres are planning to improve their facilities for data base management, and statistical analysis. See Appendix VIII-Data Banks.

A number of users mentioned the absence of a comprehensive bank of small area data. The definition of *small area* varied from less than a city lot to a parish within north-east New Brunswick. Such data were necessary for policy formulation, program design and operations and (mostly in Prince Edward Island) for evaluation of programs.

B. DATA PROCESSING

As might be expected, there are both similarities and differences to be observed in the operations of the three provincial data processing departments. These will be discussed under the following headings:

- Organization of the data processing function
- Priority setting for allocation of data processing resources
- Budgeting and charging practices
- Project control
- Hardware and software
- Utilization
- Personnel
- Use of outside services

Greater detail regarding these topics is contained in Appendix V.

1. Organization of the Data Processing Function

The three government data processing centres have different reporting relationships. In Nova Scotia, the Director of Data Processing reports to the Co-ordinator of Management Consulting Services who, in turn, reports to the Provincial Secretary. The Division of Management Consulting Services provides operations research, O & M and microfilm services to government departments and agencies. In New Brunswick, the Director of the Data Processing Branch reports to the Assistant Deputy Minister of Supply and Services, while in Prince Edward Island, the Director of Computer Services reports to the Deputy Minister of Finance.

In at least one province, government departments are not allowed to have systems analysts on their staff. No distinction is apparently made in this case between a computer systems analyst and an information analyst who is more concerned with the use of the information than the system/computer interface. Only one provincial government has formally appointed departmental *computer liaison officers*.

2. Priority Setting for Allocation of Data Processing Resources

In only one province is there a formal plan setting out the allocation of manpower to the development of new systems over the next 2-3 years. This particular province has a committee of users (Data Processing Advisory Committee) which prepares a systems development program from a list of proposed projects (most of which have no cost justification details attached).

In the other provinces, priorities are determined by the Director of Data Processing, either by himself or in conjunction with one or two key individuals. In at least one of these provinces, priorities are dynamic to some extent which may cause a user to find his development work "bumped" to some unspecified future date.

Since the computer hardware is not a limiting factor in most cases, the growth of applications is restrained essentially by the number of systems analysts and programmers authorized by the Treasury Board. In at least two provinces the budgetary

4. Project Control

Project control practices for computer systems development vary from the formal to the informal. In the latter case, user specifications are allowed to evolve as the project progresses so that it is not possible to compare estimated and actual costs at project completion. In no cases are there design reviews or formal post implementation appraisals to determine whether benefits claimed for the project were in fact achieved.

5. Hardware and Software

All three provinces have acquired new computers in the past 12 months. The acquisition process varied from a bidding and benchmark procedure used by one province to an upgrading of equipment with no competitive bids considered desirable in another. In no case was a terminal hook-up to an outside computer examined as a serious alternative, nor was the possibility of running applications on outside hardware to off-set peak loads.

The three main government computers are all different. Prince Edward Island has a Univac 9400. New Brunswick has a Univac 1106 and Nova Scotia has an IBM 370/145. Programs for the IBM computer are written mainly in assembler language with a few in PL/1. COBOL is the predominant language used in Prince Edward Island and New Brunswick. The compatibility of the hardware for data and program exchange is discussed in Appendix VII.

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The government in New Brunswick also possesses an IBM 1130 located in the Department of Natural Resources whereas Nova Scotia has a Hewlett Packard mini-computer located in the Department of Development. There have been pressures from government agencies and crown corporations in New Brunswick and Nova Scotia who wish to obtain their own computing facilities - often out of a fear of possible conflicting workloads and low priorities for their work. At present, the Workmen's Compensation Board in New Brunswick has an NCR - recently upgraded. In Nova Scotia, the Nova Scotia Power Commission has a Univac 9400 and the Workmen's Compensation Board has an IBM 360/20.

6. Utilization

Conversions to the new equipment are virtually complete in all three provinces. Based on what is now known about future applications and assuming that the development staff is not drastically increased, the present equipment is considered by the data processing directors to be adequate for the next few years. Minor expansions are planned for two or three years hence. One province is now running two shifts with three hours in a shift now devoted to a temporary experiment with APL, a time-sharing language. One is running two shifts and the other one shift, five days per week.

7. Personnel

In total, the three government data processing centres have authorized positions for 54 analysts and programmers. There are, at present, no unfilled positions in this category in Prince Edward Island. Nova Scotia and New Brunswick have vacancies now and have experienced difficulties in the past in acquiring experienced personnel (although turnover is low). New Brunswick and Prince Edward Island have no technical colleges supplying computer training. Nova Scotia has two. The government data processing installation in Nova Scotia which uses assembler as the programming language must train most of its programmers. None of the three provincial governments has a career plan for systems analysts and programmers.

The work to date has not involved on-line systems or complex data bases although such systems are now being proposed. While some of the staff have the capability, little programming of a scientific nature has been required. Budgets and work scope have not permitted the hiring of experienced systems programmers or file management specialists. Individuals attempt to keep up-to-date technically by reading professional journals and attending the occasional course presented by the computer supplier. In fact, activity concerned with professional development in data processing is almost non-existent in the Maritimes with the exception of one association which has a Halifax chapter.

8. Use of Outside Services

Utilization of outside data processing services is low. Prince Edward Island has no local service bureaux or resident data processing consulting firms. The only computers on the island other than the government's Univac 9400 belong to the University of Prince Edward Island. There is one slow speed terminal in the government and it is connected with the Land Title System.

In Nova Scotia, provincial government policy has been to restrict the use of outside services, and all requests must be channelled through the Co-ordinator of Management Services. No programming is done on a contract basis.

The New Brunswick government spent about $50,000 on outside computer services last year. Much of this was with the University of New Brunswick which does most of the scientific computing required by government departments. Some $24,000 was spent for key-punching overload assistance. Little contract programming was carried out; however the Department of Highways purchased the ICES engineering design package which is being run on the UNB computer. All major requests for outside services must now be submitted to the Data Processing Advisory Committee for approval.

C. EXTERNAL FACTORS

1. Availability of Computer Power in the Maritimes

The provincial government, the telephone company and the main university in Nova Scotia and New Brunswick are the major users of computer power in the two provinces and each possesses hardware of roughly equivalent power. The universities differ in their use of the equipment, however, since their processing is less of a commercial nature (i.e. high input-output, little computation). In Prince Edward Island the telephone company has no computer but has its processing done at the Maritime Telegraph & Telephone Company site in Halifax. Appendix V-C gives details of external computer resources.

The Maritime Telegraph & Telephone Company has formed Maritime Computers Ltd. in Halifax to supply time sharing services, market computer time from the telephone company's own computer and provide some software support. Similar services are offered by Teldata, the subsidiary of the New Brunswick Telephone Company in Saint John. Both Dalhousie University and the University of New Brunswick offer computer time commercially. Software support for the Dalhousie computer is provided by a local branch of SMA, a data processing firm based in Montreal.

Only one other commercial service bureau from outside the region has branch offices in the Maritimes - IBM has small computers in Saint John and Halifax, which access IBM's larger computers outside the province when necessary.

This in itself is twice the computer connect cost of the typical time-sharing service. It is interesting to note that while some of the tele-processing services based in the Toronto-Ottawa area will absorb line charges for Vancouver users, the same arrangement does not apply to Maritime users who must pay for their own communications costs.

This disadvantage extends to a number of areas. For example, the National Research Council in Ottawa has offered time on its PDP 10 computer free to those doing development work in Computer Assisted Instruction. Maritimers would find this offer expensive at a cost of $0.60 per minute.

While the new data transmission system recently announced by the Trans-Canada Telephone System will appreciably reduce transmission costs between any two of the designated cities, these rates will not be of immediate benefit to the casual Maritime user because Halifax, Moncton and Saint John are the only designated serving areas at this point and the service is primarily to handle private line communications.

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VI. JOINT PROGRAMS - A REVIEW

1. Pre-requisites for Effective Programs of Joint Action

Where all parties involved in programs of joint action do so on a strictly voluntary basis (i.e. they do not come under a single authority which can ensure adherence to stated policy), problems of priority differences and lack of commitment will arise. The need for commitment is especially important in the case of joint projects where future independence is restricted, such as a unified system for motor vehicle registration or a plan for inter-dependence among computer resources.

It must also be recognized that where differences exist in the technical competence or degree of systems development of the parties, that the more advanced member will normally have less to gain than the others. In joint programs of this nature, all parties will have to give up something, whether it be the independence to specify all the requirements of a system or the freedom to schedule resources without regard to outside demands. While strong support of joint projects on the part of the three governments generally is assumed, this may in itself not be sufficient. To overcome the counter-productive influences described above, it is therefore important to consider incentives such as special funding which will enable systems or services which would not have been obtainable otherwise to be provided on a joint basis.

Such funding would be accompanied by conditions such as commitment to a timetable, provision for technical and financial monitoring, and administrative machinery to facilitate orderly progress. If long-term commitment on the part of those concerned is not assured, it would seem that programs for joint actions should not be extended into those areas which could leave one or more of the parties at a severe disadvantage later on if the collaboration were to cease, unless of course the immediate short-term benefits made even this eventuality worth risking.

2. Present Framework for Co-ordination in Computers/ Communication/Information Management

There are at present three committees which have been set up by the Council of Maritime Premiers to plan and initiate programs for joint action in the area indicated above. They are:

- The Regional Data Bank Committee
- Computing Resources Committee
- Consultative Committee on Communications

The Regional Data Bank Committee comprises 10 to 15 members who represent the users of information and are more oriented to data management than computer processing. The committee was formed in 1969 and meets on an ad hoc basis. Two studies have been sponsored, this study on Information Management in the Maritime Provinces, and the Motor Vehicle - Driver Licensing Pilot Project. The committee lacks a clear mandate and is limited to an advisory role.

Members speak only for their individual departments since they are not in a position to represent all users in their respective governments. The committee chairman is a member of the Council secretariat. Minutes of meetings go to the members but receive limited distribution elsewhere.

The Computing Resources Committee comprises the Co-ordinator of Management Consulting Services from Nova Scotia, the Director, Data Processing from New Brunswick and the Director of Computer Services from Prince Edward Island. This committee is usually invited to the meetings of the Data Bank Committee to provide specialist advice.

The Consultative Committee on Communications was formed "to provide for consultative liaison between the federal and provincial governments concerning all aspects of communications to ensure the orderly development of effective and efficient communication systems in the Maritimes at the lowest possible cost and consistent with the basic interests of the people".

3. Previous Studies and Joint Programs at the Provincial Level

i. Information Systems

In 1971, a study of Statistical Information Systems suitable for the Province of New Brunswick was carried out by Dr. H.K. Larsen of the University of New Brunswick. His recommendations were that: (1) New Brunswick

establish a bureau of statistics and pass a statistics act, (2) a higher priority be placed on data and information collection and storage as well as analyses, (3) all government data and information related programs be integrated and standardized, and (4) a central data and information collection service be established which should gradually evolve into a data and information bank. No action was taken on these recommendations.

ii. Computer Services

In 1971, separate studies were carried out in both Nova Scotia and New Brunswick on the desirability of combining the major computer resources in the respective provinces. In New Brunswick, this encompassed the computer facilities of the government and the telephone company. In Nova Scotia, the computer at Dalhousie University was included in the study. The formation of a crown corporation offering computer services was recommended for Nova Scotia. The New Brunswick report saw no major economies to be gained in hardware consolidation without the inclusion of the University of New Brunswick computer in the project. Certain other advantages such as the attraction of specialist staff were identified. No action was taken in either case.

A new communications network joining the universities in New Brunswick will be instituted in April, 1973 under the co-ordinating efforts of the New Brunswick

Higher Education Commission. The computer at Dalhousie University is presently linked, or will be in the future, with all major Nova Scotia universities. Progress has been achieved on a voluntary basis.

4. Regional Programs

The history of voluntary co-operation among governments has been dealt with extensively in the Maritime Union Study, and the difficulties experienced to date by the Council with joint projects is not atypical. Appendix VI reviews the history of the Land Registration and Information Services project which has been a major undertaking of the Council. The next section of this report examines the potential for joint action at the operating level while Section VIII presents recommendations to encourage and facilitate joint action.

VII. JUSTIFICATION OF JOINT ACTION IN INFORMATION MANAGEMENT AND PROCESSING

In reviewing the case for joint action among the Maritime provinces, the decision to proceed must be based on commonality of objectives and advantages in the use of collective resources over resources employed individually. The specific points identified in the case for joint action are as follows:

1. Reduction of Duplication in Systems Development

The greatest potential for cost savings lies in this area. Since the direct costs for data processing resources alone in the development of a major system range from $250,000 to $500,000, the possibility of collaboration among the three provincial governments in joint systems development should be fully explored. Joint development need not imply *common* systems since systems developed with experience transfer could be operated independently, on the same or different computers. With a common system there would be additional savings in programming and administrative costs.

Also, it is not necessary that the development of the two or more similar systems proceed concurrently. In fact, from a quality standpoint the evolutionary process is to be preferred, where the experience of some or all of the team working on the first system is later transferred to the development of the next.

However, joint development demands certain conditions. The practicability of this approach depends to a

large degree on the measure of conformity between the departments in jurisdictional responsibilities and administrative approach. This is not always easily achieved.

It is estimated that the savings resulting from joint development could reach 50% of the costs which would be incurred under independent development. Based on the present and projected staff resources, if the program is started next year such savings would amount to $200,000 in the first year increasing to $500,000 in the fifth year, if most development (other than program maintenance) is carried out on a joint basis. In addition, the quality of systems developed in this manner should be better than the average system developed independently.

There are also other aspects of system sharing. For example in Prince Edward Island, volumes of transactions might not justify the development cost whereas the operation of the system might otherwise bring significant benefits. The practice of using computer programs developed elsewhere has already been utilized with some success. Another opportunity lies in the joint purchase of software where the contract terms permit this.

2. Regional Planning

If regional planning is to be undertaken for the Maritimes, it is mandatory that information inputs are co-ordinated and readily and equally accessible from each province. In this regard, there is a broad requirement for a means of standardizing on

definitions of data, methods of collection, quality control, classification of data, and file management.

3. Federal-Provincial Programs

The standardization of data collection procedures and definitions will enable the Maritime provinces to make a more effective assessment of the collective needs of the region when making submissions to the Federal Government (e.g. discussions concerning the guaranteed annual wage).

4. Rationalization of Hardware

The most immediate benefits in this area would appear to lie within the provinces where it may be advantageous to form crown corporations, as four other provinces have done, to serve the computing needs of the government, the government agencies, the universities, schools and hospitals and even non-government customers when conditions are appropriate.

Eventually, it may be desirable for the region to designate specific computers as functional or specialized centres, but the geographical dispersion and relatively small number of existing computers reduce the possibilities for significant advantages at this time.

The benefits from rationalizing computer hardware within a province are the following:

- Uneconomic proliferation of smaller computers for government departments and agencies will be avoided.

While there may be situations justifying special purpose hardware, the central government computer has ample capacity for general applications in each province. The user's fear of poor turn-around should be overcome through education and experience.

- There are appreciable economies of scale in computer hardware. Steps should be taken to ensure that no further occasions for consolidation are passed up without an objective assessment of the costs and benefits. Both the Maritime Telegraph & Telephone Company and Dalhousie University have indicated that they would be interested in exploring possibilities for collaboration.

- A large computer installation will justify and attract the computer specialist who is essential for experience transfer and the effective use of hardware and software. This is especially true in the Maritimes where to date the installations have been unable to justify such specialists.

- Local data processing resources will be available to attract business and industry.

All of the above benefits would also apply to rationalization with a regional perspective.

5. Human Resource Development

Development of both administrative and technical information systems is limited by the staff available.

Training programs could be developed and presented on a joint basis for specialists and management staff. Career development and experience transfer programs could be co-ordinated by the Computing Resource Committee. In addition, it may be found advantageous for each government data processing centre to contribute funds toward the maintenance of a small specialist staff to be located with the Council Secretariat and available to each province when required.

6. Joint Action in the Field of Communications

If considered sufficiently desirable, the three governments might combine their resources to provide a communication link (such as a multiplexed line) to the Toronto-Ottawa-Montreal area to reduce the cost of accessing data banks and computer facilities located there. The effect of communications costs on the general availability of computing power within the region should also be monitored.

Thus a variety of areas could be approached on a joint basis, the degree of collaboration possible ranging from voluntary co-operation to complete integration of departments or services. Both extremes have hazards. If action is strictly voluntary, it is difficult to establish and sustain motivation of the participants. In the case of complete integration without political union, there is the inevitable discontinuity of changes in government to contend with.

For joint action to be successful, there are minimum prerequisites:

- commitment on the part of the governments
- a program, funds and accountability for results
- organization and authority for co-ordination and control
- motivation through common interest

Our recommendations are based on a flexible approach, starting with the minimum prerequisites. With reinforcement from the political environment and preliminary successes, joint involvement can progressively increase.

VIII. RECOMMENDATIONS

In the light of the foregoing we make the following recommendations.

Environment for Provincial Joint Action

The Maritime provinces do not have extensive resources in information processing and the installations that do exist are concentrated in a few cities. Steps must be taken to ensure that these facilities are used effectively and that technological developments such as improvements in data communications can be utilized to the advantage of the region.

A number of significant benefits to be derived from joint action have been identified. Since sponsorship for programs of joint action rests with the Council of Maritime Premiers, there is a need for an individual who is qualified to advise the Council on opportunities for joint action and to assume responsibility for activities undertaken.

Recommendation: That the three governments individually and collectively concern themselves with the problem of ensuring that adequate information management resources are available generally and economically within the region.

Recommendation: That an Information Policy Advisor be appointed by the Council of Maritime Premiers with specific responsibilities, objectives and funds for which he is held

accountable. (See Appendix IX for an outline of responsibilities). These funds should be sought from the Federal Government and/or the Maritime provinces to provide incentives for government departments to cooperate in programs of mutual benefit in the information management area.

Co-ordination of Information Management Activities Within Each Region

At present information systems in each province are developed independently without reference to a master plan for a comprehensive information base. This leads to needless duplication of information in some cases and significant gaps in others.

In addition there is no one individual with the responsibility for standardizing the definition of terminology and classifications or for cataloguing, storing and making available the data and statistical information resources of the government.

Recommendation: That the position of provincial Information Systems Co-ordinator be created to perform these functions. Appendix IX contains an outline of his responsibilities.

Recommendation: That a program be instituted to catalogue and standardize the terminology for information being collected and disseminated in each government, consistent with the standards developed for the region.

Co-ordination of Information Related Activities Within the Region

a. Information Management

There is a need for an interprovincial committee to:

- co-ordinate joint projects in systems development and management education
- identify opportunities for joint systems development to eliminate unnecessary duplication among the provinces
- initiate programs to standardize data and information definitions and classifications within the region, and otherwise prepare the groundwork for a regional data base

Recommendation: That the present Regional Data Bank Committee be restructured into a smaller committee to comprise the three provincial Information Systems Co-ordinators and the regional Information Policy Advisor who would be the chairman. The committee would be assigned the above responsibilities.

b. Information Processing

There is a need for an inter-provincial committee to:

- co-ordinate and plan the data processing facilities of the three provincial government jurisdictions, within the perspective of regional needs in the public and private sectors

- develop standards for hardware and software compatibility
- ensure the availability within the region of courses on general computer concepts and the technical aspects of information technology
- identify opportunities for collaboration in the acquisition of software, the sharing of technical expertise, the preparation and presentation of courses
- maintain an inventory of data processing resources in the region.

Recommendation: That the present regional Computing Resources Committee be continued with the addition of the regional Information Policy Advisor as chairman. The committee would be assigned the above responsibilities.

Administration of Information Management in Provincial Government

To improve the cost effectiveness of the information management activity, it is important that there be mechanisms to: identify high pay-off applications, ensure that resources are adequate, deploy these resources according to objectively set priorities and monitor the systems development process. Since projects are normally ranked on their cost (benefit potential) it is desirable that users have a realistic appreciation of both costs and benefits. This is not necessarily the case now.

Recommendation: That each province institute a user steering committee (where one does not now exist) to review priorities and cost justification for systems development. See Appendix IX for an outline of responsibilities.

Recommendation: That each province prepare a master plan leading to a comprehensive information base for program planning and control.

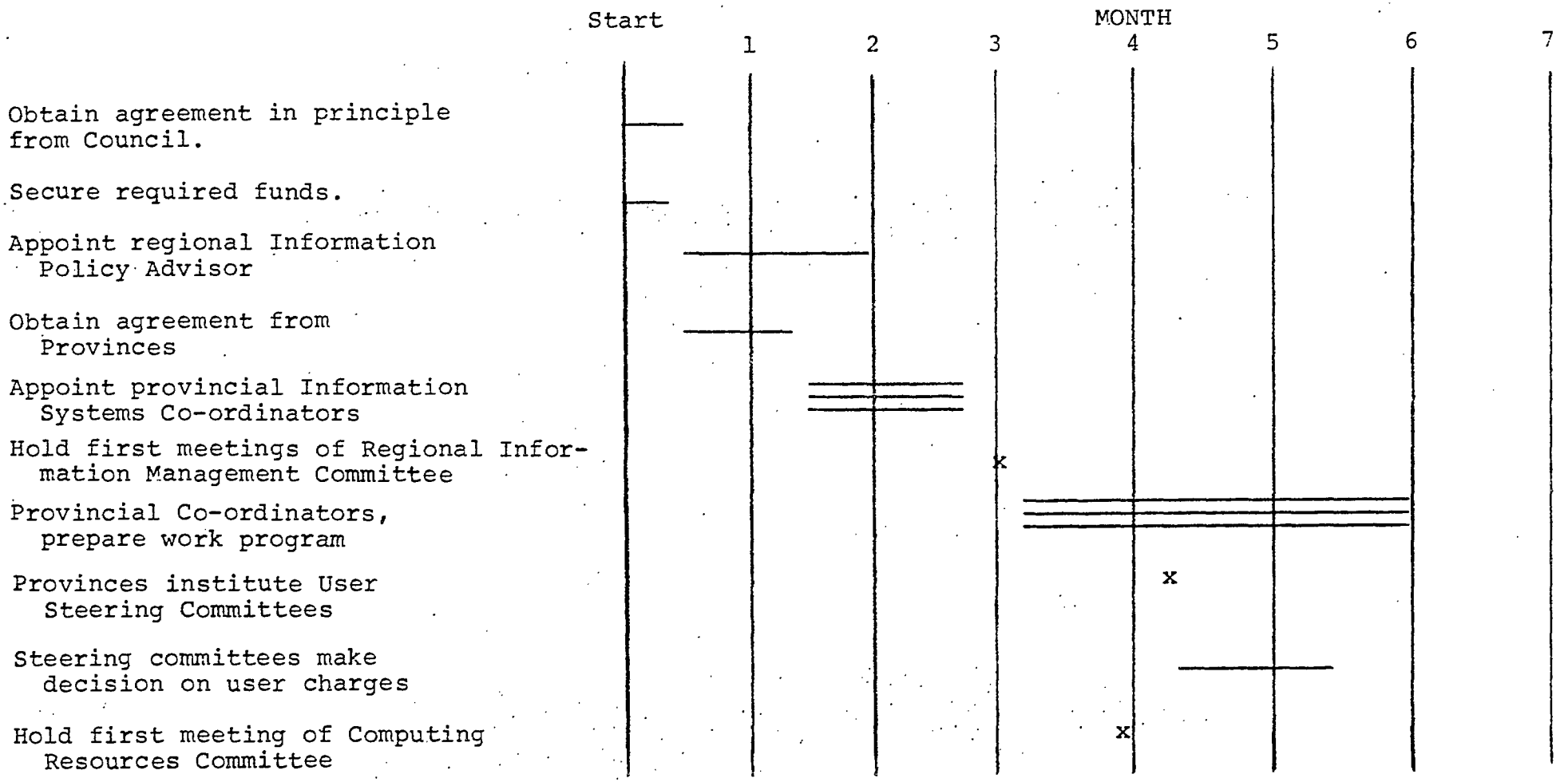
Recommendation: That each province institute a user charging and budgeting system to cover services for systems development, maintenance, computer operations and any other consulting services.

Recommendation: That each province institute formal project control systems to monitor systems development, which include a feasibility study and a post implementation review to verify that projected benefits are obtained.

Recommendation: That each province formulate a policy regarding the use of external information management services as alternative or supplement to its internal resources.

Recommendation: That each province provide educational programs to ensure that users become familiar with the application of information management and their role in the system development process.

IX. IMPLEMENTATION PROGRAM



X. CONCLUSION

A brief but wide-ranging examination of information management needs and resources in the three Maritime governments was conducted through interviews with over 170 senior government officials and directors of information processing centres in the region. The capability of these latter resources was matched against the perceived present and future needs in the public administration area taking into account the broader implications for regional development.

Potential regional deficiencies were identified requiring united action on the part of the three governments. Some areas of weakness were uncovered in the co-ordination and cost effectiveness of information systems development. Finally, significant opportunities for cost reduction and improved public service were found to exist (if the provinces can work together) in developing new systems for program planning and administration.

We would like to thank the three provincial co-ordinators who gave so freely of their time in arranging the many interviews for the study team: C. R. Marks, Director of Economic Research, Office of Economic Advisor, New Brunswick; H. Fairclough, Co-ordinator, Management Consulting Services, Nova Scotia; Miss M. S. Clark, Research Officer, Executive Council Secretariat, Prince Edward Island.

Urwick, Currie & Partners Ltd.

STUDY OF INFORMATION MANAGEMENT IN THE MARITIME PROVINCES

TERMS OF REFERENCE

OBJECTIVE

To review the computer/communications resources in the Maritimes and to recommend a course of action on the data management activities of the three provincial governments.

Computer/communications resources include the elements of computer/communications hardware, the operating and applications software, the complete spectrum of relevant people skills, the associated administrative systems and procedures, and the base of accessible data.

STUDY REQUIREMENTS

This study will cover the following topics:

To determine the past experience, the current situation and the future plans in the provincial governments and to survey and describe the external environment with respect to Maritime impact in the following areas:

- Hardware (computer and communications)
- Software
- Applications
- Personnel and training
- Technology
- Data
- Organization
- Financial

EXPECTED OUTPUTS

1. A documented information base of computing/communications resources in the Maritimes.

2. An analysis of computer/communications resources in the Maritimes indicating growth in the past, present situation, trends and long-range plans.

3. A cost/benefit analysis of the various alternatives for data management in the three provinces, individually and jointly, considering external impacts.

4. Recommendations for the improvement of data management activities in each province considering external impacts.

5. Recommendations for a common approach to data management in the Maritimes considering external impacts.

6. Provision and presentation of interim and final reports.

STUDY TEAM

URWICK, CURRIE & PARTNERS LTD.

W. M. Kerrigan	Partner in charge
P. F. Wade	Project co-ordinator
P. R. Kemball	
J. P. Pastinelli	

DEPARTMENT OF COMMUNICATIONS

M. E. Melnyk	D. O. C. Project Leader
J. Arakelian	Communications Advisor, Atlantic Region
A. Kuhn	Study Director and Advisor to Council of Maritime Premiers
A. Ross	Liaison with pilot project on Motor Vehicle Registration

LIST OF THOSE INTERVIEWED IN NEW BRUNSWICK

GOVERNMENT AND GOVERNMENT AGENCIES

DEPARTMENT	TITLE	NAME
Agriculture and Rural Development	Deputy Minister	R. D. Gilbert
	Assistant Deputy Minister	H. R. Scovil
	Director of Planning	E. Keizer
	Economist	P. Mosher
Civil Service Commission	Director of Staffing	D. Barr
Economic Growth	Deputy Minister	H. A. Nason
	Economist	R. Maskill
Education	Deputy Minister	F. T. Atkinson
	Deputy Minister	A. A. Saintonge
Executive Council	Queen's Printer	W. A. Peterson
Finance	Deputy Minister	J. W. Williamson
	Secretary of Treasury Board	E. Fanjoy
Fisheries and Environment	Deputy Minister	L. Chenard
Health	Deputy Minister	Dr. E. A. Watkinson
	Director, Administration	J. Astle
	Assistant Manager-Financial Services, Hospital Services	W. King

NEW BRUNSWICK (cont'd)

DEPARTMENT	TITLE	NAME
Health	Director, Medicare	D. J. Junk
	Director, Research and Planning	D. Letouze
Highways	Deputy Minister	R. H. Sweet
Historical Resources Administration	Legislative Librarian	J. LaBell
Justice	Deputy Minister	G. F. Gregory
	Director of Law Reform Division Attorney's General Office	A. Reid
Labour	Deputy Minister	R. P. Campbell
Municipal Affairs	Deputy Minister	E. G. Allen
	Admin. Services Co-ordinator	H. G. Irwin
	Director of Assessment	E. Cronk
	Director, Planning	T. J. Jellinek
Natural Resources	Deputy Minister	R. L. Bishop
	Forester	B. Meadows
	Forester	B. M. Smith
	Survey Engineer	C. B. Carlin
	Director, Mineral Resources	Dr. R. R. Potter
	Director, Lands	W. F. Roberts

DEPARTMENT	TITLE	NAME
Office of the Auditor General	Auditor General	W. McNichol
	Deputy Auditor General	R. E. Goodwin
	Auditor	K. W. Burke
Office of the Premier	Special Assistant to the Premier	A. C. Parks
	Member, Cabinet Secretariat	I. D. MacBain
	Social Development Co-ordinator Development Policy Secretariat	P. C. Léger
	Economic Advisor to the Premier	C. R. Marks
	Director, Information Services	R. D. Campbell
	Chairman, Cabinet Secretariat	J. F. O'Sullivan
	Economist, Office of Economic Advisor	N. Campbell
Provincial Secretary	Deputy Provincial Secretary	H. H. D. Cochrane
Social Services	Deputy Minister	W. Morrissey
Supply and Services	Deputy Minister	R. Palmer
	Director, Planning & Control	J. H. Fowler
	Director of Data Processing	G. F. Henry
	Computer Programs Analyst	W. Sole
Tourism	Deputy Minister	R. S. MacLaggan
	Research Officer	R. Cunningham

NEW BRUNSWICK (cont'd)

DEPARTMENT	TITLE	NAME
Youth	Deputy Minister	J. E. Anderson
Community Improvement Corp.	Chairman-General Manager	J. P. Blanchard
	Director, Program Planning and Evaluation	G. Lévesque
N.B. Higher Education Commission	Research Officer	L. Arsenault
N.B. Housing Corporation	President	K. C. Scott
N.B. Liquor Control Commission	Chairman	G. L. Leblanc
	Director, Administration	B. Oliver
Workmen's Compensation Board	Chairman	R. Jones
	Executive Director, N.B. Industrial Safety Council	H. E. Briggs

EXTERNAL

New Brunswick Power Commission

B. J. Rideout, Director, Data Processing and Accounting

New Brunswick Telephone Co.

E. D. Thompson, Vice-President - Operations, formerly Secretary to New Brunswick Treasury Board

University of New Brunswick, Computing Centre

Prof. W. D. Wasson, Director

LIST OF THOSE INTERVIEWED IN NOVA SCOTIA

GOVERNMENT AND GOVERNMENT AGENCIES

DEPARTMENT	TITLE	NAME
Agriculture and Marketing	Deputy Minister	D. L. Parks
Attorney General	Deputy Attorney General	G. Coles
Auditor General	Auditor General	A. W. Sarty
Board of Commissioners of Public Utilities	Chairman	W. D. Outhit
Civil Service Commission	Civil Service Commissioner	S. J. Rudolph
Development	Deputy Minister	L. Single
	Economic Advisor	A. Pinard
Education	Deputy Minister	Dr. H. M. Nason
	Asst. Chief Director of Education, Planning and Budgeting	H. K. MacKay
Executive Council Office	Secretary to Treasury Board	R. A. Johnson
Finance	Deputy Minister	L. W. Lacusta
Fisheries	Deputy Minister	B. Meagher
	Director of Administration	J. W. Watt
	Economist	C. Debaie

NOVA SCOTIA (cont'd)

DEPARTMENT	TITLE	NAME
Highways	Deputy Minister	W. P. Kerr
Hospital Insurance Commission	Executive Director	J. G. Hare
Nova Scotia Human Rights Commission	Director	C. McCurdy
Labour	Deputy Minister	R. E. Anderson
	Director of Economics & Research	J. Dobson
Lands and Forests	Deputy Minister	R. H. Burgess
	Administrative Assistant to Deputy Minister	L. S. Hawboldt
Mines	Deputy Minister	Dr. J. P. Nowlan
Municipal Affairs	Director of Grants & Finance	G. D. Feindel
N.S. Government Purchasing Agency	Director	E. D. Lewis
N.S. Housing Commission	Assistant to Executive Director	B. G. Smith
N.S. Liquor Commission	General Manager	G. L. MacKay
N.S. Power Commission	Vice-President Finance	R. C. Fraser
N.S. Research Foundation	Vice-President	T. B. Nickerson
Premier's Office	Principal Assistant to Premier	M. J. L. Kirby
Provincial Secretary	Acting Deputy Minister	A. J. Hickey
	Co-ordinator, Management Consulting Services	H. Fairclough
	Director of O & M	E. L. Banks
	Director of EDP	M. R. Redgrave

DEPARTMENT	TITLE	NAME
Public Health	Deputy Minister	Dr. G. G. Simms
	Executive Director, Health Council	R. H. Knox
Public Welfare	Deputy Minister	Dr. F. R. MacKinnon
Public Works	Deputy Minister	D. J. Power
Registry of Motor Vehicles	Registrar	D. J. Tully
Tourism	Deputy Minister	V. M. Knight
University Grants Committee	Chairman	Dr. A. L. Murphy
	Financial Analyst	D. F. C. Burton
Water Resources Commission	Chairman	E. L. L. Rowe
Workmen's Compensation Board	Chairman	S. T. Pyke
	Comptroller	H. R. Gill
N.S. Commission on Education, Public Services, Municipal-Provincial Relations	Chairman	J. Graham
Maritime Medical Care	General Manager	S. P. Brannan

EXTERNAL

Dalhousie University

L. Vagianos, Director of Communications

I. Ali, Director, Computer Center

IBM Canada Ltd., Halifax

V. M. Campbell, Branch Manager, Data Processing Division

Maritime Telegraph & Telephone Co. Ltd.

S. Robertson, Vice-President Operations

I. E. H. Duvar, Manager-Business Information Systems

UNIVAC Div., Sperry Rand Canada Ltd. Halifax

A. F. Shatford, Manager, Marketing & Systems Support

LIST OF THOSE INTERVIEWED IN PRINCE EDWARD ISLAND

GOVERNMENT AND GOVERNMENT AGENCIES

DEPARTMENT	TITLE	NAME
Agriculture and Forestry	Deputy Minister	M. W. White
	Director, Economics, Planning & Marketing Br.	G. Ryle
	Manager, Crop Insurance Agency	R. B. McInnis
	General Manager, Land Development Corporation	C. Wulff
Community Services	Deputy Minister	C. H. Stewart
Development	Deputy Minister	R. A. Higgins
	Human Resources	T. R. Connor
	Economist	F. Schwartz
Education	Deputy Minister, Administration	L. R. Moase
	Director, Library Services	D. Scott
	Director, Planning Division	C. Campbell
	Planning Librarian	P. Marshall
	Planning Officer	G. Hughes
	Director, Vocational and Continuing Education	I. Mackenzie

DEPARTMENT	TITLE	NAME
Environment and Tourism	Deputy Minister	D. B. MacAdams
	General Manager, Environmental Ctrl. Comm.	A. J. Hiscock
	Division Head - Water Resources Environmental Ctrl. Comm.	Dr. B. Dousse
	Director, Land Use Services Centre	N. Flemming
	Division Head - Recreation Planning Land Use Services Centre	J. Allison
	Division Head - Land Titles and Registration, Land Use Services Centre	I. M. MacLeod, Q.C.
	Geographer	P. Galand
Executive Council Secretariat	Research Officer	M. Clark
Finance	Deputy Minister and Secretary to Treasury Board	G. D. Dennis
	Assistant Deputy Minister	B. White
	Director, Data Processing	G. MacNeil
	Director of Tax Assessment, Land Valuation Division	C. M. Davies
	Assistant Secretary to Treasury Board	K. Wornell
Fisheries	Deputy Minister	E. M. Gorman

DEPARTMENT	TITLE	NAME
Health	Deputy Minister & Executive Director, Hospital and Health Comm.	Dr. O. H. Curtis
	Assistant Deputy Minister	Dr. B. D. Howatt
	Director of Laboratories	Dr. J. Craig
	Director of Finance, Hospital and Health Services Commission	C. A. Holland
	Director of Claims and Assessment Hospital and Health Services Commission	J. R. Hobbs
	Director of Hospital Standards Hospital and Health Services Commission	C. W. Hill
P.E.I. Housing Authority	General Manager	J. A. Comeau
Industry and Commerce	Deputy Minister	D. E. Morrison
	Program Planning Director	D. Darlington
	General Manager of Market Development Centre, Industrial Enterprises Inc.	R. Grose
	General Manager, Lending Authority	W. Jay
Justice and Attorney General	Deputy Manager, Admin.	W. MacKay
	Chairman, Liquor Control Commission	A. B. Wood
Labour	Deputy Minister	J. M. McAlduff
	Chairman, Workmen's Compensation Board	J. J. Mustard

DEPARTMENT	TITLE	NAME
Office of the Economic Advisor	Economic Advisor	M. Lane
Office of the Provincial Auditor	Provincial Auditor	T. Kaptein
Premier's Office	Principal Secretary to the Premier	A. Wells
Provincial Secretary	Deputy Provincial Secretary	G. L. Monkley
	Registrar of Motor Vehicles	J. T. Gallant
	Queen's Printer	G. W. K. Auld
	Chairman, Civil Service Commission	E. G. MacLeod
	Secretary, Public Utilities Commission	W. R. Brennan
	Public Archivist	N. de Jong
	Advisory Services, Public Archives	A. J. Brown
Public Works and Highways	Deputy Minister	J. Gilmore
Welfare	Deputy Minister	J. E. Green
Royal Commission of P.E.I. and Land Use	Chairman	C. Raymond

EXTERNAL

Holland-College

Commander E. J. Jefferys, Administrative Office

University of Prince Edward Island

J. W. Hancock, Computer Director

STUDY OF INFORMATION MANAGEMENT IN THE MARITIME PROVINCES

SUMMARY OF INFORMATION SYSTEMS IN THE PROVINCIAL GOVERNMENTS PRESENT AND PROPOSED

Information system and computer application requirements are described under the following headings:

- Resources
- Government Programs
- Indicators

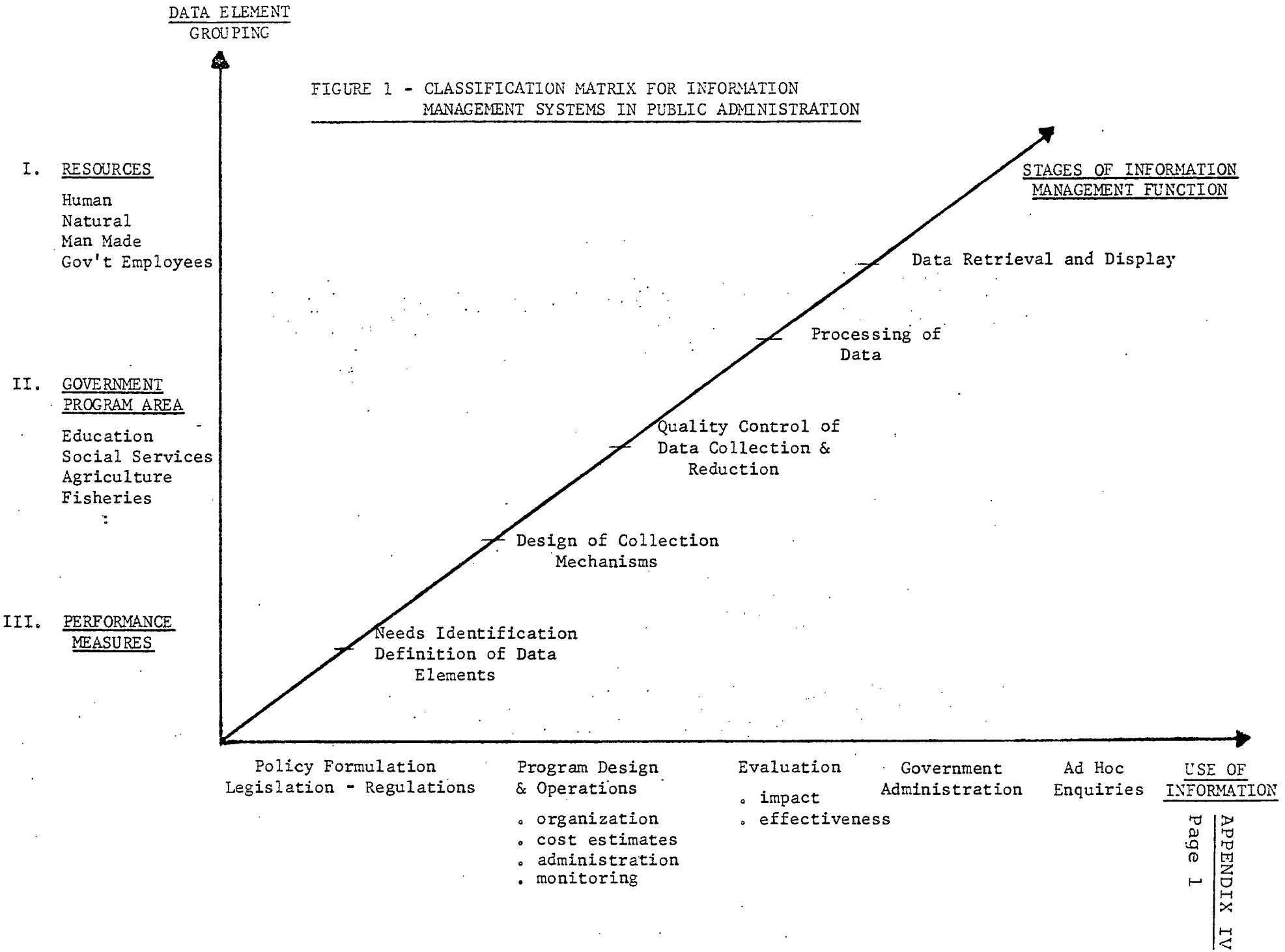


FIGURE 1 - CLASSIFICATION MATRIX FOR INFORMATION MANAGEMENT SYSTEMS IN PUBLIC ADMINISTRATION

I. RESOURCES

Because of the importance of the resource base in the provincial and regional economy and the rather wide variation in kinds of items, it is helpful from an information management perspective for presentation purposes to separate the resource base as shown in Figure 1 into human, natural and man-made. The discussion will be focused on the type of data required for a data base, the need for which was either stated or implied by respondents.

A. HUMAN

The census made by Statistics Canada constitutes the main human resource data base for each province. Other files and systems referring to individual citizens are described under the appropriate heading in the section, Government Programs, e.g. welfare, education, etc.

B. NATURAL RESOURCES

The basic elements of land, water, air, forests, minerals, and wild life constitute the region's endowment of natural resources. These resources are of significant importance to the economy of each province and the region as a whole. Thus successful government policy and programs are contingent upon an accurate inventory of these resources. With the possible exception of wildlife, each of these assets has a definite geographic location as a key factor in their description.

. Lands

A substantial amount of data has been obtained concerning the precise geographic location of land, its use and capability in the Canada Land Inventory and on a small area basis, surveying and mapping of land under the aegis of APSAMP, more recently the Council of Maritime Premiers, and the Federal Government. Because of the widespread implication of this work, it is discussed in detail in another section of the report (Appendix VI).

Ownership of land, and associated mineral rights, is a key element in any land inventory. The three provinces under the Council have embarked on a program of altering the basis for recording ownerships and liens, easements, etc. against a property.

. Minerals

Land based mineral deposits are of interest only to the two mainland provinces. In each of these jurisdictions there are deposits being actively worked and it is an essential part of the inventory to record the resource and its basic characteristics. In addition, both the government and private industry obtain geo-science data on various sites, e.g. location or rock out-croppings, geo-chemical composition, etc. No provincial computer applications were reported with inventory implications.

Offshore oil and gas deposits, their leases and management are the subject of recent activity on the

part of the Atlantic Coast provinces affected. The inventory is conceptually similar to that required for minerals.

- Forests

Two provinces have significant forest resources and each has data on the stock of resources by merchantible yield and growth rate. One province reported a computer application with inventory implications, i.e. collection of forest cruise information, while the second reported a forest inventory application. The Canada Land Inventory contains a substantial body of data related to actual and potential use of land for forestry.

- Water

No systematic inventory of water resources, watersheds, major lakes and streams, coastal bodies exists. None of the provinces has a data base encompassing items such as flow characteristics, physical and biological characteristics, usage patterns, etc.

- Air

None of those interviewed dwelt upon the topic of data needs for air management and, with the possible exception of urban concentrations and industrial developments, data needs are minimal. It is worth noting that the Lorneville Impact study did not have an adequate data base to work with. More detailed meterological data were required.

. Wildlife

Offshore fishing information is obtained in a co-operative survey made with Statistics Canada as the focal point. Estimates of the "inventory" and landings of fish by species and location are produced.

Inventories of fish (one province) and game (two provinces) are produced by type and by area.

The potential for technical co-operation is keyed to the possession of accurate surveys and maps. The initial steps required to obtain these keys are well underway in the region.

C. MAN MADE ASSETS

Each province has a very considerable investment in this category of resources which covers both the public and private sector. As for natural resources, the key data element is location.

. Housing

Data pertaining to the stock of housing, its uses, general characteristics, location, etc. are in part available from assessment files, census data, power corporation appliance surveys, housing agencies, fire marshall, health inspection, etc. Severe inadequacies exist from the user viewpoint, e.g. abandonments are not available and information about rural housing is scarce. One province has substantial data obtained as part of a survey effort for farm

families in 1968. Another is currently conducting a survey of housing in small towns and villages. Another computer application produced a file on home ownership and home improvement grants. Users expressed a need for accurate data on housing characteristics available on a timely basis.

- Infrastructure

At present there does not exist an inventory of data describing the investment in infrastructure roads, other communication linkages, rails, public facilities health, education, welfare, public protection, government buildings, tourist and recreation facilities. It is recognized that some of this information exists, but it is not organized in a coherent fashion from the users point of view.

- Private Sector

Data on plant and equipment generally are obtained via Statistics Canada. At the sub-provincial level this is generally unsatisfactory because of the confidentiality requirement that imposes a minimum of three respondents a cell before dissemination is permitted. The two provinces which lack a statistics act are particularly affected by this requirement. This has its ironic aspect in that government, Federal or Provincial, have frequently invested funds or guaranteed loans to the respondents. Thus many items of the data required are on file, or the means to get the data exists, but it cannot be disseminated in two of the three provinces.

The potential for co-operation is much the same as for the previous dimensions of the resources sector with some differences in the private sector data. It is understandable that some data would be regarded as proprietary in view of the competition for industry. However this does not obviate the feasibility of co-operation at the technical level of standardization of concepts and definitions. A relative neutral starting point is joint action in the "house keeping" task of conducting and maintaining inventories of publicly owned facilities.

There is a need for co-operative practices in the area of management of information to generate and maintain data bases on a variety of resources. There is a substantial possibility of technical cooperation which could be exercised at the required level.

II. GOVERNMENT PROGRAMS

The need for information was usually expressed by the respondent in terms of knowing about specific events or items occurring in the functional system for which he was responsible, e.g. number of students taking a course, location of educational facilities, etc. Therefore in this section the focus of the discussion shifts from data needs to computer applications, actual or potential. An important implication of the shift is that the focus of cooperation shifts from relatively neutral items such as terminology, methods and procedures, etc. to active commitment of resources to joint development of an information system to support an organizationally defined operating system.

Differences among the provinces in provincial-municipal relationships, relationships with the private sector in health and medical care financing and operation, etc. all combine to limit the respondent's appreciation of the technical possibility of co-operative action and perhaps over-emphasize the situational barriers.

Areas of potential co-operation could be classified in a number of ways, by functional area, e.g. health, education; by type of application, people counting by status, current or projected; and by relative priority of undertaking among others. However it is, in our judgement, unlikely that any one classification system will prove dominant for purpose of pointing out where co-operation potential exists. Thus the following material consists of a list of areas where co-operation is technically desirable and appears cost effective from a regional viewpoint. In some cases joint action exists and this is indicated. No priority is implied by the order of presentation.

. Education

- Two provinces have the teacher payroll computerized and the third has developed a teacher characteristics file.

- One province has data on some students as a by-product of its pupil scheduling program; a second has just initiated a student characteristics file. The third province is considering a student characteristics file, as the next step. Statistics Canada has been working with one province in this area.

- All provinces require a facilities file, although one has such a file in the rudimentary stages of development and another is considering one.

- Two experienced a need for operational analysis of primary and secondary transportation costs.

- All need a research and analysis capability to assist in policy development with particular emphasis in cost control.

Higher Education has been the subject of recent action by the three provinces and the Council of Maritime Premiers, in the formation of a regional Commission on Higher Education. One province has worked out an agreement with its post secondary institutions (universities and colleges) covering the development of an integrated computer network.

Health

- Two of the three provinces are giving consideration to integration of the Medicare Claims Processing and Payment and the Hospital Services Payment data processing operations.

- Each of the provinces stated a need for additional analysis of operational performance data.

- Two of the jurisdictions need analysis of laboratory services data.

- Two of the jurisdictions are actively pursuing the acquisition and installation of hospital management information system packages, (some hospitals in the region have and use a payroll and/or management package). Each province recognizes the need to tie into patient records.

- Two of the three stated a need for an improved system of retrieval of vital statistics data (Statistics Canada processing takes up to two years).

- Two jurisdictions are beginning to provide dental care to at least specific target populations, e.g. pre-school age children is one case. No systems work was reported.

- Each unit of government has Workmen's Compensation Boards which also process payment for claims from doctors.

- None of the provinces has allocated people and money to medium and long range planning for such issues as the development of health status indicators, financial impacts of prepaid group practice or its variants.

Social Services

- One province has just invested considerable effort in formulating the objectives of provision of social services and hence is on the threshold of defining its information requirements and information practices. Currently it has operational and monthly reporting and annual statistics in two areas; general welfare, child and family service and a cheque writing application.

- One province embarked upon the design and implementation of a computer assisted management system for operational and financial control. It is intended to be an on-line system with direct entry at the case level. It also has a payroll for applicants.

- One province has a computer application covering a portion of its caseload (long term) with the capability of estimating the financial impact of rate alterations. It contains substantial data on current recipient income and expenditure.

- Each province expressed the need for more statistics for research/social planning and the resources to utilize these statistics.

Labour

The prime data need expressed by organizations concerned with labour was labour force data on a sub-regional basis in particular small firms which are excluded from most surveys. All reported grappling with the problem of occupational definitions, which has not been resolved at the theoretical or practical level.

An area of emerging need for information is that associated with human rights, particularly discrimination in employment based upon sex, race, language. The crunch will come when enforcement orders must be monitored.

The only computer applications reported were statistical analyses.

- Housing

Two of the three housing organizations have no computer applications at present. Prince Edward Island has a home ownership and home improvement grants file. All expressed a need for additional data and research. In view of recent federal action, these needs are likely to become salient.

- One organization is currently doing a special survey of housing conditions in small communities.

- All agree that census data are inadequate for policy purposes due to both method and timing of collection.

- Abandonment statistics are required as are data on a small area basis particularly rural and urban fringes.

- Data and research on the cost of various types of approaches to housing policy are needed.

- Agriculture

Each of the provinces utilizes the Statistics Canada farm management tool, CANFARM.

Computer applications include the production of mailing labels, statistical and management reports on a livestock artificial insemination program, meteorological statistical reporting, agricultural engineering designs, special studies, e.g. socio-economic analysis of farm families, departmental management costing.

Potential applications include a file on production characteristics, e.g. soil, analysis results, fertilizer applications, disease patterns in crops, yields, etc., feed analyses, additional research on farm production, socio-economic profiles of farmers and farm profitability; financial management for loan and granting authorities.

- Fisheries

Statistics Canada plays the major role in the collection and production of various statistics for off shore fisheries, e.g. landings, processed value, etc. The only computer application reported was a departmental expenditure system and some statistical reports on inshore fisheries.

Potential applications as foreseen by respondents were not primarily in the area of basic production statistics. The analysis of these statistics at the provincial level and studies of the socio-economics of the fishing industry, particulary fishermen, were mentioned.

- Forests

The computer applications reported include a forest inventory (two provinces), tree volume and area volume, general forestry statistics, accounting, miscellaneous special studies, e.g. sample plot growth.

Potential applications are projections of resource requirements, estimates of forest yields, and analyses of reforestation alternatives.

- Lands

A major regional application of land survey and mapping with computerized storage of data has been underway for several years and is the subject of a proposal for the Council of Maritime Provinces to act as the agent on behalf of each province. Because of the wide spread and complex ramifications associated with this application, it will be discussed in a special section of the report. Related potential applications will also be explored in this context under the heading, Land Registration and Information Services (Appendix VI).

- Park Lands

Park attendance statistics are kept on a computer file in two provinces.

- Mines

Applications reported were of the special study type, e.g. flows, and an analysis of a large number of mineral samples in one major rock basin.

Potential applications mentioned include the creation of a file on mineral occurrence and plotting of this (to be done on a non-government computer in the U.S.), sophisticated analysis of deposit potential, geological and chemical.

- Environment

Water quality, well characteristics, mathematical modelling of air quality, storage and analysis of efficient quality, water flow data for utilities were all mentioned as potential applications.

It is worth mentioning that all respondents foresaw a general requirement for collection of substantial amounts of data on ambient environmental condition in urban areas, and areas with substantial industry. Some envisaged being overwhelmed with data obtained by remote sensing devices in a telemetry network. In fact, the recently completed Lorneville Impact Study called for continuous sampling of ambient pollution levels in both air, land and water.

- Voters' List

There are no current applications, although one province is in the concept feasibility stage of a computer application to reduce the time required to obtain voters' lists and another is considering such an application.

- Liquor Control Boards

The Liquor Control Boards in all three provinces are not using the computer to any extent although one has cash registers producing punched paper tape ready for computerized application. At least two of the Boards are ready to proceed on the mechanization of sales and inventory accounting as well as sales forecasting and possible automatic inventory replenishment. One of the Boards estimates potential savings of $500,000 to $900,000 per year and believes it could use a system which was developed for a Liquor Control Board outside the Maritimes. The situation would appear to be ideal for a collaborative project.

- Law Reform

Two provinces are undertaking the provision of looseleaf formatted statutes, the third will most likely do so when

its statutes are revised. A number of other provinces have done so including Quebec. New Brunswick have placed their statutes on tape through co-operation with Queen's University.

- Vehicle and Driver Licensing

Two provinces have an automated system for driver registration and motor vehicle registration. The third is going to move to an automated system. These have been the subject of another study and thus these applications will not be discussed further here.

- Land Registration

A major change in real estate registration has been proposed on an integrated basis under the aegis of the Council of Maritime Premiers. It will be discussed separately in Appendix VI in view of its overall size and importance and being one of the major portions of the proposed Land Registration and Information Service.

- Inspection Services

A variety of departments are engaged in the provision of inspection services, e.g. fire marshalls, health departments, mine departments, municipal affairs, etc.

No applications reported, except motor vehicle in two provinces; one province reported having abandoned an equipment inspection file application because of input data difficulties. No application potential was expressed. Such an outcome is not surprising because none of the respondents had any reason to consider inspection services as an entity worthy of study. Only a small portion of each individual's budget was consumed,

in many cases, by this type of activity. However, viewed as an entity, particularly at the regional level, it is a potential area of co-operation for information management.

- Personnel

Each of the provinces has a civil service payroll application basically to produce cheques and one intends to introduce a compensation payroll system.

One province reported an establishment file revised to the payroll to produce a monthly establishment report.

Two provinces intend to produce personnel information systems. Potential applications mentioned were in the areas of costing for labour negotiations and for manpower planning. One jurisdiction anticipates obtaining a computerized employee file by early spring 1973.

- Queen's Printer

Two jurisdictions were actively involved in the revision of statutes and a switch to providing looseleaf binding. The third will face this problem in a year or so.

- Taxation

All three provinces reported taxation applications. These included retail sales tax, gasoline tax, billing of property tax, two provinces; consumers tax, one province. One province has a land sales analysis program to support property assessment.

- Property Assessment

  Two provinces had automated files for property assessment activities.

- Highways

  One province has acquired the ICES computer program which will offer the opportunity to facilitate highway design activities to a considerable extent. There had been substantial investment of time in debugging an earlier version. Use of this package requires a substantial data base of survey data, soil conditions, land ownership, etc. which is not yet fully developed.

  One application reported by the two provinces was traffic counts. Sufficiency ratings, linked to traffic counts, were used by one department in producing its maintenance budget. Another department was considering a maintenance management information system. A haulage account payroll and machine charges for equipment use were also reported as were an accounting and job costing application. Evaluation of accident data was regarded as a potential application by one department.

- Public Works

  No applications were reported in the area of inventory management of facilities and non-highway related equipment. No strong need for such applications was expressed by respondents. It is quite possible that the combined governments' investment may justify development of systems and procedures if not a computer application.

Financial

A number of financial or financial related applications were reported. Payrolls for civil servants were computerized in all three provinces and considerable dissatisfaction was expressed with these applications as currently designed.

Teachers' payrolls were computerized at the provincial level in two jurisdictions. Pensions for civil servants in two provinces and for teachers in three provinces were also computerized. Welfare recipient payrolls were produced in three provinces.

Billing applications were reported by a number of departments and agencies including power commissions. Areas of application in two provinces were billing for electrical services, property taxes, and health laboratory services. One department had a natural resources revenue billing application (not mentioned in the user need interview).

Tax applications reported were property taxes; two provinces, consumer tax, health tax, and gas tax.

Two provinces reported computerized public accounts and one of these had computerized appropriations accounts.

One province expressed a strong need for an overhaul in its basic financial management practices and it seems that the other two could participate in specific areas, e.g. commitment accounting, payrolls, and audit task.

Property assessment files are computerized in two provinces.

- Miscellaneous

  A few of the applications reported did not fit into one of the preceding government programs. These related to information for policy formulation and, more frequently, for program evaluation. The application usually consisted of survey data on computer tape plus a program for manipulation of the data. While these applications were small in number, this will be an area of rapid growth over the next decade. Part of this growth will be generated by agreements entered into under regional development cost-sharing arrangements and part by the need to find out what government programs are effective in dealing with specific problems, e.g. job development, unemployment, etc. This trend to research and analysis on government program operations and effectiveness offers an opportunity for co-operation at both the technical level, methodology, etc., and the level of information management practice.

This section has identified the computer applications within the region in a manner which facilitates identification of potential joint action. If each province had all the applications which exist in the region, there would be a substantial increase in data processing operations.

Thus one can foresee a trend of increasing data processing operations with an ever larger investment in data requiring and warranting improved information management practices. However the rising demand for data processing must not be allowed to displace the smaller but equally important demand for applications to support policy formulation and program evaluation with their requirements for non-processing types of skills.

III. INDICATORS

For thirty years the key indicator of societal performance was a very imperfect indicator, Gross Provincial Product, Gross National Product and its components. Its defects were legion. For example, it did not account for the value of a mother's time spent raising children yet if she worked, she became a "productive" member of society. To overcome these and other defects, a substantial amount of work in various parts of the world has gone into the development of a broadly based set of indicators of social performance. A consensus has not emerged to date, and in a society with values shifting as rapidly as they are today, the task is monumental.

Two respondent departments, in different provinces, expressed a need for social indicators encompassing more than the economic aspects of societal performance. In one case, this was a comment underlying the needs relating to a specific geographic area. In the other, it was an explicit province-wide concern and was expressed with full recognition that only approximate indicators were possible at this time.

By devoting a little extra effort to the definition of information needs for policy planning and program evaluation, there is the opportunity of collecting data which may be used to reflect various aspects of the quality of life. For example, by combining data available, (or potentially available) from assessment files with power commission appliance surveys and occupancy patterns, it should be possible to generate a set of data from which one could infer the material quality of life at home. A logical extension would be to infer the nature of the family

relationship by linking data from the Medicare file on prevalence of illness to those on the educational performance of children. A survey of leisure time activities could also be conducted to provide an additional dimension as could a survey on work attitudes.

The following paragraphs will emphasize economic concepts of societal performance solely because that aspect is significantly better developed not because it is a complete representation of performance.

Respondents in the areas most interested in performance measures tended to be concentrated in the Department of Development, (Prince Edward Island and Nova Scotia), Economic Growth and the office of Economic Advisor, New Brunswick. All expressed a need for improved scope of performance measures and increased usefulness of existing measures. In the latter area, strong needs were expressed for disaggregated data to produce economic profiles of sub-provincial areas. The type of data to be obtained includes time series data from Statistics Canada, in particular the CANSIM data. In addition, data from surveys of manufacturing, agricultural production of major products, construction, tourism, retail sales, rental dwelling occupancy rates, retail prices, wages and salaries, etc. For comparative analysis, United States and United Nations series should be available.

One area worth exploring is the obtaining of data from the files of the Industrial Development Bank on a statistical basis, plus the files of other loan agencies. These could be used to develop industrial profiles in some depth in small areas and for inter-provincial comparisons.

There exists substantial potential for joint action with respect to acquisition and maintenance of the United States and United Nations time series data as well as the CANSIM data. The key to obtaining co-operation is ensuring quick access to any user. While there might be some reluctance to share data obtained via surveys, there is clearly a cost saving to be obtained in the design of collection and processing operations and to a lesser extent the actual conducting of these operations via joint action.

Finally there would seem to be an opportunity for co-operation in the selection of non-economic indicators of performance which should be produced for each province and the region as a whole.

STUDY OF INFORMATION MANAGEMENT IN THE MARITIME PROVINCES

PROVINCIAL COMPUTER RESOURCES

A. GOVERNMENT DATA PROCESSING CENTRES

ELEMENT	PRINCE EDWARD ISLAND	NOVA SCOTIA	NEW BRUNSWICK
1. ORGANIZATION			
Location	Data Processing Division in the Department of Finance operating under Treasury Board policies.	Management Consulting Services in the Department of Provincial Secretary operating under Treasury Board policies.	Data Processing Branch in the Department of Supply and Services operating under Treasury Board policies and the D.P. Advisory Committee.
Scope of Responsibility	Central service agency providing data processing services.	Internal consultant group providing data processing and management consulting services.	Central service agency providing data processing services.
Planning Process	No permanent user committee. Next year's budget prepared. Application selection by Director and Department officers. Objectives and priorities established by Director of Computer Services. No formal procedures.	No permanent user committee. Three year budget with five year plan prepared. Application selection by the user. Objectives and priorities established by the Co-ordinator of Management Consulting Services. Formal procedures.	Data Processing Advisory Committee. Next year's budget with four year plan prepared. Application selection by users, Data Processing Advisory Committee and Treasury Board. Objectives and priorities established by the Data Processing Advisory Committee. No formal procedures.
Structure	Data Processing Division: Director, Secretary and Three Groups (25) Operations (15): Operations Supervisor and Three Sections: I/O Control (1) K/P Operations (11) Computer Operations (2) Analysts (4): Programming (4): Senior Programmer and Programmers	Management Consulting Services: Co-ordinator and Two Directorates (93) - EDP Directorate (71): One Director and Two Groups: Data Centre (44): One Manager, One Clerk and Three Units: Data Control and Library (6) KP Operations (25) Computer Operations (11) System Programming (26): Project Leaders (7) Programmers (8) Production System (Maintenance, Standards, Training) (11) Organization and Methods (21): One Director and Three Groups: Microphotography Unit (7) OIM (9) Administrative Services (4)	Data Processing Branch: Director, Two Clerks and Four Divisions (98): Computer Operations (18): Operations Supervisor and Four Groups: Data Control (7) Mail Room (2) Operations (8) Data Preparation (57): Keypunch Co-ordinator and Seven Keypunch Teams: KIP Operations (56) Systems Development (12): Chief System Analyst and Project Teams Project Leaders (4) Program Analysts (7) Application Maintenance (8) One Supervisor and Support Program Analysts (7)

STUDY OF INFORMATION MANAGEMENT IN THE MARITIME PROVINCES

PROVINCIAL COMPUTER RESOURCES

ELEMENT	PRINCE EDWARD ISLAND	NOVA SCOTIA	NEW BRUNSWICK
Growth	Equipment 1960 - 1966: Unit Record 1967 : IBM 1130 1972 : UNIVAC 9400 Personnel 1966: 4 1972: 25	Equipment: 1954 - 1965: Unit Record 1966 : IBM 360/30 1968 : IBM 360/40 1972 : IBM 370/145 Personnel 1965: Several Installations 1972: 93	Equipment Up to 1961: Unit Record 1961 : IBM 1401 - Card System 1966 : GE 415-425 1972 : UNIVAC 1106 Personnel 1966: 35 1972: 90

PROVINCIAL COMPUTER RESOURCES

ELEMENT	PRINCE EDWARD ISLAND	NOVA SCOTIA	NEW BRUNSWICK
1. FINANCIAL			
Current Budget	Data Processing Division 72/73 Total $245,000 Salaries $145,600 Equipment rentals $79,909	Management Consulting Services 72/73: Total $1,260,370 Data centre $727,090 (salaries $278,250) (equipment $410,340) System Prog. $317,060 (salaries $295,560) O/M $216,220 (salaries $175,970)	Data Processing Branch 72/73 Total $1,090,420 Salaries $528,096 Equipment rentals $403,270
Previous Budget	1969/1970 Total $130,339 1970/1971 Total $130,339 1971/1972 Total $173,972	1969/1970 Total $905,674 1970/1971 Total $935,519 1971/1972 Total $1,028,565	1970/1971 Total $655,900 1971/1972 Total $992,282
Forecasts	1973/1974 Total $274,813 No staff increases considered.	1973/1974 Total $1,458,740 1974/1975 Total $1,557,610 1975/1976 Total $1,663,310 No staff increases considered.	1973/1974 Total $1,259,88 Future need for five program analysts and five keypunch operators.

STUDY OF INFORMATION MANAGEMENT IN THE MARITIME PROVINCES

PROVINCIAL COMPUTER RESOURCES

ELEMENT	PRINCE EDWARD ISLAND	NOVA SCOTIA	NEW BRUNSWICK
1. HARDWARE			
Computer			
Configuration	UNIVAC 9400 (65 K bytes) 2 disc drives (29 million bytes) 2 tape drives (800 bpi, 34 K bytes/second) 1004 subsystems (600 cards/minute) (600 lines/minute)	IBM 370/145 (256 K bytes) 2 disc drives (29 million bytes) 8 tape drives (1600 bpi, 160 K bytes/sec.) 1403 printer (1100 lines/minute) 2540 reader punch (1000/300 cards/minute) 2501 reader (600 cards/minute)	UNIVAC 1106 (131 KW, 36 bits) 4 disc drives (29 million bytes) 8 tape drives (200-800 bpi, 96 Kc/ 9300 subsystem reader (600 cards/min) printer (600 lines/minute) 0768 printer (900-1100 lines/minute)
Cost	($6,707/month)	($27,076/month)	($22,369/month)
Storage & Tape Library Contract	4 disc packs, 200 tape reels 7 years lease with 3 and 5 years options	12 disc packs, 1000 tape reels Some peripheral units are leased ($7,836/month out of $27,076) - monthly rental contract for the rest.	6 disc packs, 8,000 tape reels 7 years lease with 3 years option
Data Communications	No equipment.	2702 control unit 2741 terminal plus data sets ($1,820/month) (+ 5 outside terminals)	No equipment.
Unit Record and Data Conversion	6 punch - verifier 1 punch - verifier interpreter ($835/month)	16 keypunches 8 key verifiers 1 collator 1 accounting machine 1 alpha interpreter 1 marksensing converter 1 sorter ($4,343/month)	46 key tapes 13 key punch/verifiers ($9,100/month)
Microfilm		3 automatic filmers 2 precision filmers 1 planetary camera film processing and film duplicating equipment	

STUDY OF INFORMATION MANAGEMENT IN THE MARITIME PROVINCES

PROVINCIAL COMPUTER RESOURCES

ELEMENT	PRINCE EDWARD ISLAND	NOVA SCOTIA	NEW BRUNSWICK
3. HARDWARE			
Computer			
Configuration	UNIVAC 9400 (65 K bytes) 2 disc drives (29 million bytes) 2 tape drives (800 bpi, 34 K bytes/second) 1004 subsystems (600 cards/minute) (600 lines/minute)	IBM 370/145 (256 K bytes) 2 disc drives (29 million bytes) 8 tape drives (1600 bpi, 160 K bytes/sec.) 1403 printer (1100 lines/minute) 2540 reader punch (1000/300 cards/minute) 2501 reader (600 cards/minute)	UNIVAC 1106 (131 KW, 36 bits) 4 disc drives (29 million bytes) 8 tape drives (200-800 bpi, 96 Kc/ 9300 subsystem reader (600 cards/min) printer (600 lines/minute) 0768 printer (900-1100 lines/minute)
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Microfilm		3 automatic filmers 2 precision filmers 1 planetary camera film processing and film duplicating equipment	

STUDY OF INFORMATION MANAGEMENT IN THE MARITIME PROVINCES

PROVINCIAL COMPUTER RESOURCES

ELEMENT	PRINCE EDWARD ISLAND	NOVA SCOTIA	NEW BRUNSWICK
Last equipment change			
Date	June 72	July 72	September 72 (previous equipment phasing out in February)
Previous equipment	IBM 1130 1 sorter 1 collator 6 punches 4 verifiers	IBM 360/40 (92 K bytes) 2 disc drives 6 tape drives 1403 line printer 2540 reader/punch 2501 reader	Honeywell GE 415 6 tapes - (16 K 24 bits) GE 425 8 tapes - (32 K 24 bits) 1 card reader (900 c/minute) 1 line printer (1100 l/minute)
Reason for change	Capacity exceeded.	Capacity exceeded (650/700 hours per month)	Capacity exceeded.
Selection Criteria	Price Expansibility C.E. in Charlottetown	Programs conversion costs (17 - 20 man years)	Performance/cost Expansibility
Major expected changes	Faster printer and RJE or IITRAN 1 communication adapter 5 terminals (4 school-boards - MVR 32 K core expansion	No significant changes except 2702 for 3705 communication control unit and cheaper tape drives.	Additional channels considered within next few years (I/O bottleneck).
Utilization			
Shifts	2 shifts on 5 day week (computer and keypunch operations) should be reduced to 1 shift for computer operations.	2 shifts (3 shifts occas.) on 6 day week for computer operations (APL is run now 3 hours a day, 5 days a week during the first shift).	2 shifts on 5 day week
Utilization rate	About 40-50 hours a week (estimated)	About 300 hours/month from August to November 72	According to benchmark results, previous application should not require more than 80-90 hours/week with 1106.
Supplies			
Cards	$2,000 a year	$9,570 a year	$4,196 a year
Standard stationery	$5,500 a year	$12,100 a year	$24,176 a year
Preprinted forms	$6,500 a year	Preprinted forms are paid by the users.	$10,288 a year

STUDY OF INFORMATION MANAGEMENT IN THE MARITIME PROVINCES

PROVINCIAL COMPUTER RESOURCES

ELEMENT	PRINCE EDWARD ISLAND	NOVA SCOTIA	NEW BRUNSWICK
4. SOFTWARE			
Operating System	9400 DOS (18 K bytes) used (multi-programming and spooling available but not used).	OSMFT 2 (release 21) used, 2 fixed partitions (90 K and 76 K bytes) available;VSI, HASP under OS available.	EXEC 8 (DOS) (58 KW) used. Multiprogramming with up to 4 jobs in 73 KW available.
Compilers and Languages	COBOL used. Assembler, Fortran available; IITRAN (timesharing) will require OS 4 operating system and additional hardware.	ASSEMBLER and RPG used. Cobol, Fortran, PI/1 Mathlan, GPSS; APL (timesharing) is used by external users.	COBOL used Some routines in Assembler FORTRAN.
Packages	EXTRACTO used. Application programs of Protestant School Board of Greater Montreal available in education field.	CULPRIT used. VALUE COMPUTING used.	EXTRACTO and UNIVAC Data Management system considered. Some tests with GEMINI. Conversion package from GE COBOL programs and files to UNIVAC used to do 90% of all conversion.

PROVINCIAL COMPUTER RESOURCES

ELEMENT	PRINCE EDWARD ISLAND	NOVA SCOTIA	NEW BRUNSWICK
5. A. APPLICATIONS			
Number	35 applications	27 significant applications	27 applications (10 others using other facilities)
Major existing	PROPERTY TAX 440h/year PAYROLL 240h/year WELFARE 144h/year MEDICARE 136h/year MOTOR VEHICLES 70h/year SALES TAX 48h/year	MEDICARE 2487h/year MOTOR VEHICLES 686h/year POWER COMMISSION BILLING 407h/year PAYROLL 147h/year HIGHWAYS ACCOUNTING 135h/year WELFARE 107h/year	MEDICARE 1763h/9mo. STUDENT SCHEDULING 1254h/9mo. APPROPRIATION 1118h/9mo. WELFARE INFORMATION 1100h/9mo. PROPERTY TAX 848h/9mo. PAYROLL 702h/9mo.
Status	Property tax and general welfare are newly developed systems, all others have been converted from 1130 unit record design.	Major systems have been developed since 1966 with a tape oriented system design except payroll accounting which has been converted from previous unit record systems.	Some of these systems (like payroll) have been converted from card design to tape design system. All others are more recent and are tape systems.
Considered development	- Inventory control and forecasting (Liquor Control Commission, regional school units, Department of Public Works. - Stock control for DPW - Appropriation accounting - Student programming with IITRAN - Library catalogue label system for school boards - Scientific applications	- Resource information system in Education - Consolidation of psychiatric patient treatment information - Stock control system in hospitals - Personnel information system for Civil Service Commission - Property tax - Student programming with APL	- Welfare information (completion) - Hospital administrative system - Education cost system - Comprehensive payroll - Personnel information system - Mental health records

STUDY OF INFORMATION MANAGEMENT IN THE MARITIME PROVINCES

PROVINCIAL COMPUTER RESOURCES

ELEMENT	PRINCE EDWARD ISLAND	NOVA SCOTIA	NEW BRUNSWICK
SERVICES			
Systems	System Pre-Survey Requirements Definition Feasibility Study Systems Analysis and Design System Programming Project Management Project Implementation and Conversion System Maintenance System Documentation	System Pre-Survey Requirements Definition Feasibility Study Systems Analysis and Design System Programming Project Management Project Implementation and Conversion System Maintenance System Documentation	System Pre-Survey Requirements Definition Feasibility Study Systems Analysis and Design System Programming Project Management Project Implementation and Conversion System Maintenance System Documentation
Processing And Other	Applications Batch Processing File Management Systems Scientific Programming Keypunching Training	Applications Batch Processing Organization and Methods Analysis Management Consulting Space Planning Microfilm Services Training APL Time-Sharing Keypunching Operations Accounting File Management System Records Management Directives Management	Applications Batch Processing Keypunching Training

PROVINCIAL COMPUTER RESOURCES

B. OTHER GOVERNMENT AGENCIES AND DEPARTMENTS

PRINCE EDWARD ISLAND	NOVA SCOTIA	NEW BRUNSWICK
	Department of Development	Department of Natural Resources
	Hewlett Packard mini-computer	IBM 1130
	Nova Scotia Power Commission	New Brunswick Power Commission
	UNIVAC 9400 (96 K bytes) 4 tape drives (1600 bpi) 4 disc drives (8414) 1 card reader 1 card punch 1 printer (1100 lpm) 1 optical document reader	IBM 360/30 (32 K bytes) 3 disc drives (2311) 1 tape drive (2415) 1 card reader/punch 1 printer (600 lpm)
	Nova Scotia Workmen's Compensation Board	New Brunswick Workmen's Compensation Board
	NCR Century 50	IBM 360/20

STUDY OF INFORMATION MANAGEMENT IN THE MARITIME PROVINCES

PROVINCIAL COMPUTER RESOURCES

C. MAJOR COMPUTER RESOURCES EXTERNAL TO THE GOVERNMENTS

PRINCE EDWARD ISLAND	NOVA SCOTIA	NEW BRUNSWICK
University of Prince Edward Island	Dalhousie University	University of New Brunswick
PDP 11/45 (24 K words) 3 disc drives (7.5 million bytes) 2 tape drives (9 track, 800 bpi) 1 card reader (300 cpm) 1 line printer (1200 lpm) 2 hard wired terminals no communications facilities at present	CDC 6400 (65 K words of memory) 5 disc packs (35 million char each) 3 7-track tape drives (800/1600 bpi) 2 9-track tape drives (800/1600 bpi) 1 line printer (1000 lpm) 1 card reader (1000 cpm) 1 6671 communication controller-16 ports	IBM 370/155 (1 million bytes) 9 disc drives (2314) 4 disc drives (3330) 2 tape drives (120 K b/s 800/1600 bpi) 2 1403 line printer (1100 lpm) 1 2540 card reader punch 1 2501 optical card reader (1000 cpm) 1 3705 communications controller
Languages: Fortran IV, BASIC for batch mode processing		Languages: APL, WATFIV, FORTRAN, ALGOL...
	Packages: DATUM (law retrieval package) ICES	Packages: Mark IV ICES
Growth: Expand to 32 K memory and time sharing		Communications: 4 medium speed ports, 32 low speed Growth: Upgrade to 370/158 add 4 3330 disc drives and 1 tape drive in Fall/73

PRINCE EDWARD ISLAND	NOVA SCOTIA	NEW BRUNSWICK
	Maritime Telegraph & Telephone Co., Halifax IBM 370/155 (512 K bytes) 8 disc drives (2314) 8 tape drives (9-track - 1600 bpi) 1 2501 card reader (1000 cpm) 1 2540 card reader/punch 2 printers (1100 lpm) 1 paper tape reader 1 2701 communications controllers supporting medium speed terminals Growth: Conversational remote job entry this fall Software Packages: RSVP; AUTOFLOW Maritime Computers Ltd., Halifax 3 2116 Hewlett Packard time sharing computers 2 large CDC disc drives 1 Kodak COM unit IBM data Centre, Halifax IBM 360/30 (64 K bytes)+ System 3 4 disc drives 1 tape drive (used also as a terminal for remote batch) NCR Data Processing Centre, Halifax NCR C 100 (32 K bytes) 2 tape drives 2 disc drives	New Brunswick Telephone Co. Saint John IBM 370/145 (512 K bytes) 8 disc drives (2314) 2 disc drives (3330) 3 tape drives (1600 bpi 1 7-track) 1 card reader/punch 1 paper tape reader 1 printer 1 2701 communications controller IBM Data Centre, Saint John IBM 360/30 (64 K bytes) 5 disc drives 3 tape drives (used also as a terminal for remote batch)

LAND REGISTRATION AND INFORMATION SERVICES (LRIS)

I. INTRODUCTION

Under the aegis of the Council of Maritime Premiers, the three provinces have jointly initiated a project, LRIS, which has the potential to significantly increase the effectiveness of policy formulation and public administration in the region at both the provincial and regional level. The title of the project, Land Registration and Information Services, gives an indication of the scope of the undertaking. The coding system used in identifying a parcel of land is applicable to all location-specific information, from census data through natural resources to roads. The purpose of this appendix is to summarize the current status of the project, and to highlight its potential for improving the effectiveness of information management in government.

II. BACKGROUND

In the early 1960's the Federal Government undertook a program to provide a base for land use planning, the Canada Land Inventory program. Because of the vast amount of data to be handled, it was necessary to computerize the data on land use to assess its capability to sustain agriculture, wildlife, forestry and recreation. A geo information system (GIS) is being developed. It is interesting to note that this development has had a long and troubled history. It was recognized that for detailed planning the scale employed in mapping was too crude for

use by provincial and municipal governments. Thus, in 1968 the Atlantic Provinces Survey and Mapping Program (APSAMP) was initiated with each province pursuing its own survey and mapping program. The Land Registration and Information Services integrates the surveying and mapping functions of the three provinces and extends them to include a redesign of the present land registry system and its automation. Broadly, this includes: changing the entire basis of land registry from its present voluntary document depository approach to one based upon the Torrens concept; developing suitable property laws; and modifying organizational arrangements regarding the 39 registry offices in the Maritime region. These activities encompass the first three funded phases of LRIS for which an allowance of about $120,000 per year has been provided. The fourth and, as yet, unfunded phase "envisages a data bank wherein would be stored, in respect of each land parcel, such information as the routes of underground and overland utilities; community planning, assessment and land use and resource data."

According to the initial plan, the Land Registration and Information Services will consist of the following elements:

1. A headquarters directorate and an adjoining systems planning division, these components to be located in Fredericton, New Brunswick;

2. A surveys and mapping division, to be located in Prince Edward Island;

3. A land title registration division, to be located in Nova Scotia;

4. A land statistics division, also to be located in Nova Scotia.

III. POTENTIAL

Full exploration of the implications of having data linked explicitly and unambiguously to location requires a major effort. The only limitations at this point in the development of computer/communications hardware are the creativity of the individuals specifying the information to be collected and the financial resources available to them. However, one aspect is clear - the LRIS's coding system offers the potential of providing a unified code structure for most departmental information.

Major implications flow from this:

1. Departments can organize their operations with respect to a given area much more effectively.

2. Intersecting activities; e.g. watershed management and forestry management, can be successfully integrated.

3. Policy development - formulation of legislation and regulations - can be aided by assessment of the specific impact on sub-regions of the province.

4. Sub-regions can be defined to vary according to the need at hand obviating the temptation to establish administratively uniform districts for disparate items such as welfare and watershed management.

5. Evaluation of government programs can be placed in a spatial context .

More concretely it will be possible to establish an information base for planning, analysis, implementation, and evaluation by establishing basic interlocking inventories of:

- land use and potential
- buildings and structures including community facilities
- resources: forests, minerals, water, air
- populations, homes, wildlife, animal

In turn, these will be critical to effective utilization of opportunities for economic development - particularly infrastructure, social development, and environmental management.

IV. REALIZATION

Realization of this significant potential may be endangered by two shortcomings: a lack of planning associated with Phase III activities (modification of the land title system) and an inadequate investment in the conceptual development and design of the overall system.

Some of those interviewed in our study were of the opinion that the scope and complexity of the legal ramifications of changing the land title system have not been appreciated. Others, who should have been informed about the plans and progress of the LRIS project, were not. There was a strong concern that the project was lacking the formal co-ordination and broad input necessary for an undertaking with such far-reaching implications. Also those who were familiar with the preliminary systems design and computer programming expressed reservations about the level of expertise which is being brought to bear in that area.

If the success of this project is not to be endangered by inadequate planning and poor communications, immediate remedial measures are necessary. Even now there are signs that some departments are developing systems which could duplicate to some extent the features of the LRIS system.

Programs written in a low level language (close to machine language) such as ASSEMBLER must be re-written to run on the equipment of another manufacturer. Thus, systems developed by Nova Scotia in ASSEMBLER and PL/1 are not transferable to the Univac equipment.

The COBOL programs of the Univac Computers (New Brunswick and Prince Edward Island) would run with minor modifications on the Nova Scotia IBM hardware.

Many programs are available from software houses or the computer suppliers on a purchase or lease basis. There may be advantages to joint negotiations where the program is of value to more than one computer centre.

3. Data Enquiry

A user with a teletypewriter terminal accesses data stored on (or off) line at a remote computer site. The enquiry and the response pass over communication lines. (There are few terminals of this nature in the three governments although they can be rented for as little as $55 per month.)

While there are no on-line data banks at present in the Maritime governments, some are now becoming generally available in Canada. For example, there are: CANSIM, the file of time series data prepared by Statistics Canada; P.I.P., the pollution reference file maintained by the National Science Library; and the Revised Statutes of Canada file on the University of Ottawa computer. The QUIC/LAW retrieval system is used to access the latter two files in an interactive mode.

Pre-requisites: User terminal (low or medium speed); processing computer with communications facilities appropriate to terminal, and suitable software to access file.

Present Capability: All three of the government computers are capable of handling this type of enquiry with some upgrading of software and hardware.

4. Data, Program and Computer Sharing

A user from a terminal* can run his job on a remote computer using:

- his own programs or data.
- programs or data maintained in the computer library.
- programs or data belonging to another user (with his permission).

The input and processing can take place in an interactive or batch (delayed) mode.

Pre-requisites: Similar to case 3.

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* *A computer such as the IBM 1130 or the Univac 9400 can be used in place of the terminal to send data and instructions to the processing computer (usually from punched cards) and print the output. This is a valuable alternate when the program cannot easily be made to run on the terminal computer.*

Present Capability: Similar to case 3 for government computers. The computers belonging to the universities and the telephone companies are now equipped to handle such processing in one of the two modes (batch or interactive).

As can be seen from cases 3 and 4, the combination of the modern computer (capable of handling multiple programs and input/output devices simultaneously) and remote processing has greatly reduced the significance of the location of the computer relative to the user. This is true if communication costs do not play a predominant role. In fact, if the computer is large enough, only the factors cost, service and security need be of interest to the user, not jurisdictional control. (The question of security relates to both confidentiality of files and safeguards against destruction or loss).

DATA BANKS AND FILE MANAGEMENT

This appendix presents a brief discussion on some aspects of computerized information storage and retrieval.

With manual systems, the same piece of information may be gathered more than once, transcribed onto multiple documents and stored in a number of cabinets under different filing schemes. Updating is carried out with varying degrees of diligence.

Recognizing the duplication of effort and opportunity for errors and inconsistencies in this approach, computer technology has been working towards the one-time entry of information. The objective is that after its conversion to machine readable form, the same piece of data is used in all computer programs requiring that information and it is then filed for reference in as many files as are necessary. While practice has not reached the goal of single data entry, great progress has been made in the handling of computer files.

A file contains data elements which have something in common: the same use, the same computer program, the same government program etc. To reduce the number of times that the same element of information appears in different places, the data base (or data bank) concept was developed.

Under this philosophy, all data elements are grouped together which have a common key or identifier. Thus the social insurance number becomes a key for human resources while the land parcel number becomes the key for the natural resources.

A new problem has now been introduced. Jurisdictional boundaries are no longer observed since more than one department may be involved in collecting and editing the input data, and the same or different departments will have need to access the file. To provide co-ordination, the position of data administrator is often created. Restraint must be exercised in specifying the contents of a data base since the number of elements can grow too large and the file becomes unmanageable.

The efficient handling of large files with many data elements has become an area of specialization in itself. Special software packages are available to update the files, permit selective retrieval and provide special displays and summaries. A number of these packages are available on the government and university computers in the Maritimes.

Special problems which have to be considered in any data base development are:

- The structure of the files: Because it is often difficult at the outset to foresee all the information which should be collected, it is frequently desirable to add data elements to the file after the initial file has been prepared. Certain file management packages have limited flexibility in this regard. The initial file design can also have an important effect on the cost of retrieval. If it is known that certain types of information will be required most of the time, this knowledge can be used in structuring the file to reduce costs.

- The quality of the data: Maintenance of the integrity of the data in the file is a major responsibility. If users find the data inaccurate, they will lose confidence and the value of the data bank is lost.

The user interface: Communications problems become intensified because of the number of departments involved in collecting and using the information. Answers must be found for such questions as: What goes into the file?; Who is responsible for quality?; Who pays for storage and retrieval costs?

While we cannot in this study attempt to identify data element groupings which would be appropriate for the Maritime governments,we have included in Table 1 a typical set of data element groupings applicable to public administration.

TABLE 1

A TYPICAL SET OF DATA ELEMENT GROUPINGS

RESOURCES

Human Resources

Birth, death and marriage register
Vital statistics
Census data
Voters roll
Professional registers and licences

Natural Resources plus Physical Development

Agriculture land use
Air transportation
Commercial land use
Communications
Forest inventory
Fuel generated electricity
Hydro electric power
Industrial land use
Land use density
Land titles
Minerals resources
Natural gas
Parks and recreation
Public land use
Public works inventory
Rail transportation
Real property assessment
Residential land use
Soil analysis
Transportation terminals
Vehicle transportation
Water resources

Man-Made Assets

Equipment inventory (public works)
Industry and plants
Housing

Government Employee Resources

Employee master file
Retired personnel
Authorized positions

GOVERNMENT PROGRAMS

Agriculture

Crop yields
Livestock inventory
Climatology statistics
Farm productivity

Education

Teacher register
Student register and history
Curriculum inventory
Administration costs
Facilities inventory
Student transporation

Fisheries

Landings
Processed value
Plants and productivity
Income statistics

Hospital Administration

Hospital costs
Patient statistics
Register of doctors
Laboratory services

Motor Vehicle Registration - Driver Licensing

Register of motor vehicles
Register of driver licences and infractions

Public Service

Air pollution
Civil defense
Fire protection
Flood control
Libraries
Police protection
Public assistance
Senior citizens programs
Solid waste disposal
Water pollution

Roads and Tourism

Accident and insurance claim statistics
Gasoline tax revenue
Road inventory - surface ratings - traffic patterns
Travel surveys

Social Services

Workmen's compensation claims
Criminal records
Welfare case history
Medicare patient master
Labour statistics
Insurance claim statistics

RESPONSIBILITY OUTLINE FOR NEW FUNCTIONS

- Regional Information Policy Advisor

- Provincial Information Systems Co-ordinator

- Provincial User Steering Committee for Information Systems

RESPONSIBILITIES OF REGIONAL INFORMATION POLICY ADVISOR

1. To advise the Council on policy regarding information management and the planning of data processing resources in the region.

2. To act as the Council's program manager for information-based undertakings conducted directly under the Council's auspices. In this capacity he would be responsible in cases of systems development for assuring that the system specifications reflected user requirements, that the implementation process was carefully conceived and implemented. Where studies were commissioned he would ensure that terms of reference were prepared and would be responsible for the work of the task force.

3. To initiate and coordinate programs to encourage common definitions and classifications of data elements key to planning.

4. To maintain an up-to-date knowledge of developments in the Maritime provinces (and elsewhere as appropriate) in information management activites and bring significant items (such as plans for parallel systems) to the attention of the Council and provincial departments and Treasury Boards.

5. To ensure that the role of information systems in the social and economic development of the region is recognized and that situations requiring corrective action are brought to the Council's attention.

6. To formulate and secure the development of a comprehensive network of data bases for regional planning.

7. To provide guidance on the regional implications of patterns of information resource developments with particular reference to computers.

8. To maintain an inventory of data processing resources in the region.

ROLE OF THE PROVINCIAL CO-ORDINATOR OF INFORMATION SYSTEMS

1. To act as a focal point for planning and co-ordinating information management and systems development within the province.

2. To keep informed on information needs and resources of all government departments and agencies.

3. To be a member of the provincial User Steering Committee for Information Systems.

4. To be a member of the Regional Information Management Committee where he would be the official spokesman for users in the provincial government he represents.

5. To make recommendations to the User Steering Committee for a longer term plan leading to a comprehensive set of data bases for government planning.

6. To act as the custodian of the province's data resources ensuring that adequate measures are taken to safeguard the resources and maintain confidentiality when this is required.

7. To direct a program to classify and catalogue data and statistical information available to the government.

8. To keep informed of general developments in data base technology.

9. To bring to the attention of the User Steering Committee needs for support skills such as statistical analysts, operations research and information analysts which are not available internally.

ROLE OF THE PROVINCIAL USER STEERING COMMITTEE FOR INFORMATION SYSTEMS

FUNCTION

1. To develop policy, budgets and priorities for information management activities within the provincial government.

2. To develop policies regarding information processing resources within the province, consistent with regional policy.

The committee would be comprised of senior representatives (deputy minister level) from: departments with a major requirement for information systems, the Treasury Board and the Data Processing Centre. The Informations Systems Co-ordinator would be a key member.

MODE OF OPERATION

It is essential that all matters be considered at the policy and conceptual level rather than in detail; otherwise members will delegate attendance to more junior individuals from their departments. For this reason, sufficient support staff must be made available to carry out the background work necessary for the committee to make informed decisions.

- Each year after reviewing individual department plans and budgets for information processing, the committee would prepare an overall EDP budget for Treasury Board approval.

- Criteria would be agreed on for assessing the cost effectiveness of proposed information systems.

- Each year priorities would be established for the deployment of EDP resources consistent with a longer term master plan, and overall government priorities.

- The committee would also:

  - supervise the development of a longer term plan leading to a comprehensive information base.

  - make a decision on the implementation of a user charging and budgeting system for EDP services.

  - develop standards for feasibility studies, project initiation, project control and post implementation review.

  - develop a policy for the use of outside services.

  - make decisions on proposals for joint systems development with other provinces.

  - resolve major priority conflicts concerning the development of EDP resources.

  - ensure that the information management resources of the government were adequate (for example, that expertise was available in statistical analysis, operations research, O & M, etc.)

  - review the educational needs of users in the area of information management, e.g. computer concepts and quantitative methods.

  - provide support for the program of data and information cataloguing and standardization.