DEPARTMENT OF COMMUNICATIONS

AN ECONOMIC ANALYSIS OF THE CANADIAN COMPUTER SOFTWARE INDUSTRY: PHASE II

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Peat, Marwick and Partners

Management Consultants

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Place de Ville
112 Kent Street
Ottawa, Ontario K1P 5P2
(613) 237-6402

January 31, 1983

PRIVATE

Dr. C. D. Le
Director
Economic Analysis Division
Communications Economics Branch
Department of Communications
Journal Tower North
300 Slater Street
OTTAWA, Ontario
K1A 0C8

Dear Dr. Le:

Re: Computer Software Industry Project - Phase II
DOC File No. 5420-1 (DEA)

Please accept our proposal to carry out a study to examine the requirements related to the development of a vigorous Canadian computer software industry. We are pleased to respond and feel that our experience in projects relating to systems, economic development and policy formulation make us well qualified to carry out this study.

We look forward to discussing our proposal with you and are prepared to answer questions you may have on our approach, qualifications and references. We look forward to your response.

Yours very truly,

PEAT, MARWICK and PARTNERS

P. L. Kelley
Partner

PLK:ws

Peat, Marwick and Partners

DEPARTMENT OF COMMUNICATIONS

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I - INTRODUCTION

Peat, Marwick and Partners is pleased to respond to DOC's request for proposal (reference 5420-1 (DEA)) of December 24, 1982. The proposal deals with Phase II of the Communications Economics Branch's, Computer Software Industry Project.

PEAT MARWICK'S INVOLVEMENT WITH THE SOFTWARE INDUSTRY

Peat Marwick has an indepth understanding of the computer software industry. This knowledge has been gained and is kept current through our close involvement with key industry participants. We are active in three primary areas:

1. Provision of Professional Services to Industry Participants. We provide audit, tax and management consulting services to major participants in the software industry. This range of professional services gives us an awareness of the economics of developing, maintaining and marketing software products. We have an understanding of the requirements for success in this industry.

2. Provision of Professional Services to the Software Industry's Customer Base. We are often involved in the evaluation and selection of software products on behalf of our clients. This puts us in close contact with many software suppliers and also provides us with a good understanding of the nature of the customer demand for software products.

3. We are a Participant in the Industry. Through our Systems Development Group we develop, maintain and install computer software. Peat Marwick has proprietary software for mainframes as well as mini-computers. We also implement and install other vendors software products for our clients.

All of these services are provided in Canada and in the United States by the Canadian and U.S. partnerships respectively. Many of these services are provided in other countries through local Peat Marwick partnerships.

BACKGROUND

The Communications Economics Branch of the Department of Communications is conducting studies related to the Communications/Information Sector. It is our understanding that:

- Price Waterhouse conducted an overview study entitled "Toward a Policy Framework for the Economic Development of the Communications/Information Sector". This study identified the software industry as a key component in the Communications/Information Sector.

- Evans Research has been engaged to conduct Phase I of a two-phase project to study the Canadian software industry for the Department of Communications and the Ontario Ministry of Transportation and Communications. By conducting interviews and surveys with Canadian software industry participants, the study will attempt to provide factual data about the industry's strengths and weaknesses and an assessment of the world-wide market for software in the 1980's. Thus, the study should be able to identify possible opportunities for the Canadian industry.

- A second phase of the project is planned to develop policies and strategic plans for the development of the software industry over the next 10 years. Due to time constraints, it was decided to overlap this phase with Phase I.

- Various studies have been conducted related to industrial strategies and technological development in Canada. A few examples of the studies are:

  - Forging the Links. A Technology Policy for Canada, Science Council of Canada, February 1979. In the report the Science Council recommends implementing an industrial strategy based on the principle of technological sovereignty. This strategy would stress the development of a capability in Canadian industry that would allow the industry to fully participate in the rapidly changing world-wide technological environment.

  - Technology Transfer by Department of Communications: A Study of Eight Innovations, 1980. The study reviewed the effect of policies on enhancing technology transfer from government laboratories to industry by examining eight innovations from DOC's Space and Research sectors. It was anticipated that

this study would aid other federal departments and their laboratories to identify means by which innovation-based industrial development could be promoted in Canada.

- Work for Tomorrow - Employment Opportunities for the '80s, House of Commons. This report investigated the serious shortages of certain critical skilled trades in Canada. The findings included that there are shortages of electronic technicians, computer specialists and engineers. It recommended that there should be better coordination of federal and provincial programs. In addition, it recommended that the governments should adopt an industrial strategy linked to employment and training policies.

OBJECTIVES OF PHASE II

In order to comment on the strategic issues for the development of a vigorous and competitive software industry in Canada, Peat Marwick proposes to meet the following objectives as outlined in your request for proposal:

- Based on the findings of Phase I and information obtained from other sources, identify areas of opportunity for the Canadian software industry in the domestic and foreign markets.
- Collect from key industry and government participants strategic options for the software industry over the next 10 years.
- Propose, assess and suggest action plans that the federal and provincial governments might take in order to stimulate and support the software industry. We will address all areas of the software industry, including system software, application software and productivity enhancement software.
- Prepare overall timeframes and cost implications of the various programs.

II - APPROACH AND WORK PROGRAM

OUR APPROACH

We have developed a very specific approach to Phase II and look forward to discussing it with the Project Authority.

In a study as important as this one, we believe that a key to success is quality rather than quantity. We propose to use Partners and Managers in our Firm to obtain the opinions of the key personnel of the software industry and of the private and public sectors. In order to obtain a national view, we propose to use our Senior personnel from our offices located across Canada. While most of the software vendors are located in Toronto and Ottawa, we feel that the software customers' views across Canada must be obtained.

In addition, we propose to obtain from the literature search, selected documentation regarding foreign software industries. In this manner we will be able to obtain a view of the existing status of the industry and the directions it may follow. Finally, we will use a core group to analyze and consolidate the findings of the study.

We feel that prior to interviewing the industry experts, careful and thorough preparation must be taken to obtain the maximum feedback. Prior to interviewing, we will review and analyze the results from the Phase I project to learn and understand the industry strengths, weaknesses and opportunities. In addition, we will perform a thorough and complete literature search utilizing the latest library retrieval techniques.

We propose to use a team approach, both within our Firm and within the project. Our Firm's team will consist of several Partners and Managers and an information specialist.

We propose that a Steering Committee be established to work with us to ensure a successful study. The Steering Committee would consist of the Project Authority and his designates.

Steering Committee meetings could be chaired by the Project Authority or his designate. Formal invitations to the interviewees and panel of experts should be jointly issued in order that key personnel will participate.

Finally, we believe that this study must not be one person's or one firm's view. An informed consensus must develop from the interviews and panel discussions. We feel that our Firm can be the synthesizer necessary to put forth this overall consensus.

WORK PROGRAM

Based on your request for proposal, we have developed a work program as presented in this proposal. As we commence each project stage, our team will review what is required in that stage, plan how to achieve it and what deliverables are required.

In accordance with your terms of reference relating to methodology/tasks, we have subdivided the project into the stages and tasks. Our work program for completing this study is outlined below.

Literature Search

The first stage in this study is to perform a literature search. For over 10 years, there has been an explosion of information on the computer industry, both hardware and software. To understand the present state of the software industry and to project its place in a future Canadian industrial strategy, we propose doing extensive literature reviews.

Through our Resource Centre in Ottawa, we have access to five bibliographic systems that allow us access to the historical and present day literature on the software industry in Canada and other countries such as the U.S., Japan and Europe. We will be able to evaluate the present day market and to ascertain the validity of historical projections. By employing data bases such as those produced by Predicast Inc. or Economics Abstracts International, we are able to retrieve market impact studies of both a global and national nature. We also access from England the Fintel service which is a sophisticated business data base offering information on the international scene with emphasis on the European Economic Community.

Peat Marwick's information specialist will work with the Department of Communications personnel to develop the best strategy in getting quality material from the data base reviews. In addition, she will take advantage of the resources in Ottawa, at the National Library, CISTI and the Department of Communications to pinpoint valuable Canadian material that may not appear on the data bases.

The five tasks comprising the literary search are outlined below:

- Retrieval Strategy. The retrieval strategy for the literature search will be developed.
- Title Search. The selected data bases are searched using the retrieval strategy. The data bases accessed may be those available by Peat Marwick, the Department of Communications or the National Library.
- Title Review. The titles selected by the search are reviewed for their appropriateness. The topic summaries will be reviewed by both the information specialist and project team members.
- Title Retrieval. The selected titles from the previous task are obtained.
- Material Review. The selected material will be reviewed by both our information specialist and core project team members. The material will be examined for information pertaining to the computer software industry. In particular, this examination will focus on:
  - software development trends
  - the software industry development
  - the present state of the software industry
  - the software industry strategy
  - government strategies to the software industry
  - the role of firmware
  - the trends toward automating software creation.

Fact Gathering

The objective of this stage is to obtain facts, views and opinions held by various experts in industry and government. This is a most important stage as it will capture the majority of information to be used as a basis for the preliminary and final reports.

The tasks in the fact gathering stage are presented below:

- Interview List. An interview list will be developed forming the basis for the tasks to follow. It is our intention to develop a list as encompassing as possible, with due regard to the budget and time constraints. Our list will consist of experts from both the public and private sectors. It will include representatives from the federal and provincial governments, the major software development companies and major industrial and service organizations. Included in this last category would be forestry, mining, fishing, banking, insurance and manufacturing.

- Interview Guides. The second task in this stage is to develop the interview guides. The importance of this task should not be underestimated, as it is the driving tool for gathering the desired information. The guides will include issues concerning:

  - the trends towards automating software creation
  - the role of firmware
  - high-level languages, data base management systems, application packages and specialized systems
  - the comparison of the Canadian software industry versus that in the U.S., Japan, U.K., and other agreed upon countries
  - the constraints on software development
  - the growth of the software industry in Canada.

  Further questions or modifications to the above will come about as a result of the analysis of the Phase I Report and the literature search.

- Schedule Interviews. The interviews will be scheduled in this task.

- Interviews. It is our intention to conduct interviews across Canada. Peat Marwick has local offices located across the country. We would interview in the Atlantic Provinces, Quebec, Ontario, Alberta, Saskatchewan and British Columbia. Thus, a complete spectrum of answers would be obtained allowing a detailed analysis to be undertaken.

  Each of our interviewers have many years of experience in the systems and data processing industries. Each will be using the interview guide. Uniform and professional interviews will be conducted, ensuring that only pertinent and relevant information is obtained.

- Analysis. The purpose of the analysis task is to synthesize the information collected during the interviews and literature search. The basis for analysis is dependent upon the interviewees, their replies, the questions posed to them, and the skill and experience of the users. Expected output of this task would include:

  - software industry developments in Canada, U.S. and abroad
  - existing, proposed and potential areas of Canadian software development
  - the Canadian users software requirements in the 1980's.
  - the expectations from the users of the Canadian software industry
  - the perceived image and role of the software industry in Canada
  - the present perceived constraints on software development
  - the potential constraints on software development subject to foreign competition
  - views on possible strategies the Department may adopt towards the industry.

- Conclusions and Suggestions. Conclusions will be developed from the analysis of the interviews and the suggested scenarios. The conclusions will address:

  - the types of software that should be developed in the 1980's, and their potential users

  - the role of governments in alleviating the existing and proposed constraints on software development.

  Included in the suggestions will be possible strategies for the development of the Canadian software industry.. These will be based on the results of the expected analysis as presented above. These strategies will be evaluated in light of:

  - software development trends and expected directions of development in the 1980's

  - the comparison of the Canadian software industry to those of other countries

  - the constraints on software development.

  The suggestions will also include possible measures which could be taken by the federal and provincial governments to stimulate the Canadian software industry. Such commentary could include:

  - subsidies or grants to the software industry

  - tax/accounting treatment

  - the capitalization of software development

  - government participation in developmental and pilot projects

  - the implementation of skills training programs

  - the role of governments in assuring a viable Canadian software industry

  - the direction the development of computer software should follow in order that Canadian industry can be competitive, both home and abroad

- Steering Committee Review. The purpose of the meeting of the Steering Committee is to review the conclusions and suggestions. The information presented to the Steering Committee will form the basis of a preliminary report, which will in turn, form the basis for the Round-Table discussion. Thus, this review meeting is critical in the development of the project.

  This review meeting will also serve a second purpose. The invitees to the Round-Table will be finalized. Both the Steering Committee and Project Team members will put forward candidates to be chosen to sit at the Round-Table.

- Preliminary Draft. The final task in the Fact Gathering stage is the preliminary draft report. This report will document the information developed to date. It will incorporate any modifications agreed upon during the third Steering Committee meeting. The preliminary draft could be issued to those invited to the Round-Table, and thus will form the basis for discussion at this event.

Round-Table

The Round-Table is the third stage of the project. At the Round-Table, a panel of experts will try out, validate and strengthen the policy recommendations.

The selection of the panel of experts will have been finalized at the Steering Committee meeting. The basis for information for this panel will be the preliminary draft.

We propose that Mr. John MacLean, the Firm's Senior Consulting Partner, chair the Round-Table. Mr. MacLean is a recognized authority on computer applications and sophisticated reporting systems. He has authored many articles on topics pertaining to data processing and has conducted seminars, lectured and delivered addresses for a wide variety of associations locally and nationally.

Mr. MacLean was Chairman at an international conference arranged by our Firm to discuss the role to be played internationally by our consulting firms in EDP and Management Sciences.

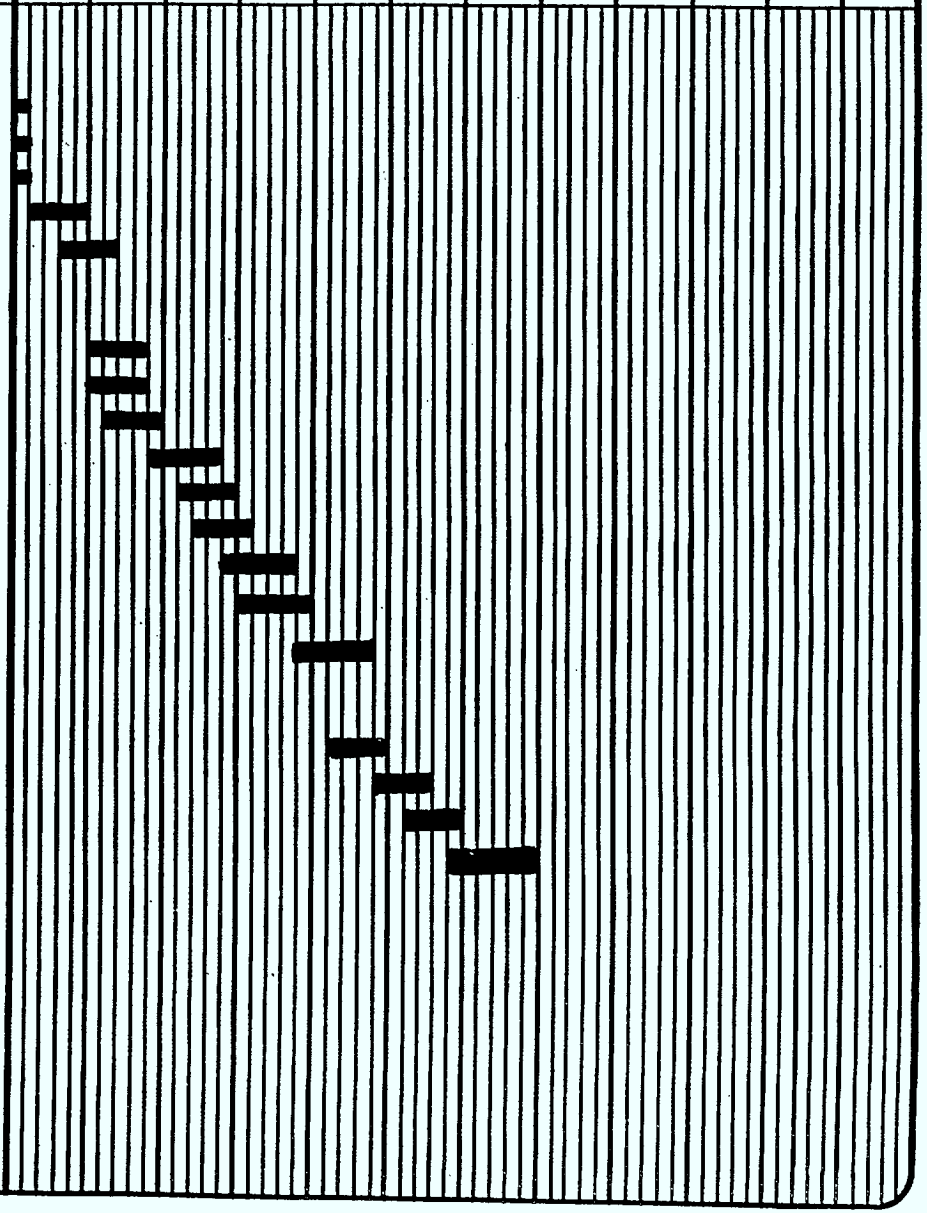
Peat, Marwick and Partners

PROJECT: Computer Software Industry Project - Phase II

CLIENT: Department of Communications

REFERENCE	PROJECT PHASES / DETAILED TASKS	RESPONSIBILITY
	LITERATURE SEARCH	
	RETRIEVAL STRATEGY	
	TITLE SEARCH	
	TITLE REVIEW	
	TITLE RETRIEVAL	
	MATERIAL REVIEW	
	FACT GATHERING	
	INTERVIEW LIST	
	INTERVIEW GUIDES	
	SCHEDULE INTERVIEWS	
	INTERVIEWS	
	ANALYSIS	
	CONCLUSIONS AND SUGGESTIONS	
	STEERING COMMITTEE REVIEW	
	PRELIMINARY DRAFT	
	ROUND-TABLE	
	FINAL REPORT	
	ROUND-TABLE COMMENTS	
	STEERING COMMITTEE REVIEW	
	PRODUCE FINAL REPORT	
	FINAL PRESENTATION	

PROJECT PLAN



Mr. MacLean will be assisted by Mr. Patrick Kelley, the Firm's Partner-In-Charge of the System Development Group and Engagement Partner of this project.

Final Report

The final stage in this project is the production of the final report. The tasks involved in producing the final report are outlined below:

- Round-Table Comments. At the Round-Table, the panel of experts will have put forward several comments concerning the suggestions, recommendations, and conclusions. These comments will be reviewed and analyzed.

- Steering Committee Review. We will conduct a debriefing meeting with the Steering Committee to discuss results of the Round-Table discussion.

- Produce Final Report. The final report will be produced.

- Final Presentation. The final presentation is the last task in the project. The pertinent conclusions and suggestions developed during the course of the project will be presented. The invitees to this presentation should include the interviewees, panel of experts, Steering Committee and members of the Project Team.

Based on the tasks described above, we have developed the project plan as shown in the Exhibit, opposite.

The project plan shows:

- the prepatory work being done in March
- the interviews being carried out in April
- the analysis, suggestions and conclusions being developed during May.

The two Steering Committee meetings are scheduled for the end of May and end of July. The Round-Table is scheduled for the end of June. The final report is

expected to be produced the end of August and the final presentation given mid-September.

This schedule makes allowance for adequate time for review and feedback.

III - PEAT, MARWICK AND PARTNERS EXPERIENCE

Peat, Marwick and Partners is one of the largest Canadian-owned consulting firms with a permanent staff of over 150 professionals. From our offices in Halifax, Montreal, Ottawa, Toronto, Calgary, Edmonton and Vancouver, we provide a comprehensive range of consulting services to business organizations and governments at all levels. Since 1954, Peat, Marwick and Partners has provided services to a wide range of clients in the industrial, commercial, financial and institutional segments of our economy.

With respect to this project, our offices have particular strengths in performing studies related to systems, economic development and policy formulation. Below are presented summaries of relevant engagements conducted by our various offices throughout Canada.

Market Viability Study

The study was conducted to determine the market for a computerized project management system.

The prime objectives were to:

- identify potential market size and characteristics of target market segments
- establish product features required by potential customers
- determine competitive products
- identify important service factors and recommend key marketing strategies.

Software Package Review

Our Firm was engaged to review the functional specifications for a software package to provide wholesale banking software to the Schedule B banking community in Toronto.

Included in this project was a marketing study for the potential usefulness of this software.

Training Course Development

The purpose of this engagement was to develop a training course for a Canadian hardware, software and retailing company. The objectives of the course were to:

- increase sales to small business
- improve communication between sales representatives and customers
- improve the marketing approach.

Market Study - Business Graphics and Word Processing Equipment

A two-step market survey was designed and developed with the objective of testing a new product concept in the business graphics and word processing equipment area. The target market for this specific product was the small and medium-sized architectural and engineering firms.

Market Thrust Development - Satellite Communications

This study presented an outline of a research program designed to address present traffic content and system utilization and to develop a 10 year traffic demand forecast for satellite communications systems and related services. The report reviewed options for organizations development and market development strategies. It emphasized action-oriented market research related to present satellite communications.

Market Assessment

This study assessed the market for an accounting serviced based on a sophisticated software and technical oriented computer system. The market in the Toronto area was statistically analyzed to determine the degree of expected computerization.

Interviews with potential users were conducted to verify the validity of statistical findings.

Market Analysis of Micro-Computers in Education

The purpose of this study was to determine the most appropriate role for TV Ontario in serving the educational software needs of the institutional and home computer markets. This study:

- examined the market and its characteristics in terms of users, consumer hardware, and educational software
- reviewed the educational computing community, identifying major participants, their roles and opportunities for change
- detailed the results of the literature scenario.

New Product Market Opportunities for Selected Household Appliances

This was a major study of the domestic appliance market in Canada. The objective was to identify specific product and market opportunities in Canada, including target market segments, product specifications, recommended channels of distribution and forecasts of sales poentials.

The study included:

- a literature review to gather statistical data and background information on markets, products, and demographic trends in Canada
- trade interviews covering a broad cross-section of the industry including appliance manufacturers, retailers, mobile home manufacturers, builders, developers and manufacturers of consumer products such as detergents and convenience foods

- an extensive consumer research program including focus discussion groups in Toronto and Montreal.

Canadian Advanced Technology Association - Ottawa

The purpose of this study was to enable participating CATA members to formulate an appropriate response to the federal government's initiative in the Office Communications System (OCS) area. In order to determine the optimal response, CATA needed to know the characteristics of the OCS market of the future, and the success factors which predicate world-class international performance in this market. Once these broad dimensions were known, the strategic option which best meets both government and industry objectives could then be determined. The study was a vital component in the Association's long-term strategic planning, and in the development of individual members' business strategies.

Province of Saskatchewan/DREE - Evaluation of the Canada-Saskatchewan Subsidiary Agreement on Productivity Enhancement and Technology Transfer in Agriculture (PETTA)

The PETTA Agreement was a three year initiative to enhance the productivity and transfer of new technology to agriculture producers and processors. The PETTA Agreement comprises three programs:

- Crop Diversification and Technology Transfer
- Productivity Improvement and Program Development
- Public Information and Evaluation.

The evaluation study included:

- assessing the objectives of each program and identifying evaluation issues
- interviewing program managers, academics and agro-industry associations

- surveying program recipients.

The evaluation provided an independent assessment of program activity and a basis on which governments could discuss the merits of additional federal-provincial programming in Saskatchewan.

IV - STAFFING, TIMING AND COSTS

STAFFING

The success of an engagement such as this depends heavily upon the professional consulting staff involved. With this in mind, we have assembled a highly qualified and experienced team that can provide local presence in the software market. Detailed résumés are included in Appendix A.

As Engagement Partner, we propose Mr. Patrick L. Kelley, Partner-In-Charge of the Firm's System Development Group. As such, he is responsible for groups of Project Leaders, Systems Designers, Programmers and EDP Technical Specialists, located in our consulting offices who respond to client needs for high quality software development expertise. Prior to joining Peat, Marwick and Partners, Mr. Kelley held the positions of Vice-President Information Systems and Planning for a large multi-national Canadian Corporation and Chief of Computer Services for the Department of National Defence. Mr. Kelley will conduct the interviews in Montreal and participate in those in Ottawa. He will be responsible for the final report and assisting at the Round-Table discussion.

We propose involvement from Mr. John MacLean, the Firm's Senior Consulting Partner. Mr. MacLean is a recognized authority on computer applications and sophisticated reporting systems and has authored many articles on these and other topics pertaining to the field of data processing. He has conducted seminars, lectured and delivered addresses for a wide variety of associations locally and nationally.

Mr. MacLean has participated directly in several hundred major data processing assignments. He was Chairman at an International conference arranged by our Firm to discuss the role to be played internationally by our consulting firms in EDP and Management Sciences. He continues to liaise closely with Peat, Marwick colleagues around the world who also undertake major EDP assignments in the public and private sectors. Mr. MacLean would chair the Round-Table discussion.

In assisting Messrs. Kelley and MacLean, we propose Mr. Alan Cockman, Mr. Gerald Bolduc, Mr. David Dickson and Mr. Gordon Campbell to conduct nation-wide interviews.

Mr. Alan Cockman is a Partner in our Edmonton office. He has been involved in a wide range of data processing business systems and organizational studies for a variety of government and private organizations. Mr. Cockman will conduct the interviews in Alberta and Saskatchewan.

Mr. Gerald Bolduc is the Manager of the Systems Development Group in our Vancouver office. He has considerable experience in the management of system development and large conversion projects. Mr. Bolduc will conduct the interviews in British Columbia.

Mr. David Dickson is the Manager of the System Development Group in our Toronto office. He has had over 20 years experience in the systems and data processing field in a wide range of industries. In the past 15 years, Mr. Dickson has directed systems and data processing organizations with a staff ranging from 12 to 160. Mr. Dickson will be responsible for conducting the interviews in southern and western Ontario and the Atlantic Provinces.

Mr. Gordon Campbell is Manager of Quality Assurance for our System Development Group in Ottawa. Mr. Campbell has had extensive analytical and managerial experience in the data processing field. Mr. Campbell will be responsible for conducting the interviews in Ottawa.

Ms. Elizabeth MacDonald-Curley is an Information Specialist in the Firm's Ottawa office. Through her work in the private and public sectors, she has developed extensive expertise in automated information retrieval and dissemination. Ms. MacDonald-Curley will be responsible for conducting the literature search.

TIMING AND COSTS

Our fees for professional costs and out-of-pocket expenses for travel, administrative support, and computer literature search time is $25,000. We are prepared to commence on March 1, 1983 and to finish by September 30, 1983. As shown on our

project plan, we have scheduled to be completed by mid-September. If an earlier finish date is required, we can compress our project plan, as we have allowed significant time for review and feedback.

We understand that one copy of each of the preliminary and final reports is required to be submitted to the project authority.

Our billings will be submitted monthly on the basis of percentage completion.

APPENDIX A

RESUMES

- Patrick L. Kelley
- John D. MacLean
- Gordon Campbell
- Alan Cockman
- Gerald Bolduc
- David Dickson
- Elizabeth MacDonald-Curley

Peat, Marwick and Partners

P.L. KELLEY
Partner

EDUCATION: St-Bonaventure University, B.S. Math
Planning Executives Institute
American Management Association

AFFILIATION: Association of Systems Management

EXPERIENCE: 9 Years industry experience
2 Years Government of Canada experience
7 Years consulting with Peat, Marwick and Partners

AREAS OF PROFESSIONAL COMPETENCE

Mr. Kelley is the Partner-In-Charge of our Firm's national activities in computer system software development. He is responsible for groups of project leaders, system designers, programmers, and EDP technical specialists located in our consulting offices who respond to client needs for high quality software development. Prior to joining Peat, Marwick and Partners, Mr. Kelley held the positions of vice-president, information systems and planning, for a large multi-national Canadian corporation, and of chief of computer services for the Department of National Defence.

EDP SYSTEMS DEVELOPMENT:

- large project planning
- implementation of System Life Cycle Methodologies
- management of software design, development and implementation
- assessment of software quality
- strategic and technical assessment of system development plans.

EDP SYSTEMS PLANNING:

- system development strategies
- evaluation of system development proposals
- resource assignment and organization for development
- planning systems and executive control.

EDP OPERATIONS:

- hardware and load assessment
- software usage, control and security
- organization, standards of performance, management control.

INFORMATION SYSTEMS USAGE:

- relationship of EDP information systems to corporate goals and operations
- data base development and usage
- information flow analysis
- MIS design.

EXAMPLES OF RELEVANT EXPERIENCE

P.L. KELLEY

INDUSTRY EXPERIENCE:

A Chemicals Corporation, New York

- Manager - Application Programming. Responsible for design of all commercial and scientific computer applications. Major work included production scheduling, heat exchanges design, financial reporting systems. Responsible for centralizing computer systems and programming.

Food and Drug Manufacturer

- Vice-President, Information Systems and Planning. Established a central systems group and North America wide computerized systems in A/R, A/P, inventory control and financial reporting. Established group to conduct special analysis of company operations and corporate information requirements.

  Developed marketing analysis group to conduct a location analysis and a competitive analysis of this company. Developed and implemented plans and systems for financial control of subsidiaries. Conducted analysis and forecast of future profitability of operating companies. Conducted studies of organization requirements for the future in the distribution business. Headed team to identify requirements and prepare detailed plans for the operational integration of acquired companies. Worked with acquired companies to install new management reporting and control systems.

Department of National Defence

- Chief of Computer Services. Managed the installation of the largest on-line inventory system undertaken at that time in Canada, comprising two large computer centres and 300 terminals. Also managed systems and internal consulting operations. Conducted special organization studies on command and control structures and needs.

CONSULTING EXPERIENCE:

Foreign Food Processor

- Conducted a study to determine the financial viability of establishing a food processing facility in Quebec. A financial model was developed. Negotiations were conducted with law firms, the federal Departments of Agriculture and Regional Economic Expansion, and the Government of Quebec. A detailed report was prepared for the project.

CONSULTING
EXPERIENCE:
(Cont'd)

Unemployment Insurance Commission

- Provided project planning and coordination for the Senior Executive Director and a team of five consultants on the revamping of a major computer system, the study of media and communications material, and the revamping of all major clerical control systems utilized by the Commission throughout Canada.

Department of Supply and Services

- Provided consulting services to project teams in the Corporate Systems Branch on revamping of major computer systems and advice on the major study of all inventory control and management functions currently operated by the Department.

Transport Canada

- Conducted a study on the financial and inventory control and management systems utilized by the Department. A concept of financial control and inventory control was developed.

- A detailed system design for financial control and inventory control and management was done. This involved the specifications of all control points and levels, the design of all inventory control rules and processes, and the design of all inventory management functions including reorder, replenishment, excessive stock, and inventory level rules.

- Conducted a study of the financial reporting systems utilized by the senior administrators and the Deputy Minister. A concept of coordination and consolidated reporting was developed.

Unemployment Insurance Commission

- Determined long term system development objectives and developed a processing strategy and plan to achieve these objectives. The plan included hardware determination, staffing levels, detailed application development time tables, and cost analysis.

CONSULTING EXPERIENCE: (Cont'd)

Large Chemicals Corporation

- Participated in an evaluation of this corporation's order entry and order processing systems. Helped establish a long term development plan for the implementation of a highly integrated set of order processing systems for multiline businesses. As well, conducted education programs for senior management on business and environmental factors affecting advanced order processing/data base systems in the 1980's.

Loto Canada

- Aided in the initial establishment of the Crown corporation to operate a national lottery system. Established the policy structure, organization and profit targets. Designed a system to allocate territories to distributors. As well, designed and installed a computer-based information system to provide complete marketing data on geographic and demographic bases, and to measure distributor incomes and advertising effects.

Major Transportation Company

- Conducted an operational review of the EDP systems at the business operations and management reporting levels. Led a corporate team in the design of an information system development plan, including the applications alternatives, hardware/software change plans, resource assignments, and user/system interfaces necessary to accomplish the plan. The management controls and planning processes surrounding EDP were revamped to provide greater management involvement and a continuous planning process.

Major Communications Carrier

- Conducted an operations review of the complete EDP function within the corporation. This major assignment involved in-depth reviews of EDP policies, organization, the system development process, the data centre operations, and the operational planning of the EDP function. As well, the system/user interface with regard to system development, project leadership, and system maintenance was examined. Results of the engagement included the revamping of the system planning, system maintenance and operational planning processes, organizational adjustments and significant tightening of internal controls.

CONSULTING EXPERIENCE: (Cont'd)

Large Chartered Bank

- Conducted a detailed review of the cheque processing operational systems. Included in this review were studies, recommendations, and implementation assistance in the areas of organization, software and equipment improvements, unit cost identification, costing system development, and management reporting and control of the whole clearing system. Included in this study was a major survey of the clearing-related production and financial data of Canadian and American banks.

Major Transportation Company

- Became Acting Systems Director to guide the installation of a multi-million dollar on line computer system and to bring together all information systems projects. Revised the organization structure, installed basic management control tools, and led the development of a detailed system plan for future development.

Major Communications Carrier

- Conducted the development of a complex RFP and vendor-scoring process for a large scale EDP procurement. The preparation of the RFP included development of detailed specifications for the mandatory and desirable characteristics for hardware (CPU, storage and terminals), software (operating system, data base management system, language translators) and contractual terms. The vendor scoring processes included the assignment of weights to various elements of the proposals. Participated with the client in evaluation of the proposals, management presentations, and vendor debriefings.

Large Commercial Airline

- Aided the central system group in a review and preparation of reports related to the adequacy of their unit costing systems. In subsequent assignment, aided the client in the detailed development of a unit costing system for their entire online system and their large batch processing systems. Two major computer systems were included in this analysis. The unit-costing problem included recognition of major elements of production such as CPU's, switches, telecom usage, back up capacity assignment, reserved time, and peak loading. A significant section of the assignment was devoted to the development of the units of measure, obtaining management agreement and assigning costs to the units.

CONSULTING
EXPERIENCE:
(Cont'd)

Large Multi-National Food Processor

- Prepared a detailed EDP strategy for the future. This engagement involved detailed interviewing of senior managers, reviews of business plans, and preparation of strategic opinions in concert with business plans. Considerations included distributed processing, online systems, major expansion of budgets, and revamping of the management controls.

Canadian Tobacco Company

- Prepared a complete EDP plan and strategy for the future. The assignment involved an examination of the future EDP environment, major new application needs, and detailed plans for integration of process control-related systems and the management information systems of the company.

Canada Post Corporation

- Under the IMPAC plan of the Office of the Comptroller General, carried out detailed studies of the payroll applications for the new corporation.

Public Works Canada

- Developed a conceptual system model for the implementation of revenue dependency. This assignment included user requirements analysis and the specification of an approach to system design, development and implementation.

Large Metals Processing Company

- Managed the analysis and specification of a new corporation-wide order processing system. This assignment involved the management of a large project team. Evaluated several software packages, developed a tender and selected a final vendor. Detailed subsystem specifications, and user manpower requirements were also developed. This system, implemented in a large IBM environment, is world scale in concept and operation.

Peat, Marwick and Partners

JOHN D. MACLEAN
Senior Consulting Partner

EDUCATION: Various post-education courses in business topics
Holds Certificate in Data Processing, Certified Management Consultant

AFFILIATION: Canadian Information Processing Society, Certification Council of the Institute for Certification of Computer Professionals
Institute of Management Consultants of Ontario
Various clubs

EXPERIENCE: 25 years as professional consultant
8 years prior EDP/systems experience in industry

AREAS OF PROFESSIONAL COMPETENCE

Mr. MacLean is a recognized authority on computer applications and sophisticated reporting systems and has authored many articles on these and other topics pertain- ing to the field of data processing. He has conducted seminars, lectured and delivered addresses for a wide variety of associations locally and nationally.

Mr. MacLean has participated directly in several hundred major data processing assignments. He was chairman at an international conference arranged by our firm to discuss the role to be played internationally by our consulting firms in EDP and Management Sciences. He continues to liaise closely with Peat, Marwick colleagues around the world who also undertake major EDP assignments in the public and private sectors.

DATA PROCESSING STRATEGY	. defining user needs at all management levels . priority setting systems, technology, investment, etc. . planning and monitoring systems and reporting implementation . assessing and advising on organizational impacts
CONCEPTUAL COMPUTER USAGE	. financial systems . operating and control systems for management . sophisticated reporting concepts
MANAGEMENT INFORMATION SYSTEMS	. reporting structure and format . data collection, integrity, security . data base applicability
MANAGEMENT AUDIT/ OPERATIONAL REVIEWS	. organizational effectiveness . effectiveness and efficiency evaluation . performance indicators and reports . scheduling and control . technical assessment
DATA PROCESSING SECURITY AND AUDIT	. control, backup, documentation needs . audit trails and audit role liaison . file retrieval and reconstruction
COMPUTER INDUSTRY	. industry trends . technological impact . suppliers and technology, services, etc.

ORGANIZATION/
PROFITABILITY, ETC. . as appropriate to the above.

CONSULTING EXPERIENCE: (cont'd)

Major Canadian Trust Company

- Mr. MacLean has acted as advisor to senior management on critical issues involving information handling, the role of the computer, strategies with respect to systems development, facilities consideration, and the like. He was responsible for the conduct of a detailed examination of data processing security and auditability of systems.

CONCEPTUAL COMPUTER USAGE

Expo '67

- Our firm was retained by Colonel Churchill and later Mr. Philippe de Gaspe Beaubien to conceive, and later implement, the operations control room whose role it was to coordinate day-to-day activities of all departments of Expo, particularly in the event of existing or pending emergencies. Our firm prepared all systems and procedures, trained operating personnel and monitored the performance of the room during the critical start-up weeks. The control room was in operation well in advance of any other major facility at Expo.

Montreal and Canadian Stock Exchanges

- Our firm was retained by the Exchanges to develop a systems concept that would permit members to have trading, display, ticker and quotation system that was equal to or faster than any other in the world. This objective was accomplished; our firm conceived the system, developed the system and operating procedures, trained operating personnel and on behalf of the Exchanges, liaised closely with the four supppliers whose equipment functioned together on a real-time mode.

MANAGEMENT INFORMATION SYSTEMS

Major Insurance Company

- Directed a project team, comprising consultant and departmental personnel, which made a comprehensive study of departmental information systems and current projects. The study encompassed reviews of all branches and functions at headquarters and in each region, and resulted in a long-range plan for the company which is to result in a highly sophisticated reporting system.

CONSULTING EXPERIENCE: (cont'd)

Major Canadian Retail Chain - Women's Wear

- For a client operating in excess of 400 stores in Canada, advised the senior Financial Vice-President and the President in matters concerning data processing, inventory management, purchasing, accounting systems and other control technology to service the organization on a local level and provide management with operational data.

Major Canadian Banks

- Led and participated in full-scale review of needs leading to definitions of EDP strategy and associated management information systems. Devised suite of top level reports graved to enable senior management to keep informed regarding EDP activity, key projects, resource elements and overall performance of sophisticated computer dependent environment.

MANAGEMENT AUDIT/OPERATIONAL REVIEWS

Major Meat Processor

- A major review and assessment of computer use was carried out for senior management of this national, multi-divisional company. The utilization of EDP resources was viewed in the light of the organization's aims and objectives to assess effectiveness of the approach taken and results being obtained. Guidelines were established for future direction of EDP development in the company and recommendations were made as to a future course of action.

Major Canadian Utility

- Partner responsible for the Management Audit of a major gas utility. The company was subjected to an overall review with emphasis on organization calibre and structure, information and performance monitoring systems, personnel and labour relations, use of financial and operational resources and inventory management.

CONSULTING
EXPERIENCE:
(cont'd)

DATA PROCESSING SECURITY AND AUDIT

Mr. MacLean has participated in several DPSE engagements, nota
with two of Canada's major banks, a major insurance company an
trust company. In addition, he has participated in simi
assignments with other clients of the firm representing ot
segments of industry.

Major Canadian Banks

- Assistance was provided to three banks in clarifying the r
and responsibilities of the Inspection Department regard
examining the Bank's EDP systems to up-grade its method
operating and its approach to reviewing and commenting on
systems and operations. Guidelines, operating criteria
procedures were developed covering the Inspection Departmen
role relating to computer applications in operation and be
designed and data centre operations. A staff training prog
was designed, and data centre operations. A staff train
program was designed in liaison with the Bank's train
officers.

COMPUTER INDUSTRY

For several clients engaged in or interested in becoming invol
in the data centre industry, industry-wide reviews have b
carried out to look at market potential, application are
resource requirements, financial considerations respecting
implementation and operation of data centres to serve
community at large.

Diversification Studies

- Mr. MacLean has conducted a number of diversification stud
in the computer services industry. He assisted a la
Canadian company in assessing acquisition and new busin
opportunities in the Canadian computer services indust
Factors considered in selecting suitable acquisition candida
included among other things, marketing strategies, mar
coverage, applications experience, and competitors' streng
and weaknesses.

CONSULTING
EXPERIENCE:
(cont'd)

In another engagement, Mr. MacLean assisted a client in reviewing potential acquisition candidates to form part of an anticipated nation-wide computer utility. As part of this study, consideration was given to market strategies for providing computer services in selected application areas, including small users.

Computer Time-Sharing Utility

- Mr. MacLean directed an operational review and assessment of the future prospects for a computer services firm offering time-sharing and software applications in Ontario. To provide background information for the review, the computer services market was studied to identify competing suppliers, their strengths and weaknesses, and future market opportunities.

ORGANIZATION/PROFITABILITY, ETC.

National Harbours Board

- Study of the national organization of the Federal Agency administering most of the major commercial ports in Canada. The study involved brief reviews of the operations and oganization of most of the key commercial ports and resulted in the development of a structure of relationships between ports, regions and the Ottawa head office.

  Conducted an in-depth management audit of a major Canadian port to evaluate management practices, long-range planning, profitability, savings potential, organizational implications, etc.

Canada Post Office

- In examining a series of key functional areas in the Canada Post Office, our firm evaluated current practices and identified vital needs and priorities with a view to optimizing efficiency and developing suitable recommendations and criteria for Cabinet consideration in regard to the Post Office becoming a Crown Corporation. Environmental considerations to the year 2000, automation, and financing needs received close attention. A major area studied was information systems and effective computer use. Organizational concepts, the impact of technology and the formulation of a modular information system serving all elements of the Canada Post Office predominated in this vital study.

Peat, Marwick and Partners

GORDON L. CAMPBELL
Supervisor - Quality Control and Standards

EDUCATION: Belmont Consolidated School

AFFILIATION: Data Processing Management Association

EXPERIENCE: 8 years Commercial EDP Management
4 years Business Systems Design

AREAS OF PROFESSIONAL COMPETENCE

Mr. Campbell has extensive experience in the data processing field. This experience includes analytical and managerial experience in development and implementation of wholesale distribution systems. He has managerial experience in the System Development, Planning and Data Centre Operations Departments.

EDP SYSTEMS EXPERIENCE:
- design and implementation of Business Application
  - Financial
  - Inventory Control
  - Sales Reporting

PROJECT MANAGEMENT:
- planning, scheduling, and coordinating

SYSTEM EVALUATION:
- review of operational systems ranging from completely manual to fully computerized and instituted operational control standards

EQUIPMENT AND SELECTION:
- responsible for, and participated in, the evaluation of computer and peripheral hardware

EXAMPLES OF RELEVANT EXPERIENCE

GORDON L. CAMPBELL

INDUSTRY EXPERIENCE:

Major International Grocery Distributor

- designed and implemented Accounting and Inventory Control Systems
- supervised a multi-divisional conversion to a centralized data centre
  - user training
  - operation training
  - external controls
  - documentation preparation
- cost/benefit analysis for EDP hardware and software
- submissions, review and decision of EDP hardware proposals
- participated in the development and controlled a Project Life-Cycle methodology
- planning and control of Corporate Policy and Procedures Manuals
- participated in the development and managed systems planning and assurance functions to ensure delivery of tested systems met user defined requirements
- development of standards for programming methods and documentation
- development of operational standards and procedures

EXAMPLES OF
RELEVANT EXPERIENCE

GORDON L. CAMPBELL

Canadian International Development Agency, Federal Government

- Evaluated the quality of documentation produced during the combined feasibility and functional analysis phases of the development of an integrated application system intended to service the entire agency. The evaluation included extensive interviews of key users and members of the project team. Paticular emphasis was placed on the establishment of an automated data dictionary.

Public Works Canada

- Acted as an administrative and project leader of the analysis phase of Revenue Dependency.

- During the analysis phase co-ordinated the delivering of all modules and ensured that the standards were followed by giving advice and reviewing the content for all project teams deliverables.

Peat, Marwick and Partners

ALAN C. COCKMAN
Partner

EDUCATION: Royal Masonic Schools
Tottenham Technical College

AFFILIATION: Institute of Management Consultants Association for Systems Management; British Computer Society

EXPERIENCE: 9 years consulting in Canada, United Kingdom and West Germany
8 years in Industry

AREAS OF PROFESSIONAL COMPETENCE

Mr. Cockman has been involved in a wide range of data processing, business systems and organizational studies for a variety of government and private organizations. A selection of his areas of competence include the following:

DATA PROCESSING:
- hardware feasibility and selection
- data processing policy and procedures
- installation performance audit
- installation security evaluation
- computer centre management
- data processing staff selection

BUSINESS SYSTEMS: Analysis, design and implementation including the following:

- management information systems
- financial information systems
- sales order processing systems
- purchasing control systems
- inventory control systems including forecasting and bill of materials
- production control systems
- warehouse layout
- payroll
- personnel information systems
- loan accounting systems
- insurance claims control system
- insurance policy valuation system
- membership accounting
- taxation systems
- filing systems

ORGANIZATIONAL STUDIES:
- government agencies
- manufacturing industry
- mining companies

CONSULTING EXPERIENCE:

Government of the Northwest Territories

- Responsible for a project concerned with developing a Financial Information System for users throughout the Territorial Government. The design process involved three main phases: feasibility and conceptual design; system design; and detailed design. The system is designed to be fully integrated and covers functions such as encumberances, purchasing control, accounts payable, cheque reconciliation, receivables, billings, loan accounting, accounts receivable, project and program cost accounting, general ledger and budget preparation and control. The Financial Information System also embraces a revised pseudo coding account structure.

  The system is designed to be operated upon the Government Hewlett-Packard computer in Yellowknife with dispursed processing in the four Regional Offices at Fort Smith, Inuvik, Rankin Inlet and Frobister Bay. On-line facilities for data entry and inquiry are build into the system, as is a report generator to provide reporting flexibility for users.

Alberta Housing Corporation

- Responsible for a study into the financial reporting and budgeting requirements of the major housing authorities reporting to the Corporation. Revised reporting and a revised set of chart of accounts were prepared to assist in improving comparability between authorities. Subsequently, we have been engaged to implement our recommendations.

Government of the Northwest Territories

- Responsible for an audit of data processing within the Territorial Government. The study evaluated computer use satisfaction, computer and system department performance, planning, security, staffing and organization.

Major Canadian Oil and Gas Company - Alberta

- Undertook an engagement to develop a training program geared to the specific EDP Internal Audit requirements of the Company.

CONSULTING EXPERIENCE:
(continued)

Department of Housing and Public Works - Alberta

- Responsible for undertaking a feasibility study into the financial, cash and project progress of capital construction projects undertaken within the Public Works Division. The system is designed to cover project management from initial approval through to completion, and allows access to historical information on past construction projects.

Workers' Compensation Board - Alberta

- Engaged in assisting this major provincial agency in the selection of main frame hardware. An important aspect of the selection concerned evaluating the suitability of proposed equipment for high volume of local and remote on-line enquiry needs.

Department of Agriculture - Alberta

- Responsible for a study which analysed the feasibility of creating a Tax Deferred Trust Account to assist in levelling the fluctuations in farming income. The study investigated the federal income tax legislation to determine all aspects of taxation applying to farmers and their utilization of each measure. In addition through our offices worldwide, we conducted an analysis of existing income levelling schemes to determine their suitability to Canada. An important part of the evaluations considered the impact of the trust on existing legislation and private sector financial institutions. The study determined that a trust account system would be feasible and economically advantageous (a similar system is operating in New Zealand) but requires a lengthy legislative process. Also, it was recommended that, as a short term solution, consideration should be given to amending the current legislation for Income Averaging Annuity Contracts to include farming income.

Department of Housing and Public Works - Alberta

- Involved in analyzing the requirement for the access to, and controls of, manual filing for a division of a Provincial Government Department. The study determined a need for both centralized and decentralized filing systems based on a standard coding structure with cross-referencing between the individual filing sub-systems.

CONSULTING EXPERIENCE:
(continued)

Saskatchewan Farmstart Corporation

- Responsible in analysing and designing a system to cover the operation of a major farm credit program administered by the Corporation and a Provincial Government Department. Major areas of the system covered loan application approval, security checking, loan disbursement, repayment and management reporting. The study was also concerned with evaluating the organizational and staffing requirements of the Corporation, in conjunction with the Department of Agriculture, to effectively handle Farmstart's programs.

Prairie Farm Rehabilitation Administration

- Participated in a study concerned with evaluating the management needs of the largest autonomous operating organization within the Federal Department of Regional Economic Expansion (DREE) and determining whether the department's own computer based information system could be utilized. It was concluded that the departmental system was not suited and the organization's requirements were able to be met with only minor amendment to existing manual systems.

Government of the Northwest Territories

- Responsible for an audit of data processing within the Territorial Government. The study evaluated computer use satisfaction, computer and system department performance, planning, security, staffing and organization.

School District - British Columbia

- Participated in an engagement to evaluate the computer based payroll system installed within the Districts and to determine whether the system was capable of transferring to a more powerful computer. We concluded that the system was not performing satisfactorily within its present environment and was not capable of revision. A second study was conducted to develop new specifications for the payroll system integrated with a personnel information system.

School Division - Alberta

- Involved in analysing the system and information needs of the School Division. These determined that the use of data processing would be of benefit. A mini-computer was selected, which also provided packaged application systems to meet the majority of the Division's needs.

CONSULTING EXPERIENCE:
(continued)

PRIVATE SECTOR:

Major Canadian Oil and Gas Company - Alberta

- Undertook an engagement to develop a training program geared to the specific EDP Internal Audit requirements of the Company.

Major Utility Company - Alberta

- Responsible for undertaking a study into the security and control of the total data processing function within the utility company and its major subsidiaries. The study evaluation included administration, acquisition, operation data control, programming, systems, standards and documentation, data base management, other technical software and applications.

  In addition to these areas, the engagement was also concerned with evaluating the structure, roles, reporting and staffing level requirements of the Internal Audit Department of the Company.

Major Firm of Consulting Engineers - Alberta

- Undertook an evaluation into the security of on-line data processing systems installed within the firm. The study concluded that most areas of the system provided minimum risk of loss to the company, although the areas password security and systems recovery required the implementation of new procedures.

Major Pipeline Transmission Company - Alberta

- Participated in a data processing strategic study in evaluating the commercial computing requirements of the Company, including accounting, financial control and materials management applications. The results from these analyses were amalgamated with the needs of technical and engineering data processing to develop a total statement of the Company's current and projected data processing requirements and prepare a five year computing strategy. The study found that there was a need to separate the highly variable volumes of the technical processing from the commercial computing environment and recommended the installation of a stand-alone machine for the engineering systems.

Major Mining Company - Alberta

- Responsible for analysing the requirements and developing a system for senior management of the company. The system provided management with both financial and operating data highlighting variances from budgeting and plan.

CONSULTING EXPERIENCE:
(continued)

Financial Services Company

- Participated in a study to identify the information and control needs of the Company, whose operations include mutual funds management and a trust company. The engagement analysed the existing systems within each area of the Company, such as marketing, accounting, investments and customer relations, and also determined their information requirements. A system specification was issued at the conclusion of the study to allow the internal data processing staff to commence upon the detailed development and implementation of the new system.

Engineering Company - British Columbia

- Responsible for an engagement to analyse the applicability of computer based system to process production, stores inventory and accounting information. It became apparent that insufficient information existed within the production area to enable scheduling and control systems to be implemented and, in consequence, an interim system designed to build up a file of production data was recommended. We also recommended that the inventory record- ing system should remain manually based until the production system is computerized and that accounting systems should be processed by a service bureau.

Medical Clinic - Saskatchewan

- As part of a comprehensive study of the clinic, responsible for analysing the administrative systems and use of the computer installed within the clinic. A major recommendation for the study was to remove the computer and replace it with alternative processing offered by the Provincial Government and an independent service bureau.

Agricultural Co-operative - Saskatchewan

- Responsible for a study concerned with analysing and clarifying the inventory within the retail sales division of the co-operative. Revised ordering and stocking policies were produced for the product range of over 2500 highly seasonal items. An information system for purchasing and inventory management was also developed.

CONSULTING EXPERIENCE:
(continued)

Meat Packing Company - Saskatchewan

- Responsible for a study which evaluated the operations of the Company's Data Processing Department to determine any areas of weakness. We concluded that while much of the operation was satisfactory, there were concerns within the areas of data security, operating statistics and hardware acquisition procedures. A recommended plan of action to remove these problem areas was also produced.

Hotel Operations Company - Saskatchewan

- Responsible for evaluating the data processing requirements for the Company, which is concerned with the operation of hotels in major centres within Saskatchewan. An analysis was conducted into both the front and back office systems which concluded that a mini-computer system could be of benefit. However, after receiving proposals from computer vendors and visiting users of standard systems, it was agreed to implement only the back office accounting and leave the front office reservation and non-accounting systems until more proven systems had been developed. A CADO computer system was selected to handle the initial applications.

Industry Association - Saskatchewan

- Undertook a study to analyse the workload and manual systems efficiency of the Association office and to determine the staffing levels required to maintain an efficient operating environment. The major conclusion was that the reorganization of office functions would result in a more even distribution of work and eliminate the need for additional staff.

Light Manufacturing Company - Wales, United Kingdom

- A study of the computing requirements of the company which, through merger, had two computer centres. The study evaluated the need for computing within the new company and the requirements for the collection and distribution of data at the various locations within the company.

Major Pharmaceutical Company - Wales, United Kingdom

- Participated in a study for the ethical drugs division of a pharmaceutical company. The study involved a detailed analysis of individual stock movements to determine lead times, stock levels, re-order points. Statistical stock control methods were utilized to evaluate the optimum forecasting methods. The system was implemented on a desk-top computer.

CONSULTING EXPERIENCE:
(continued)

Major Toy Manufacturer - Wales, United Kingdom

- Assisted in a study for a toy manufacturer concerned with optimizing the storage area within the main finished goods warehouse. The engagement covered the design of the warehouse layout, the selection of materials handling equipment and the pallet loading design by product.

Major Distilling Company - Scotland, United Kingdom

- Participated in the analysis and design of a computer based share registration system for the largest liquor producer in the United Kingdom. The system was later adopted by a computer manufacturer.

Major Pharmaceutical Company - England

- Involved in a study to design and implement a sales order processing system for the Dyestuff Division of the pharmaceutical company. The system covered order processing from order taking through to completion and interfaced with accounts receivable and inventory reporting systems.

Major Insurance Group - England

- Engaged in developing a conceptual system to cover the automatic renewal of policies and recording and control of claims for general and auto policies. The system was designed to provide on-line inquiry and selective on-line updating of policy-holder data. The system, with associated data volumes, was utilized as the basis of a specification issued to computer equipment suppliers.

Motor Insurance Company - Wales U.K.

- Responsible for developing a system to handle policy records and renewals for a fast growing company specializing in auto insurance. The system was designed to be initially installed on a service bureau in a batch processing mode moving to an on-line environment. The system was later extended to include branch accounting and salesmen commission and performance analyses.

Major Life Insurance Group - Scotland

- Involved in developing and implementing a life insurance policy evaluation system designed to meet the four yearly United Kingdom government reporting requirements, as well as the more frequent evaluation requirements of the actuarial department of the company. The system was designed around a compiler which generated coding

CONSULTING EXPERIENCE:
(continued)

recording to the actuarial formulae input to the system. The policies were valued using the formulae with associated mortality tables. The evaluation system was later marketed in Britain by a major computer manufacturer under the name of RIVAL (Rapid Insurance Valuation).

Major Computer Manufacturer

- As sales executive with a major computer supplier responsible for a portion of the City of London, England, Mr. Cockman was involved in marketing hardware and providing systems advice to several of the largest U.K. insurance organizations. His client base included approximately four million dollars of equipment installed by insurance companies.

Peat, Marwick and Partners

GERALD BOLDUC
Manager, System Development Group

EDUCATION: York University (Science)

AFFILIATION:

EXPERIENCE: 11 years with a major computer manufacturer
3 years management consulting experience

AREAS OF PROFESSIONAL COMPETENCE

AREAS OF PROFESSIONAL COMPETENCE

Mr. Bolduc is the manager of the System Development Group in our Vancouver office. He has considerable experience in the management of system development and large conversion projects.

EDP EXPERIENCE:

- System support management
- Computer sizing/performance monitoring
- Project monitoring
- Conversion sizing
- Project/implementation planning
- Systems analysis and design
- On-line transaction processing
- Requirements definition
- Hardware/software evaluation and selection
- Contractual review

INDUSTRIES:

- Airline
- Municipal
- Utility (Gas)
- Forestry
- Retail
- Insurance
- Financial
- Distribution
- Service bureau

INDUSTRY EXPERIENCE

Sperry Univac Canada Ltd. (Toronto, Winnipeg, Vancouver)

As a Systems Support Analyst, provided support to customers in the areas operating systems maintenance, technical training, language translatio system/conversion sizing, competitive analysis, benchmarking, produ presentations, system reviews, and programming.

INDUSTRY EXPERIENCE
(cont.)

As a project manager, was responsible for the implementation of several large conversion and system development projects, both in the on-line and batch environments.

As a systems support manager, was responsible for the management of installation planning for new hardware and software systems. Implementations encompassed several environments including on-line transaction processing, message switching, distributed processing, and packaged software. Instituted standard project control procedures for the various computer installations.

CONSULTING EXPERIENCE

A Major City in Western Canada

Conducted an evaluation and costing of a computer conversion of a Univac 1110 2x2 to an IBM 3033 AP. The major conversion areas addressed were database, on-line transaction processors/programs, job control/ECL, cobol/fortran/assembler applications, local code assessment (operating system), training required and communications/network.

A Major Gas Utility

Provided project management assistance and technical guidance to the data processing team in conducting a computer evaluation and selection.

Areas of emphasis were the definition of long range requirements and the optimum system environment, deriving selection and benchmark criteria, conversion sizing, implementation planning and contractual considerations.

A Financial Institution

Participated in a major future needs project in the development of a long range data processing plan. Upon initiation of the plan, provided the project management discipline to be adopted for this $6,000,000 implementation and the necessary project monitoring capability.

Ministry of Health

On behalf of the Department of Central Supply, conducted an advisability study and systems design for a remote batch inventory system for the distribution of surgical and pharmaceutical supplies. Also, within the same Ministry, developed a conceptual systems design for an on-line inventory system and maintenance of related demographic data for the Division of Speech and Hearing.

Peat, Marwick and Partners

DAVID A. DICKSON
Manager

EDUCATION: B. Comm. (Major-Accounting) Sir George Williams University (Concordia) 1958

AFFILIATION:

EXPERIENCE: 14 years Industry Experience
9 years Government Experience

AREAS OF PROFESSIONAL COMPETENCE

Mr. Dickson is a Manager in the Systems Development Group of our practice. He has had over 20 years experience in the systems and data processing field in a wide range of industrial classifications:

- 5 years - aircraft manufacturing
- 5 years - financial institution
- 4 years - food processing and distribution
- 9 years - provincial government

He has held a variety of positions and has had experience in planning, analysis, design, programming and implementation of information systems as well as operations.

In the past 15 years, Mr. Dickson has directed the system functions in the organizations which he has been employed. These systems and data processing organizations have ranged from a staff of a dozen and annual budgets of $400,000 to 160 and $13 million. Principal areas of competence include:

POLICY FORMULATION

- development of policies for the effective utilization of staff and funding for the system and data processing resource;
- development of policies concerning the organization of the systems and data processing resource including number and levels of permanent and contract staff.

OPERATIONAL REVIEWS

- Mr. Dickson has performed operational reviews within organizations to determine the effectiveness of the systems function including organizational structure, funding methods and performance.

PROJECT MANAGEMENT

- directed a wide range of projects from initial requirements definition through to implementation;
- developed and implemented structures for project management establishing multi disciplinary terms to include functional, client and systems resources.

EXAMPLES OF RELEVANT EXPERIENCE	DAVID A. DICKSON Manager

INDUSTRY EXPERIENCE:

Major Canadian Aircraft Manufacturer

- Mr. Dickson was employed by a major aircraft manufacturer initially as a programmer and latterly as supervisor of Systems Development;
- he was responsible for designing and developing initial computer applications including payroll, accounts payable, material accounting and inventory control;
- he managed the team responsible for a computer main frame conversion;
- he established programming standards for systems development.

Major Canadian Trust Company

- Mr. Dickson was hired as the Manager of Systems for a major trust company to manage the systems development for their first computer;
- he selected and trained existing trust company staff to develop the initial applications;
- he managed the development of the initial applications of Guarranteed Investment Receipts, Corporate Trust Accounting, Mortgage Accounting and Personal Trust;
- Mr. Dickson carried out the planning for the installation of their first computer and subsequently was also responsible for all computer operations.

Major Canadian Food Distributor

- Mr. Dickson was employed by a major food distributer as Manager of Computer Systems with responsibility for computer installations at four locations;
- he was responsible for a project to standardize systems at each location;
- he devised and implemented a strategy to have systems maintenance performed and controlled from one location thus substantially reducing manpower and equipment costs;

- he carried out the analysis for requirements definition and conceptual design of new shelf labelling and ordering systems that reduced store inventories.

Major Canadian Food Processor

- Mr. Dickson was hired by a major holding company in the beverage and food industries, subsequent to its takeover of a large food processor, to establish a systems and E.D.P function for its food group of companies;

- established a long range strategic and operational plan, developed an organization structure, hired staff and implemented basic systems for inventory control, order processing, sales reporting, payroll, accounts receivable and accounts payable;

- developed an equipment strategy, carried out an equipment study, recommended and subsequently implemented the strategy of having all development and operations run by a commercial computer utility reducing the EDP hardware and processing costs by 40%.

A Large Provincial Government-Housing Ministry

- Mr. Dickson was employed as the Director of Management Systems for the Ministry;

- carried out a study of computer hardware and processing requirements which resulted in conversion to a private sector computer utility reducing processing costs by 30% and increasing performance threefold;

- developed a plan for systems development over a three year period;

- established the concept of multi disciplinary project teams consisting of functional, user and system expertise;

- responsible for an initial feasibility and conceptual design of an integrated information system for head office and regional offices for rent collection, accounts payable, general ledger, capital expenditures and government cost sharing reporting.

EXAMPLES OF
RELEVANT EXPERIENCE

DAVID A. DICKSON
Manager

A Large Provincial Government - Revenue Ministry

- Mr. Dickson was employed as the Director of Management Systems for the Ministry with overall responsiblity for the development, maintenance and operations of all data processing and business systems functions in support of the provincial tax systems including corporations tax, retail sales tax, gasoline tax, tax credit systems as well as the provincial property assessment system;

- during this period he implemented an internal funding or charge-back system that provided incentive for users to increase their investment in computer systems, thus reducing their staff complement;

- developed a performance report on one of the major tax systems which indicated the overall staff cost savings as a result of computerization. This report also forecasts future savings as a result of investment in continuing development;

- initiated a study to redevelop the property assessment system which resulted in a feasibility study identifying substantial benefits in both dollar savings and increased service to the public;

- participated in a long range Ministry Plan Report to Management Board indicating the benefits of increased systems development funding in meeting overall government restraints in staffing and funding. During a five year period, investment increased from $5 million annually to $13 million;

- instituted a plan to eliminate "application backlog" through the "charge back" system and the acquisition of outside temporary resources;

- established a became the founding Chairman of a government wide Systems Council. The membership of this Council was composed of the senior systems executive of each government Ministry. The role of the Council was to

address the major issues facing the systems community in its role of servicing the government, individual Ministries and the the Public. An operational plan for the Council was developed and presented to Management Board and approval and funding was received.

CONSULTING EXPERIENCE:

Provincial Government

- acted in an advisory role to the systems executive for a provincial government ministry;
- prepared a report on a staffing strategy for the systems department of a provincial government ministry;
- prepared a report on the optimum mix of permanent and contract staff for the systems department of a provincial government ministry;
- assisted two Ministries in the recruitment of a Director and Assistant Director respectively for their systems department.

Major Optics Company

- managed a project to review, document and analyse the existing computer systems, making recommendations for improvement.

Peat, Marwick and Partners

ELIZABETH MCDONALD-CURLEY
INFORMATION SPECIALIST

EDUCATION: Loyola of Montreal, B.A. (Honours) History
McGill University, Masters of Library Science
Certificate, French Language, Universite de Dijon, France

AFFILIATION: Canadian Library Association - Director, Caslis (1982-1985)
Special Library Association

EXPERIENCE: 1 Year Librarianship - McGill University
3 Years Librarianship - Private Industry (BNR and SNC Group)
4 Years Librarianship - Federal Government (National Library of Canada)

AREAS OF PROFESSIONAL COMPETENCE

Ms. Curley, through her work as an information specialist in the private and public sectors, has developed extensive expertise in automated information retrieval and dissemination.

- Search specialist for a computer-based reference service.
- Training seminars on the concepts and applications of on-line retrieval.
- Resource person on the National Library-CISTI committee preparing guidelines for the implementation of boolean logic to the DOBIS system; and to the DOBIS committee addressing information content and format development for public and professional use in Canadian libraries.
- Evaluation of on-line bibliographic systems.
- Task force member, Scientific and Technical Information (STI) Project - Ministry of State for Science and Technology.
- Private sector library planning, development and management for a large engineering consulting group.
- Development of customized information package for use by corporate executives.

CONSULTING EXPERIENCE:

Program Evaluation of the Inet Trial

- Currently, Ms. Curley is one of the consultants conducting the evaluation of the Inet project for the National Library and six participating libraries of the Bibliographic Interest Group. The engagement covers the seven Inet sub-projects including Videotext, bibliographic, data derivation and reference services. Ms. Curley is managing the Reference sub-project.

CONSULTING
EXPERIENCE
Cont'd:

Market Analysis

- Assisted in the development and execution of a market analysis of a micro-library system for our client. It was necessary to pinpoint potential target audiences, interview them, and analyze the results. An evaluation of the present competition in both Canada and U.S. was also done.

Legal Information Retrieval

- The scope of this study included an examination of the total provision of legal information services, including public access systems, in order to recommend the most efficient and effective method of obtaining access to legal information generated by the staff of the Federal Department of Justice.

Technical Assistance for Auditing and Accounting Training

- This engagement for the Government of Guinea, funded by the World Bank, aimed at advising the Ministry of State Control in the control and audit of public enterprises in Guinea. Assisted in the area of establishment of specialized library collections in the french language, where possible, as well as archival procedures for proper records control.

Litigation Support System

- Assisted in a feasibility study and requirements definition related to the development of a computerized litigation support system for a major Canadian law firm. The products of the study were a system definition, an overall conceptual design, a vendor analysis and selection recommendations, and a technical and administrative implementation plan.

Material Management - Personnel Requirements

- The purpose of this study was to develop a methodology on a pilot project basis to identify Agriculture Canada's personnel who have a significant participation in the life cycle of material. It was necessary to ascertain Training and Development needs regarding the activities within the life cycle and match these to specific private or public sector or departmental material management training courses. The study also investigated areas where no such courses existed to help Agriculture Canada with its future development plans.

CONSULTING
EXPERIENCE
Cont'd:

Professional Service Firm - Research

- The Firm was engaged by the client to review Montreal newspapers for the 1930's period. The information was required to make-up the bulk of a book being assembled by the client.

- After a content analysis, it was determined that insufficient material existed to ensure a quality publication and, at our recommendation, the project was discontinued.

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AN ECONOMIC ANALYSIS OF THE CANADIAN COMPUTER SOFTWARE INDUSTRY: PHASE II

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