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THE THAILAND-CANADA HUMAN RESOURCES DEVELOPMENT PROJECT
INSTITUTIONAL LINKAGE PROJECT PROPOSAL

APRIL 1993

INSTITUTIONAL DEVELOPMENT AND CAPACITY BUILDING: A PROJECT OF INSTITUTIONAL LINKAGE AND TECHNICAL COOPERATION between SURANAREE UNIVERSITY OF TECHNOLOGY, (SUT) THAILAND and CANADIAN UNIVERSITIES TECHNOLOGY CONSORTIUM, (CUTC) CANADA

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SUMMARY PAGE

- ***Project Name:*** Institutional Development and Capacity Building: A Project of Institutional Linkage and Technical Cooperation
- ***Project Code Name:*** CUTC/SUT
- ***Submission Date:*** April 15, 1993
- ***Canadian Partner Institution:*** Canadian Universities Technology Consortium (CUTC), Toronto, Ontario, Canada
  - Ryerson Polytechnical Institute (Lead Canadian Partner)
  - University of Waterloo
  - University of Guelph
  - Technical University of Nova Scotia (TUNS)
- ***Thai Partner Institution:*** Suranaree University of Technology, Nakhon Ratchasima, Thailand (Lead Thai Partner)
- ***Project Abstract:***

A project of institutional linkage and technical cooperation to support the institutional development and capacity building of Suranaree University of Technology (SUT) through: (a) customized training programs in Canada; (b) technical assistance services in Thailand; and (c) joint academic and scholarly initiatives in both countries.

The project also involves the development and implementation of a number of innovative, joint academic initiatives including: (a) an English as a Second Language (ESL) Centre; (b) an international applied science and engineering undergraduate program; (c) a joint Ph.D. program in which the research phase is undertaken in Thailand under the joint supervision of Thai and Canadian personnel; (d) a co-op student exchange program.

The project also incorporates a number of programs to strengthen university-industry linkages for both CUTC institutions and SUT including: (a) short upgrading programs for personnel from Thai enterprises; and (b) participation of Canadian and Thai industries and enterprises in a technical and commercial exposition supported by the Thai government at SUT in 1995.

- ***Project Deliverables:*** (See attached summary)
- ***CIDA Funding Requested:*** $995,484
- ***Canadian Institutional Contribution:*** $601,605
- ***Thai Institutional Contribution:*** $3,931,345
- ***Other Sources of Funding:*** $432,535
- ***Duration of CIDA-Funded Activities:*** July 1, 1993 to March 30, 1998

Deliverables in Thailand	Deliverables in Canada
Program 1: Institutional Capacity Building Program	
• 4 Canadian specialists provide technical services and assistance activities in Thailand in the following disciplines: library specialist (1); management information specialist (1); and ESL (2). • Organization, planning and operational framework including policies, procedures, and implementation guidelines for the above-mentioned academic and support units at SUT.	• 16 SUT personnel receive customized training in Canada based on assessment of their individual needs in the following disciplines: academic administration and management (4); academic chairs and coordinators (6); technical and administrative support staff (4); and ESL teachers (2). • Academic administration framework and academic program and curricular plans for disciplines supported by the project.
Program 2: Institutional Academic Programs	
• 8 Canadian and 8 Thai professors design and develop framework for international undergraduate academic program. • 16 Canadian and 16 Thai professors jointly teach, supervise and evaluate 4 applied science and engineering undergraduate programs in: electrical engineering, mechanical engineering, chemical and environmental engineering and food science and engineering for two years. • Approximately 200 Thai students enrol in the first two years of the above-mentioned international program. • 5 Canadian and 5 Thai professors develop guidelines and the framework for the joint Ph.D. program and supervise the research phase in Thailand. • 10 Thai students undertake their research work (with joint supervision by Thai and Canadian professors) in Thailand. • 10 Canadian co-op exchange students complete one semester work placements in Thai enterprises.	• Approximately 40-60 Thai students become eligible to continue their studies in CUTC institutions in Canada. • 10 Thai Ph.D. candidates successfully complete their coursework, comprehensive examinations, and thesis defense (after two-year research period in Thailand) in Canada. • 10 Thai students complete one semester work placement in Canadian enterprises.
Program 3: University-Industry Linkage Program	
• A joint CUTC/SUT team develops framework for 4-6 advanced technology seminars for Thai enterprises. • 6 Canadian and 6 Thai professors jointly design, develop and deliver 4-6 advanced technology seminars. • 120-240 engineers and technicians from Thai enterprises train in selected advanced technology disciplines. • A joint CUTC/SUT develops framework for Canadian enterprises participation in Industrial Exposition at SUT. • 10-20 Canadian enterprises participate in Industrial Exposition at SUT in 1995.	• 1 Thai co-op officer receives customized training in Canada and develops framework for co-op education at SUT.

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1.0 ESTABLISHING ELIGIBILITY: THE RATIONALE FOR THE PROJECT

The project outlined in this proposal is a project of institutional linkage and technical cooperation involving the following institutions:

(a) The Suranaree University of Technology (SUT) (Lead Thai Partner) in the northeastern Province of Nakhon Ratchasima, Thailand; and
(b) The Canadian Universities Technology Consortium (CUTC) composed of the following Canadian Institutions:
    - Ryerson Polytechnical Institute, Toronto, Ontario
    - University of Waterloo, Waterloo, Ontario
    - University of Guelph, Guelph, Ontario
    - Technical University of Nova Scotia (TUNS), Nova Scotia

The Consortium have assigned Ryerson Polytechnical Institute to be the lead Canadian partner in this project and Ryerson International (RI) to be the Canadian Project Implementation Unit (PIU) for the project.

1.1 Development Priorities

The stated objectives of the seventh National Economic and Social Development Plan for Thailand are:

(a) To sustain the economic growth rate at a stable and appropriate level.
(b) To redistribute income and decentralize development to the regions and rural areas at a larger scale.
(c) To accelerate the development of human resources and upgrade the quality of life while improving the environment and natural resource management.

This project and its programs address all three goals. In particular, the project supports: (a) the development of human resources in science and technology and the transfer of relevant technologies to sustain the country's economic development; (b) the economic development in the relatively underdeveloped Northeast region of the country, by supporting the establishment, development and capacity building of a major regional university of technology with strong linkages to industry and business in the region; and (c) the development of human resources in fields related to the agricultural, natural resources and environmental sectors.

The project's purpose is to provide support to a new institution of higher education: Suranaree University of Technology (SUT), in the northeastern province of Nakhon Ratchasima. Suranaree University of Technology has been identified by Thailand's Ministry of University Affairs (MUA) as a priority within the program of higher education development in Thailand and more particularly in the northeast region of the country.

The stated mission of this autonomous university is:

(a) To produce and upgrade high-level manpower in the critical areas of science and technology.
(b) To carry out research and development in relevant fields of science and technology.
(c) To provide technical services for both the private and public sectors including research and development, training, and equipment services.
(d) To foster the preservation of local art and culture.

The project will provide support for the development and implementation of educational and training programs in areas relevant to Thailand's stated development needs and objectives, including:

(a) Agricultural science and technology.
(b) Industrial and manufacturing technologies.
(c) Resource and environmental technologies.
(d) Information and social technologies.

In particular, the project addresses important development priorities, challenges, and needs in Thailand and Canada. Table 1 provides a summary of these priorities and the project's response to them.

1.2 Institutional Development

The project endeavours to support the institutional development of SUT by incorporating activities aimed at strengthening all relevant human resources and institutional capacities, improving the quality and relevance of academic programs and maximizing institutional efficiency. The project aims to achieve the following institutional development outcomes:

(a) An effective academic administration and management framework as a result of customized study tours and training of SUT academic administrators in Canada as well as the technical services of Canadian consultants at SUT in Thailand.
(b) Relevant academic programs and curricula of high academic standards, as a result of customized training and technical upgrading of SUT academic program coordinators in Canada, and counterpart technical services of Canadian professors in Thailand.
(c) A higher level of research capacity as a result of the training at the Ph.D. level of 10 SUT faculty members, who will do their coursework in Canada and conduct their research in Thailand under joint supervision of Canadian and Thai professors.

Table 1: Projects Response to Development Priorities

Development Priorities	Project's Response
Thai Perspectives	
1. Strengthening the capacity of institutions of higher education and increasing their flexibility and responsiveness.	The project will incorporate innovative programs at SUT such as cooperative education and international applied science and engineering undergraduate programs, to strengthen SUT's capacity and increase its flexibility and responsiveness.
2. Increasing access to higher education and training, especially in regions poorly served by the system of higher education.	SUT is located near the capital city in the Province of Nakhon Ratchasima, 250 km northeast of Bangkok. The province has been identified as the industrial centre for the northeastern region of Thailand. When fully operational, SUT will be one of the three major institutions of higher education in the region and will provide opportunities for higher education for over 8,000 students, at least 50% of whom will be residents of the region.
3. Increasing the availability of in-service training and technical upgrading for Thai personnel working in commerce and industry.	One of SUT's main objectives is to develop and implement an effective continuing education program including short-term certificates and diploma courses in relevant disciplines to employees from the productive sector in the region.
4. Improving both the access and quality of higher education and training in Thailand.	SUT is being established as the first fully autonomous university in Thailand. Such autonomy will provide the university with the opportunity to develop equitable access policies that can reconcile the following conflicting demands: (a) academic standards vs gender and regional equity; and (b) flexibility and responsiveness vs meeting the social demand for higher education.
5. Internationalization of higher education.	With the support of CUTC, the project introduces three international initiatives: (a) establishment of an English as a Second Language (ESL) centre at SUT; (b) development and implementation of international applied science and engineering undergraduate programs; and (c) development of a joint Ph.D. program.
6. Strengthening the Role of Thailand as a Spring-board to Asia.	• The project will position SUT as an important participant in Thailand's drive to expand its influence in Asia through the incorporation of the following: (a) access to the international applied science and engineering undergraduate programs to students from other countries in the region; (b) language training through the ESL centre for students from countries in the region; and (c) participation in the project's technical services activities by trainees and personnel from compatible institutions of higher education in the region. • SUT will take advantage of the technical assistance that the Government of Thailand has been extending to other countries in the region by incorporating some of its compatible programs into the above-mentioned activities. • Ryerson is working to develop a linkage project with Danang Polytechnic in Vietnam on behalf of CUTC. SUT has agreed to link future initiatives in Vietnam to this project.

Development Priorities	Project's Response
7. Promotion of Industry-University Linkages.	• The SUT undergraduate programs to be developed and implemented in this project will incorporate a cooperative education model involving the active participation of private-sector enterprises in program design, development, and implementation.
8. Addressing industrial sector priorities and relevant occupational needs.	The project addresses industrial sector priorities by: • Improving the university's ability to respond to the needs of employers through their active involvement in the implementation of the university's cooperative education schemes. • Including private-sector representation in all academic advisory committees for SUT academic programs. • Encouraging university-industry cooperation through the development of innovative joint initiatives, such as in-service education and training programs for personnel from Thai enterprises.
Canadian Perspectives	
1. International marketing of Canadian academic programs and services.	Canada has not effectively marketed its academic programs internationally. In comparison to other English-speaking countries, such as the USA, UK, and Australia, or French-speaking countries such as France and Belgium, Canadian institutions have not taken advantage of international educational opportunities in the dynamic markets of South-East Asia. The project calls for CUTC's involvement in two new international academic initiatives: (a) an international applied science and engineering undergraduate program; and (b) a joint CUTC/SUT Ph.D. program. These two initiatives will provide administrators, faculty, and students from Thailand and other countries in South-East Asia with the opportunity to familiarize themselves with the capacities and resources of Canadian institutions of higher education and especially those of CUTC institutions.
2. Facilitating the development of trade and joint venture initiatives for Canadian enterprises in the following sectors: agro-industries, food products; environmental technology; transportation; telecommunications; and energy.	Through the participating of CUTC institutions, the project will develop a database of key Canadian and Thai enterprises in these sectors to assist SUT in identifying participants in an industrial exposition that the Government of Thailand will host at SUT in 1995.

(d) Efficient institutional support services including library automation and information systems; management information systems; and scientific equipment operation, maintenance and repair, as a result of study tours and customized training of SUT personnel in Canada and technical services of Canadian consultants in Thailand.
(e) Meaningful cooperative education policies and procedures as a result of study tours by Thai personnel in Canada.

1.3 Institutional Commitment

During a visit by Ryerson International's Associate Director to Thailand in the summer of 1990, the Ministry of University Affairs (MUA) in Thailand identified SUT as one of the priorities targeted for development by the Ministry. The permanent secretary of MUA suggested that Ryerson take the lead in identifying Canadian universities with relevant capacity and experience for partnerships in a project of institutional linkages under the Thailand-Canada Human Resources Development Program. On the basis of preliminary assessment of SUT needs, Ryerson International identified the CUTC-member institutions using the following criteria: (a) University of Guelph, for its strength in the field of crop, animal, and earth sciences; rural development; and food science and engineering, all disciplines of interest to SUT; (b) University of Waterloo, for the excellence and international reputation of its engineering programs and for its vast experience in cooperative education; (c) Technical University of Nova Scotia (TUNS), for its strength in resource sciences, and chemical and environmental engineering, as well as its experience in the development and implementation of degree-completion engineering programs; (d) Ryerson, for its strength in the development and implementation of applied professional undergraduate programs, its recent experience with the engineering accreditation process, and the experience of Ryerson International in consortia development and management.

A description of all CUTC-institutions, including their mandate, programs, and activities, is provided in Appendix I. The appendix also provides relevant information about SUT.

The participating Canadian and Thai institutions have so far invested considerable resources and effort in pursuing the development of this institutional linkage project, including needs assessment missions, study tours, and project development missions. Table 2 shows a summary of basic information pertaining to all previous visits and study tours by Canadian and Thai missions in the period August 1990 - March 1993, and the corresponding CUTC and SUT institutional support provided.

During the period 1990-1993 and as a result of the above-mentioned Thai and Canadian missions, the project design emerged as a joint initiative after considerable and useful discussions. A true spirit of friendship and partnership

has developed between the participants, which will hopefully have a positive impact on he timely implementation of its activities.

Supporting documentation showing evidence of SUT and CUTC institutional commitment is shown in Appendix II and includes letters from the presidents of CUTC institutions and SUT, as well as reports from previous planning missions.

1.4 Mutual Benefits

Thailand is an emerging regional economic power straddling the economically developing countries of the ASEAN region and the newly stabilized and developing countries of Indo-China. SUT, as a newly established university in north-eastern Thailand, is a viable partner for Canadian initiatives in the region. This project will be mutually beneficial to the Thai and Canadian institutions involved.

(a) Benefits to SUT:

- Institutional capacity building in the areas of academic administration and management, academic programs and curricula, and institutional support services.
- Innovative strategies and approaches in higher education delivery, including the incorporation of cooperative education in program implementation; the active participation of industry and commercial enterprises in curriculum planning, design and implementation; and the development and implementation of international education programs.
- Development of the university's research capacity;
- Positioning the university as a key participant in Thailand's drive to become a springboard to Asia.

(b) Benefits to CUTC:

- The internationalization of undergraduate academic programs in applied science and engineering. This will establish the participating Canadian universities on a competitive footing with American, British, Australian and Japanese universities establishing similar programs in Thailand and other countries in the region.
- Opportunities for participation in joint research initiatives and joint supervision of Ph.D. programs, thus strengthening the capacity of CUTC-institutions for participation in internationally-funded research initiatives.
- Experience in working with Canadian and Thai industries and enterprises for the development of potential mutually beneficial trading and joint-venture initiatives.

The participating universities are also committed to facilitating linkages between Canadian enterprises and their Thai and regional counterpart institutions and to helping identify opportunities for trade and technology cooperation.

1.5 Non-Proprietary Focus

The benefits of the project and its programs and activities will not be restricted to the organizations involved or to their employees. Thai and Canadian students, and their countries as a whole, will benefit from increased educational opportunities. Short courses will be offered by Canadian and Thai faculty to faculty and academic personnel from other institutions in the region and possibly other countries. Workshops and seminars for the Thai private sector will be jointly delivered by Thai and Canadian faculty, and will also involve participation by the Canadian private sector. The co-op placements will benefit Thai and Canadian students; students from Thailand and the region will benefit from the ESL Centre and international programs jointly offered by SUT and CUTC.

Table 2: Institutional Commitments

Mission	Date, Duration and Venue	Cost and Financial Responsibilities			
		Cost Item	SUT	CUTC	CIDA
Reconnaissance mission to Thailand by RI's Associate Director	August 1990, one week, Thailand	- travel, accommodation and living expenses - in-kind replacement cost* for RI's Associate Director		5,500 3,000	
Reconnaissance mission to Canada by four MUA and SUT representatives	April 1991, two weeks, Canada	- travel - accommodation and living expenses - in-kind replacement costs for Canadian and Thai personnel	14,000 9,000 16,000	9,000	
Planning mission to Thailand by four CUTC personnel	October 1992, three weeks, Thailand	- travel - accommodation and living expenses - in-kind replacement costs for Canadian and Thai personnel	16,000 9,000 9,000	36,000	
Second planning mission to Thailand by four CUTC personnel	December 1992, two weeks, Thailand	- travel - accommodation and living expenses - in-kind replacement costs for Canadian and Thai personnel	16,000 6,000 6,000	24,000	
Final planning mission to Canada by 4 SUT Personnel+	February-March 1993, two weeks, Canada	- travel - accommodation and living expenses - in-kind replacement costs for Canadian and Thai personnel	5,864 13,600	10,000	19,120
Total Institutional Contribution			124,964	86,500	19,120

* **Replacement Cost: Canadian ($3,000/week), Thai ($2,000/week)**

\+ **Administrative Arrangement Ryerson/ARA Consulting Group Inc.**

2.0 THE TECHNICAL DESCRIPTION OF THE PROJECT

2.1 Overall Project Objective

The project objectives are the following:

(a) Institutional capacity building for SUT in the areas of academic administration and management, academic program and curriculum, institutional support services and the establishment of an English as a Second Language (ESL) Centre;
(b) Improving the flexibility and responsiveness of SUT to meet higher education demands in Thailand and also in South East Asia and Indo-China through innovative programs including an international applied science engineering undergraduate program, a joint research and Ph.D. programs and a co-op student exchange program;
(c) Strengthening SUT's links with Thailand's productive sector through the establishment of university-industry linkage programs including cooperative education programs, a university - industry training program, and technology cooperation initiatives.
(d) Developing mutually beneficial institutional linkages between SUT and CUTC's institutions through the various joint international initiatives described in (b) above that can be sustained after the end of the project.

2.2 Project Approach

2.2.1 Methodology

The methodology adopted in the design of the project activities includes a number of important features to ensure effective and successful implementation. These features include:

(a) Canadian - Thai partnership. All programs and activities of the project were designed and will be implemented jointly by Canadian and Thai teams. For example, the international applied science and engineering undergraduate programs will provide for the education of SUT students in Thailand for the first two years of the program (with English as a medium of instruction) and the option for completing the last two years of the study program in Canada. The teaching and evaluation will be jointly undertaken by Canadian and Thai professors.
(b) Customized training. All training programs and related activities, particularly those taking place in Canada, will be custom designed to respond to the specific needs of the Thai professors, scholars, undergraduate and graduate students, and support personnel. The training will involve more than one university within CUTC to ensure exposure to different institutional settings

and, hence, a broader understanding of the problems, issues, and solutions available.

(c) Innovative initiatives. The project incorporates a number of innovative initiatives to strengthen the flexibility, responsiveness and dynamism of SUT. These include the international applied science and engineering undergraduate programs, the ESL Centre, and the joint Ph.D. program, which involve international joint activities both in Canada and in Thailand.

(d) Broad constituency participation. Participation in project activities is broad and includes academic administrators, faculty, students, support staff, and participants from industry.

2.2.2 Research

The research to be undertaken in this project will consist of scientific studies on the transfer and adaptation of relevant technologies in Thailand in the following sectors: agriculture, manufacturing, natural resources, environment, transportation and telecommunication. The research will be undertaken by junior SUT faculty participating in the joint Ph.D. program under joint supervision of Canadian and Thai professors.

2.2.3 Women in Development

The participation of women in applied science and engineering programs has been traditionally low in Thailand as well as in Canada. It is the expressed aim of SUT as well as the Canadian universities in CUTC to increase such participation in the future. The project design will therefore include activities and study components to allow academic administrators from SUT to study the strategies adopted by Canadian universities to increase the participation of women in applied science and engineering programs. The composition of the first group of student already selected for enrolment at SUT from the northeastern region of Thailand (representing 50% of the total number of first year students) has a female participation level of 60%.

The participation of women in SUT and CUTC programs is outlined in Table 3(a); and the participation of men and women in project management operations and activities is shown in Table 3(b).

2.2.4 The Environment

Normally, the establishment of an institution of higher education in Thailand would not have had a directly identifiable impact on, or relationship to, the environment or environmental concerns. This project, however, will have a number of initiatives and activities that can have a positive impact on the environment. These include the following:

(a) The development and implementation of environmentally-related academic programs that have distinct environmental components, such as chemical and environmental engineering, food science and technology, and transportation engineering, will help increase the capacity of Thai graduates to address environmental issues.
(b) The development of SUT's capacity through the university-industry linkage program to design and deliver short-term training programs for personnel from industry in relevant environmentally-related fields, such as waste water management, effluent treatment, waste reduction and the transportation of hazardous material, will result in positive outcomes in environmental management.
(c) The technical cooperation initiatives incorporated in the project involve the participation of Canadian and Thai industries in joint ventures, many in environmental technologies and related industries.

2.3 Sustainability

CIDA's financial contribution will be used as seed funding to enable the launching of project initiatives that are substantially funded by SUT and to a lesser extent by CUTC. In addition to financial commitment and contributions, many other factors will contribute to the long-term sustainability of initiatives funded by the project including: (a) commitment by SUT of human and physical resources; (b) the diversification and mobilization of alternative financial resources to support initiatives such as student and trainee fees; (c) the direct and in-kind contribution of Thai enterprises; and (d) the relevance of these initiatives to national and regional economic development goals.

The programs and initiatives that will be readily sustained and the factors influencing their sustainability are shown in Table 4.

2.4 Project Plan

2.4.1 Project Programs, Activities and Outputs

The project objectives and outputs (deliverables) will be achieved through the implementation of three programs: (1) institutional capacity-building program; (2) international academic programs; and (3) a university - industry linkage program.

Program 1.0: Institutional Capacity-Building Program

This program aims to develop SUT's institutional capacity through a number of sub-programs including: (i) development of academic administration and management framework, (ii) development of academic programs and curricula; (iii) development of institutional support services; and (iv) establishment of an ESL Centre.

Program 2.0: International Academic Programs

These programs aim to improve the flexibility and responsiveness of SUT through the development of a number of joint academic and scholarly initiatives, including: (i) international applied science and engineering undergraduate programs; (ii) a joint Ph.D. program and (iii) a co-op student exchange program.

Program 3.0: University - Industry Linkage Program

This program aims to strengthen SUT's links to the productive sector, especially the industrial enterprises, through a number of initiatives as follows: (i) development and implementation of cooperative education at SUT; (ii) development and implementation of in-service joint university - industry training programs; and (iii) establishment of a technology cooperation program.

Details of the various programs, activities and deliverables are outlined in Figure 1 and Table 5.

Table 3: Women's Participation in the Project

(a): Male and Female Participation (%) in CUTC and SUT

University	Male	Female
University of Waterloo	81	19
University of Guelph	76	24
TUNS	80	20
Ryerson	85	15
SUT (forecasted)	44	56

(b): Participation (%) of Men and Women in Project Management, Operations and Activities

	CUTC		SUT	
Activity	Male	Female	Male	Female
Implementation and Management	60	40	80	20
Project activities	75	25	70	30

Table 4: Factors Affecting Sustainability

Program	Sustainability Factors
The ESL Centre	• Achieving capacity in English is key to SUT's goal of establishing the English language as a medium of instruction in its international applied science and engineering undergraduate programs. SUT has established an English language department and hired staff who will continue to provide instruction at the end of the project. • SUT's contribution to this program is significant as shown in the following: - SUT $21,225 (28%) - CUTC $13,855 (19%) - CIDA $34,010 (53%)
The International Applied Science and Engineering Program	• CUTC and SUT have made a commitment in conceptualizing and designing this program to make it a sustainable long-term initiative and to use CIDA's contribution to put together the academic and administrative framework for the program. SUT and, to a lesser extent, CUTC institutions, have contributed significantly to the cost of the program. • Thai student fees and fees from other potential students from the region will be the main source of revenue for the long-term sustainability of this program. • Technical services provided by Canadian professors will enable Thai professors (who will have worked jointly with Canadians counterparts during the first four years of program implementation) to carry on the teaching of the first two years in Thailand on their own after CIDA funding is finished. • The contribution of the partners to this activity is as follows: - SUT $516,520 (16%) - CUTC $265,427 (8%) - Student Fees $2,194,839 (68%) - CIDA $223,248 (8%)
The Joint Ph.D. Program	• This program is seen as a very important contribution for building scientific research capacity at SUT. The university has therefore launched a drive to hire young Thai faculty members to participate in this program and experienced engineering professors to support its joint supervision. • SUT has also made a commitment to purchase and equip the relevant research laboratories needed to support this research in Thailand. • SUT's contribution to this program is considerable, as seen from the following: - SUT $837,536 (80%) - CUTC $43,546 (4%) - CIDA $158,561 (16%)

Program	Sustainability Factors
The Cooperative Student Exchange Program	• SUT has made the incorporation of a co-op approach to applied science and engineering undergraduate education a cornerstone of its academic mission. The university has hired a co-op coordinator and supporting staff to support the establishment of co-op education at the university. The co-op student exchange program in this project is a small contribution to increasing the awareness of the relevance of co-op education among faculty, staff and students at SUT. • SUT and CUTC are working to identify some key international enterprises with operations in both Canada and Thailand as well as local Canadian and Thai enterprises that can potentially be committed to provide work placements for the participating students. So far, two have been identified: Northern Telecom Inc. and IBM Inc. • Students will be responsible for all travel and living expenses in Thailand and in Canada. The distribution of the share of the cost of this program is as follows: - SUT $4,520 (1%) - CUTC $6,781 (2%) - Student Fees $198,890 (54%) - Salaries from Enterprises $144,648 (40%) - CIDA $10,170 (3%)
Joint In-Service Training Programs for Thai Industry	• The Government of Thailand considers SUT a key catalyst for economic development in the Northeast region. SUT is committed to establishing relevant capacity for providing technical assistance and services to Thai industries and enterprises in the region. The design, development and delivery of short-term training courses and seminars to personnel from these enterprises will be an important priority for the university. • The joint cooperation of Canadian and Thai professors in this endeavour will be easily sustainable at the end of the CIDA-funded phase because most of the cost of this program is contributed from training fees charged by SUT to participants from Thai industries and enterprises. • The sharing of this program's costs are as follows: - SUT $20,683 (12%) - CUTC $42,267 (25%) - Fees from Personnel of Thai Enterprises $88,934 (52%) - CIDA $18,926 (11%)

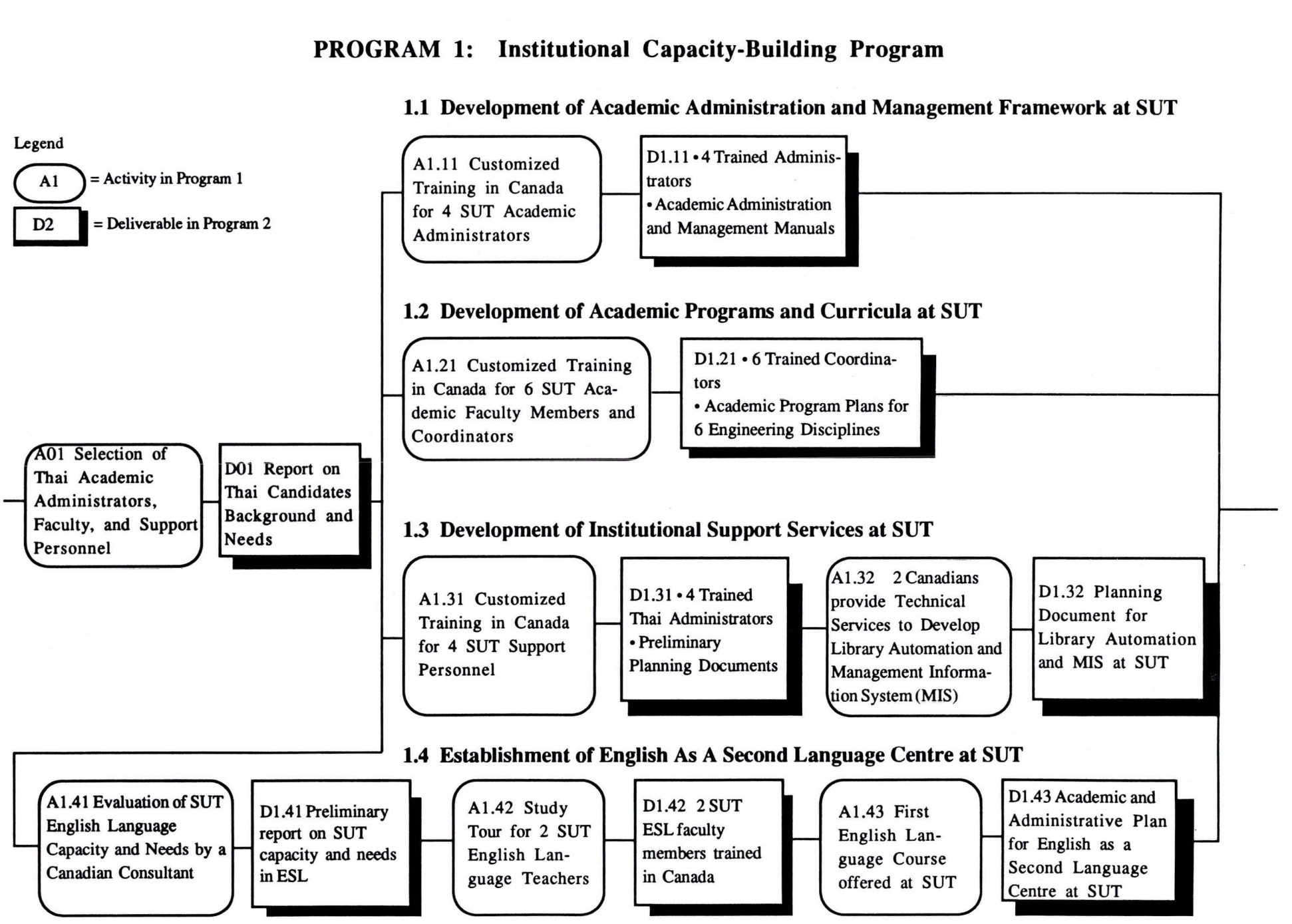
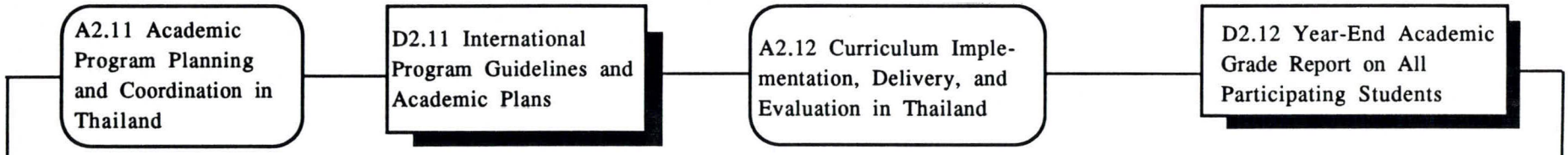


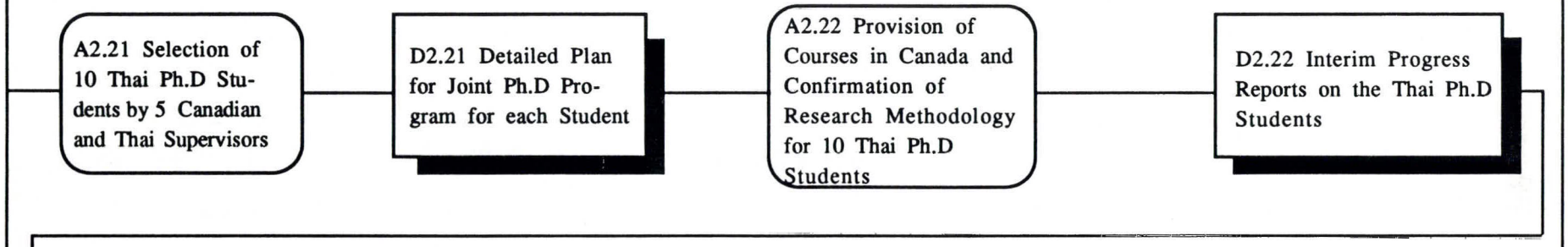
Figure 1: Project's Program, Activities and Deliverables

PROGRAM 2: International Academic Programs

2.1 International Applied Science and Engineering Undergraduate Program



2.2 Joint Research and Ph.D Program



2.3 Co-op Student Exchange Program

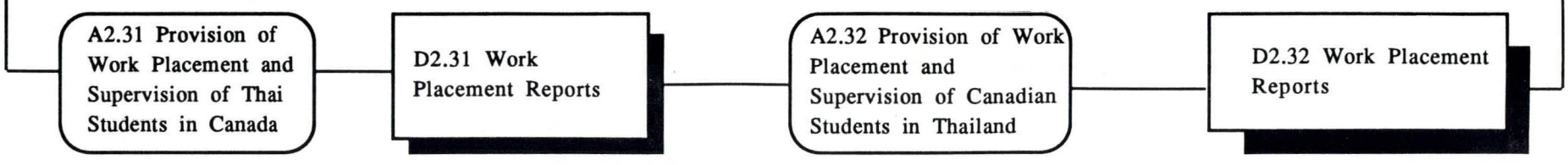
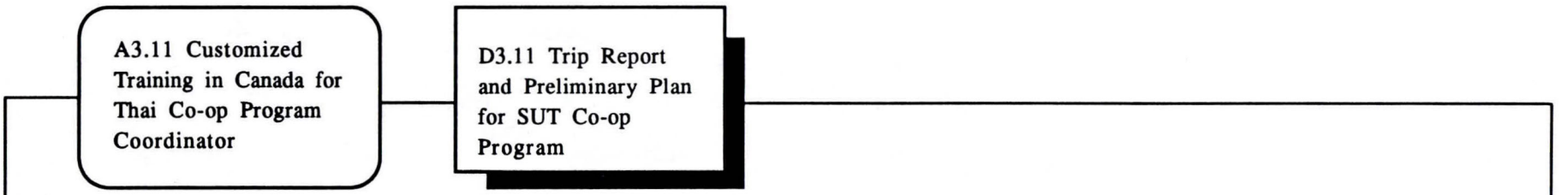


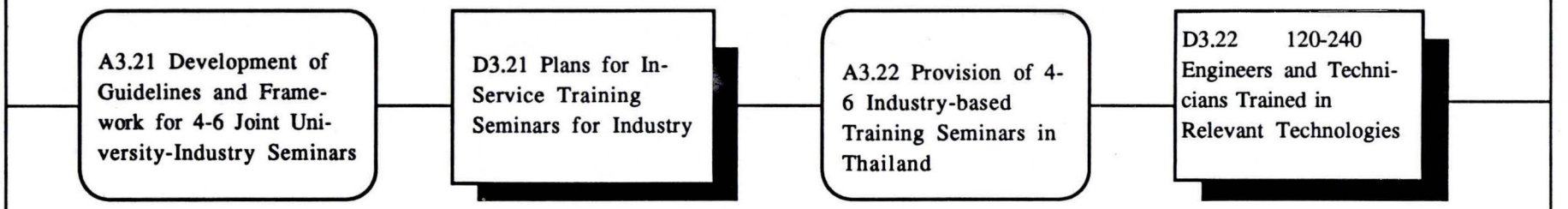
Figure 1 (Continued): Project's Programs, Activities and Deliverables

PROGRAM 3: University-Industry Linkage Program

3.1 Development of Cooperative Education at SUT



3.2 Joint University-Industry Cooperation and Training Initiatives



3.3 Technology Cooperation Initiatives

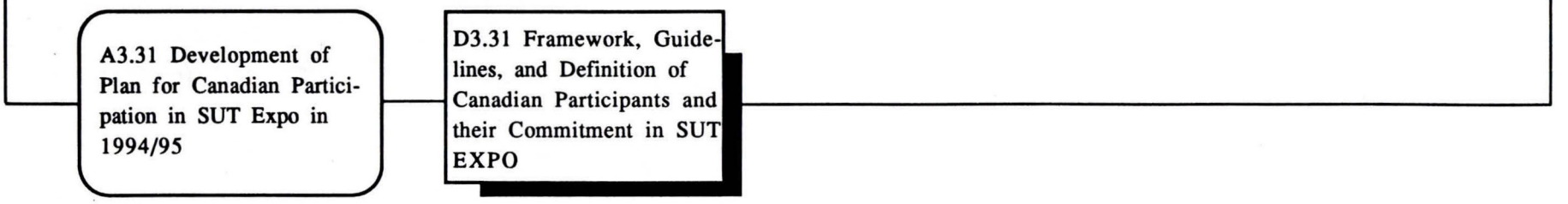


Figure 1 (Continued): Project's Programs, Activities and Deliverables

Table 5: Details of Project's Program, Activities and Deliverables

PROGRAM 1: INSTITUTIONAL CAPACITY-BUILDING PROGRAM			
ACTIVITY		**DELIVERABLE**	
Description	**Date, Venue & Duration**	**Description**	**Date**
A01 Selection of Thai academic administrators, faculty and support personnel	3 weeks, Thailand, Apr-Jun/93	D01 • Detailed report on the selected Thai candidates including their backgrounds (CVs) and the corresponding desired areas of training.	Aug. 1993
1.1 Development of Academic Administration and Management Framework at SUT			
A1.11 Provision of customized training in Canada for 4 SUT academic administrators.	6 weeks, Canada, Jul-Dec/93	D1.11 • 4 trained SUT Academic Administrators in the areas of academic planning, policy development, system of governance, curriculum development, research Administration, Standards and Promotion, Admissions, Curriculum Planning, etc. • Each Administrator will produce an academic administration and management manual for his/her faculty.	Mar. 1994
1.2 Development of Academic Programs and Curricula at SUT			
A1.21 Provision of customized training in Canada for 6 SUT faculty members and coordinators	12 weeks, Canada, Jul-Dec/93 Jul-Dec/94	D1.21 • 6 trained SUT Chairs or Coordinators in curriculum development and planning in various areas of applied science and engineering disciplines. • Each Chair or Coordinator will develop a complete academic program plan for his/her discipline including program structure, course and curriculum design guidelines, laboratory design and equipment specification, laboratory manual guidelines and educational specifications.	April 1995
1.3 Development of Institutional Support Services at SUT			
A1.31 Provision of customized training in Canada for 4 SUT support personnel in: - Library Automation (2) - Management Information Systems (1) - Scientific Equipment (1)	6 weeks, Canada, Jul-Dec/93	D1.31 • 4 trained SUT support personnel in the areas of library automation, management information systems, and scientific equipment. • SUT personnel will develop a planning document outlining their respective departments/units strategic plans, organizational structure, equipment specifications, and systems and procedures.	April 1994

PROGRAM 1: INSTITUTIONAL CAPACITY-BUILDING PROGRAM (Continued)			
ACTIVITY		**DELIVERABLE**	
Description	**Date, Venue & Duration**	**Description**	**Date**
A1.32 Provision of technical services to SUT by 2 Canadian consultants to develop SUT's institutional support services and information systems (MIS).	4 weeks, Thailand, Apr-Jun/94	D1.32 • Detailed reports including recommendations concerning the development and implementation of the library automation system and the management information system for SUT outlining the corresponding strategic plan, organizational structure, equipment specifications, operation systems and procedures.	June 1994
1.4 Establishment of English as a Second Language Centre at SUT			
A1.41 Evaluation of SUT English language capacity and needs by 1 Canadian ESL professor	3 weeks, Thailand, May-Jul/93	D1.41 • Preliminary report on SUT capacity and needs in ESL.	Sept. 1993
A1.42 Study tour for 2 SUT English language teachers in Canada	4 weeks, Canada, Sept-Dec/93	D1.42 • 2 SUT faculty members trained in Canada to develop and offer ESL programs. • Detailed curriculum plan for English language program at SUT.	Dec. 1993
A1.43 Joint offering of first English as a Second Language course at SUT by Canadian-Thai team.	4 weeks, Thailand, Apr-Jun/94	D1.43 • 40 SUT students complete the first ESL program at SUT.	June 1994
PROGRAM 2: INTERNATIONAL ACADEMIC PROGRAMS			
2.1 International Applied Science and Engineering Undergraduate Programs			
A2.11 Academic program, planning and coordination. 3 visits to Thailand by 8 Canadian academic coordinators before the start of the academic year in 1994, 1995, and 1996 to assess all relevant issues concerning the planning and implementation of the four international undergraduate programs.	4 weeks, Thailand, Jan-Mar/94 Apr-Jun/95 Jan-Mar/96	D2.11 • Report on the international applied science and engineering undergraduate programs. • Development of international program delivery guidelines for Thai students and faculty including: - curriculum planning and enrolment targets - human resource and academic work loads - Thai program accreditation eligibility - admissions and promotion policies - academic credit transferability - Canadian/Thai long-term cooperation plans and other relevant matters.	Oct. 1995

PROGRAM 2: INTERNATIONAL ACADEMIC PROGRAMS (Continued)			
ACTIVITY		**DELIVERABLE**	
Description	**Date, Venue & Duration**	**Description**	**Date**
A2.12 Curriculum implementation of the international applied science and engineering undergraduate programs. Teaching and supervision assignments by 32 faculty members from CUTC institutions in the period 1994-1997.	4 weeks, Thailand, each year from 94/95 to 97/98	D2.12 • Admission of 80, 120, 160 and 200 Thai South East Asian students in year 1 to 4 of the international applied science engineering and undergraduate programs with target graduates of 60, 90, 120, and 150 in year 1 to 4. • Program delivery and evaluation by joint CUTC/SUT team • Progress reports on the outcome of programs at the end of each academic year 1 to 4.	June 1994 to June 1998
2.2 Joint Research and Ph.D. Program			
A2.21 Selection of 10 Thai Ph.D. students and formation of joint supervisory teams in Thailand. 5 Canadian professors will undertake the assignment in Thailand.	2 weeks, Thailand, Apr-Jun/94	D2.21 • List of the 10 successful Ph.D. candidates in specific areas of applied science and engineering research and corresponding list of Thai/Canadian supervisory teams. • Detailed plan for the jointly supervised study programs of the 10 Thai students.	Aug. 1994
A2.22 Provision of Ph.D. courses in Canada and confirmation of research methodology for 10 Thai Ph.D. candidates.	18 months, Canada, Jul/94 Dec/95	D2.22 • Interim progress reports on the course work and the comprehensive examinations for the 10 Thai Ph.D. candidates.	April 1996
A2.23 10 supervisory visits by 5 Canadian professors to conduct Thai/ Canada-supervised research work in Thailand.	2 weeks, Thailand, Jul-Dec/96 Jan-Jun/97	D2.23 • Progress reports on the thesis research work on each of the 10 Thai candidates and confirmation of their readiness to defend thesis in Canada.	June 1997
A2.24 Ph.D. thesis defense in Canada.	2 weeks, Canada Sep-Dec/97	D2.24 • Upon completion of the research work and thesis manuscript preparation in Thailand, the Thai Ph.D. candidates return to Canada, together with their Thai co-supervisors, to defend their Ph.D. thesis report, and research findings, and to graduate if such defense is successful. • The unsuccessful candidates continue their work with the objective of completing their Ph.D. program within the following year.	Mar. 1998

PROGRAM 2: INTERNATIONAL ACADEMIC PROGRAMS (Continued)			
ACTIVITY		**DELIVERABLE**	
Description	**Date, Venue & Duration**	**Description**	**Date**
2.3 Co-op Student Exchange Program			
A2.31 Provision of 16 weeks work placement and supervision for 10 Thai students in Canada by CUTC institutions.	1 week supervision per student	D2.31 • 10 Thai co-op students placed in Canadian industrial corporations. • Student work placement reports to SUT and CUTC.	Work semesters 1994-97
A2.32 Provision of 16 weeks work placement and supervision for 10 Canadian students in Thailand by SUT.	1994/97 1 week supervision per student	D2.32 • 10 Canadian co-op students placed in Thai industrial corporation. • Student work placement reports to SUT and CUTC.	Work semesters 1994-97
PROGRAM 3: UNIVERSITY-INDUSTRY LINKAGE PROGRAM			
3.1 Development of Cooperative Education at SUT			
A3.11 Provision of customized training in Canada for SUT co-op program coordinator.	6 weeks, Canada, Jul-Sept/94	D3.11 SUT co-op program coordinator trained in policies, procedures and industrial liaison techniques adopted by trip report and preliminary plan for SUT co-op program.	Oct. 1994
3.2 Joint University-Industry Cooperation and Training Initiatives			
A3.21 Development of guidelines and framework for 4-6 joint industrial training seminars in Thailand.	2 weeks, Thailand, Feb/94	D3.21 Plan for 4-6 industrial in-service seminars in relevant technological disciplines to be implemented in Thailand.	Dec. 1997
A3.22 Provision of 4-6 industry-based training seminars in Thailand for personnel from Thai industries and enterprises.	3 weeks, Thailand, TBD	D3.22 120-240 engineers and technicians from Thai enterprises trained on state-of-the-art topics in the various applied science and engineering disciplines,.	TBD
3.3 Technology Cooperation Initiatives			
A3.31 Technical services by 1 Canadian consultant to develop a plan for Canadian participation in SUT Expo in 1994-95.	2 weeks, Thailand, 1994	D3.31 Framework and guidelines for participation in Expo, including the definition of Canadian participants and their commitment.	TBD

PROGRAM 4: PROJECT MANAGEMENT			
ACTIVITY		**DELIVERABLE**	
Description	**Date, Venue & Duration**	**Description**	**Date**
4.1 Provision of Project Management and Administration in Thailand			
A4.11 Thai Project Implementation Unit	5 years 1993/98	D4.11 • Quarterly, semi-annual and annual reports on the progress, developments and activities of the project. The reports will also include budgetary cost items and expenditures.	1993 to 1998
4.2 Provision of Project Management and Administration in Canada			
A4.21 Canadian Management Team and Project Implementation Unit	5 years 1993/98	D4.21 • Design, development, and implementation of customized training programs. • Recruitment and coordination of all Canadian consultants providing technical services in Thailand. • Quarterly, semi-annual, and annual progress reports to CEA.	1993 to 1998
4.3 Project Supervision and Coordination			
A4.31 Canadian Project Review Sub-Committee visits to Thailand	2 weeks, Thailand 1994, 1996	D4.31 Annual Project Review Committee's reports on the implementation of project activities and financial status.	July 1994-1996
A4.32 Thai Project Review Sub-Committee trips to Canada	2 weeks, Canada 1995, 1997	D4.32 Annual Project Review Committee's reports on the implementation of project activities and financial status.	July 1995-1997
A4.33 Project management and coordination by Canadian PIU personnel	2 weeks, Thailand, 1993/97	D4.33 Quarterly, semi-annual and annual reports on the progress and implementation of project activities including budget and expenditures.	1993-1997
4.4 Project Communication			
Communication among institutions, and support services to all participants.	5 years 1993-98		

2.4.2 Project Organization

The implementation, management and control of the various project activities and assessment of their outcome are undertaken at two levels: (a) policy development and project review by a Project Review Committee (PRC); and (b) project implementation and management by two Project Implementation Units (PIUs), one in Thailand and the other in Canada. In addition, because of the complexity of coordination of activities required on the Canadian side, a Canadian technical adviser will advise the Canadian PIU on activity design and implementation. The organizational structure for project management and implementation is shown in Figure 2.

(a) The Project Review Committee (PRC)

The Project Review Committee consists of two sub-committees, one in Canada and the other in Thailand. Each sub-committee consists of four representatives of the Canadian or Thai institutions involved in the project. The composition of the two sub-committees is as follows:

Canadian Sub-committee:
- Dr. Gerry Schneider, Associate Dean of Engineering (Chair), University of Waterloo
- Dr. Jim Shute, Director, Guelph International, University of Guelph
- Dr. Bill Caley, Dean of Engineering, Technical University of Nova Scotia
- Dr. Stalin Boctor, Chair, Department of Electrical Engineering, Ryerson Polytechnical Institute

Thai Sub-committee:
- Dr. Tavee Lertypanyavit, Acting Vice-President Academic, (Chair) SUT
- Dr. Kasem Prabripulaloong, Acting Dean, School of Resource Technology, SUT
- Dr. Terd Charoenwatana, Acting Dean, School of Agricultural Technology, SUT
- TBA, Acting Dean, School of Industrial Technology, SUT

The terms of reference of the two sub-committees include ongoing review of the progress of project implementation, approval of relevant changes to project design, approval of annual project budget, review of all reports on project activities and deliverables, and development of guidelines for project evaluation.

Each sub-committee will nominate two representatives to participate in the annual meeting of the Project Review Committee (PRC) to be held alternately in Canada and Thailand. The Project Review Committee's mandate includes (a) appointment of two project monitors, one Thai and one Canadian to monitor the project's progress; (b) review of the results and outcomes of the previous year's activities and outputs; (c) approval of plans for the following year's activities, including any proposed changes to the original project design; and (d) assessment of project outcomes through evaluation of various progress reports. The Canadian and Thai project managers will be ex-officio members of the PRC.

(b) The Project Implementation Unit

Two Project Implementation Units will be established, one in Toronto, Canada and the other in Korat, Thailand. The Project Implementation Units will be responsible for the overall implementation, management,and control of all project activities and outcomes approved by the Project Review Committee. Each unit will consist of the following personnel: project manager, project coordinator, finance officer and support staff.

The names and responsibilities of Canadian and Thai personnel for the above-mentioned positions are outlined in Table 6. The Canadian Project Implementation Unit is staffed and located at Ryerson International in Toronto.

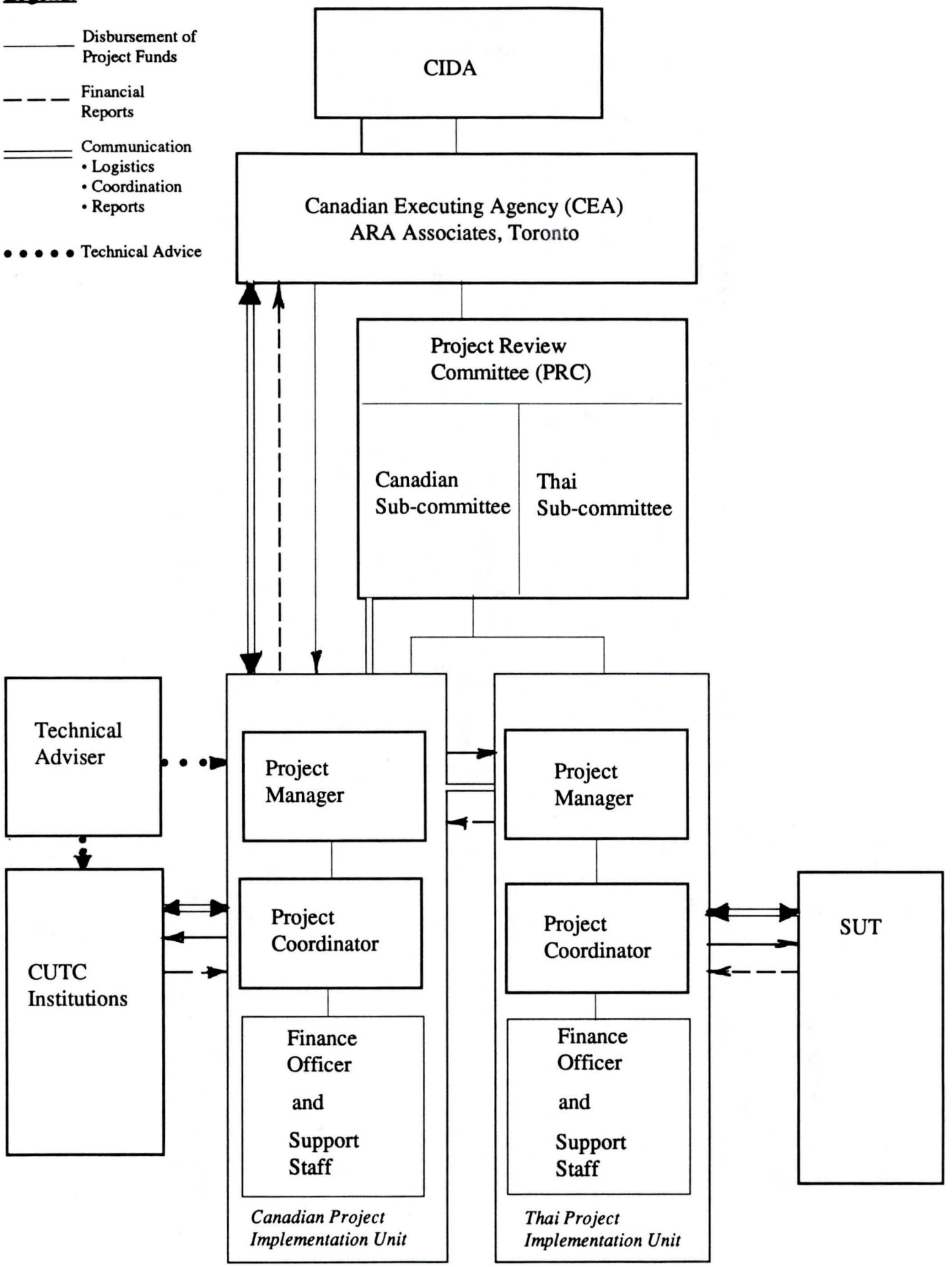


Figure 2: Organizational Structure for Project Management and Implementation

Table 6: Project Implementation Units' Personnel, Roles and Responsibilities

PIU Position	CUTC Personnel	SUT Personnel	Roles and Responsibilities
Project Manager	Prof. Samih Mikhail, Director, Ryerson International	Dr. Sam-arng Srinilta, Acting V.P., Planning and Development, SUT	-In cooperation with academic administrators from participating institutions, assess and select participating professors, consultants, and students - Conceptualize, design and supervise the implementation of the various project programs and activities. - Disburse funds to appropriate institutions and individuals involved in the implementation project activities. - Prepare progress and evaluation reports of project activities submitted to the Canadian Executing Agency and Project Review Committee.
Project Co-ordinator	Mrs. Marsha McEachrane-Johnson, Associate, Ryerson International	Dr. Chalida Rojanawathana Vuthi, Chief, External Relations Division, SUT	- Assist the project manager in the discharging of his responsibilities. - Provide planning and logistical support for project implementation. - Coordinate the project-related activities of various participating institutions. - Assist the project manager in the preparation of project budget and in the disbursement of funds to various participants. - Coordinate the preparation and production of various project reports and documents. - Design, organize and implement programs of orientation, briefing, and debriefing for all project participants travelling overseas.
Finance Officer	Ms. Aimee Horii Ryerson International	Mr. Anawach Kittiudon, Chief, Finance and Accounting Division, SUT	- Prepare financial reports and statements for the project manager and project coordinator. - Develop budget allocation and control Shells. - Make appropriate arrangements with banks for transfer and disbursement of project funds. - Reconcile and audit all project expenses according to guidelines and regulations
Support Staff	Ms. Lynne Berard Ms. Jennifer Sherwood, Ryerson International	Ms. W. Poomcharoen Ms. A. Kamchu Ms. S. Pisuttipilaipong Mrs. P. Sonsuk Mr. N. Sombat	- Provide logistical and communications support for project manager and coordinator. - Provide office management and document production support for various project documents and reports. - Prepare all travel plans and financial support for project participants.

(c) The Canadian Technical Adviser

A Canadian technical adviser will provide advice and assistance to the Canadian Project Implementation Unit in the design, coordination and implementation of project activities requiring academic planning and coordination among the participating CUTC institutions and also evaluation of academic outcomes and deliverables. In particular, the technical adviser will provide advise on the following:

(a) Design of customized training programs in Canada.
(b) Coordination of the implementation of customized training programs.
(c) Selection of Canadian consultants and professors for technical services assignments in Thailand.
(d) Design and coordination of international academic programs.
(e) Evaluation of the outcomes of various project activities.

The technical adviser is also a member of the Canadian PRC.

2.4.3 Characteristics of Project Management and Administration Systems

The management and administrative system, as well as the budget system adopted for the project, were designed to ensure effective collaboration among the participating institutions, especially members of the Canadian consortium. The important aspects of the management system include the following:

(a) Centralized Project Implementation Unit. The Canadian Project Implementation Unit proposed for the project is located within Ryerson International, which will manage the overall implementation and coordination of project activities. Ryerson International has had considerable experience in the management of similar but larger institutional linkage projects in Latin America and Asia involving consortia of Canadian institutions.
(b) Dedicated finance officer support. Ryerson International has the service of a dedicated full-time finance officer with extensive and relevant budget development and financial control experience, including the use of computerized budget systems. The Finance Department at Ryerson will control all disbursements of funds for the project.
(c) Deliverable/activity-based budget design. The budget design used for the project is deliverable/activity-based design to ensure ease of coordination of activities, especially customized training programs involving more than one institution. The budget unit cost, therefore, is based on either training week for training programs or person-day for technical and consultancy services.
(d) Centralized control of all travel and accommodation arrangements. Ryerson International will ensure the effective management of travel arrangements and accommodations for all Canadian and Thai participants through the use of an experienced travel agency that will provide comprehensive services.

(e) Orientation, briefing and debriefing. The Ryerson Resource Centre for Development Studies (RCDS) has excellent resources to support the development of useful information packages for delivery of effective orientation, briefing and debriefing sessions for all Thai and Canadian project participants. The RCDS resources have been used on many occasions by CIDA for projects in Latin America, the Middle East, and Asia.

2.5 Budget and Resource Allocation

2.5.1 Budget Design

(a) General Guiding Principles

The design of the project budget and the allocation of resources described in this section is based on the following premises:

- The design of the project (as described in 2.4) is both activity and deliverable-based. Each deliverable is associated with an activity as clearly indicated in Figure 1 and Table 5. The budget described here is also, therefore, both deliverable and activity-based.
- For the purposes of the budget, project management is considered as a fourth program similar in concept to the three programs that constitute the project. Project management is conceived as a series of activities and corresponding deliverables to make it consistent with other project initiatives.
- The project has multiple sources of funding including CIDA resources, CUTC and SUT contributions, funds from graduate and undergraduate Canadian and Thai students, and indirect contributions from Canadian and Thai private sector enterprises. In this multifaceted project, CIDA resources are being used primarily to provide seed funds for the various activities to ensure long-term sustainability after the completion of the CIDA-funded phase of the project. The mix of funding sources, therefore, varies depending on the type of activity with increased contribution by SUT in activities targeted for long-term sustainability.
- In the absence of allocation of resources for overhead costs for Canadian universities, the contribution of CUTC institutions that has been traditionally labelled "in-kind" has to be viewed as "real" contribution reflecting the reality of the financial constraints faced by the participating Canadian institutions in this project.

(b) Basis for Unit Cost Calculations

- Customized Training Costs in Canada

The design, implementation and supervision of the customized training programs in Canada will be undertaken by senior academic administrators,

coordinators, and other university personnel. The following is the basis for the unit cost calculation:

- daily full recovery replacement costs based on an average salary of $90,000, 20% benefits, and academic management fee for effecting such replacement: $600/day or $3000/week. The average time allocated for the design, implementation, and supervision of training is 2.5 days per week corresponding to a training unit cost of $1,500/week
- the contribution of CUTC to the above-mentioned unit cost is $600 (40%) and that of CIDA is $900 (60%)
- the cost of living allowance in Canada of $500/trainee week will include an SUT share of $200 (40%) and a CIDA share of $300 (60%). Other training costs including travel to and in Canada will be fully funded by CIDA.
- Thai trainees salaries and benefits will be provided by SUT.

• Technical Services in Thailand

The design, delivery and evaluation of technical services will be undertaken by Canadian professors and consultants in Thailand. The costs and sources of funding for this activity will be based on the following premises:

- the Canadian consultants' fees representing the replacement costs to CUTC institutions is $600/working day and include a CUTC contribution of $240 (40%) and a CIDA share of $360 (60%)
- CIDA will provide the full cost of travel to Thailand
- SUT will provide the cost of travel in Thailand and accommodation and living expenses in Thailand

• Other Programs

The following exceptions to the above-mentioned cost-sharing arrangements are incorporated in the budget to increase the contribution of CUTC, SUT, Canadian and Thai private-sector enterprises, and other private sources to increase the potential for long-term sustainability of various programs.

- International Applied Science and Engineering Undergraduate Program: the costs of technical services provided by Canadian professors and consultants in the teaching, supervision, and evaluation of this program is also based on replacement costs of $600/working day. This cost will be shared by CUTC and SUT on a 50/50 basis. No funds will be requested from CIDA for this activity.
- Joint Ph.D. Program: all costs associated with Thai Ph.D. students' studies and thesis defense in Canada including travel to and in Canada, academic fees and expenses, living expenses, and salaries/benefits will be contributed by SUT.

- Co-op Student Exchange Program: all personal costs to Thai and Canadian students participating in the program including travel to and in Canada and Thailand, and living expenses will be provided by the participating students. The trainee salaries will be paid by participating international corporations. Only minimal supervision costs will be born by CIDA and CUTC, using the cost sharing guidelines for training in Canada mentioned above.
- Technical Training Seminars in Thailand for Thai Industrial Enterprises: all costs for technical services provided by Canadian professors and consultants including travel, accommodation and living expenses and consulting fees will be derived from fees charged to participants from Thai enterprises attending seminars.

The deliverable/activity-based budget following the above-mentioned criteria and guiding principles is outlined in Table 7. Details of expenditures by deliverables for each activity/deliverable is outlined in Appendix III.

2.5.2 The Project's Work Plan: Schedule of Activities, Deliverables and Resource Allocations

The Project's Work Plan consists of the following tables and figures discussed earlier:

(a) Project's Programs Activities and Deliverables - Figure 1;
(b) Details of Project's Program Activities and Deliverables - Table 5;
(c) Deliverable/Activity-based Project Budget - Table 7; and
(d) Details of Expenditures by Deliverable - Appendix III

In addition to the above-mentioned documents, the work plan also includes the following:

(e) Quarterly Schedules of Expenses and Revenues - Appendix IV;
(f) Project's Activities Implementation Time Table outlined in the Gantt charts - Figure 3; and
(g) Schedule of Resource Requirements by Deliverables - Table 8.

Table 7: Deliverable/Activity - Based Project Budget

	Activity and Cost Items	Activity Duration and Date	Unit	Unit Cost C$ A	Quantity B	Activity Subtotal C=A x B	Sources of Funding				
							SUT	CUTC	CIDA	OTHER	Total Sources
1.	**Institutional Capacity Building Program**										
A01	**Selection of Thai Academic Administration Faculty and Support Personnel**	3 weeks 1993	person week	1,000	9	9,000	9,000	0	0	0	9,000
1.1	**Development of Academic Administration and Management Framework for SUT**										
A1.11	**Provision of Customized Training in Canada for 4 SUT Academic Administrators**	6 weeks training periods									
	a) Travel to Canada	1993-1994	person	3,400	4	13,600	0	0	13,600	0	13,600
	b) Travel in Canada		person	1,000	4	4,000	0	0	4,000	0	4,000
	c) Living Allowance		person week	500	24	12,000	4,800	0	7,200	0	12,000
	d) Evaluation of Thai Academic Administrators' needs and the design, delivery and supervision of customized training		person week	1,500	24	36,000	0	14,400	21,600	0	36,000
	e) Trainees Salaries/Benefits		person week	1,000	24	24,000	24,000	0	0	0	24,000
	Sub-total A1.11					**89,600**	**28,800**	**14,400**	**46,400**	**0**	**89,600**
1.2	**Development of Academic Programs & Curricula at SUT**										
A1.21	**Provision of Customized Training in Canada for 6 SUT Faculty members & Coordinators**	12 weeks training periods									
	a) Travel to Canada	1993-1995	person	3,400	6	20,400	0	0	20,400	0	20,400
	b) Travel in Canada		person	1,000	6	6,000	0	0	6,000	0	6,000
	c) Living Allowance		person week	500	72	36,000	14,400	0	21,600	0	36,000
	d) Evaluation of Thai faculty members' needs and the design, delivery and supervision of customized training		person week	1,500	72	108,000	0	43,200	64,800	0	108,000
	e) Trainees Salaries/Benefits		person week	1,000	72	72,000	72,000	0	0	0	72,000
	Sub-total A1.21					**242,400**	**86,400**	**43,200**	**112,800**	**0**	**242,400**

Table 7: Deliverable/Activity - Based Project Budget

	Activity and Cost Items	Activity Duration and Date	Unit	Unit Cost C$ A	Quantity B	Activity Subtotal C=A x B	Sources of Funding				
							SUT	CUTC	CIDA	OTHER	Total Sources
1.3	**Development of Institutional Support Services at SUT**										
A1.31	**Provision of Customized Training in Canada for 4 SUT Support Personnel**	6 weeks training periods									
	a) Travel to Canada	1993-1994	person	3,400	4	13,600	0	0	13,600	0	13,600
	b) Travel in Canada		person	1,000	4	4,000	0	0	4,000	0	4,000
	c) Living Allowance		person week	500	24	12,000	4,800	0	7,200	0	12,000
	d) Evaluation of Thai Support Personnel needs and the design, delivery and supervision of customized training		person week	1,500	24	36,000	0	14,400	21,600	0	36,000
	e) Trainees Salaries/Benefits		person week	1,000	24	24,000	24,000	0	0	0	24,000
	Sub-total A1.31					**89,600**	**28,800**	**14,400**	**46,400**	**0**	**89,600**
A1.32	**Provision of Technical Services to SUT by 2 Canadian Consultants to Develop SUT Institutional Support Services**	2 trips of 2 weeks duration									
	a) Travel to Thailand	1994	trip	3,400	2	6,800	0	0	6,800	0	6,800
	b) Travel in Thailand		trip	500	2	1,000	1,000	0	0	0	1,000
	c) Accommodations		person day	120	30	3,600	3,600	0	0	0	3,600
	d) Per diem		person day	80	30	2,400	2,400	0	0	0	2,400
	e) Consultant Fees		working day	600	20	12,000	0	4,800	7,200	0	12,000
	Sub-total A1.32					**25,800**	**7,000**	**4,800**	**14,000**	**0**	**25,800**
1.4	**Establishment of English As a Second Language Centre at SUT**										
A1.41	**Technical Services by a Canadian ESL Professor to Evaluate SUT's English Language Capacity and Needs**										
	a) Travel to Thailand	3 weeks	person	3,400	1	3,400	0	0	3,400	0	3,400
	b) Travel in Thailand	1993		500	1	500	500	0	0	0	500
	c) Accommodations		person day	120	20	2,400	2,400	0	0	0	2,400
	d) Perdiem			80	20	1,600	1,600	0	0	0	1,600
	e) Consultant Fees		working day	600	15	9,000	0	3,600	5,400	0	9,000
	Sub-total A1.41					**16,900**	**4,500**	**3,600**	**8,800**	**0**	**16,900**

Table 7: Deliverable/Activity - Based Project Budget

	Activity and Cost Items	Activity Duration and Date	Unit	Unit Cost C$ A	Quantity B	Activity Subtotal C=A x B	Sources of Funding SUT	CUTC	CIDA	OTHER	Total Sources
A1.42	**Study tour for 2 SUT English Language Teachers**										
	a) Travel to Canada	4 weeks	person	3,400	2	6,800	0	0	6,800	0	6,800
	b) Travel in Canada	1993	person	1,000	2	2,000	0	0	2,000	0	2,000
	c) Living Allowance		person week	500	8	4,000	1,600	0	2,400	0	4,000
	d) Evaluation of Thai Teachers needs and the design, delivery and supervision of customized training		person week	1,500	8	12,000	0	4,800	7,200	0	12,000
	e) Trainees Salaries & Benefits		person week	1,000	8	8,000	8,000	0	0	0	8,000
	Sub-total A1.42					**32,800**	**9,600**	**4,800**	**18,400**	**0**	**32,800**
A1.43	**First English Language Course Offering at SUT by Joint Canadian Thai Team (one Canadian)**										
	a) Travel to Thailand	4 weeks	person	3,400	1	3,400	0	0	3,400	0	3,400
	b) Travel in Thailand	1994		500	1	500	500	0	0	0	500
	c) Accommodations		person day	120	30	3,600	3,600	0	0	0	3,600
	d) Perdiem			80	30	2,400	2,400	0	0	0	2,400
	e) Consultant Fees		working day	600	20	12,000	0	4,800	7,200	0	12,000
	Sub-total A1.43					**21,900**	**6,500**	**4,800**	**10,600**	**0**	**21,900**
PROGRAM 1. SUBTOTAL						**528,000**	**180,600**	**90,000**	**257,400**	**0**	**528,000**
2.	**International Academic Program**										
2.1	**International Applied Science and Engineering Undergraduate Programs**										
A2.11	**Academic Program Planning and Coordination - 3 missions to Thailand in the period 1994-1996 by 8 Canadian Faculty members**	4 weeks consultancy period 1994-1996									
	a) Travel to Thailand		person	3,400	8	27,200	0	0	27,200	0	27,200
	b) Travel in Thailand		person	500	8	4,000	4,000		0	0	4,000
	c) Accommodations		person day	120	240	28,800	28,800	0	0	0	28,800
	d) Perdiem		person day	80	240	19,200	19,200	0	0	0	19,200
	e) Consultant Fees		working day	600	160	96,000	0	38,400	57,600	0	96,000
	Sub-total A2.11					**175,200**	**52,000**	**38,400**	**84,800**	**0**	**175,200**

Table 7: Deliverable/Activity - Based Project Budget

	Activity and Cost Items	Activity Duration and Date	Unit	Unit Cost C$ A	Quantity B	Activity Subtotal C=A x B	Sources of Funding				
							SUT	CUTC	CIDA	OTHER	Total Sources
A2.12	**Curriculum implementation of the International Applied Science and Engineering Under-graduate Programs-teaching and supervision assignments by 32 faculty members from CUTC institutions in the period 1994-1997**	4 week consultancy period 1994-1997									
	a) Travel to Thailand		person	3,400	32	108,800	0	0	108,800	0	108,800
	b) Travel in Thailand		person	500	32	16,000	16,000	0	0	0	16,000
	c) Accommodations		person day	120	960	115,200	115,200	0	0	0	115,200
	d) Perdiem		person day	80	960	76,800	76,800	0	0	0	76,800
	e) Consultant Fees		working day	600	640	384,000	192,000	192,000	0	0	384,000
	f) Thai Faculty Members Cost		person year	30,000	64	1,920,000	1,920,000	0	0	0	1,920,000
	Sub-total A2.12					**2,620,800**	**2,320,000**	**192,000**	**108,800**	**0**	**2,620,800**
2.2	**Joint Research and Ph.D. Program**										
A2.21	**Selection of Thai Supervisors and Ph.D. Students by 5 Canadian Faculty Members**	2 weeks 1994									
	a) Travel to Thailand		person	3,400	5	17,000	0	0	17,000	0	17,000
	b) Travel in Thailand		person	500	5	2,500	2,500	0	0	0	2,500
	c) Accommodations		person day	120	75	9,000	9,000	0	0	0	9,000
	d) Perdiem		person day	80	75	6,000	6,000	0	0	0	6,000
	e) Consultant Fees		working day	600	50	30,000	0	12,000	18,000	0	30,000
	Sub-total A2.21					**64,500**	**17,500**	**12,000**	**35,000**	**0**	**64,500**
A2.22	**Provision of Ph.D. Courses for 10 Thai Candidates in Canada and confirmation of Research Methodology**	18 months 1995-1996									
	a) Travel to and in Canada		person	4,000	10	40,000	40,000	0	0	0	40,000
	b) Academic Fees & Expenses*		person	20,000	10	200,000	200,000	0	0	0	200,000
	c) Living Expenses		person	18,000	10	180,000	180,000	0	0	0	180,000
	d) Trainees Salaries/Benefits		person	18,000	10	180,000	180,000	0	0	0	180,000
	Sub-total A2.22					**600,000**	**600,000**	**0**	**0**	**0**	**600,000**

** Fees vary from one institution to another. If graduate students are to be considered CIDA supported students, fees could be half the amount shown.*

Table 7: Deliverable/Activity - Based Project Budget

	Activity and Cost Items	Activity Duration and Date	Unit	Unit Cost C$ A	Quantity B	Activity Subtotal C=A x B	Sources of Funding SUT	CUTC	CIDA	OTHER	Total Sources
A2.23	**Jointly Supervised Research Work in Thailand - 10 visits by 5 Canadian Professors to Supervise Ph.D. Research**	2 weeks consultancy									
	a) Travel to Thailand	1996-1997	person	3,400	10	34,000	0	0	34,000	0	34,000
	b) Travel in Thailand		person	500	10	5,000	5,000	0	0	0	5,000
	c) Accommodations		person day	120	150	18,000	18,000	0	0	0	18,000
	d) Perdiem		person day	80	150	12,000	12,000	0	0	0	12,000
	e) Consultant Fees		working day	600	100	60,000	0	24,000	36,000	0	60,000
	f) Thesis Continuation Fees*		person	4,000	10	40,000	40,000	0	0	0	40,000
	Sub-total A2.23					**169,000**	**75,000**	**24,000**	**70,000**	**0**	**169,000**
A2.24	**Thesis Defense in Canada by 10 Thai Ph.D.Students**	2 weeks 1997-1998									
	a) Travel to and in Canada		person	4,000	10	40,000	40,000	0	0	0	40,000
	b) Co-supervisors travel to/in Canada		person	4,000	5	20,000	0	0	20,000	0	20,000
	c) Co-supervisors Living Allowance		person week	500	30	15,000	6,000	0	9,000	0	15,000
	d) Co-supervisors Salaries/Benefits		person week	1,000	10	10,000	10,000	0	0	0	10,000
	Sub-total A2.24					**85,000**	**56,000**	**0**	**29,000**	**0**	**85,000**

* Fees vary from one institution to another. If graduate students are to be considered CIDA supported students, fees could be half the amount shown.

2.3	**Co-op Student Exchange Program**										
A2.31	**Provision of 16 week Work Placements and Supervision for 10 Thai Students in Canada by CUTC Institutions**	1 week supervision per student									
	a) Travel to and in Canada +	1995-1996	person	4,000	10	40,000	0	0	0	40,000	40,000
	b) Living Expenses +		person week	300	160	48,000	0	0	0	48,000	48,000
	c) Supervision Fees		person week	1,500	10	15,000	0	6,000	9,000	0	15,000
	d) Trainees Salaries *		person week	500	160	80,000	0	0	0	80,000	80,000
	Sub-total A2.31					**183,000**	**0**	**6,000**	**9,000**	**168,000**	**183,000**

* Salaries paid by participating international corporations.

\+ Travel and living costs borne by students.

Table 7: Deliverable/Activity - Based Project Budget

	Activity and Cost Items	Activity Duration and Date	Unit	Unit Cost C$ A	Quantity B	Activity Subtotal C=A x B	Sources of Funding				
							SUT	CUTC	CIDA	OTHER	Total Sources
A2.32	**Provision of 16 week Work Placements and Supervision for 10 Canadian Students in Thailand by SUT**	1 week supervision per student									
	a) Travel to and in Thailand +	1995-1996	person	4,000	10	40,000	0	0	0	40,000	40,000
	b) Living Expenses +		person week	300	160	48,000	0	0	0	48,000	48,000
	c) Supervision Fees: SUT Contribution		person week	400	10	4,000	4,000	0	0	0	4,000
	d) Trainee Salaries *		person week	300	160	48,000	0	0	0	48,000	48,000
	Sub-total A2.32					**140,000**	**4,000**	**0**	**0**	**136,000**	**140,000**
PROGRAM 2. SUBTOTAL						**4,037,500**	**3,124,500**	**272,400**	**336,600**	**304,000**	**4,037,500**

* Salaries paid by participating international corporations.
\+ Travel and living expenses borne by students.

3.	**University-Industry Linkage Program**										
3.1	**Development of Cooperative Education at SUT**										
A3.11	**Provision of Customized Training in Canada for 1 SUT Co-op Program Coordinator**	6 weeks 1994									
	a) Travel to Canada		person	3,400	1	3,400	0	0	3,400	0	3,400
	b) Travel in Canada		person	1,000	1	1,000	0	0	1,000	0	1,000
	c) Living Allowance		person week	500	6	3,000	1,200	0	1,800	0	3,000
	d) Needs evaluation, design, delivery & supervision of customized training		person week	1,500	6	9,000	0	3,600	5,400	0	9,000
	e) Trainee Salary/Benefits		person week	1,000	6	6,000	6,000	0	0	0	6,000
	Sub-total A3.11					**22,400**	**7,200**	**3,600**	**11,600**	**0**	**22,400**

Table 7: Deliverable/Activity - Based Project Budget

	Activity and Cost Items	Activity Duration and Date	Unit	Unit Cost C$ A	Quantity B	Activity Subtotal C=A x B	Sources of Funding SUT	CUTC	CIDA	OTHER	Total Sources
3.2	**Joint University-Industry Cooperation and Training Initiatives**										
A3.21	**Technical Services to Develop the Guidelines and framework for 4-6 joint industrial training seminars in Thailand by 1 Canadian**	2 weeks 1994									
	a) Travel to Thailand		person	3,400	1	3,400	0	0	3,400	0	3,400
	b) Travel in Thailand		person	500	1	500	500	0	0	0	500
	c) Accommodation		person day	120	15	1,800	1,800	0	0	0	1,800
	d) Per diem		person day	80	15	1,200	1,200	0	0	0	1,200
	e) Consultant Fees		working day	600	10	6,000	3,000	3,000	0	0	6,000
	Sub-total A3.21					**12,900**	**6,500**	**3,000**	**3,400**	**0**	**12,900**
A3.22	**Technical Services by 6 Canadian Consultants to provide training seminars in Thailand for personnel from Thai industrial enterprises**	3 weeks 1996-1997									
	a) Travel to Thailand*		person	3,400	6	20,400	0	0	0	20,400	20,400
	b) Travel in Thailand*		person	500	6	3,000	0	0	0	3,000	3,000
	c) Accommodation*		person day	120	120	14,400	0	0	0	14,400	14,400
	d) Perdiem*		person day	80	120	9,600	0	0	0	9,600	9,600
	e) Consultant Fees*		working day	600	90	54,000	0	27,000	0	27,000	54,000
	Sub-total A3.22					**101,400**	**0**	**27,000**	**0**	**74,400**	**101,400**
* Fees and travel paid by Thai industries.											
3.3	**Technology Cooperation Initiatives**										
A3.31	**Technical Services by a Canadian Consultant to develop the plan for Canadian participation in SUT Expo in 1994-95**	2 weeks 1994-1995									
	a) Travel to Thailand		person	3,400	1	3,400	0	0	3,400	0	3,400
	b) Travel in Thailand		person	500	1	500	500	0	0	0	500
	c) Accommodation		person day	120	15	1,800	1,800	0	0	0	1,800
	d) Per diem		person day	80	15	1,200	1,200	0	0	0	1,200
	e) Consultant Fees		working day	600	10	6,000	3,000	3,000	0	0	6,000
	Sub-total A3.31					**12,900**	**6,500**	**3,000**	**3,400**	**0**	**12,900**
PROGRAM 3. SUBTOTAL						**149,600**	**20,200**	**36,600**	**18,400**	**74,400**	**149,600**

Table 7: Deliverable/Activity - Based Project Budget

	Activity and Cost Items	Activity Duration and Date	Unit	Unit Cost C$ A	Quantity B	Activity Subtotal C=A x B	Sources of Funding				
							SUT	CUTC	CIDA	OTHER	Total Sources
4.	**Project Management**										
4.1	**Provision of Project Managment and Administration in Thailand**	**5 years 1993-1998**									
A4.11	**Thai Project Implementation Unit**										
	- Project Manager		person days	450	70	31,500	31,500	0	0	0	31,500
	- Project Coordinator		person days	240	200	48,000	48,000	0	0	0	48,000
	- Support Staff		person days	120	200	24,000	24,000	0	0	0	24,000
	Sub-total A4.11					**103,500**	**103,500**	**0**	**0**	**0**	**103,500**
4.2	**Provision of Project Management and Administration in Canada**	**5 years 1993-1998**									
A4.21	**Canadian Management Team Canadian Personnel**										
	- Technical Advisor		working day	600	70	42,000	0	16,800	25,200	0	42,000
	- Project Manager		working day	600	160	96,000	0	38,400	57,600	0	96,000
	- Project Coordinator		working day	350	200	70,000	0	28,000	42,000	0	70,000
	- Support Staff		working day	200	300	60,000	0	24,000	36,000	0	60,000
	Sub-total A4.21					**268,000**	**0**	**107,200**	**160,800**	**0**	**268,000**
4.3	**Project Supervision and Coordination**										
A4.31	**Project Review Committee Visit to Thailand Two 2-person missions by Canadian Professors.**	2 weeks duration 1994 and 1996									
	a) Travel to Thailand		person	3,400	4	13,600	0	0	13,600	0	13,600
	b) Travel in Thailand		person	500	4	2,000	2,000	0	0	0	2,000
	c) Accommodations		person day	120	60	7,200	7,200	0	0	0	7,200
	d) Perdiem		person day	80	60	4,800	4,800		0	0	4,800
	e) Consultant Fees		person day	600	40	24,000	0	9,600	14,400	0	24,000
	Sub-total A4.31					**51,600**	**14,000**	**9,600**	**28,000**	**0**	**51,600**

Table 7: Deliverable/Activity - Based Project Budget

	Activity and Cost Items	Activity Duration and Date	Unit	Unit Cost C$ A	Quantity B	Activity Subtotal C=A x B	Sources of Funding				
							SUT	CUTC	CIDA	OTHER	Total Sources
A4.32	**Project Review Committee Visit to Canada Two 2-person missions by Thai Professors.**	2 week duration 1995 and 1997									
	a) Travel to Canada		person	3,400	4	13,600	0	0	13,600	0	13,600
	b) Travel in Canada		person	1,000	4	4,000	0	0	4,000	0	4,000
	c) Living Allowance		person week	500	8	4,000	1,600	0	2,400	0	4,000
	d) Thai Salaries/Benefits		person week	1,000	8	8,000	8,000	0	0	0	8,000
	Sub-total A4.32					**29,600**	**9,600**	**0**	**20,000**	**0**	**29,600**
A4.33	**Project Managment and Coordination Eight supervisory missions to Thailand by Canadian PIU Personnel**	2 week duration 1993-1997									
	a) Travel to Thailand		person	3,400	8	27,200	0	0	27,200	0	27,200
	b) Travel in Thailand		person	500	8	4,000	4,000	0	0	0	4,000
	c) Accommodations		person day	120	120	14,400	14,400	0	0	0	14,400
	d) Perdiem in Thailand		person day	80	120	9,600	9,600	0	0	0	9,600
	e) Travel within Canada Toronto/Halifax/Guelph/Waterloo		trip	1,000	20	20,000	0	4,000	16,000	0	20,000
	f) Accommodations in Canada		person day	120	60	7,200	0	0	7,200	0	7,200
	g) Perdiem in Canada		person day	80	60	4,800	0	0	4,800	0	4,800
	Sub-total A4.33					**87,200**	**28,000**	**4,000**	**55,200**	**0**	**87,200**

Table 7: Deliverable/Activity - Based Project Budget

	Activity and Cost Items	Activity Duration and Date	Unit	Unit Cost C$ A	Quantity B	Activity Subtotal C=A x B	Sources of Funding				
							SUT	CUTC	CIDA	OTHER	Total Sources
4.4	**Project Communciations and Support Services**										
A4.41	**Communications Among Institutions and Support Services for all Participants.**										
	a) Communication Costs					20,000	6,000	6,000	8,000	0	20,000
	b) Reports & Production Costs					6,000	1,000	1,000	4,000	0	6,000
	c) Orientation and Briefing for Canadian and Thai Participants		person	70	105	7,350	0	2,940	4,410	0	7,350
	d) Program Support Materials for Thai Trainees		person	150	38	5,700	0	2,280	3,420	0	5,700
	Sub-total A4.41					**39,050**	**7,000**	**12,220**	**19,830**	**0**	**39,050**
PROJECT MANAGEMENT SUBTOTAL						**578,950**	**162,100**	**133,020**	**283,830**	**0**	**578,950**
TOTAL ALL PROGRAMS						**5,294,050**	**3,487,400**	**532,020**	**896,230**	**378,400**	**5,294,050**
Inflation Provision @ 5% compounded annually						636,919	443,945	58,085	80,754	54,135	636,919
Subtotal						5,930,969	3,931,345	590,105	976,984	432,535	5,930,969
GST only applicable to CUTC and CIDA portions *						30,000	0	11,500	18,500	0	30,000
TOTAL						**5,960,969**	**3,931,345**	**601,605**	**995,484**	**432,535**	**5,960,969**

* GST calculated based on CUTC reimbursement of 67% of GST due to University status.
The GST for the project is claimed together with the Universities monthly submission to Revenue Canada.

FIGURE 3: PROJECT ACTIVITIES IMPLEMENTATION TIME TABLE

	1993		1994				1995				1996				1997				1998	
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
PROGRAM 1: INSTITUTIONAL CAPACITY-BUILDING PROGRAM																				
A01 Selection of Thai Academic Administrators, Faculty and Support Personnel	3																			
A1.11 Development of Academic Administration and Management Framework at SUT through the provision of customized training		2	2																	
A1.21 Development of Academic Programs and Curricula at SUT through the provision of customized training		1	2			2	1													
A1.3 Development of Institutional Support Units at SUT																				
A1.31 Customized training in Canada		1	2		1															
A1.32 Provision of Technical Services to Develop Institutional Infrastructure				1		1														
A1.4 Establishment of English as a Second Language Centre at SUT																				
A1.41 Evaluation of SUT English Language Capacity and Needs	1																			
A1.42 Study tour for two SUT English Language Teachers		2																		
A1.43 First English Language Course offering at SUT by Joint Canadian-Thai Team				1																
PROGRAM 2: INTERNATIONAL ACADEMIC PROGRAMS																				
2.1 International Applied Science and Engineering Undergraduate Programs																				
A2.11 Academic Program, Planning and Coordination				4				2	2											
A2.12 Curriculum Implementation of International Applied Science and Engineering Undergraduate Programs					4				5	4			5	2	4		5	3		
2.2 Joint Scholarly Research and Ph.D. Program																				
A2.21 Selection of Thai Supervisors and Ph.D. Students and Formation of Joint Supervisory Teams in Thailand				5																
A2.22 Provision of Ph.D. Courses in Canada and Confirmation of Research Methodology									10											
A2.23 Jointly Supervised Research Work in Thailand													4	1	3	2				
A2.24 Thesis Defence in Canada																	6	4		

Legend: $\frac{x}{y}$; x = Number of funded CUTC participants, y = Number of funded SUT participants

FIGURE 3: PROJECT ACTIVITIES IMPLEMENTATION TIME TABLE

	1993		1994				1995				1996				1997				1998	
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
PROGRAM 3: UNIVERSITY-INDUSTRY LINKAGE PROGRAM																				
2.3 Co-op Students Exchange Program																	3	2		
A2.31 Provision of Work Placements and Supervision for 10 Thai students in Canada by CUTC										1 5		1 5								
A2.32 Provision of Work Placements and Supervision for 10 Canadian Students in Thailand by SUT											5 1		5 1							
3.1 Development of Cooperative Education at SUT																				
A3.11 Provision of Customized Training in Canada for the Co-op Program Coordinator			1																	
3.2 Joint University-Industry Cooperation & Training Initiatives																				
A3.21 Development of Guidelines and Framework for 4-6 Joint Industrial Training Seminars in Thailand			1																	
A3.22 Provision of Industry Training Seminars in Thailand for personnel from the enterprises															2	2	1	1		
3.3 Technology Cooperation Initiatives																				
A3.31 Development of Plan for Canadian Participation in SUT Expo in 1994/95					1															
PROGRAM 4: PROJECT MANAGEMENT																				
A4.11 Provision of Project Coordination and Administration in Thailand																				
A4.21 Provision of Project Coordination and Administration in Canada					On Going for Life of Project															
4.3 Project Supervision and Coordination																				
A4.31 Review Committee Trips to Thailand				2								2								
A4.32 Review Committee Trips to Canada								2								2				
A4.33 Project Management and Coordination					2				2				2				2			

Legend: $\frac{x}{y}$; x = Number of funded CUTC participants, y = Number of funded SUT participants

Table 8: Projects Resource Requirement By Deliverables

Program/Deliverable	Resource Requirements		
	Dedicated staff and consultant time	Other resources	Subtotal
1. Institutional Capacity Building Program			
A01 Selection of Thai Academic Administration Faculty and Support Personnel	9,000	0	9,000
1.1 Development of Academic Administration and Management Framework at SUT			
A1.11 Provision of Customized Training in Canada for SUT Academic Administrators	60,000	29,600	89,600
1.2 Development of Academic Programs and Curricula at SUT			
A1.21 Provision of Customized Training in Canada for SUT Faculty Members and Coordinator	184,500	63,960	248,460
1.3 Development of Institutional Support Services at SUT			
A1.31 Provision of Customized Training in Canada for SUT Support Personnel	60,750	29,970	90,720
A1.32 Provision of Technical Services to SUT by Canadian Consultants to Develop SUT Institutional Support Services	12,600	14,490	27,090
1.4 Establishment of English as a Second (ESL) Centre at SUT			
A1.41 Technical Services by a Canadian ESL Professor to Evaluate SUT's English Language Capacity and Needs	9,000	7,900	16,900
A1.42 Study Tour for SUT English Language Teachers	20,000	12,800	32,800
A1.43 First English Language Course Offering at SUT by Joint Canadian Thai Team	12,600	10,395	22,995
2. International Academic Program			
2.1 International Applied Science and Engineering Undergraduate Programs			
A2.11 Academic Program Planning and Coordination	103,320	85,238	188,558
A2.12 Curriculum Implementation of the International Applied Science and Engineering Undergraduate Programs	2,633,791	362,145	2,995,936
2.2 Joint Research and Ph.D. Program			
A2.21 Selection of Thai Supervisors and Ph.D. Students	31,500	36,225	67,725
A2.22 Provision of Ph.D. Courses for Thai Candidates in Canada and Confirmation of Research Methodology	198,450	463,050	661,500
A2.23 Jointly Supervised Research Work in Thailand	70,150	127,442	197,592
A2.24 Thesis Defense in Canada	12,155	91,163	103,318

2.3 Co-op Student Exchange Program			
A2.31 Provision of 16 Week Work Placements and Supervision in Canada	107,356	99,445	206,801
A2.32 Provision of 16 Week Work Placements and Supervision in Thailand	58,763	99,445	158,208
3. University-Industry Linkage Program			
3.1 Development of Cooperative Education at SUT			
A3.11 Provision of Customized Training in Canada for Co-op Program Coordinator	15,000	7,400	22,400
3.2 Joint University-Industry Cooperation and Training Initiatives			
A3.21 Technical Services to Develop the Guidelines and Framework for Industrial Training Seminars in Thailand	6,000	6,900	12,900
A3.22 Technical Services by Canadian Consultants to Provide Training Seminars in Thailand	64,595	56,700	121,295
3.3 Technology Cooperation Initiatives			
A3.31 Technical Services to Develop the Plan for Canadian Participation in SUT Expo in 1994-95	6,300	7,245	13,545
4. Project Management			
4.1 Provision of Project Management & Administration in Thailand			
A4.11 Thai Project Implementation Unit	114,381	0	114,381
4.2 Provision of Project Management and Administration in Canada			
A4.21 Canadian Management Team	296,172	0	296,172
4.3 Project Supervision and Coordination			
A4.31 Project Review Committee Visit to Thailand	26,492	30,465	56,957
A4.32 Project Review Committee Visit to Canada	9,272	25,034	34,306
A4.33 Project Management and Coordination	0	98,657	98,657
4.4 Project Communications and Support Services			
A4.41 Communications Among Institutions and Support Services	0	43,153	43,153
TOTAL	4,122,147	1,838,822	5,960,969

2.6 Personnel

2.6.1 Personnel Positions and Names

This is an institutional linkage and technical cooperation project involving an commitment by participating Canadian and Thai institutions to provide the services of senior academic administrators, faculty coordinators, professors, and

consultants to participate in the various project activities outlined in this proposal. It is therefore not possible at the time of writing of this report, to name individual Canadian or Thai personnel targeted for participation in the project other than project management personnel assigned to responsibilities in the Canadian and Thai Project Review Sub-committees, Project Implementation Units, as well as the Canadian technical adviser. The positions and names of these personnel were outlined earlier in Table 6.

The Canadian and Thai Project Implementation Units will prepare a yearly work plan for assessment and evaluation by the Project Review Committee, the CEA and the overall Thai-Canada human resources Project Steering Committee in which the names, positions and responsibilities of all participating Canadian and Thai participating personnel will be clearly identified.

2.6.2 Qualifications of Personnel

The participating Canadian and Thai management personnel are full-time university academic administrators, professors, and senior support personnel. They have the usual university professor's academic credentials, qualifications, and experience. Biographical details and the academic background and experience of the above-mentioned personnel as well as their title, responsibilities, activities and their expected outputs, are provided in Appendix V.

3.0 ADDITIONAL FACTORS TO ESTABLISH MERIT

This multifaceted project has, in addition to the programs, activities, and deliverables outlined in Section 2, a number of important, distinctive features and factors that merit special attention.

3.1 Participation of Canadian and Thai Enterprises

The project has a series of university-industry joint initiatives with objectives to: (a) strengthen the links between CUTC, SUT and industrial enterprises in Canada and Thailand; (b) strengthen SUT's capacity to provide relevant technical assistance and services to Thai industries; and (c) make use of the project to provide an avenue for Canadian and Thai enterprises to consider trade arrangements, joint ventures, and other potential interests. The program incorporates an activity aimed to support the participation of Canadian enterprises in an industrial exposition supported by the Thai government and scheduled to take place at SUT in 1995.

CUTC and SUT have obtained preliminary commitments from the following private-sector participants:

(a) International enterprises including Northern Telecom Inc. and IBM Inc.;
(b) National Thai industry organizations such as the Federation of Thai Industries; and
(c) Canadian associations including the Canadian Manufacturers Association and the Canadian Exporters Association.

The project management teams in Canada and Thailand will pursue additional commitments from other potential enterprises in the above-mentioned categories.

3.2 Institutional Networking

The concept of a Canadian consortium as a partner institution for a project of institutional linkage and technical cooperation is one that has been tried by some Canadian universities in the past. The success of such consortia is critically dependent on institutional network and communication capacities of the participating institutions. A number of important factors have been incorporated in the design of the project to ensure that networking and communication is effective: (a) The project is managed by Ryerson International and the participation of individual universities is coordinated by their international liaison officers. The linkages between the international liaison officers is strong through their participation in various forums and panels organized and supported by the Association of Universities and Colleges of Canada (AUCC); (b) The universities, their international liaison officers, and faculty and administrators are all linked by EMail and InterNet; (c) The relatively long process of planning and design of this project has resulted in the strengthening of the links among Canadian participants and between them and their Thai counterparts; and (d) SUT will be integrally linked to CUTC institutions by EMail and InterNet.

3.3 Other Institutional Linkages

It is foreseen that many of the project programs and activities will lead to important linkages to other institutions in Thailand and in Canada. Examples of this includes:

(a) The ESL Program: CUTC has identified Fanshawe College of Applied Arts and Technology in London, Ontario as a potential participant in the proposed ESL program because of its strength and long experience in the delivery of such programs and the incorporation of a home-stay component in the program.
(b) Upgrading of Thai Technical Institutes: A number of Thai technical education institutions are being upgraded to degree-level status. SUT is pursuing discussions with the Department of Vocational Education (DOVE) to define

the human resources development needs of the teaching staff of these institutions and the opportunities for SUT's participation. The international applied science and engineering undergraduate program is one potential area for such intervention and participation in some of the workshops and seminars in Thailand offered to Thai enterprises is another.

(c) Ryerson, on behalf of CUTC is negotiating with Danang and other polytechnics in Vietnam to develop programs of technical cooperation. The mission of these Vietnamese institutions is very similar to those of SUT except for their lack of financial, physical and human resources. SUT has made preliminary commitments to include personnel from these institutions in relevant technical services activities such as technical workshops and seminars in Thailand.

3.4 Project Management Capability and Absorptive Capacity

3.4.1 Project Management Experience of the Partners

All CUTC institutions have relevant experience in international cooperation projects. Appendix VI provides a summary of each CUTC institution's international experience.

The Canadian Project Implementation Unit is staffed by Ryerson International's personnel on behalf of CUTC. Ryerson International has had considerable and relevant experience in the design, development, implementation and supervision of international cooperation projects. Ryerson International has managed and implemented programs of technical cooperation in over 20 countries in Asia, the Middle East, China, the Caribbean, Latin America, and Africa since 1982/83. Of particular relevance to this project are the following experiences:

(a) Ryerson International's role in the development of a consortium of community colleges and universities, The Canadian Education and Training Consortium (CETC), of which CUTC is a member. CETC is a key partner is the CIDE-RYERSON CORPORATION (CRC) which is the Canadian Executing Agency for an $8 million project of technical cooperation with the Brazilian National Industrial Apprenticeship Service (SENAI) to support the establishment of three technology centres of excellence in the Northeast of Brazil. The project is in its fourth year of operation and has been quite successful in meeting all of its stated objectives according to planned schedules.

(b) Ryerson International is the manager of a joint Ryerson/Guelph partnership in a project of technical cooperation to support the development and strengthening of institutional capacity of NUR University in Bolivia. The project is in its final year of activity. Its programs and deliverables have been successfully completed and its goals achieved according to stated objectives.

(c) Ryerson International managed a similar, although less multifaceted five-year project of technical cooperation between Ryerson and the Shanghai University of Technology (SUT), to support the upgrading of advanced technology programs in microelectronics and computer technology, as well as international business and trade.

3.4.2 Absorptive Capacity of the Thai Partners

As mentioned earlier, the Government of Thailand has designated Korat, the capital of the province of Nakhon Ratchasima, as the regional industrial centre for the Northeast and SUT as a key institution for the development of human resources for the region. Funds in excess of $30 million have already been spent on building the physical infrastructure of the university. The infrastructure includes university administration buildings; academic buildings including classroom, lecture theatres, laboratories, and workshops; housing units for staff and students; recreational facilities; and other relevant facilities. Details concerning the status of the university development are outlined in the two Canadian Mission Reports to Thailand in Appendix II. The Ministry of University Affairs (MUA) in Thailand has allocated an additional $30 Million from Thai and bilateral funds to complete the university development over the five year period 1993 to 1998.

In addition, MUA has designated SUT as the first autonomous Thai university, providing it with the legal and financial framework to make SUT's salary structure attractive for the Thai academic community. As a result, SUT was able to attract and hire experienced and respectable academics from other Thai universities in key senior administrative positions. SUT has also been able to hire and fill key academic chairs and coordinator positions for the first phase of its academic development program involving the six academic disciplines targeted for support by this project. These six academic disciplines represent only 20% of the overall long-term academic plan for the university. SUT, therefore, appears to be in a fairly favourable position to provide the financial resources and supporting services to facilitate the participation of the appropriate personnel in the targeted programs over the life of the project.

The design of the various programs, activities, and deliverables was an ongoing joint effort by CUTC institutions and SUT extending over a period of 2 years since the first reconnaissance mission by Ryerson International's Associate Director in August 1990. Since then, there have been two Canadian missions to Thailand and two Thai missions to Canada to design, modify, and analyze, in great detail, the content and schedule of various project activities and ensure the viability of their implementation, taking into account the financial and human resources capacities of SUT.

3.4.3 Absorptive Capacity of the Canadian Partners

The coordination of the participation of four Canadian institutions in this project requires careful consideration of institutional strengths, areas of specialization, and availability of Canadian professors and other personnel. This was taken care of in the design of the management structure through the appointment of a Canadian technical adviser to provide advice to the Project Implementation Unit concerning the design, coordination, and implementation of project activities in Thailand and Canada. The timing of various project activities, especially the technical services provided in Thailand by Canadian professors and consultants, took advantage of some complementarity of academics semesters in Thailand and Canada. Canadian participants will travel to Thailand in the period May-September, which often represents a relatively low activity period in Canadian universities.

A number of additional measures have been incorporated in the design of the project to ensure the ability of the CUTC institutions to fulfil their commitment to the project:

(a) CUTC institutions will make a special effort to encourage their professors to participate in the proposed project initiatives during their sabbatical leaves.
(b) The equitable division of labour between the four CUTC universities in the international applied science and engineering undergraduate program is as follows: mechanical engineering (Waterloo); electrical engineering (Ryerson); chemical and environmental engineering (TUNS); and food science and engineering (Guelph); and will ensure that no institution is committed to accepting more than its absorptive capacity of Thai students (a maximum of 10-15 students per year starting in 1997).
(c) The division of labour between three of the CUTC universities in the joint research and Ph.D. program ensures that no university is committed to accepting more than five Thai Ph.D. students, which should not present a problem for the CUTC universities.

4.0 ACCESS TO INFORMATION

The Canadian institutions do not foresee any problems concerning access to information in Canada and under the provisions of Access To Information legislation. All institutional planning and operational documents will therefore be available for evaluation upon request by the CEA acting on behalf of CIDA. The availability of information in Thailand is subject to different guidelines and no Access to Information Act exists at present. SUT senior academic personnel, however, have made a commitment to share planning and operational information relevant to the project with the Project Steering Committee and the CEA.

APPENDIX I:

DESCRIPTION OF CANADIAN AND THAI PARTNER INSTITUTIONS

1. Origin

Over the past decade, the pace of scientific and technological advancement in Thailand together with the rapid industrialization of the country, has brought an overwhelming demand for high-level manpower and technical know-hows in various fields of science and technology. In response to the country's development needs, a number of projects to establish new higher education institutions under the Ministry of University Affairs were put forward during the Fifth National Economic and Social Development Plan (1982-1986).

In February 1984, The Ministry of University Affairs appointed a committee to review the proposals for the establishment of new higher education institutions. This body duly decided to set up four working groups to undertake feasibility studies in the four regions of Thailand. In regard to the Northeast region, the committee recommended that two colleges be established in Ubon Ratchathani Province and Nakhon Ratchasima Province, the college in Ubon Ratchathani to be called Ubon Ratchathani College and the one in Nakhon Ratchasima to be called Suranaree College. The cabinet approval was delayed for over three years, however, due to the uncertainty of economic situation at the time.

Then in September 1988, the Cabinet brought up the matter for reconsideration and passed the resolution for the establishment of new regional universities including the approval for the establishment of Suranaree College in Nakhon Ratchasima Province under jurisdiction of Khon Kaen University with provision that this college must be further developed to be an independent university in the future In accordance with this provision, the Ministry of University Affairs appointed the Suranaree University Project Committee to take responsibility for preparing and carrying out the Suranaree University Project.

After a period of further study and consultation, the committee recommended along with the operational details of the project, that the future university be renamed to Suranaree University of Technology as to reflect the unique commitment to the scientific and technological development of the country.

2. Location

The Northeastern Region of Thailand has been one with extensive natural and human resources yet with only one higher educational institution for advanced study in science and technology, namely, Khon Kaen University. This institution is, therefore, unable to meet the needs of the region, particularly the demand for personnels highly trained in science and technology to support economic and industrial expansion in the region.

For Nakhon Ratchasima province in the lower Northeast, both physical and economic factors make it an ideal location for a new university. Nakhon Ratchasima is a large province, second only to Bangkok in terms of population. Surrounded by Chaiyaphum, Buriram, and Surin provinces with modern highway and railway system, it is the gateway linking Northeastern Region with the Central Region and the Eastern Seaboard. Topography and climate are also favorable. Located on a plateau surrounded by hills, the province has a tropical savanna climate. The average annual temperature is 26 - 27 ^{o} c and the monsoon and tropical depressions provide rainfall adequate for agriculture.

Nakhon Ratchasima is the site of the regional or district headquarters of many government agencies serving the Northeast, including, the Office of Education, the Irrigation Office, the Livestock Department, the Royal Forestry Department, the Rural Development Operation Center, the Army's Regional Headquarters, and the Headquarter of the First Squadron, Royal Thai Air Force.

Nakhon Ratchasima is also a center of agriculture and industry. It was designated a regional economic center since the Fifth National Economic and Social Development Plan (1982-1986), for studies have shown it has raw materials and resources sufficient to support manufacturing and other industries. Industrial establishments are already in operation include gunny bag mills, kenaf combing and spinning mills, tapioca-product plants, electricity-generating stations, automobile industries, and rock-crushing plants.

The site of university is a 7,000 rai plot of land (approx. 2,800 acres) in Huay Ban Yang Reservoir area, about 20 kilometers from the business center of Nakhon Ratchasima.

Table 1 : Suranaree University of Technology's curriculum

School/Department	Type of course/Degree offered			
1. School of Science				
1.1 Basic Sciences	Service Course	-	-	-
1.2 Basic Sciences	-	-	MS.	Ph.D.
2. School of Social Technology				
2.1 General Education	Service Course	-	-	-
2.2 Information Technology	-	-	MS.	Ph.D.
2.3 Management Technology	-	-	MS.	Ph.D.
2.4 Technology Management	-	-	MS.	Ph.D.
3. School of Agricultural Technology				
3.1 Plant Production Technology	-	BS.	MS.	Ph.D.
3.2 Animal Production Technology	-	BS.	MS.	Ph.D.
3.3 Biotechnology	-	BS.	MS.	Ph.D.
3.4 Agricultural Engineering	-	BS.	MS.	Ph.D.
3.5 Food Technology	-	BS.	MS.	Ph.D.
3.6 Genetic Engineering Technology	-	BS.	MS.	Ph.D.
3.7 Agricultural Product Development Technology	-	BS.	MS.	Ph.D.

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3. University Mission

Suranaree University of Technology is expected to help boosting investments in the region and make subsequent impact on economic growth, job opportunities and income distribution for the people of the Northeast. It is also to facilitate growth in agricultural and agro-industrial sectors in the area. In doing so, the university must fulfill the following missions:

1) To produce high level manpower in the fields of agricultural, industrial, resource, and social technology to meet the needs of the region and country.
2) To pursue experimentation, research and development in the fields of agricultural, industrial, resource, and social technology to serve national and regional development necessities.
3) To provide technical services for public and private sectors and foster the use of university facilities for public purposes.
4) To foster the preservation of art and culture in the Northeast region.

4. University Structure

The administrative structure of Suranaree University of Technology has been devised to efficiently support university operations. Specifically, Suranaree University of Technology will function primarily in four types of activities and the organizational structure is developed to reflect these four primany functions:

1) Office of the President is responsible for coordination of university policy in all areas and for administrative and business duties in coordination with the administrative sections of the schools, centers, and institute.

2) Schools are responsible for instruction and research. Each school is composed of academic departments and has research facilities for use by its staff.

At presents five schools have been established:

2.1 School of Science

2.2 School of Social Technology

2.3 School of Agricultural Technology

2.4 School of Industrial Technology

2.5 School of Resource Technology

3) The Institute is responsible for conducting and coordinating research and development activities of the university. Currently the Research and Development Institute is the only research institute of the university.

4) Centers are responsible for providing technical services to agencies inside and outside the university.

The university now has five centers:

4.1 Student Service Center

4.2 Library and Educational Media Center

4.3 Computer Center

4.4 Equipment Center

4.5 Academic Services Center

However, incorporated within the Research and Development Institute is the Technopolis as a semi-independent R & D unit of the university. The Technopolis will be run in collaboration between the university, the government, and the private sectors.

5. The Design of Academic Programs

In determining which courses are to be offered, the university takes into consideration the needs of the regional community and the country and the capacity as well as the readiness of the university to acquire and secure necessary personnels and equipments to operate various units and programs.

With these factors in mind Suranaree University of Technology will offer the following academic programs:

1) School of Science

1.1 Basic sciences (non-degree program being a part of the general education curriculum)

1.2 Basic sciences (graduate level only)

2) School of Social Technology

2.1 General education (Non-degree)

2.2 Information Technology (graduate level only)

2.3 Management Technology (graduate level only)

2.4 Technology Management (graduate level only)

3) School of Agricultural Technology

3.1 Agricultural Engineering

3.2 Plant Production Technology

3.3 Animal Production Technology

3.4 Biotechnology

3.5 Food Technology

3.6 Genetic Engineering Technology

3.7 Agricultural Product Development Technology

4) School of Industrial Technology

4.1 Mechanical Engineering

4.2 Electrical Engineering

4.3 Electronics Engineering

4.4 Instrumentation Engineering

4.5 Industrial Engineering

4.6 Production Engineering

4.7 Bio-medical Engineering

4.8 Telecommunications Engineering

4.9 Computer Technology

4.10 Printing Technology

4.11 Transportation Technology

4.12 Packaging Technology

5) School of Resource Technology

5.1 Chemical Engineering

5.2 Environmental Engineering

5.3 Mining Engineering

5.4 Petro-chemical Engineering

5.5 Geotechnology

5.6 Fiber, Textile and Pulp Technology

5.7 Metallurgy

5.8 Polymer and Rubber Product Technology

5.9 Ceramics Technology

5.10 Energy Technology

In conjunction with the standards set forth by the Ministry of University Affairs, the emphasis of curriculum design is placed on several innovative features, i.e., an integrated generally education program, the application of work-based and multi-disciplinary teaching and learning strategies; the use of residential living concept to foster learning experiences, etc.

The philosophical foundation behind the curriculum design involves the belief that future technologists should possess four elements of qualities-technoware, humanware, inforware and orgaware. To acquire these qualities, students must progress through three major components of the curriculum:

1) General Education Courses in this category, accounting for no less than 30 credits, include subjects in social studies, languages, management and computer, etc.
2) Professional or Specialized Education Courses in this area are further divided into 2 groups:
   2.1 Fundamental courses in science and technology
   2.2 Major courses, placing a strong emphasis on on-the-job practice so as to be in line with the university's philosophy, must account for no less than 90 credits. Fundamental and major courses altogether
3) Free elective Courses, accounting for no less than 3 credits

School/Department	Type of course/Degree offered			
4. School of Industrial Technology				
4.1 Mechanical Engineering	-	BS.	MS.	Ph.D.
4.2 Electrical Engineering	-	BS.	MS.	Ph.D.
4.3 Electronics Engineering	-	BS.	MS.	Ph.D.
4.4 Instrumentation Engineering	-	BS.	MS.	Ph.D.
4.5 Industrial Engineering	-	BS.	MS.	Ph.D.
4.6 Production Engineering	-	BS.	MS.	Ph.D.
4.7 Computer Technology	-	BS.	MS.	Ph.D.
4.8 Packaging Technology	-	BS.	MS.	Ph.D.
4.9 Telecommunication Engineering	-	BS.	MS.	Ph.D.
4.10 Printing Technology	-	BS.	MS.	Ph.D.
4.11 Transport Technology	-	BS.	MS.	Ph.D.
4.12 Biophysics	-	BS.	MS.	Ph.D.
5. Academic Section of Resource Technology				
5.1 Chemical Engineering	-	BS.	MS.	Ph.D.
5.2 Environmental Engineering	-	BS.	MS.	Ph.D.
5.3 Polymer and Rubber Product Technology	-	BS.	MS.	Ph.D.
5.4 Ceramics Technology	-	BS.	MS.	Ph.D.
5.5 Geotechnology	-	BS.	MS.	Ph.D.
5.6 Fiber Textile and Pulp Technology	-	BS.	MS.	Ph.D.
5.7 Metallurgy	-	BS.	MS.	Ph.D.
5.8 Mining Technology	-	BS.	MS.	Ph.D.
5.9 Petro-chemical Engineering	-	-	MS.	Ph.D.
5.10 Energy Technology	-	-	MS.	Ph.D.

Table 2 : Plan for program opening

School/Department/Curriculum	First year of operation									
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1. School of Science										
1.1 Basic sciences	general education course (non-degree)									
1.2 Basic sciences	graduate program only									
2. School of Social Technology										
2.1 General Education	general education course (non-degree)									
2.2 Information Technology	graduate program only									
2.3 Management Technology	graduate program only									
2.4 Technology Management	graduate program only									
3. School of Agricultural Technology										
3.1 Plant Production Technology			Academic Year 1992							
3.2 Animal Production Technology			Academic Year 1992							
3.3 Biotechnology			Academic Year 1993							
3.4 Agricultural Engineering					Academic Year 1994					
3.5 Food Technology					Academic Year 1995					
4. School of Industrial Technology										
4.1 Mechanical Engineering			Academic Year 1992							
4.2 Electrical Engineering			Academic Year 1992							
4.3 Transport Engineering			Academic Year 1992							
4.4 Telecommunications Engineering			Academic Year 1992							
4.5 Electronics Engineering			Academic Year 1993							
4.6 Instrumentation Engineering			Academic Year 1993							
4.7 Printing Technology			Academic Year 1993							
4.8 Packaging Technology			Academic Year 1993							
4.9 Industrial Engineering					Academic Year 1994					
4.10 Production Engineering					Academic Year 1995					
4.11 Computer Engineering						Academic Year 1996				

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School/Department/Curriculum	First year of operation									
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
5. School of Resource Technology										
5.1 Chemical Engineering			Academic Year 1992							
5.2 Environment Engineering			Academic Year 1992							
5.3 Polymer and Rubber Product Technology			Academic Year 1993							
5.4 Ceramics Technology					Academic Year 1994					
5.5 Geotechnology					Academic Year 1995					
5.6 Fiber Textile and Pulp Technology						Academic Year 1996				
5.7 Metallurgy							Academic Year 1997			
5.8 Mining Technology								Academic Year 1998		
Total 28 Branches	12	6	3	3	2	1	1	1	-	-

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Table 3 : Estimated student enrollment of SUT

Subject Area	Academic Year										Collective Sum
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	
1. Agricultural Technology	120	180	240	300	300	300	300	300	300	300	2640
2. Industrial Technology	240	480	540	600	660	660	660	660	660	660	5820
3. Resource Technology	120	180	240	300	360	420	480	480	480	480	3540
Total number of new students	480	840	1020	1200	1320	1380	1440	1440	1440	1440	12000
Total number of new and present students	480	1320	2340	3540	4380	4920	5340	5580	5700	5760	
Total number of graduates	-	-	-	-	480	840	1020	1200	1320	1380	6240

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Table 4 : Estimated student enrollment : School of Agricultural Technology

Subject Area	Academic Year										Collective Sum
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	
1. Plant Production Technology	60	60	60	60	60	60	60	60	60	60	600
2. Animal Production Technology	60	60	60	60	60	60	60	60	60	60	600
3. Biotechnology	-	60	60	60	60	60	60	60	60	60	540
4. Agricultural Technology	-	-	60	60	60	60	60	60	60	60	480
5. Food Technology	-	-	-	60	60	60	60	60	60	60	420
Total number of new students	120	180	240	300	300	300	300	300	300	300	2640
Total number of new and present students	120	300	540	840	1020	1140	1200	1200	1200	1200	
Total number of graduates	-	-	-	-	120	180	240	300	300	300	1440

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Table 5 : Estimated student enrollment: School of Industrial Technology

Subject Area	Academic Year										Collective Sum
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	
1. Mechanical Engineering	60	60	60	60	60	60	60	60	60	60	600
2. Electrical Engineering	60	60	60	60	60	60	60	60	60	60	600
3. Transport Technology	60	60	60	60	60	60	60	60	60	60	600
4. Telecommunications Engineering	60	60	60	60	60	60	60	60	60	60	600
5. Electronics Engineering	-	60	60	60	60	60	60	60	60	60	540
6. Instrumentation Engineering	-	60	60	60	60	60	60	60	60	60	540
7. Packging Technology	-	60	60	60	60	60	60	60	60	60	540
8. Printing Technology	-	60	60	60	60	60	60	60	60	60	540
9. Industrial Engineering	-	-	60	60	60	60	60	60	60	60	480
10. Production Engineering	-	-	-	60	60	60	60	60	60	60	420
11. Computer Technology	-	-	-	-	60	60	60	60	60	60	360
Total number of new students	240	480	540	600	660	660	660	660	660	660	5820
Total number of new and present students	240	720	1260	1860	2280	2460	2580	2640	2640	2640	
Total number of graduates	-	-	-	-	240	480	540	600	660	660	3180

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Table 6 : Estimated student enrollments: School of Resource Technology

Subject Area	Academic Year										Collective Sum
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	
1. Chemical Engineering	60	60	60	60	60	60	60	60	60	60	600
2. Environmental Engineering	60	60	60	60	60	60	60	60	60	60	600
3. Polymer and Rubber Product Technology	-	60	60	60	60	60	60	60	60	60	540
4. Ceramics Technology	-	-	60	60	60	60	60	60	60	60	480
5. Geotechnology	-	-	-	60	60	60	60	60	60	60	420
6. Fiber Textile and Pulp Technology	-	-	-	-	60	60	60	60	60	60	360
7. Metallurgy	-	-	-	-	-	60	60	60	60	60	300
8. Mining Engineering	-	-	-	-	-	-	60	60	60	60	240
Total number of new students	120	180	240	300	360	420	480	480	480	480	3540
Total number of new and present students	120	300	540	840	1080	1320	1560	1740	1860	1920	
Total number of graduates	-	-	-	-	120	180	240	300	360	420	1620

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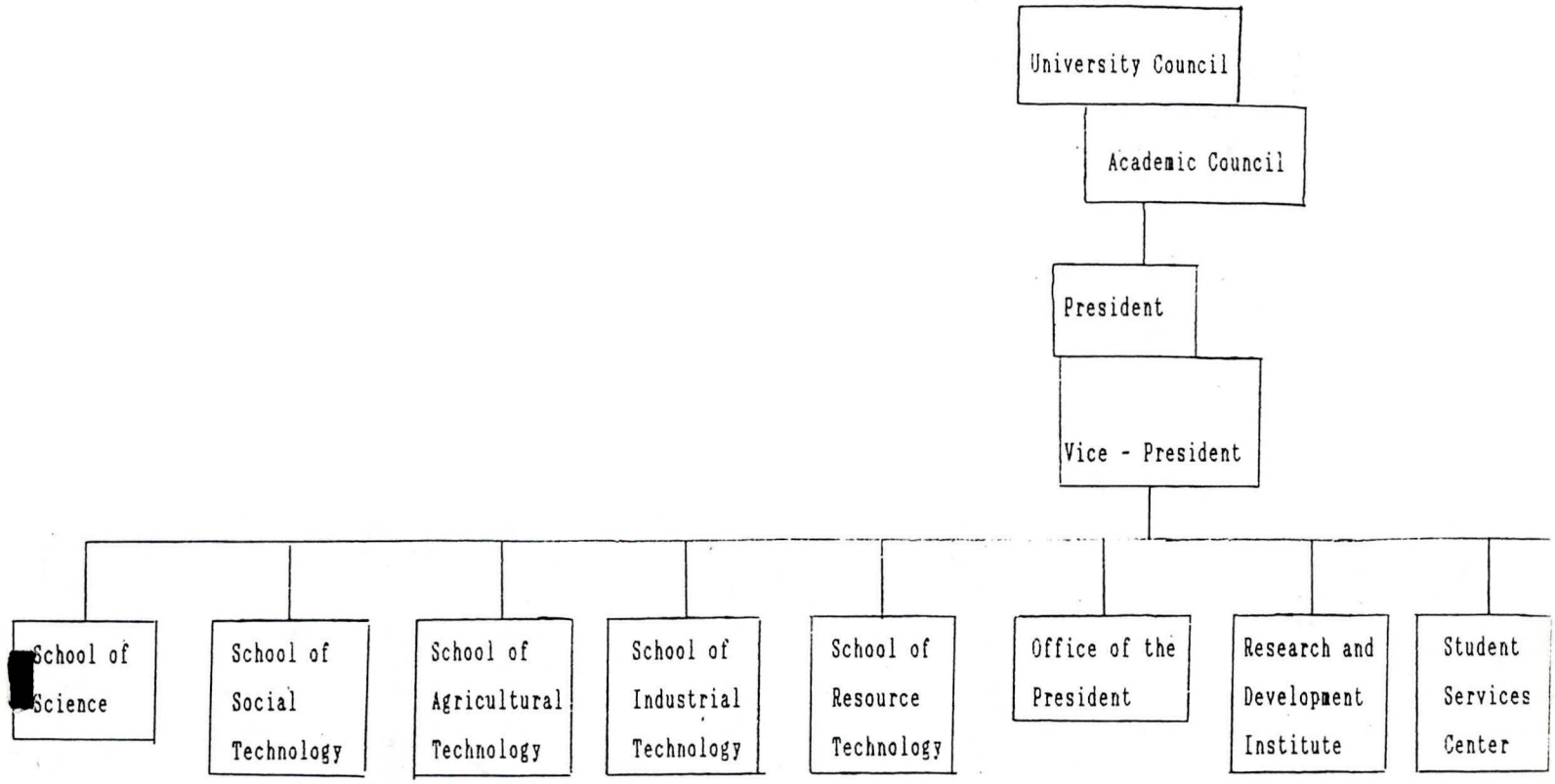

dministrative Section
- Departments
- Research Lab.

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- Administrative Division
- Finance Division
- Planning Division
- Personnel Division
- Student Affairs Division
- Buildings and Grounds Division
- Foregin Relations Division

- Administrative Section
- Coordination Sub-Division
- Document Sub-Division
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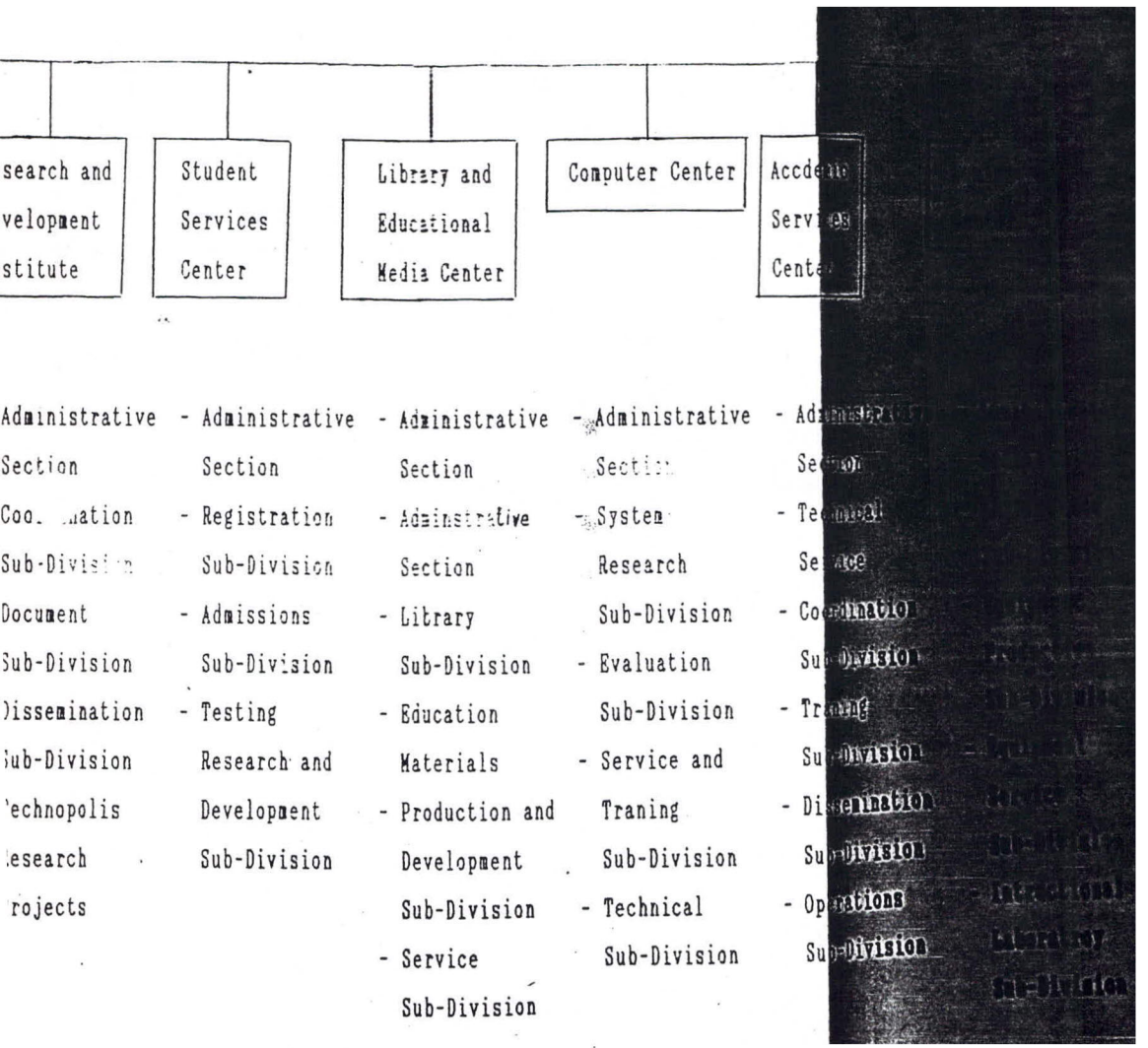
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THE UNIVERSITY OF WATERLOO

The University of Waterloo, with more than 25,000 students and 72,000 alumni, is a distinctive university of high quality stemming from the many innovations in teaching and research it has pioneered throughout its short history.

Classes at the University of Waterloo commenced in July, 1957, with the introduction of the Co-operative Engineering program. In March, 1959, a Private Bill was approved by the Legislative Assembly of the Province of Ontario incorporating the University of Waterloo as a degree-granting institution offering courses at both the undergraduate and the graduate level. The University is co-educational and non-denominational. It is a member of the Association of Universities and Colleges of Canada and the Association of Commonwealth Universities.

The University is situated on a beautiful 900 acre (365 hectare) campus in the northwest section of the City of Waterloo. Waterloo and its twin city Kitchener form a highly diversified business and industrial community with a combined population of approximately 240,000 located in midwestern Ontario.

Waterloo has focussed its development on six academic areas in two main groupings as follows: Engineering, Mathematics and Science on the one hand, and the Humanities, Social Sciences and Environmental Studies on the other. Within the six Faculties representing these fields of study are professional programs in Accounting, Actuarial Science, Architecture, Engineering, Optometry and Urban and Regional Planning. In addition to the academic programs offered by UW's six Faculties, an independent studies program and several interdisciplinary options are also available.

The University of Waterloo is internationally renowned for basic and applied research, and is recognized as one of Canada's most research intensive universities. A reputation for innovation and creativity is built upon the University's solid foundation in basic research and a strong commitment to apply the results of scientific inquiry to technological, economic and societal needs.

Co-operative Education

Many of the University's programs relate to the workplace through Waterloo's pioneering of co-operative education in Canada. Almost 10,000 of Waterloo's 16,000 full-time students are enrolled in co-operative education programs in which four-month academic terms are alternated with four-month work terms for practical career experience. Co-op students graduate with two years of career experience in addition to the normal four years of academic studies at the honours level.

Waterloo introduced co-operative education to Canada at its founding in 1957 with Engineering as the original program. Now there are 40 co-operative programs available in all six Faculties. Waterloo's co-op enrolment is the largest in the world.

International Programs

The University has undertaken many international co-operation, development and exchange programs, for which the International Programs Office provides assistance, liaison and administration. A listing of Waterloo's current international development projects and collaboration and exchange agreements is attached.

The Faculty of Engineering has been involved in major development activities in Brazil and China, assistance programs in the Ukraine and South Africa, and faculty and student exchanges with many countries all over the world.

Links with Industry

The University continues to strive to help improve Canada's competitive position by seeking new technologies for development and commercialization. Numerous spin-off companies have been formed over the years as a result of the University's support for technology transfer and licensing. The interest of students, staff and faculty in entrepreneurial activity has increased markedly over the past decade, as has research conducted under contract with the private sector.

Faculty of Engineering

The Faculty of Engineering has seven fully accredited undergraduate programs: Chemical, Civil, Computer, Electrical, Geological, Mechanical and Systems Design. All disciplines offer graduate programs leading to both the M.A.Sc. and Ph.D. degrees.

Mathematics teams from Waterloo, which frequently include Engineering students, have excelled in their performance in the annual International Putnam Mathematics Contest; the Waterloo teams are typically in the top five, in company with Harvard, MIT, Princeton and Harvey Mudd. Since 1991 Waterloo has had the highest number of Industry, Trade and Technology Canada Scholarships awarded to its students of any university in the country. Within the University, the largest number of Canada Scholarships are awarded to Engineering students. In 1993, eight of the prestigious NSERC Scholarships were awarded to Waterloo, the largest number to any one institution in Canada; of the eight, seven went to Engineering students.

Co-operative Engineering Program

The preparation for an Engineering career includes both formal academic studies and intensive training in the practice of Engineering. The Co-operative Engineering Program at Waterloo provides a completely integrated pattern of academic study and industrial experience in various phases of Engineering, with graduation requiring satisfactory performance in both areas.

TECHNICAL UNIVERSITY OF NOVA SCOTIA

The Technical University of Nova Scotia (TUNS) is a unique post secondary institution in the Canadian educational system. TUNS is an independent technical university constituting a comprehensive center for research and the development of manpower in the fields of the technical professions. The Universities mission is to foster the development of Nova Scotia by providing excellence and leadership in engineering, architecture and computer science education and research.

The TUNS educational system is unique in that all undergraduate programs are jointly offered through a series of ten affiliated universities who offer the first two years of the programs, leaving TUNS free to concentrate on the senior undergraduates and post-graduate programs. TUNS has 1400 students and in terms of graduating students is the sixth largest engineering facility in Canada. It has 480 post-graduate students. TUNS has two faculties, (Engineering and Architecture), and a School of Computer Science. It offers degrees in the following programs of study:

ARCHITECTURE
Architecture
Environmental Design Studies
Urban and Rural Planning*

COMPUTER SCIENCE
Electronics Option
Industrial Option
Chemical Processes Option

ENGINEERING
Agricultural Engineering
Applied Mathematics
Bio-environmental Engineering
Biomedical Engineering*
Chemical Engineering
Civil Engineering
Electrical Engineering
Engineering Mathematics*
Food Science*
Industrial Engineering
Mechanical Engineering
Metallurgical Engineering
Mining Engineering
Naval Architecture and Marine Engineering*
Water Resources Engineering*
Fisheries Engineering*

* Offered at the graduate level only.

A work/study Co-operative program is offered in Architecture, Computer Science and most Engineering departments. These programs formally integrate academic study terms with industrial work terms in order to enhance a students professional development.

Each engineering department has well-equipped laboratories for teaching and research. The University is surrounded by, and interacts with, a large research community. All laboratories have links to computing facilities both in house and in centralized locations. The TUNS library has the best collection of engineering reference material in Maritime Canada and operates as part of the regional and national technical information network. Local research institutes and universities allow access to large-scale specialized equipment.

TUNS has a critical role as an agent of change contributing to the quality of life and the economic and technical betterment of Canada, its Atlantic Region and Nova Scotia. Combining the resources from a number of academic departments of the University and drawing from industry, government and the community, Centres of Excellence have been established to provide a focus and direction to applied research and undergraduate and graduate studies. These Centers and Institutes operate nationally and internationally and promote the development and transfer of advanced

range of topics within the Department as well as in conjunction with other departments and a number of research centres on the campus. Students have the option of joining either the co-op or non co-op undergraduate programs.

The Department of Chemical Engineering at the Technical University of Nova Scotia currently consists of 7 full-time faculty members, 5 adjunct professors, 97 undergraduate students, 3 technologists and about 25 graduate students.

Environmental Programs

The Faculty of Engineering is cognizant of the current and future importance of the environment and of the desirability of offering young Nova Scotians opportunities to take environmental engineering programs. Three department are actively involved in programs in environmental engineering. The Department of Chemical Engineering has included an environmental option within the Chemical Engineering program. The student would take four technical elective courses in the final two terms of the Chemical Engineering program. The Department of Civil Engineering has defined an environmental stream where the students start to specialize in the third term of the Civil Engineering program at TUNS.

The Department of Agricultural Engineering has developed a joint program with the Nova Scotia Agricultural Collage in bio-environmental engineering. This program has been designed to attract transfer students from agricultural science primarily but it would also appeal to science students, particularly biology majors. Engineering students can also transfer with a term or so makeup.

TUNS undertakes research in the area of the environment through several of our Departments and Centres. These include Agricultural Engineering, Chemical Engineering, Civil Engineering, Mechanical Engineering, Department of Urban and Rural Planning, and the Centre for Water Resources Studies. TUNS is a partner in the Centre for Environmentally Sustainable Economic Development.

technology.

TUNS operates the following Centres:

Atlantic Industrial Research Institute (AIRI)
Biomedical Engineering Institute
Centre for Water Resource Study (CWRS)
Canadian Institute for Fisheries Technology (CIFT)
Centre for Marine Vessel Design and Research (CMVDR)
Vehicle Safety Research
Minerals Engineering Centre
Nova Scotia CAD/CAM Centre

In addition we are partners in the following Centres:

Nova Scotia Centre for Environmentally Sustainable Economic Development (CESED)
Advanced Materials Engineering Centre (AMEC)
Applied Microelectronics Institute (AMI)

TUNS has been involved in a wide range of projects in the field of international development. Currently TUNS has nine human resources development linkage projects in the fields of agricultural engineering, industrial engineering, mechanical engineering, energy studies, environment, urban planning, and water resources. TUNS is also involved in research projects in small scale water supplies, low cost housing, fish processing equipment, solar water heaters, small scale fluidized bed combustors and circulating fluidized bed boilers. TUNS is involved in each continent and the following countries: Guyana, Trinidad, Peru, Columbia, Nigeria, Kenya, Egypt, India, Pakistan and China. It has 400 international students from over 50 countries admitted to its programs.

Department of Chemical Engineering

The Chemical Engineering program prepares students for careers in the chemical and process industries and in a variety of related fields. These encompass, among others, the traditional areas of environmental control, plastics and polymers, pulp and paper, instrumentation and process control, petrochemicals, petroleum and natural gas processing and energy conversion and utilization, as well as the growing fields of biotechnology, food processing, composite materials, corrosion and protective coatings, and manufacture of microelectronic components.

The curriculum is designed to provide the student with a broad background in the underlying science of chemistry, physics and mathematics. This is then combined with a detailed knowledge of engineering principles and practice, along with a good appreciation of social and economic factors. Thorough understanding of the principles is accomplished through lecture, tutorial and laboratory activities, and extensive use is made of the departmental computing facilities. Laboratory involvement is considered an important component of the student's education. Elective courses provide the student with the opportunity to obtain additional training in one of the following areas: computers and process control, biotechnology, environment, energy resources and utilization, and research and development.

Research opportunities leading to the Master's and Doctorate degrees are offered in a wide

UNIVERSITY of GUELPH

CENTRE FOR INTERNATIONAL PROGRAMS

March 29, 1993

PROFILE

The University of Guelph is a mid-sized Canadian university established as a degree-granting institution in 1964. Some 15,000 students are enroled in seven faculties - agriculture, veterinary medicine, family and consumer studies, arts, social sciences, biological science and physical science. It offers a broad range of post-graduate degrees, with the majority of graduate students enroled in agriculture and veterinary medicine. The University has the largest agriculture and veterinary faculties in Canada and employs approximately 750 faculty engaged in research, teaching and service.

The University has engaged in international activities in a systematic way since 1970. It has a formal commitment to international activity in both developing and developed countries and it has provided a significant proportion of the trained manpower in agriculture, veterinary medicine and related fields in Canada and has contributed as well to these sectors in many countries of the world. A substantial number of faculty have been engaged in development work in the University's own projects or as consultants to projects in other organizations. The University's international development work has included apiculture, crop production, institutional strengthening, training workshops, food technology, agricultural engineering, humanistic studies, agricultural extension and training, aquaculture, veterinary training, research in numerous sectors, development communications support, applied social science, family studies, rural development and rural extension.

ORGANIZATION AND EXPERIENCE

The Centre for International Programs was the first of its kind in Canada and has a facilitating, coordinating role with the responsibility of stimulating and supporting a continually growing range of University involvement in international activities.

As the focal point for the University's negotiations and contractual arrangements for international activities, the Centre for International Programs is the major link with external funding agencies, government departments and institutions around the world. The Centre's responsibilities include preliminary planning leading to project and program development, as well as preparation and follow-up of project proposals, program monitoring, reporting and ongoing liaison with funding sources. Through these functions, the experience and expertise of the University community is focused effectively for international activities, over one hundred and thirty of which have been implemented by the University of Guelph from 1970 to the present.

GUELPH • ONTARIO • CANADA • N1G 2W1 • (519) 824-4120 • FAX (519) 767-0756

Through the Centre for International Programs, the University is able to access qualified scientists having specialized expertise and can provide services, in integrated project form or as separate entities in the following areas:

- Project identification, preparation, management and evaluation
- Prefeasibility and feasibility studies
- Human resources identification and recruitment
- Education sector and policy studies
- Rural Planning and development studies and project management
- Rural Extension Systems and training
- Overseas and on-site personnel training programs
- Distance education services
- Higher education development and education institution building
- Library systems and library information systems development
- Fellowship and faculty exchange programs
- Institutional cooperation programs
- Trainer training programs

ACADEMIC EXPERTISE (FOOD SCIENCE)

The University of Guelph has the only accredited Food Science program in Ontario and has been a leader in this area since the turn of the century. Food Science is an applied discipline that draws on all areas of science: chemistry, physics, engineering, biology and nutrition. The students are part of the Honours B.Sc. Program. The University works closely with the multi-billion dollar food industry and through the Cooperative Education option, provides the unique opportunity to ensure on-the-job training for students.

Courses are offered in Food Engineering, Food Chemistry, Food Microbiology, Food Processing, Food Analysis, Food Product Development, Food Packaging, Sensory Analysis, cultured and Fermented Foods, Beverage Technology, Meat Processing, Dairy Processing and Cereal Technology.

DEPARTMENT OF FOOD SCIENCE FACULTY/AREAS OF EXPERTISE

FACULTY	EXPERTISE
Dr. S. Barbut Associate Professor	Poultry products technology. Effect of processing on meat and eggs. Meat microbiology, gelation and structure.
Dr. D.L. Collins-Thompson Professor	Microbial physiology and applied genetics. Emphasis in Lactobacillus, Listeria, Clostridium.
Dr. D.G. Dalgleish Professor	Chair in Dairy Chemistry. Structure and behaviour of milk proteins.
Dr. J.M. deMan Professor Emeritus	Chemistry of fats and oils. Physical properties of foods including rheological measurements. Food additives.
Dr. C.L. Duitschaever Associate Professor	Industrial microbiology. Fermentation technology. Beverage technology. Food microbiology. Cultured dairy products.
Dr. H.D. Goff Assistant Professor	Processing, chemistry and structure of dairy products and formulated foods. Preservation of foods by freezing.
Dr. M.W. Griffiths Professor	chair in Dairy Microbiology. Dairy/food microbiology. Psychrotrophic bacterial pathogens. Food spoilage organisms.
Dr. E.A. Gullett Associate Professor	Sensory evaluation of foods as an analytical tool and a measurement of quality. Colour measurement.
Dr. L.J. Harris Professor	Interactions of micro-organisms in foods, natural Assistant antimicrobial agents, bacterial derived food ingredients.
Dr. A.R. Hill Assistant Professor	Milk proteins, cheese technology, dairy chemistry, dairy processing.
Dr. Y. Kakuda Associate Professor	Chemistry of food lipids and milk proteins. lipid oxidation. Confectionary products. Analytical techniques, nutrient analysis.
Dr. M. LeMaguer Professor and Chair	Food engineering. Kinetics and thermo-dynamics of food systems. Engineering of food materials. Food processing.
Dr. R.W. Lencki Assistant Professor	Food engineering, process economics, effluent treatment, extraction of food materials, bioreactor optimization.

DEPARTMENT OF FOOD SCIENCE FACULTY/AREAS OF EXPERTISE

FACULTY	EXPERTISE
Dr. A.G. Marangoni Assistant Professor	Physical properties of food materials. Biotechnology and genetic engineering. Fruit and vegetable products.
Dr. V.F. Rasper Professor	Chemistry and technology of carbohydrates. Cereal chemistry and dough rheology. Dietary fibre analysis.
Dr. D.W. Stanley Professor	Food enzymology and protein chemistry. Postharvest and post-mortem physiology. Food texture and microstructure.
Dr. H.J. Swatland Professor	Meat quality, muscle growth, electronic systems for measuring food quality and intracellular enzyme activity.
Dr. R. Y. Yada Associate Professor	Protein structure-function relationships. Food related enzymes. Post-harvest physiology and processing.

OTHER AREAS OF EXPERTISE

LIBRARY

The University's Library's collection of more than 2.5 million items (books, journals, documents, maps, films, slides, CD-ROM disks, video and audio-materials) is made freely available to all users through the public service divisions in the McLaughlin Library building and in the Veterinary Science Section, Ontario Veterinary College.

The Library has a leadership role within the academic community in the application of new information and communications technologies. It's chief staff have extensive international experience and were instrumental in developing the first open access library in a Chinese university.

MANAGEMENT INFORMATION SYSTEMS

The Department of Computing and Information Science provides a distinctive applied orientation emphasizing research that can contribute to industry and government. Training is based on three areas of technical specialization: distributed systems, interactive software environments and articial intelligence.

Several faculty have extensive international experience and have worked in Africa, the Americas and Asia in short term training courses and institutional strengthening.

SUMMARY

The association of the University of Guelph with the Canadian Universities Technology Consortium provides a superior blend of proven academic and scientific expertise. These strengths are focused on agricultural technology and human resource development.

Projects undertaken over the years have largely been carried out on behalf of the Canadian International Development Agency, World Heath Organization, Food and Agriculture Organization and the International Development Research Centre. The University of Guelph's international experience has spanned the globe. A list of projects (Appendix I) is attached for information.

Ryerson Polytechnical Institute

A member of the Council of Ontario Universities, Ryerson is internationally recognized as a leader in the provision of professionally relevant, career-oriented education. Its emphasis on applied professional education, as well as its research activities and extensive links with industry, make it particulary responsive to changing technology, social and labour-market needs, and international trends.

Through a blend of professional, professionally-related, and liberal studies courses, Ryerson programs integrate theory with contemporary practice. Ryerson offers 34 full- and part-time degree or diploma programs, of which 29 are degree programs, to more than 12,000 students. Many of its programs are unique not only provincially, but nationally, while others are comparable to those offered at other Ontario universities.

The Continuing Education Division serves more than 35,000 registrants, either at Ryerson, at off-campus locations, or through distance education programs. More than 800 courses are offered, covering more than 450 subject areas, and leading to professional certification, certificates, diplomas, or degrees in fields such as engineering, business, applied arts, and community services. The Division is continually developing new programs and courses and has been particularly responsive to the diverse educational needs of emerging professions and occupations.

Over the past decade, research activity at Ryerson has increased dramatically. Schools and departments throughout Ryerson are conducting research projects financed both internally and through government research grants and corporate sponsorship. The three special centres — the Office of Research and Innovation, the Centre for Advanced Technology Education, and Ryerson International — have all undertaken significant research programs.

Ryerson has a faculty of more than 600 teaching staff, with strong academic credentials and extensive related professional experience that is continually renewed by working with, and in, business and industry. The use of part-time faculty widens the scope of current practice and experience to which students are exposed. By maintaining close links with industry, Ryerson ensures the currency of its programs and forges relationships that often lead to valued partnerships.

Ryerson graduates enjoy very high rates of employment in fields related to their course of study, and high starting salaries. For more than half, job searches are not necessary because of numerous job offers or jobs obtained before graduation. In addition, approximately one-quarter of Ryerson graduates pursue post-graduate education.

Ryerson's downtown location in Toronto, Canada's largest and most multicultural city, ensures access to a wide range of commercial, cultural, and recreational activities.

Programs

The 34 Ryerson day school programs are administered by five faculties. They lead to either a Bachelor of Applied Arts, Bachelor of Business Management, Bachelor of Engineering, Bachelor of Social Work, or Bachelor of Technology degree. Programs marked with an asterisk lead to a diploma.

Faculty of Applied Arts

- Fashion (Design or Merchandising options)
- Graphic Communications Management
- Interior Design
- Journalism (Newspaper, Magazine, and Broadcast majors)
- Photographic Arts (Film Studies, Media Arts, or Still Photography options)
- Radio and Television Arts
- Theatre* (Acting, Dance, or Technical/Production programs)

Faculty of Arts

- Applied Geography
- Arts* (General studies)
- Public Administration

Faculty of Business

- Business Management (Accounting Finance, Business and Economics Decision Support Systems, Computer Business Information Systems, Human Resources Management, Marketing Management, or Management and Enterprise Development options)
- Hospitality and Tourism Management
- Administration and Information Management

Faculty of Community Services

- Child and Youth Care
- Early Childhood Education
- Environmental Health
- Food, Nutrition, Consumer and Family Studies
- Midwifery
- Nursing
- Social Work
- Urban and Regional Planning

Faculty of Engineering and Applied Science

- Aerospace Engineering
- Applied Chemistry and Biology
- Applied Computer Science
- Architectural Science
- Chemical Engineering (co-op)
- Civil Engineering
- Electrical Engineering
- Industrial Engineering
- Landscape Architecture*
- Mechanical Engineering
- Survey Engineering

Special Centres

Centre for Advanced Technology Education (CATE)

The Centre for Advanced Technology Education (CATE) exemplifies the partnerships that Ryerson has established with industry and government. It was developed in collaboration with major Canadian corporations, and with the federal and provincial governments, to provide manufacturing managers, professional engineers, technologists, and senior engineering students with advanced technology educational opportunities. CATE has also undertaken a significant research program.

CATE's expertise extends to:

- CIM (Computer integrated manufacturing).
- Lasers and fiber optics.
- Research and development projects.
- Co-operative ventures with business and industry.
- A wide range of training activities with a special emphasis on computer-related training and education.
- Implementation and management of new technology.
- Problem solving.

Participants in CATE programs benefit from access to some of the finest facilities and resources available in Canada.

Office of Research and Innovation (ORI)

The Office of Research and Innovation (ORI) promotes, encourages, and supports research among Ryerson faculty, students, and staff. It administers and contributes to the development of Ryerson research policy, and oversees the quality of research and adherence to research policy. ORI provides an Institute-wide focus and administrative centre for basic and applied research as well as research-related activities, which include innovations ranging from creative endeavours in the applied arts to the commercialization of technology. ORI is the point of contact for granting councils and other research funding sources, including government and industry.

Another aspect of ORI's mandate is to promote Ryerson research capabilities externally. Ryerson, through ORI, provides scientific and technical assistance to the external business community. ORI assists faculty and students in contracting research, development, and consulting projects with outside organizations, and assists industry by matching their needs to the facilities and expertise at Ryerson. Industrial projects cover a broad range of areas, including applied research, product and process development, and feasibility studies.

Other Resources

Rogers Communications Centre

The new Rogers Communications Centre is a leading facility for undergraduate education and professional development in the fields of communications and electronic media. Housing the Schools of Radio and Television Arts, Journalism, and Applied Computer Science, and featuring state-of-the-art communications systems, the Centre is designed to support the development of new interdisciplinary curricula and research ventures in areas at the forefront of communications technology.

Resource Centre for Development Studies

The Resource Centre for Development Studies (RCDS), located in the Ryerson library, is a specialized collection of resources focusing on developing countries and international development issues.

The collection and services have been developed during the past 12 years to provide support to Ryerson academic programs and the research, professional services, and projects undertaken by RI.

The collection covers a broad range of contemporary development topics and is particularly strong in those regions and subjects in which RI has been active. It includes files on more than 350 international development organizations and 120 countries, and has a significant collection of materials on development communications, education in developing areas, primary health care, technology transfer, and women in development.

The Ryerson library's main holdings (more than 300,000 volumes, 3,500 serial titles, microforms, and audio-visual materials), its bibliographic databases on CD-ROM, computerized search service, and interlibrary loan service strengthen the support given by RCDS to RI.

Ryerson International (RI), established in 1980, is the international agency of Ryerson Polytechnical Institute, a Canadian leader in the provision of applied professional education and a member of the Council of Ontario Universities, the Association of Universities and Colleges of Canada, and the Association of Commonwealth Universities. All linkages with institutions outside of Canada come under the auspices of the Centre.

RI is engaged in a wide range of international activities and programs with institutions in the US, Europe, Asia, Latin America, the Caribbean, and the Middle East. RI provides services such as education and training, applied research, human resource development, policy development, and organizational planning to support the development and capacity building of institutions in developing countries. RI's role is to plan, facilitate, manage, and monitor such programs of cooperation with partner institutions.

RI also plays a facilitating role in the development of institutional linkages between Ryerson and institutions of higher education in Europe, Japan, and North America. These agreements, which are reviewed and monitored by RI, may involve faculty, staff, student, or administrative personnel exchanges; joint research initiatives; or joint curriculum development; and are initiated, developed, and implemented by academic departments, schools, and faculties at Ryerson.

RI's international activities enrich Ryerson faculty and staff and have a long-term impact on teaching, research, and the internationalization of the curriculum. For these reasons, international cooperation is a logical extension of Ryerson's mandate to provide career-oriented education — today's graduates live and work in an interdependent global community.

RI Capacities

It is now widely accepted that relevant career-oriented higher education that prepares graduates for meaningful employment in the modern productive sectors of the economy is linked to the economic growth and development of modern nations bulding. As a result, career-oriented education has become the focus of expansion and diversification in higher education. At the same time, government agencies and the private sector are recognizing the need to give higher priority to human resource development and professional upgrading.

Independently and in broad-based consortia, RI offers a range of technical services that can assist public and private institutions in developing countries as they make major changes in education and training programs. These include:

- Feasibility and needs assessment studies for the development of new educational and training programs and institutions or the upgrading and modifying of existing programs and institutions.
- Assistance with the development and/or restructuring of post-secondary educational and training institutions. This includes planning of all aspects of education and training infrastructures, such as the construction of new institutions, institutional development and capacity building, the planning of support systems, faculty and staff training, and professional development programs.
- Fellowship training and upgrading for educators, administrators, professionals, and technical staff; and the development and delivery of specialized, short-term in-country academic and training programs.
- Technical advice and services on the introduction of new equipment and technical systems for education and training.

Resources and Expertise

Since its inception in 1948, Ryerson has evolved from a diploma-granting training institute into a degree-granting polytechnic with a rapidly expanding research capability. The experience of Ryerson's own growth and development is a significant asset to RI in assisting other institutions as they adapt to changing social and economic conditions.

The expertise of Ryerson faculty and administrative staff is one of RI's resources; to date, more than 150 faculty and staff members have been directly involved in international cooperation activities, the majority on overseas assignments. In addition, RI works in partnership with other special centres at Ryerson, such as the Centre for Advanced Technology Education, the Office of Research and Innovation, and the library's Resource Centre for Development Studies.

RI also works in partnership and consortia with other educational institutions, governmental and non-governmental institutions, and the private sector to bring the greatest range of expertise to its activities; these arrangements may involve Canadian, North American, or international partners.

Ryerson has been working internationally since the 1960s and is recognized by its peers — in universities, government, and the private sector — for the excellence of its work in international development.

Funding

Core funding for RI operations is provided by Ryerson. Funding for project activities comes from a variety of sources, depending on the nature of the project, and may include:

- Canadian bilateral funding agencies, especially the Canadian International Development Agency (CIDA) and the International Development Research Centre (IDRC).
- Multilateral international funding agencies, including the World Bank, UN agencies, and regional development banks.
- Direct contracts for services from national governments and private and public sector organizations overseas.

Partnerships

RI works cooperatively with its partners to assess needs in local, regional, and national contexts and identify how these needs can best be met. A common goal of all RI activities is to work closely with international partners to design programs that take full account of the social and cultural characteristics of partner institutions. Throughout the process, RI strives to combine a sensitivity to the specific requirements of its partners with the development of solutions that assist in achieving international standards.

Further Information

For further information on Ryerson International, please contact:

Professor Sam Mikhail
Director, Ryerson International
Ryerson Polytechnical Institute
350 Victoria Street
Toronto, Ontario, Canada, M5B 2K3
Telephone: (416) 979-5000 ext. 6072
Fax: (416) 979-5352

APPENDIX II:

INSTITUTIONAL COMMITMENTS

- Institutional Commitments: Letters from Presidents of SUT and CUTC Institutions
- Trip Reports of Planning Missions and Study Tours

Suranaree University of Technology
Laemthong Building
304 Payathai Road,
Rojathevee Bangkok, 10401
Thailand

April 2, 1993

Dr.S.W. Mikhail
Director
Ryerson International Development Centre
Ryerson Polytechnical Institute
350 Victoria Street
Toronto, Ontario M5B 2K3
Canada

Dear Director Mikhail

In response to your facsimile letter of 30 March 1993 concerning the SUT-CUTC Linkage Project proposal together with the corresponding revised itemized activity-based budgetary requirements, Suranaree University of Technology has the pleasure to confirm the following:

1. Our concurrence with the activity-based budgetary requirements of the SUT-CUTC Linkage Project as revised.
2. Our firm commitment to participate in the SUT-CUTC Linkage Project as outlined in the draft project proposal which was agreed upon by representatives of the five participating universities during their meeting at Ryerson Polytechnical Institute on 12 March 1993 and also in the revised activity-based budgetary requirements of the project accompanying your letter of 30 March 1993 to us.

Under the same enclosure, please find the information on student admission and enrolment targets of our university for each of the first six school years of its operation that you requested. Kindly take note that all figures pertaining to student enrolment, including those for school year 1993, are projections as the process of selecting one half of our first-year students

for school year 1993 through the Ministry of University Affairs has not been completed. The projections were based upon the actual situation for the first half of our fist-year students for school year 1993 whose admission was determined by our university.

I also would like to take this opportunity to thank you and your staff most sincerely for the fine planning mission arrangements, the generous assistance to the mission team from our university and other concerted efforts in all aspects of the project-proposal preparation, which have been highly instrumental to the success of the mission and the smooth and satisfactory progress of each necessary task. We hope that both the planning mission report and the project proposal will be ready for submission to CIDA before the closing date of 15 April 1993 for the first round. Should there be any other thing pertaining to these matters that requires the attention of our side, please feel free to advise us.

With best regards.

Sincerely yours,
FOR THE PRESIDENT:

SAM-ARNG SRINILTA
Acting Vice President for Planning
and Development

UNIVERSITY OF WATERLOO
OFFICE OF THE DEAN OF RESEARCH

Needles Hall
University of Waterloo
Waterloo, Ontario N2L 3G1

Tel. (519) 888-4889
Fax (519) 746-7151
Telex 069-55259

April 6, 1993

President T. Grier
Ryerson Polytechnical Institute
350 Victoria Street
Toronto, Ont. M5B 2K3

Dear Dr. Grier:

I wish to confirm the participation of the University of Waterloo in the Canadian Universities Technology Consortium (CUTC), and to recognize Ryerson International on behalf of Ryerson Polytechnical Institute as the co-ordinating agency of this voluntary consortium.

The University of Waterloo, together with the members of CUTC (the University of Guelph, Ryerson Polytechnical Institute and the Technical University of Nova Scotia) will support the design, implementation and supervision of activities in a project of institutional linkage and technical co-operation between Suranaree University of Technology (SUT), Thailand, and the Canadian Universities Technology Consortium (CUTC), Canada.

Furthermore, Waterloo will provide the expertise of academic administrators and faculty in the design, development, joint delivery and supervision of an international Science and Engineering program in Mechanical Engineering at SUT. It is our understanding that the first two years of the program will be delivered in English at SUT and that a limited number of students will then be offered the option of entering the third year of the program at Waterloo to obtain their degree. This will of course be done in compliance with academic standards and the accreditation requirements of the Canadian Engineering Accreditation Board (CEAB), and with due regard for limitations on enrolment at Waterloo.

Waterloo has also agreed to participate in a joint Ph.D. program in which the research phase of the program is undertaken in Thailand by Thai candidates under the joint supervision of professors from CUTC and SUT. This is subject to an appropriate match of research interests, supervisors and candidates.

We look forward to working with our Canadian partners in strengthening links with Thai institutions of higher education, and in particular with SUT.

Yours sincerely,

Arthur J. Carty

Arthur Carty
Dean of Research

cc: Dr. Wichit, President, Suranaree University of Technology

TUNS
Technical
University
of Nova Scotia

Office of the President

March 18, 1993

President T. Grier
Ryerson Polytechnical Institute
350 Victoria Street, Toronto, Ontario, M5B 2K3

Dear President Grier:

I wish to confirm the participation of the Technical University of Nova Scotia in the Canadian Universities Technology Consortium (CUTC) and to recognize Ryerson International on behalf of Ryerson Polytechnical Institute as the coordinating agency of this voluntary consortium.

Technical University of Nova Scotia, together with the members of CUTC, Guelph, Ryerson and Waterloo Universities, will support the design, implementation and supervision of activities in a project of institutional linkage and technical cooperation between Suranaree University of Technology (SUT), Thailand and (CUTC), Canada.

Further, Technical University of Nova Scotia will provide the expertise of academic administrators and faculty in the design, development, joint delivery and supervision of an international science and engineering program in Chemical Engineering/Environment at SUT. It is my understanding that the first two years of the program will be delivered in English at SUT and the students will then have the option of entering the third year of the program at Technical University of Nova Scotia to attain their degree. This will, of course, be done in compliance with Technical University of Nova Scotia academic standards and the accreditation requirements of the Canadian Engineering Accreditation Board (CEAB), a standing committee of the Canadian Council of Professional Engineers (CCPE).

Technical University of Nova Scotia has also agreed to participate in a joint Ph.D. program in which the research phase of the program is undertaken in Thailand by Thai candidates under the joint supervision of professors from CUTC and SUT.

Technical University of Nova Scotia looks forward to working with our Canadian partners in strengthening links with Thai institutions of higher education, and in particular with SUT.

Yours sincerely,

Donald A. Roy, P.Eng.
President

DAR/fep
cc: Dr. Wichit, President, Suranaree University of Technology (SUT)
CUTC University Presidents

P.O. Box 1000
Halifax, Nova Scotia
Canada
B3J 2X4

Tel: (902) 420-7644
Fax: (902) 420-7551

UNIVERSITY of GUELPH

OFFICE OF THE PRESIDENT

March 30, 1993

Mr. Terence Grier, President
Ryerson Polytechnical Institute
350 Victoria St.
Toronto, Ontario
M5B 2K3

Dear Mr. Grier:

Re: HRD Policy and Institutional Linkages Project
between Suranaree University of Technology (SUT)
and Canadian Universities Technology Consortium (CUTC)

I wish to confirm the participation of the University of Guelph in the Canadian Universities Technology Consortium (CUTC) and to recognize Ryerson International on behalf of Ryerson Polytechnical Institute as the coordinating agency of this voluntary consortium.

The University of Guelph, together with the members of CUTC; the University of Waterloo, Ryerson Polytechnical Institute and Technical University Nova Scotia, will support the design, development, joint delivery and supervision of activities in a project of institutional linkage and technical cooperation between Suranaree University of Technology (SUT) Thailand and the Canadian Universities Technology consortium (CUTC) Canada.

Further, the University of Guelph will provide the expertise of academic administrators and faculty in the design, development, joint delivery and supervision of an international science and engineering program in Food Science, Information Management Systems and Library Information Systems at SUT. It is my understanding that the first two years of the program will be delivered in English at SUT and that students will then have the option of entering the third year of the program at the University of Guelph to attain their degree. This will, of course, be done in compliance with this University's academic standards and the accreditation requirements of the Canadian Engineering Accreditation Board (CEAB), a standing committee of the Canadian Council of Professional Engineers (CCPE).

GUELPH • ONTARIO • CANADA • N1G 2W1 • (519) 824-4120

Mr. Terence Grier, President
Ryerson Polytechnical Institute

The University of Guelph has also agreed to participate in a joint PhD program in which the research phase of the program is undertaken in Thailand by Thai candidates under the joint supervision of professors from CUTC and SUT.

The University of Guelph looks forward to working with our Canadian partners in strengthening links with Thai institutions of higher education and in particular with Suranaree University of Technology.

Sincerely yours,

Dr. J.R. MacDonald
Acting President

cc: Dr. J. Downey, President
University of Waterloo

Dr. Donald A. Roy, Acting President
Technical University of Nova Scotia

Dr. James Shute, Director
Centre for International Programs

RYERSON
OFFICE OF THE PRESIDENT

April 5, 1993

Dr. Wichit Sri-sa'an
President
Suranaree University of Technology (SUT)
328 Si-Ayudhya Road
Phayathai, Bangkok 10400
Thailand

Dear Dr. Wichit:

I write to confirm the commitment of Ryerson Polytechnical Institute to participate in the Canadian Universities Technology Consortium (CUTC).

Ryerson, together with the member universities of CUTC: the Technical University of Nova Scotia, and the Universities of Waterloo and Guelph, will support the design, implementation and supervision of activities in a project of Institutional Linkage and Technical Cooperation between Suranaree University of Technology (SUT), Thailand and CUTC,Canada.

Ryerson, in its role as the coordinating institution for the consortium will submit the project proposal to the Project Steering Committee of the Human Resources Policy, Institutional Linkage Project, Thailand, for their approval for funding. Should our submission be successful Ryerson will, on behalf of CUTC sign the required contract documents with the CIDA-appointed project managers, ARA Consulting Group Inc, and ensure the efficient management and coordination of the activities for the duration of the project.

Further, the institute will provide the resources and in particular the expertise of academic administrators and faculty to support the development of an international applied science and engineering program in Electrical Engineering to be jointly designed, delivered and monitored by SUT and Ryerson faculty. It is my understanding that the first two years of the program will be delivered in English at SUT, and that students will then have the option of entering the third year of the Electrical Engineering program at Ryerson to attain their degree. This will of course be done in compliance with Ryerson's academic standards and the accreditation requirements of the Canadian Engineering Accreditation Board (CEAB), a standing committee of the Canadian Council of Professional Engineers (CCPE).

Ryerson looks forward to working with our Canadian partners in strengthening links with Thai institutions of higher education, and in particular with SUT.

Yours sincerely,

Terence Grier
President

cc: CUTC University Presidents

Canadian Universities Technology Consortium

Report on Planning Mission # 1

to

Suranaree University of Technology

Nakhon Ratchasima, Thailand

September 28 - October 15, 1992

Ryerson International Development Centre
350 Victoria Street
Toronto, Canada M5B 2C3

Report of CUTC Mission #1 on

SUT Development, Infrastructure, Activities, and Planning

1. Physical Plant and Facilities

The implementation plans for the SUT physical plant are in an advanced stage of completion. The space available for classrooms, academic and research laboratories, computer and library centres, faculty and administrative offices and faculty and students housing seems to be quite adequate for the planned maximum student enrollment. Based on the judgements and experiences of the team's members, the following comments and recommendations can be made on the physical plant and facilities:

a) the ideas and the objectives regarding the central research laboratory facilities, especially for big-ticket items (equipment) are reasonable and commendable.

b) we prefer to see program specific laboratory and equipment facilities, not multi-user laboratories, since the latter could lead to increased bureaucracy, undetermined responsibilities, confused priorities, and possible future conflicts with regards to equipment replacement and upgrading.

c) human resources and faculty morale are extremely precious commodities that any university may possess. We therefore believe that more personalized and private faculty offices would help promote this precious work environment.

d) we believe that some attention should be given to the space accessibility for disabled students and faculty/staff members, i.e. elevators, wheelchair ramps, etc.

e) the design of the power feeds to provide a two-source back-up electrical power systems is good.

f) it seems that adequate attention will be paid to the design and implementation of the biological waste disposal facilities and that good plans are being worked on to manage chemical and hazardous material waste disposal.

g) classrooms and auditoriums will be equipped with the required audio-visual aids normal for large class sizes. A special equipment list is being prepared for this purpose.

h) attention should be given to increase the number of student workstations and laboratory experiments set-ups to at least ten, from the present two. This is particularly important for the freshmen and sophomore type laboratories. We believe that the academic benefits

of concurrent laboratory work with the lecture material, as compared to rotational type laboratory assignments which may not be course concurrent, far outweigh the increased cost of equipment duplication, especially in foundation course.

i) we recommend that faculty offices be equipped with computers (networked) as soon as resources can be made available. This will provide excellent research support and will facilitate national and international communications with the academic communities inside and outside of Thailand.

2. Faculty Workload

We are in full agreement with the academic workload plan, allowing the faculty members to have no teaching load in every one of three academic terms. This will certainly provide adequate time for the faculty to concentrate on their research activities. We also recommend that during the teaching activities terms, the teaching load should be limited to a maximum of 6 hours of lectures/week in at most two academic courses. The maximum course credits load/faculty members should be 8, assuming that teaching assistants and laboratory support personnel will be available to help in the laboratory and tutorial sessions.

It is also important to note that the faculty members should be available for at least 3 hours/week to provide the students with academic counselling. The availability of faculty to provide that extra dimension of help to their students can result in a highly successful and efficient learning environment.

3. Academic Promotion Policy

The academic promotion policy being developed at present, which includes both the academic performance measures (GPA) and the achieved course credits, seems to be quite adequate and similar to other policies used in North American universities.

4. Human Resources

The initial target of 60 academic faculty members for the critical mass required to undertake the first year's activities is appropriate. We strongly commend the adopted policy of hiring highly qualified and experienced faculty members. However, it must be emphasized that hiring highly qualified younger faculty should also be a priority. The CIDA project and the planned

cooperation in the Ph.D. programs can be used to support the professional development of some of the younger faculty members that may be hired in the future.

We also believe that the quality and qualifications of the academic support staff are of prime importance.

5. Co-op Programs

The program structure for the Bachelor's degree consists of 10 academic terms and 2 co-op placement terms, over a complete four year span. The two co-op placement terms are scheduled during the last two years of the program. This may seem to be acceptable in the Thai academic tradition, but based on the North American experience, we believe that 5 or 6 academic terms in a row without an appreciable break (say for a co-op industrial placement term) could result in severe academic fatigue which could be damaging to the students' learning experience. Another look at this structure may be warranted in the near future (i.e. after the first academic year), particularly if high failure rates materialize in comparison with other Thai universities' grade averages.

The planned two co-op industrial placements, once successfully achieved, may be expanded to three or even four placements. The key to the success of the co-op education is clearly the support of the industry. This must therefore be cultivated and nourished very carefully. Industrial advisory program committees and active and dedicated placement officers could be very useful in consolidating and expanding the acceptance of this plan by the industry. Industrial leaders must be convinced that they will reap considerable benefits from the co-op educational program, otherwise their support could wane.

6. Number of Programs and Schools

The organization of the academic programs into five major faculties (or schools) is appropriate. However, programs seem to be too finely defined. In fact, many programs could actually be thought of as specializations within a broad field of a specific engineering discipline. For example:

a) Electrical/Electronic/Communications/Instrumentation and Control/Computers, can all be considered as sub-specializations in the Electrical Engineering discipline. (See for example Appendix I describing the new curriculum of the Electrical Engineering program

at Ryerson.)

b) Industrial and Production Engineering are very closely interrelated.

c) Materials/Metallurgy/Ceramics can easily be considered as one discipline with sub-specializations.

d) Biotechnology and Genetic Engineering are similarly very closely related... etc.

It is feared that too many such finely defined programs could fragment the required efforts of many faculty members and academic administrators, resulting in weaker departments instead of cohesive, stronger departments and programs. We therefore recommend that it may be beneficial to reconsider the rationalization for such numerous programs and try to recombine the related programs in the normal fashion including the specific areas of specialization as required.

Only if a new program is created as a multidisciplinary activity, it could then warrant a specific academic administrative unit.

7. Curriculum

The academic programs at SUT require 170 course credits, of which 12 credits are awarded for the co-op placements (6 credits for each of two terms) and 158 credits for the academic course work, distributed as follows:

42 course credits for General Education

(minimum requirement is 30)

36 course credits for Mathematics and Basic Sciences

3 course credits for a Free Elective

77 course credits for Program specific subjects, including the common core of general engineering courses.

The following observations and recommendations can be made:

a) The areas covered by the General Education courses are very broad and are met with the support of the team members. However, we feel that the "Fundamentals of Economics" must be a subject covered in the General Education category, for all of the programs offered at SUT. We also feel that some of the subject matter could be combined so as to reduce the maximum number of course credits required in the General Education category to 36 (i.e. about 12 courses). This in our judgement is quite adequate and compares favourably with the Math and General Science curricular content.

b) The broad and specific areas and subject matter covered in the Math and General Science category are very good and clearly very suitable for almost all of the programs to be offered at SUT. We do recommend, however, that each of the academic programs be allowed the flexibility to specify the appropriate mix and the specific Math subjects and course credits required in this area, and similarly with respect to Physics, Chemistry, and Biology. The only limiting criteria should be that the total number of course credits in this category be no less than 36.

c) The common general engineering core courses should be limited to five, or at most six (i.e. 15-18 course credits).

d) The objective and nature of the free elective course credits are reasonable.

e) The program specific course credits would then be 65-68. This in our opinion represents the minimum acceptable academic content in this category, particularly in view of today's fast developing professional fields and the enormous knowledge and technological explosion.

f) We recommend that the students' problem solving abilities be enhanced and strengthened through the adoption of tutorial sessions in Fundamental Engineering and Mathematics subjects.

g) We also recommend that laboratory projects and experiments be required in the majority of the program specific subjects and courses to provide the students with practical hands-on experience and enforce the applications of the theoretical concepts.

h) All programs should specify an obligatory final year project requirement, equivalent to at least 3 course credits.

8. International English Language Engineering Programs

The concept and objectives of the new proposed international english language engineering programs are met with the enthusiasm and the support of the team members. Two programs will be initially launched; to be selected from among Electrical Engineering, Mechanical Engineering, and Chemical Engineering (with their corresponding specializations).

These two programs will be exact replicas of the programs offered at the partner Canadian University/Institution, but appropriately modified to tailor to the Thai academic environment. The programs will be designed to ensure that all of the academic curricular requirements of the

partner Canadian institution are met. Further, the Canadian Accreditation Requirements and the Thailand Professional Registration Requirements must be met. These programs will be delivered completely in English at the facilities and under the jurisdiction of SUT. The academic curriculum will be delivered through the cooperation of Thai and Canadian professors, specifically selected for this special project. The programs will be jointly administered academically.

The enrolment in these two programs will be drawn mostly from the Thai student population, but they will also attract students from the countries of South East Asia. Special (private university type) fees will be required to sustain the ongoing viability of these two programs.

Two options are planned for the completion of these two program requirements:

a) All four years of the programs will be taken in Thailand, in which case the B.Eng. degree will be awarded by SUT.

b) The first two years of the program will be taken and completed in Thailand, but the students could then have the option of continuing the final two years of their studies in the Canadian partner institution, transferring to the corresponding year 3 of their programs, and paying the appropriate fees to the Canadian institution. Upon completion of the program in Canada, the graduates will be awarded both the appropriate Canadian degrees and the SUT degrees.

It is anticipated that the following activities will be implemented to initiate and deliver these two programs:

a) The establishment of an "English as a Second Language" centre at SUT to provide intensive english language courses to the students planning to enroll in the international programs. Initial funds to start this activity will be provided by CIDA's HRD project, but ongoing expenses and faculty efforts will be self-supported by the centre's students fees. Both Thai and Canadian faculty are expected to provide the intensive english language training.

b) Canadian academic administrators are expected to cooperate with their Thai counterparts in providing the official approvals for these programs; and are expected to design and develop the appropriate programs' curriculum, lab and academic support services, admission/promotion/graduation policies, implementation scheme, faculty appointments/loading/assessments...etc. The CIDA's HRD project is expected to provide

financial support for the initial two planning trips of Canadian academic administrators to Thailand to set up the two engineering programs. Ongoing involvement of the Canadian academic administrators and the provision of the programs' academic administration will be self-supported through the students' fees and programs' income.

c) Canadian faculty members from CUTC member institutions will be involved in the delivery and the curriculum development of both programs. They will initially be partially supported through the CIDA HRD project funds. It is anticipated that through the first four years of the delivery of the programs, the following number of faculty members will be involved in each of the two programs:

Year 1: 3

Year 2: 4

Year 3: 4

Year 4: 4

These faculty members will be spending one month in SUT, Thailand, delivering course modules, parts of courses and cooperating with their Thai counterpart professors in examining, structuring and developing the appropriate course material and curriculum, the supporting laboratory experiments, tutorial/project assignments and other relevant academic activities.

The involvement of other Canadian faculty members in similar academic activities and research endeavours for longer periods of time (i.e. one academic term or more), which may be suitable for those on sabbatical leaves, will be funded directly by SUT through students' fees and other programs' incomes.

The programs are expected to be self-sufficient and financially viable. The involvement of Canadian faculty members will be on-going even after the expiration of the CIDA HRD project, both on short-(1 month) and on long-(1 term or more) term arrangements. It is estimated that the cost in terms of the 1992 dollars of a 4 month Canadian faculty appointment is $52,000, including academic honourarium, living and travel expenses. The implementation steps required to initiate the two international english language engineering programs are expected to start as soon as the CIDA project is approved. The first offering of these two programs will take place around mid-1994.

APPENDIX I

NEW ELECTRICAL ENGINEERING PROGRAM CURRICULUM

RYERSON

Revision 4

New Program Curriculum
Ryerson

N1A

	Lect.	Tut.	Lab.	
Calculus I	4	1		
Linear Algebra	4	1		
Chemistry	4	1		
Physics for Engineers	4		1	
Electric Circuits I	4	1	2	
Hum./Lib. Studies	3			
	23	4	3	30

N1B

Calculus II	4	1		
Applied Science	4	1		
Physics (Mechanics)	3		1	
Electric Circuits II	4	1	2	
Digital Computation and Programming	4		2	
Hum./Lib. Studies	3			
	22	3	5	30

Revision 4

New Program Curriculum
Ryerson

N2A

	Lect.	Tut.	Lab.	
Diff. Eqns. and Transforms	3	1		
Field Theory I	3	1		
Electronic Circuits I	3		3	
Electric Networks	3	1		
Digital Systems and Microprocessors	4	1	3	
Hum./Lib. Studies	3			
	19	4	6	29

N2B

Computational Methods	3		1	
Thermodynamics and Fluids	3		1	
Field Theory II	4	2		
Electronic Circuits II	3		3	
Computer Algorithms and Data Structures	4		2	
Hum./Lib. Studies	3			
	20	2	7	29

Revision 4

New Program Curriculum
Ryerson

N3A

		Lect.	Tut.	Lab.	
	Probability and Statistics	3			
	Signals and Systems	3	1		
	Advanced Electronics	4	1	3	
	Microprocessor Systems	3		2	
*	Electromagnetics	4	1		
	Hum./Lib. Studies	3			
		19	4	5	28

N3B

	Engg Practice and Ethics	2			
	Communication Systems	4	1	3	
	Control Systems	4	1	3	
*	Energy Conversion	4		3	
	Hum./Lib. Studies	3			
		17	2	9	28

Computer Systems Option

Replace courses marked with * as follows

N3A

Computer Architecture	3		2

N3B

Real-time Operating Systems	4		3

Revision 4

New Program Curriculum
Ryerson

N4A

	Lect.	Tut./Lab.
Common to all options		
Tech. Communications	1	2
Compl. Studies: Engg. & Society	3	
Thesis Seminar		1
Digital Signal Processing	3	3
Communication Systems Option		
Advanced Comm. Systems I	3	1
Electronics & Instrumentation	3	3
One of:		
Photonics	2	1
Microwave Engg.	2	1
Multivariable Control Systems	3	
Control Systems Option		
Multivariable Control Systems	3	
Digital Control Systems	3	1
One of:		
Electronics & Instrumentation	3	3
Power Electronics	4	2
Power Systems Option		
Power Systems I	3	1
Power Electronics	4	2

New Program Curriculum
Ryerson

N4A cont'd

One of:

Microwave Engg.	2	1
Multivariable Control Systems	3	
Photonics	2	1

Computer Systems Option

Digital Systems Engg. I	2	1
Electronics & Instrumentation	3	3

One of:

Advanced Comm. Systems I	3	1
Digital Control Systems	3	1

26 hours

New Program Curriculum
Ryerson

N4B

Common to all options

Compl. Studies: Engg. Economics	3	
Thesis Project		6

Communication Systems Option

Advanced Communication Systems II	3	1
Computer Communication	3	1
Optical Communication Systems	3	1

One of:

System Models and Identification	3	1
Neural Networks	3	1
VLSI Design	3	1
Artificial Intelligence	3	1

Control Systems Option

Nonlinear Control Systems	3	1
System Models and Identification	3	1

Two of:

Robotics	3	1
Neural Networks	3	1
Artificial Intelligence	3	1
Electric Drives	3	1

New Program Curriculum
Ryerson

N4B cont'd

Power Systems Option

Power Systems II	3	1
Electric Drives	3	1

Two of:

Advanced Electromechanical Systems	3	1
System Models and Identification	3	1
Robotics	3	1
Optical Communication Systems	3	1

Computer Systems Option

Digital System Engineering II	3	1
Software Engineering	3	1

Two of:

Compilers and Translators	3	1
VLSI Design	3	1
Neural Networks	3	1
Artificial Intelligence	3	1
Computer Communications	3	1
Robotics	3	1

25 hours

N1A

- **Calculus I** 4,1,0
  Limits, inverse functions, differentiation, maximum and minimum problems, definite and indefinite integrals, fundamental theorems of integration, applications of integration including area, volume, moment, pressure and work.

- **Linear Algebra** 4,1,0
  Systems of linear equations, matrix algebra and determinants, vectors in Euclidean space, lines, planes, spheres. Complex number algebra. Eigenvalues. Introduction to vector spaces, functions, inner products.

- **Chemistry** 4,1,0
  Physical chemistry with engineering applications. Atomic structure, the mole, periodic table, atomic and subatomic structures, bonding, solid state. Ideal and real gas behaviour, phase equilibria and colligative properties of solutions, thermochemistry, chemical equilibrium, electrochemistry, radiochemistry. Materials selection, crystals and structure, mechanical properties.

- **Physics for Engineers** 4,0,1
  Oscillations and simple harmonic motion, wave motion, travelling and standing waves, transverse and longitudinal waves, sound. Geometrical optics, reflection and refraction, physical optics, interference and diffraction. Quantum physics, quantization of radiation, the hydrogen atom.

- **Electric Circuits I** 4,1,2
  Basic circuit parameters and laws, analysis of direct current circuits including voltage and current sources, meters, transients in first order RL and RC circuits, magnetism and simple magnetic circuits, a.c. voltage and v-i relationships of basic elements.

N2A

- **Differential Equations and Transforms** 3,1,0
  Fourier series and transform, linear differential equations, Laplace Transform.

- **Field Theory I** 3,1,0
  Spatial vector analysis, coordinate systems. Functions of several variables, partial differentiation, relative maxima and minima. Multiple integrals, change of variables, line and surface integrals, Green's theorem. Coulomb's law and electric field intensity, electric flux density and Gauss's law, the divergence theorem, electric potential and energy stored, the directional derivatives and the gradient, the electric dipole.

- **Electronic Circuits I** 3,0,3
  Introduction to electronics, operational amplifiers, diodes, linear and non-linear circuit applications involving op. amps. and diodes. Bipolar junction and field-effect transistors: physical structures and modes of operation. DC analysis of transistor circuits. The transistor as an amplifier and as a switch

- **Electric Networks** 3,1,0
  Applications of computer-aided circuit analysis, circuit applications of Fourier series, network differential equations, initial conditions, Laplace Transform applications in Electric Networks, complex frequency and poles and zero, network functions, two-port network parameters and applications. Magnitude and phase frequency response of networks.

- **Digital Systems and Microprocessors** 4,1,3
  Topics include: Boolean algebra, the Digital abstraction. Codes. Combinational devices and circuits. Sequential circuits. Finite state machines. Control structures and data paths. Introduction to microprocessors. Lab work includes basic combinational and sequential design, timing considerations, and the use of programmable logic devices.

N1B

- **Calculus II** 4,1,0
  Logarithmic and exponential functions, partial and total differentiation, integration techniques, sequences and finite series, power series, first-order differential equations with applications.

- **Applied Science** 4,1,0
  Electric, magnetic and thermal properties of material, photoconductivity and optical material. Quantum nature of solids, uncertainty principle and Schrodinger's theorem, electron populations within bands, electric current in solids, the P-N junction, the transistor.

- **Physics (Mechanics)** 3,0,1
  Review of kinematics, particle dynamics, work, energy, conservation of energy, conservation of linear momentum, collisions, rotational kinematics and dynamics, conservation of angular momentum, equilibrium of rigid bodies.

- **Electric Circuits II** 4,1,2
  Analysis of steady state a.c. circuits, loop- and nodal-analysis techniques, basic network theorems, networks with controlled sources, resonance, power and power factor correction, magnetically coupled circuits, three-phase circuits.

- **Digital Computation and Programming** 4,0,2
  This course introduces the student to the use of a modern computing environment for technical applications. The UNIX operating system, the X-Window system and common utilities such as text and graphics editors and processors are used. The bulk of the course will concentrate on the C programming language to develop good programming techniques. The topics covered include: basic numerical programming, input and output, character data, string data, arrays, pointers and simple linked lists. Documenting, debugging and software quality assurance are also covered.

N3A

- **Probability and Statistics** 3,0,0
  Introduction to probability theory and statistical inference. Topics covered include: elements of probability theory, random variables and random vectors, functions of a random variable, expectation, sampling theory, sampling distributions, estimation, confidence limits, hypothesis testing, covariance, correlation.

- **Signals and Systems** 3,1,0
  This course deals with the analysis of continuous-time and discrete-time signals and systems. Topics include: Representations of linear time-invariant systems. Representations of signals. Laplace transform. z-transform. Transfer function; impulse response; step response. The convolution integral and its interpretation; numerical convolution. Fourier analysis for continuous-time and discrete-time signals and systems.
  Laboratory work will be performed using the MATLAB software package.

- **Advanced Electronics** 4,1,3
  A course on the analysis and design of electronic circuits. Major topics include: operational amplifier linear and nonlinear applications, integrated circuit operational amplifiers, digital logic families, active filters, power linear and switching regulators, computational circuits, oscillators, feedback and stability. Circuit applications to such areas as instrumentation, signal processing, and communication are considered. Important concepts are illustrated with laboratory experiments.

- **Microprocessor Systems** 3,0,2
  Topics include: Microprocessor structure. Assembly language programming. Using high-level languages. Cross-development, Basic I/O. Interrupts. DMA. Single-chip microprocessors, 8-, 16-, and 32-bit systems. The lab work will consist of low level I/O techniques in small microprocessor systems.

- **Electromagnetics** 4,1,0
  Poisson's and Laplace's equations, boundary value problems, uniqueness of solution, solution by separation of variables. Time-varying electromagnetic fields, Maxwell's equations, the wave equation. The uniform plane wave, wave polarization, wave reflection, refraction and diffraction. Transmission lines, the Smith chart. Elementary waveguide theory. Radiation from the short dipole, the quarter wavelength antenna, radiation resistance, antenna arrays and radiation patterns.

- **Computer Architecture** 3,0,2
  Topics include: Microinterpreter architecture. Microprogramming. Von Neumann architecture. Stack machines. General register machines. The lab work will consist of one major project involving the construction, microcoding and debugging of a computer from basic digital circuit building blocks.

N4B

- **Thesis Project** 0,6
  Independent engineering design, analysis and implementation project. Students select their topics in the areas of their specialization from among the topics suggested by faculty and corporate supervisors. Progress reports, monitoring and counselling are provided through the supervised laboratory sessions. Students are expected to spend at least an equal amount of time in unsupervised activities to fulfill the project requirements.

- **Advanced Communication Systems II** 3,1
  This course presents the principles of digital data communication systems and shows how statistical models can be used to provide optimal and suboptimal signal processing structures operating over noisy channels. The main topics include: matched filter receivers, coherent and noncoherent communication systems, M-ary digital modulation, PSK, FSK, QPSK, MSK, QAM, synchronization, modem standards and implementations, Viterbi algorithm, introduction to error control coding.

- **Computer Communications** 3,1
  An introductory course in computer communications. The standard architectures of computer network, in particular the Reference Model for Open Systems Interconnection (OSI), are covered. This includes the study of the protocols in the physical layer, data-link layer, network layer, transport layer and Local Area Networks (LAN). Basic queuing theory is also introduced as a tool to analyze the delay-throughout performance of the network.

- **Optical Communication Systems** 3,1
  Communication systems overview, electromagnetic waves and photonics. Thermal and electronic generation of light, quality of light sources and coherence. Refraction, diffraction and polarization, spectral attenuation and scattering. Classification and characteristics of optical fibres, coupling and guiding. Single-mode, multi-mode and graded-index wave guides. Dispersion mechanisms and frequency response. Semiconductor light sources (LED and ILD). Optical detectors (PIN and Avalanche diodes). Optical links and information transfer capacity.

- **System Models and Identification** 3,1
  This course deals with system models and identification of dynamical systems. Topics include: Linear time-invariant system models: classical models; modern models. Offline identification methods: least squares; generalized least squares; maximum likelihood; instrumental variables. Online identification methods: recursive least squares; Kalman filtering; extended Kalman filtering. Model reduction. Introduction to identification of nonlinear systems, stochastic systems, and multivariable systems. Laboratory work will be performed using MATLAB.

N2B

- **Computational Methods** 3,0,1
  This course deals with computational methods for solving problems commonly encountered in Electrical and Computer Engineering applications. Topics include: Number systems, errors and error propagation. Matrix operations and techniques. Solution of systems of linear and nonlinear equations. Interpolation and extrapolation. Numerical integration. Numerical solution of differential equations. Random numbers. Introduction to symbolic computation. Hardware implementation of selected methods.
  Laboratory work will be performed on Sun Workstations under the UNIX operating system using the C and RATFOR computer languages, and engineering and scientific software packages such as LAPACK, MAPLE and MATLAB.

- **Thermodynamics and Fluids** 3,0,1
  The scope and limitations of thermodynamics, macroscopic approach to heat, work, energy and the first law. Properties and state of simple substances and fluids. Control-mass and control-volume energy analysis. The second law of thermodynamics, entropy, limiting cycle efficiencies, criteria for equilibrium. Energy equations for the flow of fluids.

- **Field Theory II** 4,2,0
  Properties of dielectrics in electric fields, capacitance. Convection and conduction currents, the continuity equation. Biot-Savart law and magnetic field intensity, Ampere's circuital law, the curl and Stokes' theorem, magnetic flux density, scaler and vector magnetic potentials. Properties of magnetic materials, magnetic forces, the magnetic circuit, magnetic energy stored, self and mutual inductance. Time varying fields, Faraday's law, the displacement current.

- **Electronic Circuits II** 3,0,3
  Transistor amplifiers: small signal models, biasing of discrete circuits, and single-stage amplifier circuits. Biasing of BJT integrated circuits. Multi-stage amplifiers. Frequency response of single-stage amplifiers, feedback amplifiers.

- **Computer Algorithms and Data Structures** 4,0,2
  Topics include: Linked lists with a case study of a digital simulator. Quine-McCluskey minimization. Finite state machine simulation and data driven programming. The state coding problem with an introduction to analysis of algorithms and NP-complete problems. Heuristic algorithms with case study of the algorithms used in Espresso. Searching using trees and hashing. Sorting. Abstract data types with examples using C ++ with examples from hierarchical digital systems design. Labs will be done on Sun Workstations under the UNIX operating system. C will be the main language with C ++ used for abstract data types.

N4A

- **Technical Communications** 1,2
  Communications in Engineering, information searching, retrieval and organization, engineering writing style, standards and techniques, reporting to managers, communications and entrepreneurship.

- **Thesis Seminar** 0,1
  Discussions of design and development strategies, engineering task analysis and methodologies, engineering safety considerations and product testing procedures as they apply to the various Thesis project topics. Requirements and style of the Thesis reports.

- **Digital Signal Processing** 3,3
  This course provides a comprehensive introduction to basic principles and techniques of digital signal processing (DSP). Lecture topics include: transform analysis of signals and systems (fast and discrete Fourier transforms) and digital filter design techniques (FIR and IIR). Laboratory work is centered around workstations each of which contains state-of-the-art DSP56000 application development boards connected to microcomputers, and powerful development support tools. DSP fundamentals are reinforced through design and implementation of optimized real-time algorithms for digital filters, DFT/FFT, correlators, etc., using the DSP56000.

- **Advanced Communication Systems I** 3,1
  This course offers a detailed coverage of algorithms for digital coding of waveforms and base-band transmission of digital data. The course topics include: sampling, quantization, pulse code modulation, delta modulation, adaptive coding algorithms, standardized image and audio signal coding algorithms, base-band data transmission, line-codes, intersymbol interference, linear equalization, correlative coding.

- **Electronics and Instrumentation** 3,3
  Design and analysis of industrial and/or instrumentation electronic circuits integrating analog/digital I.C. devices around a single chip microprocessor (MC68HC705C8). Topics include: Single Chip microcontroller interfaces and applications; Data acquisition components (A/D, D/A, S/H & MUX.); Effective Grounding techniques; Switched-Capacitor filters; Telephone electronic interfaces; Op-amp noise analysis; Instrumentation and Isolation amplifiers; Transducers and Sensors; Lab projects involve the hardware and software design, simulation, construction, making operational and testing of "smart" prototype industrial circuits.

- **Photonics** 2,1
  Electromagnetic and photonic nature of light. Relativistic and quantum concepts related to the generation and propagation of optical signals in free space and material media. Quantum behaviour of light, methods of generation, detection, and recording of coherent light signals. Overview of practical laser devices and their function. Quantum and Electro-Optic properties of materials, their application in light-signal modification and modern optical displays. Bio-hazards and safety considerations.

N3B

- **Engineering Practice and Ethics** 2,0,0
  Code of ethics for engineers. Government, industry and association regulations and standards. Legal responsibilities of engineers. Impact of engineering on society and the environment. Current professional and ethical issues including safety considerations and women in engineering.

- **Communication Systems** 4,1,3
  This course studies basic principles of communication theory as applied to the transmission of information. The course topics include: baseband signal transmission, amplitude, phase and frequency modulation, modulated waveform generation and detection techniques, effects of noise in analog communication systems, frequency division multiplexing.

- **Control Systems** 4,1,3
  This is an introductory course on control systems. Topics include: System models, I/O differential equations, transfer functions; block diagram representations, block diagram reduction. Signal flow graphs, Mason's gain formula. Modelling of electrical, mechanical and electro-mechanical systems. Performance specifications in time and frequency domains. Frequency-domain and transient-response analysis for 1st, 2nd and higher order systems; steady-state error analysis. Stability analysis: Routh-Horwitz criterion, root locus method, Nyquist stability criterion. Compensation techniques: lead, lag, lag-lead compensators design in time and frequency domains, tuning rules for PID controllers.
  Laboratory work will include experiments on system identification, lag-lead compensator and PID controller design on a hot-air machine.

- **Energy Conversion** 4,0,3
  Basic principles of operation of different types of machines and their control; magnetic circuit analysis, single-phase, and three-phase transformers, principles of electromechanical energy conversion, three-phase and single-phase induction motors, synchronous machines, DC machines, introduction to solid-state motor controls and devices, transients and dynamics of machines, special machines, introduction to programmable controller, control of machine by single-chip microcomputer and by PLC.

- **Real-time Operating Systems** 4,0,3
  Topics include: Multi-tasking systems and case studies. Task context and context switch. Task synchronization and inter-task communication methods including semaphores, messages and monitors. Memory management. File systems. OS utilities (linker, loader, compilers, shell). The major lab will involve writing and using a small real-time kernel (RYMOS) in an embedded system.

N4A cont'd

- **Foundation for Microwave Engineering** 2,1
  Maxwell's equations and constitutive relations in the time domain and in the frequency domain. Energy density and boundary conditions. Helmholtz equation. Potential functions. Transverse electromagnetic waves. Wave guides and cavities. Inhomogeneously filled waveguides. Excitations of waveguides. Passive microwave components. Microwave measurements.

- **Multivariable Control Systems** 3,0
  This course deals with the control of linear time-invariant multivariable systems. Topics include: Linear algebra and matrix theory. State space models; realization of transfer functions. Canonical forms and minimal realization. Solution of state equations: state transition matrix; numerical solution. Controllability, observability, stability, detectability. State-space design techniques: pole placement; observers; servo systems. Introduction to optimal control; linear quadratic designs. To reinforce the lecture, design problems requiring the use of MATLAB will be assigned to students.

- **Digital Control Systems** 3,1
  This course deals with the theory and implementation of controller for dynamical systems using a digital computer. Topics include: Discrete-time signals and systems; *z*-transform. Sampling: the ideal sampler; data reconstruction; quantization effects. Discrete equivalents to continuous-time transfer functions; digital filters. Stability analysis techniques: Routh-Horwitz criterion; Jury's stability test; root locus method; Nyquist stability criterion. Design of digital control systems: transform techniques; state-space techniques. Hardware and software aspects in the implementation of digital controllers. Laboratory work will include experiments on D/A, A/D conversion, proportional and PID controller design of an electro-mechanical system.

- **Power Electronics** 4,2
  A course on the analysis and design of power electronic circuits. Major topics include: power semiconductor switches, AC voltage controllers, controlled rectifiers, DC to DC converters, inverters, AC to AC converters. The course focus is on the analysis of the steady state operation of power converters that allows the specification of suitable switching devices and configurations for the conversion system encountered. Transient operation is discussed but not studied in detail. Important concepts are illustrated with laboratory experiments.

- **Power Systems I** 3,1
  An overview of a power system operation and planning, introduction to per unit system, transmission line generators, current and voltage relations on a transmission line, system modelling with synchronous machines and transformers, network calculations, load-flow studies and control of power, analysis and control of interconnected power systems.

- **Digital Systems Engineering I** 2,1
  Topics include: Organization and architecture of processors. CISC and RISC processors. Memory strategies including cache memory. Virtual memory.

N4B cont'd

- **Nonlinear Control Systems** 3,1
  This course is designed to introduce basic nonlinear systems via second-order differential systems and their qualitative analysis in the phase plane. Lyapunov stability theory and its applications in stabilization via state feedback and adaptive control are to be discussed for both second-order and higher order nonlinear systems. Periodic solutions to nonlinear systems, describing functions, absolute stability (Circle and Popov criteria), singular perturbations, and averaging are some of the topics to be explored in the course. Basic concepts are illustrated via digital computer simulations and laboratory projects.

- **Robotics** 3,1
  This course provides a comprehensive treatment on the fundamentals of robotics, particularly in kinematics and dynamics. Topics include: Forward kinematics: homogeneous transformations; the Denavit-Hartenberg representation of linkages. Inverse kinematics: closed-form and numerical solutions. Differential motion; Jacobian matrix; singularities. Dynamics: the Euler-Lagrange and Newton-Euler formulations. Trajectory generation. Position and force control of robotic manipulators. Introductory computer vision: image representation; template matching ; image segmentation.
  Laboratory work will be performed on the CRS PLUS small industrial robotic systems available in the Department of Electrical Engineering.

- **Neural Networks** 3,1
  An introduction to the brain and its neurons, Neural modelling and early adaptive networks, Associative memory and cybernetic networks, Boltzmann machines and Hopfield networks, Differential competitive learning, supervised and unsupervised learning, The Delta rule and back-propagation (BP), and Analog VLSI and digital implementation of neural networks.

- **Electric Drives** 3,1
  A course on the analysis and design of electric motor drives. Major topics include: rectifier drives, chopper drives, voltage controller drives, slip energy recovery drives, voltage source inverter drives, current source inverter drives, cycloconverter drives. The course focus is on the analysis of the steady state operation of drive systems that allows the specification of suitable converters and machines for the speed and position control system encountered. Transient operation is discussed but not studied in detail. Important concepts are illustrated with laboratory experiments.

- **Power Systems II** 3,1
  An introductory study of some specialized aspects of steady-state and transient operation of electric power systems. The course material includes such subject areas as: symmetrical component analysis of unbalanced networks, power system fault analysis, power system protection, power system stability.

N4B cont'd

- **Advanced Electromechanical Systems** 3,1
  This course examines design aspects of electromechanical energy conversion devices with special emphasis on fractional hp motors and especially machines. Computer aided transient analysis of machines both in open and closed loop systems will be dealt with.

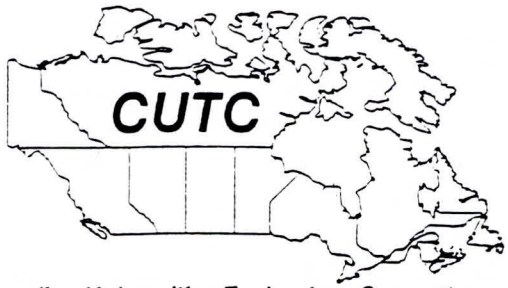
- **Digital Systems Engineering II** 3,1
  Backplane buses. Multi-processor systems. Specialized computation. Design for testability. The lab work will consist of software simulations on the Sun workstations and additions to the computer built in the Computer Architecture course.

- **Software Engineering** 3,1
  Topics include: Issues in software engineering. Software specification. System modelling. Requirements specification, validation and prototyping. Formal specification. Object-oriented design. Function-oriented design. User-interface design. CASE. Quality assurance.

- **Compilers and Translators** 3,1
  Topics include: Lexical analysis. Deterministic and non-deterministic finite automata. Hardware implementation of DFAs. Context-free grammars. Parsing techniques. Syntax directed translation. Code generation. Compiler generators. The lab work will consist of one major project involving the design and implementation of a software package for engineering applications such as an interactive matrix calculation package.

- **VLSI Design** 3,1
  This course examines the issues in Application Specific Integrated Circuits (ASICs). The emphasis will be on complex digital system design using the simple building blocks available in programmable gate arrays. The course also examines the low-level required in full custom design with emphasis on the CMOS technology.

- **Artificial Intelligence** 3,1
  Topics include: Basic concepts in AI. Low-level programming languages (LISP and Prolog). Knowledge representation. Knowledge bases and inference engines. Expert systems. Applications in Computer and Electrical Engineering. The lab work will consist of one major project involving the design and implementation of an expert system in the area of Electrical or Computer Engineering such as control systems design, power systems diagnosis and motion planning for robots.



Canadian Universities Technology Consortium

Report of Planning Mission #2

to

Suranaree University of Technology

Nakhon, Ratchasima, Thailand

November 23 - December 4, 1992

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1 Introduction

This report presents the findings and recommendations of the Second Planning Mission with respect to Suranaree University of Technology, to be located near Khorat, in the Province of Suranaree, in Thailand. The mission members were G.E. Schneider (Leader), University of Waterloo, Ms. M. Johnson, Ryerson Institute of Technology, M. LeMaquer, University of Guelph, and M. Peggs, Technical University of Nova Scotia. The duration of the Mission was two weeks, from November 23, 1992, to December 4, 1992.

The mission conducted meetings, most of which were held at the Ministry of University Affairs offices in Bangkok, Thailand, presented a workshop on co-operative education, visited the actual site of SUT, and held both curriculum and budget discussions with the appropriate Thai counterparts as the situation dictated. The results of these discussions are presented in this document.

The key results of the mission are recommendations regarding the physical plant and facilities at SUT, awareness by both Thai and Canadian mission members of certain similar activities as those planned for SUT at other Thai institutions, delivery of a workshop on co-operative education, and a decision to forego extensive curriculum *development* activity in favour of transplanting appropriate program curricula from the participating Canadian institutions and concentrating the limited resources that are available on the *implementation* of these curricula. This latter development enabled a stalemate with regard to budgetary problems to be broken and will enable the program of activities to be undertaken with the expected funding ceiling from the Canadian International Development Agency (CIDA), including the required allowance for inflation and a required 10% contingency.

2 Physical Plant and Facilities

A trip was undertaken to the physical site of the university on Friday, November 27 with return transportation on Saturday, November 28, 1992. The construction is at quite an advanced stage including *many* simultaneous building activities; these include classrooms, academic and research laboratories, computer and library centres, faculty and administrative offices, and faculty and student housing.

It was noted, however, that, in these buildings still under construction, significant repair is underway and needed. While some of these repairs are of a purely cosmetic nature, certain defects appear to reflect improper construction techniques as in there being void cavities in poured concrete walls. The extent of major construction defects is not known. There does appear to be a significant number of (apparent) surface defects and it would appear that many of these

were caused by the *settling* of the buildings after construction. In this regard, it would also *appear* that foundation drainage is not entirely adequate. It remains to be seen, after repairs are made and a longer term assessment can be made, the extent to which this may prove to be a problem.

We agree with the previous mission observation that more personalized and private faculty offices would help promote a more conducive environment for effective faculty performance and consequently improve faculty morale. It was also noted that, at the time of the visit, provision had *not* been made for connection to a computer network *nor* for individual faculty office telephone connections; yet the walls are essentially complete. The *open office ceilings* do permit, however, retro-fitting of some of the necessary connections. On the other hand, the open office ceilings do restrict the acoustic isolation of individual faculty offices, as do the somewhat frail office walls.

In the food processing laboratories, it was noted that isolation from the external and other internal environments may present problems in the control of contaminants in such a sensitive environment. Further, the nature of the floor and wall construction would likely *not* enable 'facility washdown' to be effective in the control of bacteria, etc. A visit of the pilot plant facilities for the food processing activities showed that the designated space would not be adequate. Some basic recommendations were made regarding issues related to sanitation, hygiene, washing and cleaning requirements. It should be noted as well that all food processing facilities should be able to sustain normal inspection on safety and quality from the particular government agency involved in these controls. This is particularly relevant to the education of appropriately trained personnel destined to the industry. It may also be important if the food industry itself is going to use the same facilities, which would be highly desirable to establish not only a coop program but also an active research program. A government approved pilot plant is an essential element of total interaction with the industry.

3 Visits to Other Thai Institutions

Visits were made to three other Thai universities; Thammasat University, The Asian Institute of Technology (AIT), and Kasetsart University. These visits proved to be very beneficial since the mission members were thereby provided with an opportunity to observe activities at these institutions that would be somewhat in competition with SUT. It is noteworthy, however, that the other institutions do *not* provide co-operative programs. However, both Thammasat and AIT do provide English language delivery of their programs. In this regard, Thammasat is particularly noteworthy, since the *International Program* planned for SUT would offer fundamentally an English language delivery of their Engineering and Technology programs. Thammasat was then in their *first* year of offering such a program. Thammasat also has significant external funding, form both a Japanese and a Thai federation of industries, and is able to blend their English language resources, as funded externally, with the other resources available through Thammasat University. AIT, of course, offers only graduate level programs and would not be in direct competition for the undergraduate International Program. The Thai members who accompanied

the mission members to Thammasat and to AIT, we believe, did not fully appreciate, beforehand, how far along these other institutions are in the *English language delivery* arena.

Kasetsart University has a very large activity in the food science and technology field, through its faculty of food technology and the institute of food research and product development. The faculty has programs at the BSc, MSc and PhD levels in food science and technology. It is well equipped in food chemistry, food microbiology and food processing. The students have some experience with the industry through study periods, but there is no co-op program. The number of students is substantial, about 50 per year but seem to find ready employment after graduation. This is quite probable given the state of growth of the food industry in Thailand.

At Kasetsart there seems to be a good understanding of the needs of SUT and a feeling that cooperation would be possible. The network of the academics involved in the food science field is well established and supportive of the new program. It is obvious however that the industry will be contacted more extensively in terms of work terms by the new program and that some care will have to be taken to manage both the industry interface and the relationship with the other existing programs. It may be from that point of view that the uniqueness will come from the international program.

Kasetstart offers help to the industry to develop new products and assists in the adoption of technology. The location in Bangkok where there is a very active food industry gives them an advantage in reaching the potential customers that would benefit from their services. For SUT, this kind of linkage with the industry will have to be established early on and possibly be made specific to the northeast area, at least initially, so as not to conflict with other institutions.

4 Workshop on Co-operative Education

The workshop on co-operative education was held on Tuesday, December 1, 1992 in the conference room of the Ministry of University Affairs. Including the Mission Delegation members, there were 24 people in attendance representing various sectors of the Thai country. In particular, representation was made by the following sectors: the government sector was represented by members of the Ministry of University Affairs, including Dr. Wichit Srisa-an, the permanent secretary, and by members of the Thai Chamber of Commerce; the industrial sector was represented by corporation representatives some of whom also serve as members of the Federation of Thai Industries (FTI) and/or as members of the Committee on Co-operative Education for Suranaree University. The list of atttendees is included as Appendix A of this report. Further, a copy of the slide presentation material presented by the delegation members is included as Appendix B of this report.

It is believed by the mission members that the workshop was well received by those present. The reader is refered to Appendix B for the details of the presentation; only the key elements will be provided herein. The many benefits of a co-operative education program were presented as they apply to the student, the university, and industry. It was (over-) emphasized that to be a

successful co-operative education program, industry, in particular, must not view the work terms as simply part of a training program wherein *industry* is providing training without receiving a commensurate benefit from the employment. However, numerous questions were posed by members present, particularly by those from the industrial sector, that sought clarification on this issue; thus it would be reasonable to assume that this point should be considered carefully in future activities directed at recruiting industrial companies into the co-operative environment. It is worth noting, in this regard, however, that CP Industries of Thailand *already does participate in their own program* in which summer student hires are paid and productive output is expected from such hires. This particular industry, therefore, would be an excellent target for early participation in the co-operative venture.

On the issue of the various co-op models available, it was emphasized that it would be insufficient to *simply add work terms* if a successful program is expected. The curriculum and the work place experience must be fully integrated. The suggestion was also left with those present that quotas could also be established for the co-op part of the program with some equivalent 'coursework specialization' made available for those non-co-op students. The important role that communications and communications skills play in a co-operative (and indeed any) engineering or science program was stressed. It was noted that communications skills development should be integrated thrughout the entire work and academic program of the student.

Considerable presentation and discussion were devoted to the requisite elements for success of an *existing* co-operative education model. Of particular note here are the clear understanding by all parties of the *rules of the game*, and the selection criteria, among those other issues listed in the appendix.

Cooperative education provides the student with valuable work experience. Rather than merely intersperse some work terms with academic study terms TUNS opted to modify the academic curriculum to mesh with the work term sequence. In industry the student is often faced with open-ended problems in which no one solution is the "correct answer", rather a compromise between the various viable alternatives is required. Their approach to emphasizing open-ended problem solving better prepares the student thereby making their work experience more rewarding as well as making the student more useful to the industrial partner. The matching of job description to student abilities is key to this approach. Additionally, the work term component carries with it an academic standing: each student must complete some prerequisites prior to undertaking a work term and must submit a satisfactory report on their return to the university.

The issues involved in *administering* a co-operative education program were examined with the two different roles played by the Career Services Unit and by the Work Study - Field Coordinators identified. The functions identified in the appendix were elaborated upon with the observation made that these functions were quite distinct from those activities that must be undertaken to *start* a co-operative education program. It was further noted that the administratin of a co-operative education program represents a significant continual and on-going cost associated with the operation of a co-operative program; the benefits realized as a result of this cost, of course, include a higher quality product, a better prepared, more knowledgeable, and

more mature student, among others. Perhaps the most challenging aspects of the administration are the marketing of the concept to employers and the identification of appropriate jobs.

Finally, the isues associated with the *startup* of a co-operative program were examined in some depth. It was noted that this aspect of Suranaree's development will demand considerable effort. Of the most important aspects of startup is the establishment of a roster of participating companies, particularly in view of the Thai cultural views regarding 'co-op' and the existing perception of the 'training programs'. In this regard, considerable effort will be required to ensure that both the participating companies and the students are clear as to what the expectations are! It should not be underestimated how important this aspect is to the success of the co-operative aspects of the programs. Further, related to the above, it is also extremely important that potential jobs be carefully scrutinized for their suitability as a bona fide co-op work term job!

The workshop closed with additional discussion, questions, and the observation that a co-operative program is truly a co-operative venture between the university and the participating industries.

5 Curricula Discussions

5.1 Chemical Engineering

Most Chemical Engineering curricula are essentially the same the world over. The principles of mass transfer are the same in Thailand as they are in Canada. What distinguishes one curriculum from another is the underlying philosophical approach to the task of training engineering students at the undergraduate level and the specific approach taken to prepare for their chosen profession. Much of the discussion addressed these issues.

At TUNS students are prepared for careers in the chemical and process industries by formal academic studies, laboratory coursework, integration of safety and communications into the entire programme, open-ended problem solving and through a co-operative education system.

Safety is not an add-on; it must be taught as an integral part of every engineering course so as to ingrain a "safety awareness" into everything the student does. When a student graduates and takes up an appointment in industry we want them to design and operate a process plant with safety first and foremost in their minds. During academic coursework students are set safety-related engineering problems to solve; for example, to size a relief vent for the discharge of high pressure gas from a reactor. This approach puts safety on an "engineering principles" basis. Furthermore, safety is emphasized in the laboratory courses. In one laboratory course the students work in groups of three: one is assigned the responsibility of team leader, another data engineer and the third safety engineer. These

responsibilities are rotated throughout the course.

5.2 Mechanical Engineering

Detailed discussions were held regarding the Mechanical Engineering curricula at SUT and at Waterloo; copies of the UW calendars, undergraduate and graduate, were left with the Thai personnel for their subsequent perusal.

Some of the initial discussions centered around the problems associated with providing any guarantees that Thai students would *automatically* qualify for transferral to Waterloo for the completion of their degrees and the subsequent granting of Waterloo degrees. The concerns expressed included the following: ensuring that English language proficiency of the Thai students would be adequate; ensuring that the pre-requisite material required for transfer to UW, or other institution, would, in fact, be acquired by the Thai students prior to their arrival in Canada; ensuring that, overall, the CEAB accreditation criteria would be satisfied by the Thai students at the time of their graduation in Canada; ensuring that the *quality* of education of the Thai students, prior to their transfer to Canada, would be suitable for transfer to the Canadian institutions; ensuring that the inclusion of Thai students in the Canadian programs would not significantly exclude Canadian students from the available *spaces* in the Canadian programs; and ensuring that, given the current economic climate, Thai participation would not significantly impact the *placement* of Canadian students in work-term jobs, and, if Thai participating students were not placed, ascertaining their eligibility for the granting of Canadian Co-Operative Engineering Education degrees. Some of the above can be resolved through the use of *quality control* measures but others, as in the taking of both academic and work-term places from Canadian students by Thai students, and in the satisfaction of Canadian accreditation criteria, are not so easily resolved. It was noted that, at least initially, Thai student enrolment in Canadian institutions *for degree granting purposes* would likely be limited to only a few Thai students per year. It was also noted that an exchange program agreement, with credit transfer towards their home institution degree, would be much more feasible.

It was noted that the Thai system operates on a credit system but, at least intitially, a term-like system wold be adopted, with a 4 point grading system adopted. It was also noted that, while some universities leave only the *last* grade for a given course on the transcript, SUT would *not* be adopting this practice.

With respect to the details of the curriclum for Mechanical Engineering, some deficiencies were noted: engineering economics should be included: material science courses should be included; control courses should be included; vector calculus should be included; algebra should be included; a course on the

professional aspects of engineering should be included, e.g. ME 163; and a second course on Mechanical Engineering concepts, e.g. Mechanical Engineering Concepts 2 (ME 126) should be included.

5.3 Metallurgical Engineering

Metallurgical Engineering - No discussion of the curriculum ensued other than to point out the desirability of addressing the issues of recycle and the installation of a "mini mill".

5.4 Environmental Engineering

No discussion of the curriculum ensued, however the issue as to whether the programme should be at the undergraduate or graduate level was debated. TUNS believes that an "environmental awareness" must be instilled in every engineer in each discipline such that when they graduate and design and operate a plant they will do so in an environmentally acceptable manner. To this end, at TUNS an environmental option is offered at the undergraduate level in a number of disciplines including Chemical Engineering. In North America and Europe governments have put in place legislation to enforce environmental compliance, therefore several government agencies hire environmental engineering specialists. TUNS believe that it is premature to launch a sizable undergraduate environmental engineering programme in Thailand at this stage; it is better handled through technical electives and areas of emphasis within established engineering disciplines and supplemented at the Masters degree level. It is better to train future engineers to be environmentally conscious from the start.

5.5 Food Processing Technology

A complete description of the food science and food engineering programs at Guelph was provided. Detailed outlines of all courses were also included. These are essential to the development of the international program which is proposed. We had the opportunity to meet with the future head of the Food Science Department, a PhD graduate in food science from the University of Alberta. There was extensive discussion with him of other existing programs at Khon Kaen and Kasetsart Universities. These programs are offered in Thai with a curriculum substantially different from the normal Food Science type program. The importance of the first and second year courses was stressed since they are the foundation on which the applied components of the program are built. If exchange or integration of the students is to take place with Guelph at a later

stage, third year or later, the core food science courses should also be established.

However, provided that the proper phasing in would take place we did not see any particular difficulties granting credit for the equivalent courses.

6 International Program Considerations

At various points during the mission, the International Program was discussed. In these discussions, it was noted that certain of the CUTC participating universities had some reservations concerning the placement of Thai students in the Canadian universities for completion of their degrees and the subsequent granting of Canadian university degrees to these students, in addition to their Thai degrees. Concerns expressed included the following: ensuring that the Thai academic standards would be acceptable to the Canadian participating universities; ensuring that the necessary prerequisite material would, in fact, have been taken by the Thai students; significant numbers of students would be difficult to accommodate since this would imply denying Canadian students the corresponding places; ensuring, particularly during the present economic climate, that co-op jobs could, in fact, be provided to the Thai students when this might mean that Canadian students would be denied corresponding jobs; the command of the English language of Thai students might be a problem in the interview and *in situ work* environments; total Canadian accreditation requirements would have to be met using a minimum path-weakest link approach being adopted by the CEAB; and, the Thai and Canadian accreditation criteria might be in conflict with each other.

It was interpretted by the Mission Team that the "International Program" of the SUT was an English language delivery of the basic Thai curriculum. It was intended, it is believed, that the International Program was intended to attract students from the greater Southeast Asia area to the SUT programs; the intent, it is believed, is that the International Program would be a self-sufficient, revenue producing activity of the SUT. In fact, such a program, if successful, could be a profit centre for the SUT.

It was finally agreed that it was feasible to provide the *possibility* that certain Thai students *may* qualify for completion of their degrees in a Canadian univeristy, but that the numbers would be of the order of 15-16 students, per annum, spread throughout the four participating Canadian universities.

Notwithstanding the above, it was still deemed that the International Program would provide a unique opportunity to students throughout Southeast Asia.

7 English as a Second Language Center

An engineer must be an effective communicator. The results of engineering projects are communicated to management, funding agencies, technical audiences and the general public in

both oral and written formats. We have integrated communications into the core curriculum. Furthermore, communications are being integrated throughout the entire curriculum through the setting of term papers in core engineering subjects. For example, a student or group of students will be assigned a topic to research that is relevant to the course content and they must submit a written report and give an oral presentation. This exercise constitutes part of the ongoing communications coursework as well as satisfying the requirements of the engineering component of the coursework.

Ms. M. Johnson presented a proposal for the establishment of an English as a Second Language (ESL) activity. Her proposal comprised Ryerson Polytechnical Institute as the *offering Institution*, and a program as outlined in Appendix C. There were minor changes of a budgetary nature, from the previously budgeted activity, and the program was otherwise accepted as presented. Details can be found in Appendix C.

8 Budget Considerations - Change of Course

With respect to the budget, it was noted that the CIDA funding limit per project was likely to be in the $1,000,000 range; in fact, it was believed that this would be an absolute per project maximum for the CIDA funds. Further, this amount spread over four years must include a provision for inflation, for all years except the first, and a 10% contingency allowance. Finally it was noted that the proposed undertaking was a rather massive and ambitious one, indeed. The elements of the total package include the following:

1. *Complete* curriculum development for at least three programs;
2. Development of an English as a Second Language Centre;
3. Development of an infrastructure to administer the co-operative aspects of the programs;
4. Establishment of a library infrastructure;
5. Establishment of a management information system infrastructure;
6. Development of a joint PhD program.

Of course, there are many details associated with the above activities and these are reflected by the size and complexity of the associated budget sheets. It was apparent, however, that with the resources available from CIDA sources, all of the above could not be accomplished with any certainty of success in each area of activity. It was simply too ambitious of a project given the funding constraints. In consequence of this, a proposal was placed before the Thai representatives for their consideration. This proposal entailed essentially the following:

1. That curricula be *transplanted* from participating Canadian CUTC institutions, rather than have SUT/CUTC undertake extensive curriculum development activities;

2. That provision be made for supplemental *implementation* support for these transplanted curricula;

3. That *four* programs be introduced instead of the initial plan for three, with one program corresponding to each participating CUTC institution.

The *major* benefits of the above are the following:

1. The extensive curriculum development effort is avoided during the initial stages of activity at the SUT institution;

2. the associated CIDA-eligible funding can be shifted to other areas where it was needed to reduce the over-budget allocation to CIDA;

3. the compatibility of SUT programs with CUTC programs would be enhanced thereby minimizing the difficulties associated with the Thai students completing their degrees at CUTC institutions.

This recommendation was submitted to the Thai personnel for their consideration. After the Thai personnel discussed the proposal amongst themselves and the joint meeting of the Thai personnel and the Mission was re-convened, it was revealed that the Thai representatives agreed to the proposal. The surface cost of the proposal was $180,000 to the Thai government spread over four years. After refining details of the other areas of the budget, the net cost to the Thai government came out to be just over $100,000 spread over four years.

This proposal and its acceptance was viewed as a significant breakthrough in the negotiations since it made the entire proposed program of activity feasible; up until this time, an impasse situation had developed since it was otherwise not possible to accomplish the program goals within the CIDA funding restrictions.

9 Other Issues

9.1 State of the Food Processing Industry in Thailand

Thailand is a net exporter of food to south-east asia, europe and north america. Currently about 50% of the total food production is exported. Because of the importance of the external market and the regulations regarding food safety and

quality that are placed on the processing industry for export purposes, there is a high demand for graduates in the areas of food science and technology as well as in food-processing engineering. The northeast is not different from the rest of the country but specializes in specific food processing activities.

It is noted that the industry falls into three different categories as to size and market share. The large companies, more than 500 employees, are rare. They are usually branch plants of multi-national corporations and represent about 5% of the food-processing companies and command about a 33% market share. The medium size, 150-500 employees, represent 25% of the companies and a market share of 33%. Finally the small companies, less than 50 employees, represent 75% of the companies and 33% of market share.

Typically, large companies will employ both food scientists and food engineers. Medium size companies employ food scientists or food engineers with a ratio of about 3:1. Small companies might employ a food scientist but use them as a multi-purpose employee progressing rapidly to management positions.

There is no doubt, given the growth in this sector of the economy, that there is a need at SUT for both a food science and a food engineering program. The recommendation is to develop the food science department within the school of agriculture technology, immediately, and then gradually develop, in collaboration with the chemical engineering department, the food engineering program.

9.2 Women in Development, the Environment, Linkages

It was noted that, for preparation of the proposal to CIDA, current enrolments by gender at various universitiesshould be provided and that the projection of enrolment distribution be gender at SUT would also be very useful to include in the proposal. Considerable discussion was then devoted to some of the activities that can be employed to attract more female students into the engineering disciplines; it was noted that this issue is something that CIDA considers very carefully in their review of the various proposals. Some of the discussion included the following:

1. special activities of an outreach nature could be adopted;

2. the use of a quota system could be considered;

3. a significant part of one of the fellowships in the development program could be allocated to examine women's issues;

4. recruitment of female faculty members should be active;

5. a campus-day activity could be undertaken for high school counsellors, themselve, and then also for the actual students;

6. one of the courses in the engineering curriculum already deals with some of the issues relating to women.

It was also noted that about *one-half* of the staff currently committed to SUT are women; at the time of the mission, however, there were no women *faculty* at SUT. Some of the other programs that serve to encourage women to enter science and engineering in Canada include Science Quest, Explorations, the Science Olympics, Women in Engineering Committee activities, Campus Day, and mentorship programs.

With respect to the environment, it was noted that there are plans for courses with environmental content in all of the programs and that specific activities that deal with CIDA's concern for environmental consideration include the Environmental Engineering program, and the inclusion of much environmental material in the Mechanical Engineering, Chemical Engineering, and Food Processing Technology programs.

With respect to the matter of linkages to other institutions (LTOI) and of linkages to industry (LTI), it was noted that these would be easy to include in the report since there are many mechanisms by which the linkages occur and that this material would have to simply be written appropriately. Linkages include the following:

LTOI the ESL program activities within both countries, technology college students in the northeast could attend workshops at SUT from time to time, the collaboration already in place between Ryerson, Guelph, TUNS, and Waterloo, collaboration with AIT, Chulalonghorn, Khon Kaen, etc faculty members with respect to the joint PhD activities, and further future collaboration that might evolve out of these activities, etc;

LTI provision of immersion programs in ESL to industry, design and provision of short courses to industrial personnel, Thai faculty interaction with

industry through work term site visits by these faculty, collaboration on activities related to the Technopolis, consulting and research opportunities at the Industrial Park, etc.

10 Summary

This report has presented the findings of the Second Planning Mission of CUTC with respect to the Suranaree University of Technology. The mission conducted meetings, most of which were held at the Ministry of University Affairs offices in Bangkok, Thailand, presented a workshop on co-operative education, visited the actual site of SUT, and held both curriculum and budget discussions with the appropriate Thai counterparts as the situation dictated. The results of these discussions are presented in this document and need not be further elaborated upon here.

The key results of the mission, are the recommendations regarding the physical plant and facilities at SUT, the awareness by both Thai and Canadian mission members of certain similar activities as those planned for SUT at other Thai institutions, the delivery of the workshop on co-operative education, and the decision to forego extensive curriculum *development* activity in favour of transplanting appropriate program curricula from the participating Canadian institutions and concentrating the limited resources that are available on the *implementation* of these curricula. This latter development enabled the stalemate with regard to budgetary problems to be broken and enables the program of activities to be undertaken with the expected funding ceiling from CIDA, including the required inflation allowance and the required 10% contingency.

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Appendix A - Coop Workshop Attendance

(other than mission personnel)

1.	Dr. Wichit Srisa-an	Permanent Secretary, acting SUT Rector
2.	Dr. Vidhya Pienvichitz	Senior Advisor for Academic Affairs
3.	Dr. Terd Charoenwatana	Dean, School of Agricultural Technology
4.	Dr. Kasem Prabriputaloong	Vice-Rector of Operations
5.	Dr. Wanchai Sirichana	Vice-Rector of Special Projects
6.	Dr. Tavee Lertpanyavit	Vice-Rector of Academic Affairs
7.	Dr. Virun Manklavirit	Director, Equipment Centre
8.	Dr. Thai Tipsuwanakul	Director, Educational Service Centre
9.	Dr. Amornwich Nakornthap	Secretary, Cooperative Education
10.	Mr. Wirat Na-Songkla	Representative, Thai Chamber of Commerce
11.	Ms. Yuwandee Manakasem	Lecturer
12.	Mr. Monchai Ratana	Representative, Federation of Thai Industries
13.	Dr. Wicha Tiwali	Chairman, Committee of Curriculum Development in Transportation Technology
14.	Dr. Suwet Ningsanon	Head, Department of Food Technology
15.	Dr. Kanok Palalak	Head, Department of Animals Production Technology
16.	Dr. Surin Setamanit	Chair, Committee of Curriculum Development in Environmental Engineering
17.	Mr. Suwit Punnachaiya	Lecturer
18.	Dr. Phichai Pamanikkabut	Lecturer
19.	Dr. Tinda Yinrewat	Committee, Cooperative Education

20.	Ms. Kamjana Tanthai	Assistant Secretary, Cooperative Education

Appendix B - Co-operative Education Workshop Presentation Material

The contents of this appendix comprise the slide material presented at the Workshop on Co-operative education at the Ministry of University Affairs in Bangkok, Thailand.

Suranaree Workshop on Co-operative Education

1) The Rationale for Co-operative Education

2) Socioeconomic Issues Affecting Co-operative Education

3) Strategies for Co-operative Education: Infrastructure for Co-op

4) "Coordinator" Training

5) Startup Strategies

6) A Truly Cooperative Venture

7) Summary Discussion

8) Where do we go from here?

The Rationale for Co-operative Education

1. Student

2. University

3. Industry

The Rationale for Co-operative Education

Student

- eduation for the student
- economics for the student
- experience for the class
- preparedness
- maturity at graduation
- writing skills
- interview/verbal skills

The Rationale for Co-operative Education

University

- exposure to the employers
- industrial contact of the Professors
- research cooperation
- educate the faculty
- international opportunities
- viability

The Rationale for Co-operative Education

Industry

- opportunity to examine future employees
- value for money; *not* 'training'
- access to Professorial expertise
- research collaboration
- international opportunities
- 'unique' association
- "Suranaree Advisory Council"

Socioeconomic Considerations

- Canada

- China

- Thailand?

Co-operative Education Program Models

1. *Standard* program - just add work terms

2. Develop curriculum to fully integrate work term experience.

3. Selective programs

   - quotas for co-op

   - specialization for non co-op

Requirements for Integrated Program

1. Orientation siminars

2. Core technical communications course

3. Post work experience on-going technical communications course

Content

Orientation Seminars

1. Rules
2. Placement process
3. Selection criteria
4. Job applcation and interview skills
5. Resume writing
6. Work ethic
7. Safety in the workplace

Technical Communications

A. ***Core***

1. Basic writing skills
2. Report structure and writing
3. Presentations

B. ***Post Work Experience***

1. Revision
2. Presentations
3. Ethics
4. Time Management
5. Proposal writing

Coordinator Training

Counselling and Student Resource Centre

1. Career Services Unit

2. Work Study - Field Coordinators

Career Services Unit

Responsible for administering the work semester aspects of the co-operative education program:

1. Marketing the concept of co-op education to employers.

2. Identification of appropriate jobs.

3. Organizing on-campus employer interview system.

4. Ensuring that courses are available for returning students.

Work Study - Field Coodinators

Responsible for the continued operation of the system:

1. Visit each student on the job each work semester.
2. Counselling of students.
3. Evaluation of work reports.
4. Return to campus interviews.

Startup Strategies

1. Establish roster of participating companies.

2. Establish list of jobs available from the participating companies.

3. Rank jobs as to suitability for work term experience (done by University).

4. Depending on availability, decide which program starts first.

5. Arrange interviews (on campus) between student and potential employer.

Startup Strategies (cont'd)

6. Maintain close contact with both student and employer.

7. At the end of the first work term, review with employer the results achieved.

Credibility and success will only result from excellence of the students in the workplace. This is why item 3 above is critical, i.e. ranking jobs as to suitability!

Conclusion

Better quality education - insurance policy for Thai industry!

Building a better future!

Appendix C - Centre for English as a Second Language

Suranaree University of Technology

Introduction

Ryerson has for several years conducted training in English as a Second Language (ESL), with special emphasis on Certificates in Business English and Technical English. Current high enrolments attest to the effectiveness of the program. In addition, Continuing Education has undertaken intensive programs for a number of students from other countries who have come to Ryerson to subsequently study Engineering on-site or at other universities in Canada.

A number of faculty who have ESL instruction as their special area are committed to undertaking the development, and subsequent teaching as required, and support for the Centre at SUT. As necessary, expertise from other centres of ESL training will also be utilized.

Fanshawe College of Applied Arts and Technology in London, Ontario, has an extensive ESL program. This program enrols over 1000 students per year and is supplemented by a "home-stay" program with Canadian families to increase the students' exposure to the use of English through 'immersion' practices.

The Workplan

Phase 1 Assessment and Initial Program Preparation - Immediate

This initial phase will occur in Thailand. It is recommended that a faculty member from the ESL program at Ryerson spend approximately one month visiting SUT to assess the following areas which will affect the subsequent development of the Centre:

a) assess current levels of English language instruction in the pre-university system;

b) define the future student population and undertake pre-testing of some of the possible candidates for the program to assess the expected level of English language skills;

c) review the Engineering Degree program content to determine what language skills need to be developed to ensure that the ESL program is targeted on the needs of the curriculum, and to determine those students who will be entering;

d) discuss with the Engineering faculty to ascertain what they perceive their needs will be in the development of instructional and presentational materials;

e) begin the process of identification of Thai instructors to determine what additional preparation they will require to undertake the on-site training of students. It will also be necessary to select two faculty to be the resident lead teachers for the ESL program and who will come to Canada to undertake intensive training;

f) assist in the development of the physical resources required for the Centre, and in the preparation of the list of necessary equipment and supplies for the program;

g) investigate similar Thai programs already in place (e.g. AIT) to determine what linkages might be developed;

h) establish a time schedule for the development of the program in order to meet faculty and students' needs as they move through the program;

i) discuss long-range program objectives with the University with respect to broadening the Centre's mandate to attract students who are not enrolled in Engineering (e.g. people who live in the area);

j) undertake pre-departure briefing to Thai faculty coming to Canada.

Phase 2 Program Development and Faculty Preparation - Winter/Spring

This phase will occur in Canada, at Ryerson and at Fanshawe College. Two ESL faculty from Thailand will spend one semester (four months) preparing themselves to be the lead teachers in the ESL program at SUT. During the time they are in Canada, they will undertake a number of Professional development activities. These will include:

a. further development of their personal language and teaching skills.

b. development of their ability to instruct other faculty who will be hired in Thailand to undertake ESL teaching.

c. development of the specialized curriculum in Engineering-related English, by working with Ryerson and Fanshawe College ESL instructors, and with professors from the Faculty of Engineering and Applied Sciences.

d. further assessment of the needs of the development program in Thailand, using the existing regular courses and the intensive courses at Ryerson and Fanshawe College as models. The latter model would be used for intensive programs at the Centre, and could draw students from all over Thailand and other parts of the world.

2.3 Phase 3. Pilot Program Activity - Spring/Summer, 1993

This will occur in Thailand and will serve three purposes:

a. to pilot test the curriculum that has been developed for pre-Engineering preparation of students;

b. to pilot test the regular on-going ESL courses offered during the semester;

c. to assess the capabilities and further training needs of the Thai ESL centre;

d. to undertake further training of Thai ESL faculty as required. Visiting Canadian faculty and Thai ESL faculty will act as model instructors during this pilot period;

e. provide on-going courses to Thai students during the academic year, starting with visiting faculty on-site for the initial two weeks of the term.

These activities will be carried out jointly by Ryerson and by Fanshawe College faculty and the two Thai faculty who will have had the Canadian development experience. This will require one faculty member from Ryerson and one from Fanshawe College to be in Thailand at the University, for one semester. During this time the curriculum, after assessment, will undergo re-design as required and where possible, re-testing.

2.4 Phase 4. On-going development of the ESL Centre.

While the initial thrust of the program is to prepare students to participate in and successfully complete the Engineering program both in Thailand and overseas, a long-range element of the project is the development and success of an ESL Centre that will meet the needs of a larger portion of the population living in the area of the University, as well as those from

throughout the country. This Centre can develop as a "Centre of Excellence" for training programs in Engineering-related and Business-related English. This will be an integral part of the work of the project and of the faculty from Ryerson and Fanshawe College in the initial phase, but may require specific additional involvement as well. This will be negotiated separately after the initial period of development.

4.0 SUMMARY

Ryerson has the capacity to work with the Suranaree University of Technology in the development and provision of an effective ESL program for students, faculty and other professionals in the general community.

Part of the development will occur in Thailand and part in Canada, but the emphasis will be on Thailand-based activity.

Continuous quality improvement over the five-year period is the approach taken, and will result in a highly-trained cadre of ESL trainers, students, and Faculty at Suranaree University of Technology.

Canadian
Universities
Technology
Consortium

INSTITUTIONAL DEVELOPMENT AND CAPACITY BUILDING:

A PROJECT OF

INSTITUTIONAL LINKAGE AND TECHNICAL COOPERATION BETWEEN

SURANAREE UNIVERSITY OF TECHNOLOGY (SUT), THAILAND
AND
CANADIAN UNIVERSITIES TECHNOLOGY CONSORTIUM (CUTC), CANADA

PLANNING MISSION REPORT

February 26 - March 13, 1993

Submitted April 6, 1993
by:
Canadian Universities Technology Consortium (CUTC)

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Project Abstract

Suranaree University of Technology (SUT) has been identified by Thailand's Ministry of University Affairs (MUA) as a priority within the program of development for higher education in Thailand and more particularly in the northeast region of the country. The planning mission provided the opportunity for administrators from SUT to travel to Canada to meet with personnel from the member universities of the Canadian Universities Technology Consortium to finalize proposals for a linkage project of technical cooperation and institutional development, which has been designed through four previous missions funded by the partners.

Through detailed assessment of library automation and management information systems and cooperative education programs in Canada, the mission participants defined appropriate strategies for the inclusion of these elements in the proposed linkage project and subsequent development of institutional capacity at SUT. Plans for the establishment of joint international engineering programs and a joint Ph.D. project were also finalized.

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1. Purpose of Mission

2. Achievement of Mission's Goals

3. Outputs of the Planning Mission

4. Mission Personnel

5. Financial Report based on Approved Budget

Appendices

A. Approved Budget

B. Details of Mission Schedule, Participants, Discussions and Outcomes

1. Purpose of the Mission

The purpose of the planning mission was threefold:

- To carry out the final planning phase for a project of institutional linkage between Suranaree University of Technology (SUT) and the Canadian University Technology Consortium (CUTC) that will be submitted to CIDA in April 1993. Earlier phases included: (a) visits by Canadians to Thailand and Thais to Canada to define the partnership and develop potential relationships; and (b) planning trips by Canadians to Thailand to assess SUT's needs and develop the preliminary project framework. In this phase the joint Canadian-Thai team would discuss and make all the necessary changes to the project's preliminary design necessitated by the release of CIDA's guidelines.

- To undertake a detailed assessment of the strategies adopted by Canadian member universities of CUTC in implementing cooperative education in their academic programs, and to define the appropriate strategy for SUT. The SUT cooperative education strategy is one of the cornerstones upon which the various activities in the proposed institutional linkage project will be based.

- To provide the opportunity for two Thai specialists to intensively study and assess two disciplines of great relevance and urgency to SUT: (a) library automation and information systems; and (b) management information systems. Important decisions concerning the development of SUT's capacity in these two fields, including decisions concerning the procurement of appropriate equipment and supporting software, need to be made before the anticipated beginning of the proposed institutional linkage project.

2. Achievement of Mission's Goals

All of the anticipated outputs were achieved during the two weeks of the mission. The mission achieved the following overall goals:

- **Institutional Linkage Project Design**

  Towards carrying out the final planning phase for the project of institutional linkage between SUT and CUTC, the following was achieved:
  - the overall project design was finalized and agreed upon;
  - the proposed project budget was by the SUT mission members and the CUTC participants;
  - through visits to the four CUTC campuses and discussions with academic administrators (the Vice President, Academic, and the Deans of Science and Engineering) at each institution, the proposed undergraduate international science and engineering programs and the joint international PhD programs were confirmed. Further, the level of support, and roles and responsibilities of each university within these proposed programs were defined and affirmed.

- **Comparative Education**

  SUT administrators undertook a detailed assessment of the strategies adopted by Canadian member universities of CUTC in implementing cooperative education in their academic programs. Through meetings with cooperative education administrators at the various CUTC institutions, the Thai delegation was able to gain an enhanced understanding of the needs and capabilities of SUT in the area of cooperative education. This needs assessment proved beneficial in defining SUT's requirements, the appropriate SUT co-op education strategy and the required intervention by the linkage project.

  Following successful meetings with representatives from multinational private sector firms, CUTC and SUT will continue to negotiate with the private sector to secure participation in the cooperative education programs proposed in the project.

- **Library Automation and Management Information Systems**

  The mission provided two SUT specialists the opportunity to intensively study and assess two disciplines of great relevance and urgency to SUT: (a) library automation and information systems; and (b) management information systems. During the course of the mission, a strategy was incorporated into the project proposal for support by CUTC to SUT regarding both library automation and management information systems.

- **Project Management**

  With the Project Implementation Units on both the Canadian and Thai sides in place, the mission allowed the key individuals involved in the project design, development and delivery, the opportunity to meet and discuss plans and objectives.

3. Outputs of the Planning Mission

Details of the planning mission's objectives, activities and outputs are shown in Table 1.

Table 1: Details of the Outputs of the Planning Mission

Planning Mission Objectives	Mission Activities	Mission Outputs
To confirm the viability and logistical details of the four international science and engineering programs to be jointly designed and delivered at SUT and the participating CUTC institutions, as well as support given by each CUTC university to the international academic programs.	The SUT team met with the various Deans of Engineering at the CUTC member universities and discussed the details of customized training and technical service needed to support the design and delivery of the programs.	The plan for the establishment of the joint Ph.D programs, as well as the international undergraduate applied science and engineering programs, has been agreed upon and is supported by the activities outlined in the project proposal.
To confirm the disciplines, sequencing, logistics and student numbers involved in the proposed joint Ph.D. programs.	Meetings were held between the SUT team and the Deans of Graduate Studies at the three CUTC institutions which offer graduate programs. Meetings were also held with the Vice Presidents, Academic, to confirm the nature of the institutional commitment of each of the CUTC members in support of the joint Ph.D programs.	It has been agreed that within the life of the project TUNS and the University of Guelph will accept 3 PhD candidates each, and the University of Waterloo will accept 4. Therefore a total of ten candidates will be trained under the project.
To finalize a plan for the incorporation of cooperative education at SUT.	The SUT team met with the cooperative education coordinators at three CUTC universities which offer cooperative education programs,and looked at three different models, with the view of designing the most appropriate structure for SUT.	It was agreed during the mission that one Co-operative Program Coordinator will receive a 6-week customized fellowship training program in Canada. Further, strategies were developed to facilitate the participation of the Thai Federation of Industries and Enterprises in the design of SUT's co-op program.

Planning Mission Objectives	Mission Activities	Mission Outputs
(cont'd).	Meetings were held with representatives of Northern Telecom and IBM to discuss issues surrounding the benefits derived by the private sector in the support of cooperative education programs. The mission also discussed the possibility of placing Thai students for sixteen week periods in these and other private sector companies. Also discussed with the companies was their involvement in the provision of industrial training seminars in Thailand to be jointly designed and delivered by CUTC/SUT and the companies. Funds to support the development of the framework of such activities have been identified within the project proposal to CIDA and will be shared by CIDA and the two partner institutions.	Preliminary expressions of interest were made by Northern Telecom and IBM to support the provision of work placement for Thai and Canadian students. Further negotiations are still required to obtain final firm commitment from them and other Canadian private sector enterprises.
To familiarize SUT personnel with library automation and information systems used by Canadian universities and to assess SUT's needs and objectives in these areas.	The SUT team met with Chief Librarians and library staff from each of the CUTC institutions. They discussed library automation systems and examined equipment and computer software being used in Canadian universities. They were able to discuss SUT's own capacity and needs in the area of library automation, and prepared preliminary plans for CUTC's contribution in this field.	Preliminary plans for the library information services and networks for the SUT library have been developed.
To familiarize SUT personnel with various management information systems used by Canadian universities.	The SUT mission members met with individuals responsible for Management Information Systems at each of the four CUTC institutions. Through tours of the universities' own systems and discussions regarding SUT's needs, they were able to asses a plan of action for the development of SUT's management information system.	Preliminary plans and strategies for the implementation of a management information system for SUT have been developed.

4. Mission Personnel

The mission personnel consisted of the following Suranaree University of Technology academic administrators and faculty members:

Dr. Sam-arng Srinilta, Acting Vice-President for Planning and Development;
Dr. Tavee Lertpanyavit, Acting Vice-President for Academic Affairs;
Dr. Ongkan Indrambarya, Acting Vice-President for Administration and Acting Director of Media and Educational Technology Centre; and
Dr. Thawatchai Teekachunhatean, Faculty, Department of Agriculture Technology.

During the mission, Dr. Sam-arng concentrated on intensive study and assessment of management information systems in Canadian universities. Important decisions concerning the development of SUT's own capacity in MIS, including procurement of equipment and software, will be addressed in the Project Proposal.

Dr. Tavee met with CUTC member institutions' Deans of Engineering and Vice Presidents, Academic. During the mission, he studied the international science and engineering and joint international PhD programs in the proposed institutional linkage project and confirmed each Canadian institution's commitment to, and roles and responsibilities within these programs.

Dr. Ongkan studied library automation and information systems in Canadian universities, including the member institutions of CUTC. He examined the equipment and computer software utilized at these institutions and discussed SUT's needs and capacities in the field of library automation.

Dr. Thawatchai undertook a detailed assessment of the strategies adopted by Canadian member universities of CUTC in implementing cooperative education in their academic programs, in an effort to address and define the appropriate strategy for SUT. The cooperative education strategy is one of the cornerstones upon which the various activities in the proposed institutional linkage project will be based.

5. Financial Report Based on Approved Budget

The following Expense Statement reflects the reconciled expenses for the Planning Mission based on the budget approved by the CEA. As required, all supporting original documents will be kept available for audit purposes. It is understood that the over expenditure on the expenses is to be absorbed by CUTC.

06-Apr-93

CUTC/SUT PLANNING MISSION TO CANADA

ACTIVITY BASED EXPENSE SUMMARY

Activity and Cost Items	Budget				Expenses			
	SUT	CUTC	CIDA	Total Budget	SUT	CUTC	CIDA	Total Expenses
1.0 SUT Faculty Travel to and In Canada								
1.1 Travel to Canada								
Bangkok-Toronto-Bangkok	3,627	0	0	3,627	3,627	0	0	3,627
Bangkok-Halifax-Bangkok	0	0	11,478	11,478	0	0	10,807	10,807
1.2 Travel within Canada	300	0	900	1,200	300	0	1,059	1,359
1.3 Accommodation in Canada								
Delta Chelsea, Toronto	570	0	1,995	2,565	570	0	2,993	3,563
Sheraton Inn, Halifax	0	0	390	390	0	0	466	466
Holiday Inn, Guelph	430	0	516	946	430	0	282	712
Holiday Inn, Kitchener-Waterloo	237	0	711	948	237	0	251	488
1.4 Meals and Incidentials	700	0	2,100	2,800	700	0	1,691	2,391
1.5 Professional Fees	13,600	0	0	13,600	13,600	0	0	13,600
1.6 Report Production and Communication	500	0	0	500	500	0	0	500
2.0 CUTC Participant to Accompany SUT Mission								
2.1 Airfare in Canada	0	0	600	600	0	0	866	866
2.2 Local Travel in Canada	0	0	300	300	0	0	786	786
2.3 Accommodation								
Sheraton Inn, Halifax	0	0	130	130	0	0	78	78
2.4 Meals and Incidentials	0	100	0	100	0	100	0	100
2.5 Planning and Coordination	0	10,000	0	10,000	0	10,000	0	10,000
2.6 Report Production and Communication	0	500	1,000	1,500	0	500	1,000	1,500
2.7 Entertainment of SUT Personnel	0	4,000	0	4,000	0	4,000	0	4,000
Total	**19,964**	**14,600**	**20,120**	**54,684**	**19,964**	**14,600**	**20,279**	**54,843**

*** Note - Backup documents available for all expenses of $20,279 under CIDA funding.**

Aimee Horii, CMA
Intermediate Project Accountant

Date April 6/93

APPENDIX A
Approved Budget

CUTC/SUT PLANNING MISSION TO CANADA - BUDGET PROPOSAL

ACTIVITY BASED BUDGET

Activity and Cost Items	Unit	Unit Cost C$ A	Quantity B	Activity Subtotal C=A x B	Sources of Funding			
					SUT	CUTC	CIDA	Total Sources
1.0 SUT Faculty Coming to Canada								
1.1 Travel to Canada	4 persons							
Bangkok-Toronto-Bangkok	1 person	3,627	1	3,627	3,627	0	0	3,627
Bangkok-Halifax-Bangkok	3 persons	3,826	3	11,478	0	0	11,478	11,478
1.2 Travel within Canada	4 persons	300	4	1,200	300	0	900	1,200
1.3 Accommodation in Canada	4 persons							
Delta Chelsea, Toronto	per night	95	27	2,565	570	0	1,995	2,565
Sheraton Inn, Halifax	per night	65	6	390	0	0	390	390
Holiday Inn, Guelph	per night	86	11	946	430	0	516	946
Holiday Inn, Kitchener-Waterloo	per night	79	12	948	237	0	711	948
1.4 Meals and Incidentals	4 persons	50	56	2,800	700	0	2,100	2,800
1.5 Professional Fees	4 persons	200	68	13,600	13,600	0	0	13,600
1.6 Report Production and Communication		500		500	500	0	0	500
2.0 CUTC Participant to Accompany SUT Mission								
2.1 Airfare in Canada	1 person	600	1	600	0	0	600	600
2.2 Local travel in Canada	1 person	300	1	300	0	0	300	300
2.3 Accommodation	1 person							
Sheraton Inn, Halifax	per night	65	2	130	0	0	130	130
2.4 Meals and Incidentals	1 person	50	2	100	0	100	0	100
2.5 Planning and Coordination	per day	500	20	10,000	0	10,000	0	10,000
2.6 Report Production and Communication Costs		1,500		1,500	0	500	1,000	1,500
2.7 Entertainment of SUT Personnel		4,000		4,000	0	4,000	0	4,000
TOTAL				**54,684**	**19,964**	**14,600**	**20,120**	**54,684**

APPENDIX B

Details of Mission Schedule, Participants, Discussions and Outcomes

Outcomes of Meetings of Planning Mission for
Human Resources Development Policy and Institutional Linkages Project,
between
Suranaree University of Technology (SUT), Thailand
and
Canadian Universities Technology Consortium (CUTC), Canada

Friday, February 26 to Saturday, March 13, 1993

Date	Meeting Participants		Discussions
	Thai	**Canadian**	
Technical University of Nova Scotia (TUNS), Halifax, Nova Scotia			
Monday March 1	Dr. Sam-arng Srinilta Dr. Tavee Lertpanyavit Dr. Ongkan Indrambarya Dr. Thawatchai Teekachunhatean	Mike Pegg, Chemical Engineering Robert Eagle, Director, Research Services William Caley, Dean of Engineering Ann Marie Coolen, Director Cooperative Education	•Review of itinerary •Determine objectives of mission
	Thai Delegation	Ann Marie Coolen	•Discussions on job development, work term evaluation
	Thai Delegation	Donald Roy, President	•President welcomed delegation and confirmed commitment of TUNS to the project
	Thai Delegation	William Caley Robert Eagle	•Discussions of project proposal •Discussions on co-op implementation and sequencing •Discussions on how TUNS was able to secure the participation of Canadian enterprise in co-op education program •Initial discussion on proposed international PhD program

Tuesday March 2	Dr. Sam-arng Srinilta Dr. Tavee Lertpanyavit Dr. Ongkan Indrambarya Dr. Thawatchai Teekachunhatean	Gordon Owen, Technology Transfer, Dalhousie University Tom Nickerson, President, NSRFC Andy Woyedwoda, Industrial Technology Advisor, CIFT Doug Pincock, President, AMI Leigh Beauchamp, CAD/CAM Robert Eagle	•Presentations made on how technology developed at a university could be used to aid the development of industry. The presenters represented a university technology transfer office, a provincial research organization and three university research centres. •Discussion on how enterprises benefit from employment of co-op students, as well as some drawbacks.
	Dr. Ongkan Indrambarya	Riaz Hussain, Librarian	•Discussed TUNS library operation with particular emphasis on the inter-university linkage system NOVANET.
	Thai Delegation	William Caley	•Classification of Thai needs with regard to faculty for co-op implementation and extra faculty time necessitated by co-op.
	Dr. Sam-arng Srinilta Dr. Tavee Lertpanyavit Dr. Thawatchai Teekachunhatean	Linda Burke various co-op students	•The delegation viewed and used the software used by TUNS to administer its co-op program. Discussions of SUT's needs to design, deliver and administer co-op programs in Thailand.
	Dr. Ongkan Indrambarya	Riaz Hussain	•A tour of the Dalhousie University library was undertaken and discussions revolved around the library systems and needs of SUT.
Wednesday March 3	Dr. Sam-arng Srinilta Dr. Tavee Lertpanyavit Dr. Ongkan Indrambarya Dr. Thawatchai Teekachunhatean	H. Hancock, Head of the Co-op Committee William Caley	•Discussions on role and effectiveness of co-op committee of faculty.
	Dr. Sam-arng Srinilta Dr. Ongkan Indrambarya	Dexter Kaulbauch, Vice President Rick Lowery, Treasurer	•Meeting to discuss TUNS financial and administrative procedures and MIS systems, as well as to view software packages related to same.
	Dr. Tavee Lertpanyavit	William Caley Stalin Boctor, Technical Adviser, CUTC	•Review of joint PhD and undergraduate proposals. Discussions on what will be required by both SUT and TUNS in support of the development of international science and engineering programs at SUT as well as the proposed PhD programs.
	Thai Delegation	Paul Amyotte, Head, Chemical Engineering Mike Pegg William Caley Stalin Boctor	•TUNS Chemical Engineering to provide by March 11 a proposed curriculum for Thailand (4 terms) and TUNS (either 4 or 5 terms) with a proposal to cover the 8 month work term.

Wednesday March 3 (cont'd).	Thai Delegation	William Caley Stalin Boctor Robert Eagle	•Discussions on fee structure for students in Canada, and for Thais to identify relevant research areas for the joint PhD program. •Discussions on Chemical Engineering Program concerning a generic Year 1 compatible with Waterloo (Mechanical) and Ryerson (Electrical). Also, course sequencing for a 4 term 2-year program in Thailand, and a 4 or 5 term plus 8 month work term proposal for SUT/TUNS International Chemical and Environmental Engineering.
Outcomes of TUNS Meetings: -Decision to confirm fee structure for students in Canada, and for Thais to identify relevant program areas for the joint PhD program. -Preliminary plans to provide an international Chemical and Environmental Engineering Program with a generic Year 1 compatible with Waterloo (Mechanical) and Ryerson (Electrical). Also, course sequencing for a 4 term, 2-year program in Thailand, and a 4 or 5 term plus 8 month work term proposal for SUT/TUNS Chemical and Environmental Engineering.			
University of Guelph, Guelph, Ontario			
Thursday March 4 and Friday March 5	Dr. Sam-arng Srinilta Dr. Tavee Lertpanyavit Dr. Ongkan Indrambarya Dr. Thawatchai Teekachunhatean	Tammy Bray, Assoc.VP Academic Jim Shute, Director, Centre for International Programs Kath Beaven, Assistant Director, Centre for International Programs	•Outlined commitment of University of Guelph to participate in CUTC consortium and to the SUT project.
	Dr. Sam-arng Srinilta	Doug Badger, Finance	•Discussed overall organizational structure of computing on Guelph's campus, and strategic direction towards UNIX and Open Systems. •Reviewed conceptual model of remote/field department access to central systems, including both front-end data collection and back-end financial information retrieval. •Provided demonstration of MIS. •Discussed "make versus buy" approaches, consultants potential role at SUT and process of preparing Request for Proposals.
	Dr. Thawatchai Teekachunhatean	Ed Gamble, Crop Sciences Lloyd Ross, Acting Director of Co-op Programs Peter Chisolm, Faculty Advisor for Engineering Co-op Programs	•Discussed the Crop Science/Agronomy Major Co-op program: application and acceptance of students into program; types of work experience; salaries paid; work reports; etc. •Met with Thai students, including Lynn Mitchell, a former co-op student in Crop Science, to discuss students' experience with co-op program. •Discussed Engineering co-op programs at University of Guelph and discussions on proposed international science and engineering programs at SUT and the parameters affecting the PhD program. •Brief discussion of Crop Science Department's research programs, and a short tour of laboratories and indoor growth facilities.

Thursday March 4 and Friday March 5 (cont'd).	Dr. Tavee Lertpanyavit	Marc LeMaguer, Food Science Dr. Kakuda, Graduate Coordinator Linda Harris, Food Science Co-op Coordinator	•Tour of the Department and its facilities. Particularly stressed were the physical facilities related to pilot plant activities and the importance of hygiene and sanitation in the design. •Discussion of the joint PhD program. •Discussion of specific activities related to counselling, career guiding and report grading of students. Issues related to number of students, placement in industry for potential Thai students. •Discussions of how Co-op program was established: selection of industries, on-site visits, etc. •International science program discussed. Discussion of core two-year curriculum.
Thursday March 4 to Tuesday March 9	Dr. Ongkan Indrambarya	John Black, Chief Librarian	•Discussions over four days of a wide range of issues related to the development of the library and information resource capability of SUT and the role that Guelph and other members of CUTC might play in helping to develop that aspect of SUT. •Visits to Canadian private sector companies to explore library automation systems, including equipment and software.
Outcomes of University of Guelph Meetings: •Food Sciences prepared to accept two candidates for PhD program. Linking supervisory role of the Canadian faculty to the development of the undergraduate international program may be a way of accomplishing two objectives with the same travel expenses. •Food Sciences could accept ten students in third and fourth year. •It was determined that the outline of the proposed project is very feasible from Food Sciences point of view. •Developed plans for Dr. Black to travel to Thailand soon, for specific advice on the next steps to be taken in regard to a number os library issues. •Discussion of training component of professional library staff in project proposal. The proposed "provision of technical assistance to SUT to develop non-academic administrative infrastructure" would be better achieved with two shorter visits rather than one four-week visit. •Discussions of more extensive communication links to be set up between SUT and CUTC institutions			
University of Waterloo, Waterloo, Ontario			
Monday March 8 and Tuesday March 9	Dr. Sam-arng Srinilta Dr. Tavee Lertpanyavit Dr. Thawatchai Teekachunhatean	Alan George, VP, Academic Pauline O'Neill, International Liaison Officer	•Welcome to the University •Overview of the academic and administrative structure and organization of the University. •Overview of the functions of the International Programs Office and of Waterloo's current international programs.
	Dr. Sam-arng Srinilta Dr. Tavee Lertpanyavit Dr. Thawatchai Teekachunhatean	Murray Shepherd, Head Librarian Michael Ridley, Librarian for Systems Development Lorraine Beattie, Coordinator of Administrative Services Bruce MacNeil, Associate Librarian for Information	•General overview of the library services at the University. •Discussion of considerations for the creation of an entirely electronic library, including both technological needs and human resources. •Tour of the Davis Centre Library, showing how the collection is stored and accessed, and services provided.

Monday March 8 and Tuesday March 9 (cont'd).	Dr. Sam-arng Srinilta Dr. Tavee Lertpanyavit Dr. Thawatchai Teekachunhatean	David Burns, Dean of Engineering Gerry Schneider, Associate Dean, Faculty of Engineering Herb Ratz, Director of Exchange Programs, Faculty of Engineering	•Discussions on Waterloo's undergraduate program and various scenarios through which Thai undergraduate students might participate in the program. Participation would have to be limited to two or three students per year. •Discussion of problems/difficulties in first year and transition from high school. •Discussion of mechanisms used to ensure quality of applicants. •Discussion of various fee/registration scenarios (need for visas to participate in co-op programs).
	Dr. Sam-arng Srinilta Dr. Tavee Lertpanyavit Dr. Thawatchai Teekachunhatean	John Westlake, International Coordinator, Cooperative Education and Career Services	•Overview of the Co-operative Education and Career Services Department. •Discussed: the role of the coordinators and the placement process, including work/study sequence; the interview process; the computerized ranking and placement system; work term requirements; employer evaluations; and student work reports.
	Dr. Sam-arng Srinilta Dr. Tavee Lertpanyavit Dr. Thawatchai Teekachunhatean	Bud Walker, Director, Data Processing	•Overview of Waterloo's computerized information management systems, including student course information and registration, administrative information, library systems, space management, physical plant, retail management, and many ancillary services. •Discussion of considerations for the creation of an integrated system, with decentralized operation but central control. •Discussion of priorities in the implementation of computerized systems.

Outcomes of University of Waterloo Meetings:

•An assessment of the strategies developed by University of Waterloo to secure the participation of Canadian enterprise in cooperative education programs.
•An assessment of the policies and administrative structures developed by University of Waterloo for the integration of cooperative education into its academic program.
•A commitment of the University of Waterloo's Department of Mechanical Engineering to the proposed applied science and engineering undergraduate program within the proposed institutional linkage project and the joint international PhD program.
•Preliminary commitment to possible information liaison and data sharing between Waterloo and SUT.

Ryerson Polytechnical Institute, Toronto, Ontario

Wednesday March 10	Dr. Sam-arng Srinilta Dr. Tavee Lertpanyavit Dr. Ongkan Indrambarya Dr. Thawatchai Teekachunhatean	Sam Mikhail, Director, Ryerson International Marsha McEachrane-Johnson, Associate, Ryerson International Sue Halpin, Bell/Northern Telecom Research Dave Hann, IBM	•Briefing on involvement of private sector companies in the cooperative education programs of various universities in Canada. •Discussions on possibility of having Thai students complete their co-op term at either of these companies' branches in Thailand proved promising. •Both companies will study placement of Thai co-op program students in Canada and their counterparts in Thailand.

Thursday March 11	Dr. Sam-arng Srinilta Dr. Tavee Lertpanyavit Dr. Thawatchai Teekachunhatean Dr. Ongkan Indrambarya	Dennis Mock, Vice President, Academic Sam Mikhail Marsha McEachrane-Johnson Stalin Boctor, Chairman, Department of Electrical Engineering	•VP, Academic indicated Ryerson commitment to CUTC and to the SUT proposed project. •Suggested areas that Ryerson can share its specialization with SUT including engineering accreditation, telecommunications, etc.
	Dr. Sam-arng Srinilta	Morven Wilson, Director, Computing and Communications Services	•Briefing by representatives of Finance, Admissions, Student Information, Registration, and Human Resources Departments on assessment of use of computers in each of the areas. •Discussions on existing computerized management information system, and how SUT could benefit from Ryerson's experience.
	Dr. Tavee Lertpanyavit Dr. Thawatchai Teekachunhatean	William White, Dean of Applied Science and Engineering Stalin Boctor	•PhD and international science and engineering programs were discussed extensively and the Dean expressed support for the project. •Discussion on success of co-op program at Ryerson, and recommendations for development of close ties with industry in Thailand to support such an initiative there.
	Dr. Ongkan Indrambarya	Richard Malinski, Chief Librarian Bob Jackson, Library Automation	•An assessment of the library automation system at Ryerson. •Discussions on concept of remote access. •Discussions on suggested software packages for use in SUT's library automation.
	Thai Delegation	Sam Mikhail Stalin Boctor Marsha McEachrane-Johnson	•A review of the two-week mission activities and overview of proposed project plan, management, activities, deliverable-based budget in preparation for final meeting, Friday March 12, 1993.
Friday March 12	Dr. Sam-arng Srinilta Dr. Tavee Lertpanyavit Dr. Ongkan Indrambarya Dr. Thawatchai Teekachunhatean	Sam Mikhail Marsha McEachrane-Johnson Stalin Boctor William Caley Pauline O'Neill Gerry Schneider Kath Beaven Marc LeMaguer John Black	•Review of discussions on implementation of a management information system for SUT. •Discussions on the involvement of industry in the SUT co-op education program. •The definition of the organization and structure of the project management implementation unit and project review committee. •Review of proposed deliverable-based budget with discussions on changes that need to be addressed prior to project proposal submission.

Outcomes of Ryerson Meetings:

•Preliminary plan developed for library information services and networks for the library at SUT; confirmation of activities to support the development of the library within the project.

•Preliminary plan outlined for the integration of cooperative education in academic programs at SUT, and discussions on how this may be supported by the project

•Preliminary plan for the establishment of joint international applied science and engineering undergraduate programs, as well as PhD programs at SUT. Outline of each CUTC institution's roles and responsibilities. Confirmed commitment of each institution's relevant department. Confirmation of the disciplines, sequencing, logistics, and numbers involved in proposed programs.

•Discussions on a detailed time plan for activities in the proposed project.

•Plan for gathering of information and documents necessary for inclusion in project proposal.

APPENDIX III:

DETAILS OF EXPENDITURES BY DELIVERABLES

Details of Expenditures by Deliverables

PROGRAM 1: INSTITUTIONAL CAPACITY-BUILDING PROGRAM					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D01	**Detailed report on the selected Thai candidates including their backgrounds (CVs) and the corresponding desired areas of training.**				
	Dedicated Staff/Consultant Time: Honoraria/Fees Thais				
	- Project Implementation Unit Personnel	day	1,000	9	9,000
	Total Honoraria/Fees				**9,000**
	Other Reimbursable Expenses:				
	- Communication Costs				1,901
	- Reports & Production Costs				570
	- Orientation and Briefing	person	70	9	630
	Total Other Expenses				**3,101**
Grand Total Expenses					**12,101**
	Revenue Sources:				
	- CIDA				1,514
	- CUTC				919
	- SUT				9,668
Grand Total Revenue					**12,101**

Details of Expenditures by Deliverables

PROGRAM 1: INSTITUTIONAL CAPACITY-BUILDING PROGRAM					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D1.11	**Four trained SUT academic administrators in the areas of academic planning, policy development, system of governance, curriculum development, research, administration, standards and promotions admissions, curriculum planning etc.** **Each administrator wil produce an academic administration and management manual for his/her faculty**				
	Dedicated Staff/Consultant Time: Honoraria/Fees Canadian				
	- 4 Canadian engineering deans/chairs at Waterloo, Guelph, TUNS, and Ryerson assigned to design, deliver and supervise the traning programs	person week	1,500	24	36,000
	Dedicated Staff/Consultant Time: Honoraria/Fees Thais				
	- Thai Trainees Salaries/Benefits	person week	1,000	24	24,000
	Total Honoraria/Fees				**60,000**
	Travel Related Expenses Thais				
	- Travel to Canada	person	3,400	4	13,600
	- Travel in Canada	person	1,000	4	4,000
	- Living Allowance	person week	500	24	12,000
	Total Travel Related				**29,600**
	Other Reimbursable Expenses:				
	- Communication Costs				845
	- Report and Production Costs				253
	- Program Support Materials	person	150	4	600
	Total Other Expenses				**1,698**
Grand Total Expenses					**91,298**
	Revenue Sources:				
	- CIDA				47,265
	- CUTC				14,936
	- SUT				29,097
Grand Total Revenue					**91,298**

Details of Expenditures by Deliverables

PROGRAM 1: INSTITUTIONAL CAPACITY-BUILDING PROGRAM					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D1.21	**Six trained SUT Chairs or Coordinators in curriculum development and planning in various areas of applied science engineering disciplines. Each Chair or Coordinator will develop a complete academic program plan for his/her discipline including program structure course and curriculum design guidelines, laboratory design and equipment specification laboratory manual guidelines and educational equipment specifications.**				
	Dedicated Staff/Consultant Time: Honoraria/Fees Canadian				
	- 6 Canadian engineering professors at Waterloo, Guelph, TUNS and Ryerson assigned to design, deliver and supervise the training programs	person week	1,500	72	108,000
	Dedicated Staff/Consultant Time: Honoraria/Fees Thais				
	- Trainees Salaries/Benefits	person week	1,000	72	72,000
	Total Honoraria/Fees				**180,000**
	Travel Related Expenses Thai				
	- Travel to Canada	person	3,400	6	20,400
	- Travel in Canada	person	1,000	6	6,000
	- Living Allowance	person week	500	72	36,000
	Total Travel Related Expenses				**62,400**
	Other Reimbursable Expenses:				
	- Communication Costs				1,268
	- Report and Production Costs				380
	- Program Support Materials	person	150	6	900
	Total Other Expenses				**2,548**
	Allowance of Inflation Canadian				3,952
	Allowance of Inflation Thai				2,171
Grand Total Expenses					**251,071**
	Revenue Sources:				
	- CIDA				116,949
	- CUTC				45,105
	- SUT				89,017
Grand Total Revenue					**251,071**

Details of Expenditures by Deliverables

PROGRAM 1: INSTITUTIONAL CAPACITY-BUILDING PROGRAM					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D1.31	**Four trained SUT Support personnel in the areas of library automation, management information systems, and scientific equipment.** **The SUT personnel will develop a planning document outlining their respective departments/units strategic plans, organizational structure, equipment specifications, systems and procedures.**				
	Dedicated Staff/Consultant Time: Honoraria/Fees Canadian				
	- 2 Canadian non-academic directors at Waterloo, Guelph TUNS and Ryerson assigned to design, deliver and supervise the training programs.	person week	1,500	24	36,000
	Dedicated Staff/Consultant Time: Honoraria/Fees Thais				
	- Trainees Salaries/Benefits	person week	1,000	24	24,000
	Total Honoraria/Fees				**60,000**
	Travel Related Expenses Thai				
	- Travel to Canada	person	3,400	4	13,600
	- Travel in Canada	person	1,000	4	4,000
	- Living Allowance	person week	500	24	12,000
	Total Travel Related				**29,600**
	Other Reimbursable Expenses:				
	- Communication Costs				845
	- Report and Production Costs				253
	- Program Support Materials		150	4	600
	Total Other Expenses				**1,698**
	Allowance of Inflation Canadian				778
	Allowance of Inflation Thai				364
Grand Total Expenses					**92,440**
	Revenue Sources:				
	- CIDA				47,856
	- CUTC				15,123
	- SUT				29,461
Grand Total Revenue					**92,440**

Details of Expenditures by Deliverables

PROGRAM 1: INSTITUTIONAL CAPACITY-BUILDING PROGRAM					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D1.32	**Detailed reports including recommendations concerning the development and implementation of the library automation system and the management information system for SUT outlining the corresponding strategic plan organizational structure, equipment specifications, operation systems and procedures.**				
	Dedicated Staff/Consultant Time: Honoraria/Fees Canadian				
	- 2 Canadian Consultants in MIS and Library Automation to assess and recommend on the development and implementation of these systems	working day	600	40	24,000
	Total Honoraria/Fees				**24,000**
	Travel Related Expenses Canadian				
	- Travel to Thailand	trip	3,400	4	13,600
	- Travel in Thailand	trip	500	4	2,000
	- Accommodation	person day	120	60	7,200
	- Perdiem (meals, incidentals, taxis, communication etc.)	person day	80	60	4,800
	Total Travel Related				**27,600**
	Other Reimbursable Expenses:				
	- Communication Costs				845
	- Report and Production Costs				253
	- Orientation and Briefing	person	70	4	280
	Total Other Expenses				**1,378**
	Allowance of Inflation Canadian				1,934
	Allowance of Inflation Thai				715
Grand Total Expenses					**55,627**
	Revenue Sources:				
	- CIDA				30,107
	- CUTC				10,508
	- SUT				15,012
Grand Total Revenue					**55,627**

Details of Expenditures by Deliverables

PROGRAM 1: INSTITUTIONAL CAPACITY-BUILDING PROGRAM					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D1.41	**Preliminary report on SUT capacity and needs in ESL**				
	Dedicated Staff/Consultant Time: Honoraria/Fees Canadian				
	- 1 Canadian ESL Professor to evaluate SUT's English Language capacity and needs	working day	600	15	9,000
	Total Honoraria/Fees				**9,000**
	Travel Related Expenses Canadian				
	- Travel to Thailand	person	3,400	1	3,400
	- Travel in Thailand	person	500	1	500
	- Accommodations	person day	120	20	2,400
	- Perdiem	person day	80	20	1,600
	Total Travel Related				**7,900**
	Other Reimbursable Expenses:				
	- Communication Costs				211
	- Report and Production Costs				63
	- Orientation and Briefing		70	1	70
	Total Other Expenses				**344**
Grand Total Expenses					**17,244**
	Revenue Sources:				
	- CIDA				8,968
	- CUTC				3,701
	- SUT				4,575
Grand Total Revenue					**17,244**

Details of Expenditures by Deliverables

PROGRAM 1: INSTITUTIONAL CAPACITY-BUILDING PROGRAM					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D1.42	**Two SUT faculty members trained in Canada to develop and offer ESL programs. Detailed curriculum plan for English Language program at SUT.**				
	Dedicated Staff/Consultant Time: Honoraria/Fees Thai				
	- 2 SUT English Language teacher to evaluate Thai teacher's needs and the design, delivery and supervision of customized training.	person week	1,500	8	12,000
	- Trainees Salaries/Benefits	person week	1,000	8	8,000
	Total Honoraria/Fees				**20,000**
	Travel Related Expenses Thai				
	- Travel to Canada	person	3,400	2	6,800
	- Travel in Canada	person	1,000	2	2,000
	- Living Allowance	person week	500	8	4,000
	Total Travel Related				**12,800**
	Other Reimbursable Expenses:				
	- Communication Costs				423
	- Report and Production Costs				127
	- Orientation and Briefing	person	70	2	140
	Total Other Expenses				**690**
Grand Total Expenses					**33,490**
	Revenue Sources:				
	- CIDA				18,737
	- CUTC				5,004
	- SUT				9,749
Grand Total Revenue					**33,490**

Details of Expenditures by Deliverables

PROGRAM 1: INSTITUTIONAL CAPACITY-BUILDING PROGRAM					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D1.4340 SUT students complete the first ESL program at SUT					
	Dedicated Staff/Consultant Time: Honoraria/Fees Canadian				
	- 1 Canadian ESL faculty member to plan, develop, coordinate, train and contribute in the first ESL program offering	working day	600	20	12,000
	Total Honoraria/Fees				**12,000**
	Travel Related Expenses Canadian				
	- Travel to Thailand	person	3,400	1	3,400
	- Travel in Thailand	person	500	1	500
	- Accommodations	person day	120	30	3,600
	- Per diem	person day	80	30	2,400
	Total Travel Related				**9,900**
	Other Reimbursable Expenses:				
	- Communication Costs				211
	- Report and Production Costs				63
	- Orientation and Briefing	person	70	1	70
	Total Other Expenses				**344**
	Allowance of Inflation Canadian				783
	Allowance of Inflation Thai				329
Grand Total Expenses					**23,356**
	Revenue Sources:				
	- CIDA				11,306
	- CUTC				5,146
	- SUT				6,904
Grand Total Revenue					**23,356**

Details of Expenditures by Deliverables

PROGRAM 2: INTERNATIONAL ACADEMIC PROGRAM					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D2.11	**- Report on the International Applied Science and Engineering Undergraduate Programs,** **- Development of international program delivery guide-lines for Thai students and faculty including:** **- curriculum planning and enrolment targets** **- human resource and academic work loads** **- Thai program accreditation eligibility** **- admissions and promotion policies** **- academic credit transferability** **- Canadian/Thai long-term cooperation plans and other relevant matters.** Dedicated Staff/Consultant Time: Honoraria/Fees Canadian - 8 Canadian Engineering Chairs to plan and coordinate the curriculum offering of the International Programs, admissions and promotions criteria, academic loading, accreditation requirements credit transfers, etc.	working day	600	160	96,000
	Total Honoraria/Fees				**96,000**
	Travel Related Expenses Canadian				
	- Travel To Thailand	person	3,400	8	27,200
	- Travel in Thailand	person	500	8	4,000
	- Accommodations	person day	120	240	28,800
	- Perdiem (meals, incidentals, taxis, communication, etc.)	person day	80	240	19,200
	Total Travel Related				**79,200**
	Other Reimbursable Expenses:				
	- Communication Costs				1,690
	- Report and Production Costs				507
	- Orientation and Briefing	person	70	8	560
	Total Other Expenses				**2,757**
	Allowance of Inflation Canadian				9,559
	Allowance of Inflation Thai				4,009
Grand Total Expenses					**191,525**
	Revenue Sources:				
	- CIDA				92,716
	- CUTC				42,207
	- SUT				56,602
Grand Total Revenue					**191,525**

Details of Expenditures by Deliverables

PROGRAM 2: INTERNATIONAL ACADEMIC PROGRAM					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D2.12	**- Admission of 80, 120, 160 and 200 Thai and South East Asian students in years 1 to 4 of the international applied science engineering and undergraduate programs with targets graduates of 60, 90, 120, and 150 in years 1 to 4.** **- Program delivery and evaluation by joint CUTC/SUT team.** **- Progress reports on the outcome of programs at the end of each academic year, 1 to 4.**				
	Dedicated Staff/Consultant Time: Honoraria/Fees Canadian				
	- 32 Canadian engineering professors from CUTC coordinating and contributing to the provision of the four international engineering programs	working day	600	640	384,000
	Dedicated Staff/Consultant Time: Honoraria/Fees Thai				
	- Salaries/Benefits of Thai Professors	person year	30,000	64	1,920,000
	Total Honoraria/Fees				**2,304,000**
	Travel Related Expenses Canadian				
	- Travel to Thailand	person	3,400	32	108,800
	- Travel in Thailand	person	500	32	16,000
	- Accommodations	person day	120	960	115,200
	- Perdiem (meals, incidentals, taxis, communication, etc.)	person day	80	960	76,800
	Total Travel Related				**316,800**
	Other Reimbursable Expenses:				
	- Communication Costs				6,761
	- Report and Production Costs				2,031
	- Orientation and Briefing	person	70	32	2,240
	Total Other Expenses				**11,032**
	Allowance of Inflation Canadian				44,251
	Allowance of Inflation Thai				332,408
Grand Total Expenses					**3,008,491**
	Revenue Sources:				
	- CIDA				130,505
	- CUTC				223,203
	- SUT				2,654,783
Grand Total Revenue					**3,008,491**

Details of Expenditures by Deliverables

PROGRAM 2: INTERNATIONAL ACADEMIC PROGRAM					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D2.21	**List of the 10 successful Ph.D. candidates in specific areas of applied science and engineering research and corresponding list of Thai/Canadian supervisory teams. Detailed plan for the jointly supervised study programs of the 10 Thai students.**				
	Dedicated Staff/Consultant Time: Honoraria/Fees Canadian				
	- 5 Canadian engineering professors to conduct the selection process of the 10 Thai Ph.D. candidates and to form the corresponding supervisory teams.	working day	600	50	30,000
	Total Honoraria/Fees				**30,000**
	Travel Related Expenses Canadian				
	- Travel to Thailand	person	3,400	5	17,000
	- Travel in Thailand	person	500	5	2,500
	- Accommodations	person day	120	75	9,000
	- Perdiem (meals, incidentals, taxis, communication, etc.)	person day	80	75	6,000
	Total Travel Related				**34,500**
	Other Reimbursable Expenses:				
	- Orientation and Briefing	person	70	5	350
	Total Other Expenses				**350**
	Allowance of Inflation Canadian				2,367
	Allowance of Inflation Thai				875
Grand Total Expenses					**68,092**
	Revenue Sources:				
	- CIDA				36,970
	- CUTC				12,747
	- SUT				18,375
Grand Total Revenue					**68,092**

Details of Expenditures by Deliverables

PROGRAM 2: INTERNATIONAL ACADEMIC PROGRAM					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D2.22	**Interim progress reports on the course work and the comprehensive examinations for the 10 Thai Ph.D. candidates**				
	Dedicated Staff/Consultant Time: Honoraria/Fees Thai				
	- Trainees Salaries and Benefits	person	18,000	10	180,000
	Total Honoraria/Fees				**180,000**
	Travel Related Expenses Thai				
	- Travel to and in Canada	person	4,000	10	40,000
	- Accommodation and Living Expenses	person	18,000	10	180,000
	Total Travel Related				**220,000**
	Other Reimbursable Expenses				
	- Academic Fees	person	20,000	10	200,000
	Total Other Expenses				**200,000**
	Allowance of Inflation Thai				61,500
Grand Total Expenses					**661,500**
	Revenue Sources:				
	- CIDA				0
	- CUTC				0
	- SUT				661,500
Grand Total Revenue					**661,500**

Details of Expenditures by Deliverables

PROGRAM 2: INTERNATIONAL ACADEMIC PROGRAM					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D2.23	**Progress reports on the thesis research work of each of the 10 Thai candidates and confirmation of their readiness to defend thesis in Canada**				
	Dedicated Staff/Consultant Time: Honoraria/Fees Canadian				
	- 5 Canadian engineering professors to supervise the development and progress of the thesis research work for the 10 Thai Ph.D. candidates.	working day	600	100	60,000
	Total Honoraria/Fees				**60,000**
	Travel Related Expenses Canadian				
	- Travel to Thailand	person	3,400	10	34,000
	- Travel in Thailand	person	500	10	5,000
	- Accommodation	person day	120	150	18,000
	- Perdiem (meals, incidentals, taxis, communication, etc.)	person day	80	150	12,000
	Total Travel Related				**69,000**
	Other Reimbursable Expenses				
	- Academic Fees	person	4,000	10	40,000
	- Communication Costs				2,273
	- Report and Production Costs				682
	- Orientation and Briefing	person	70	10	700
	Total Other Expenses				**43,655**
	Allowance of Inflation Canadian				16,386
	Allowance of Inflation Thai				12,824
Grand Total Expenses					**201,865**
	Revenue Sources:				
	- CIDA				83,923
	- CUTC				29,320
	- SUT				88,622
Grand Total Revenue					**201,865**

Details of Expenditures by Deliverables

PROGRAM 2: INTERNATIONAL ACADEMIC PROGRAM					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D2.24	**Upon completion of the research work and thesis manuscript preparation in Thailand, the Thai Ph.D. candidates return to Canada, together with their Thai co-supervisors to defend their Ph.D. thesis report, research findings, and graduate if such defense is successful.** **The unsuccessful cases continue their work with the objective of completing their Ph.D. program within the following year.** Dedicated Staff/Consultant Time: Honoraria/Fees Thai - Co-supervisors Salaries and Benefits	person week	1,000	10	10,000
	Total Honoraria/Fees				**10,000**
	Travel Related Expenses Thai - Travel to and in Canada - Co-supervisors travel to/in Canada - Co-supervisors Living Allowance	 person person person week	 4,000 4,000 500	 10 5 30	 40,000 20,000 15,000
	Total Travel Related				**75,000**
	Other Reimbursable Expenses - Communication Costs - Report and Production Costs - Orientation and Briefing	 person	 70	 15	 2,273 682 1,050
	Total Other Expenses				**4,005**
	Allowance of Inflation Canadian Allowance of Inflation Thai				8,234 10,947
Grand Total Expenses					**108,186**
	Revenue Source: - CIDA - CUTC - SUT				 38,961 1,480 67,745
Grand Total Revenue					**108,186**

Details of Expenditures by Deliverables

PROGRAM 2: INTERNATIONAL ACADEMIC PROGRAM					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D2.31	**10 Thai coop students placed in Canadian industrial corporations. Student work placement reports to SUT and CUTC.**				
	Dedicated Staff/Consultant Time: Honoraria/Fees Canadian				
	- Supervision Fees	person week	1,500	10	15,000
	Dedicated Staff/Consultant Time: Honoraria/Fees Thai				
	- Trainee Salaries	person week	500	160	80,000
	Total Honoraria/Fees				**95,000**
	Travel Related Expenses Thai				
	- Travel to and in Canada	person	4,000	10	40,000
	- Living Expenses	person week	300	160	48,000
	Total Travel Related				**88,000**
	Allowance of Inflation Canadian				23,801
	Allowance of Inflation Thai				0
Grand Total Expenses					**206,801**
	Revenue Sources:				
	- CIDA				10,170
	- CUTC				6,781
	- SUT				0
	- Other - Canadian				194,712
Grand Total Revenue					**211,663**

Details of Expenditures by Deliverables

PROGRAM 2: INTERNATIONAL ACADEMIC PROGRAM					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D2.32	**10 Canadian coop students placed in Thai industrial corporations. Student work placement reports to SUT and CUTC.**				
	Dedicated Staff/Consultant Time: Honoraria/Fees Canadian				
	- Supervision Fees	person week	400	10	4,000
	Dedicated Staff/Consultant Time: Honoraria/Fees Thai				
	- Trainees Salaries	person week	300	160	48,000
	Total Honorarla/Fee				**52,000**
	Travel Related Expenses Canadian				
	- Travel to and in Thailand	person	4,000	10	40,000
	- Living Expenses	person week	300	160	48,000
	Total Travel Related				**88,000**
	Allowance of Inflation Canadian				0
	Allowance of Inflation Thai				18,208
Grand Total Expenses					**158,208**
	Revenue Sources:				
	- CIDA				0
	- CUTC				0
	- SUT				4,520
	- Other - Thai				153,689
Grand Total Revenue					**158,209**

Details of Expenditures by Deliverables

PROGRAM 3: UNIVERSITY-INDUSTRY LINKAGE PROGRAM					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D3.11	**SUT coop program coordinator trained in policies, procedures and industrial liaison techniques adopted by trip report and preliminary plan for SUT coop program.**				
	Dedicated Staff/Consultant Time: Honoraria/Fees Canadian				
	- Canadian coop coordinators at Waterloo, Guelph and TUNS to assess, design and deliver the training program	person week	1,500	6	9,000
	Dedicated Staff/Consultant Time: Honoraria/Fees Thai				
	- Trainees Salaries/Benefits	person week	1,000	6	6,000
	Total Honoraria/Fees				**15,000**
	Travel Related Expenses Thais				
	- Travel to Canada	person	3,400	1	3,400
	- Travel in Canada	person	1,000	1	1,000
	- Living Allowance	person week	500	6	3,000
	Total Travel Related				**7,400**
	Other Reimbursable Expenses				
	- Communication Costs				227
	- Report and Production Costs				68
	- Orientation and Briefing	person	70	1	70
	Total Other Expenses				**365**
Grand Total Expenses					**22,765**
	Revenue Sources:				
	- CIDA				11,778
	- CUTC				3,707
	- SUT				7,280
Grand Total Revenue					**22,765**

Details of Expenditures by Deliverables

PROGRAM 3: UNIVERSITY-INDUSTRY LINKAGE PROGRAM					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D3.21	**Plan for 4-6 industrial in-service seminars in relevant technological disciplines to be implemented in Thailand**				
	Dedicated Staff/Consultant Time: Honoraria/Fees Canadian				
	- 1 Canadian Consultant	working day	600	10	6,000
	Total Honoraria/Fee				**6,000**
	Travel Related Expenses Canadian				
	- Travel to Thailand	person	3,400	1	3,400
	- Travel in Thailand	person	500	1	500
	- Accommodation	person day	120	15	1,800
	- Perdiem	person day	80	15	1,200
	Total Travel Related				**6,900**
	Other Reimbursable Expenses				
	- Communication Costs				227
	- Report and Production Costs				68
	- Orientation and Briefing	person	70	1	70
	Total Other Expenses				**365**
Grand Total Expenses					**13,265**
	Revenue Sources:				
	- CIDA				3,623
	- CUTC				3,084
	- SUT				6,558
Grand Total Revenue					**13,265**

Details of Expenditures by Deliverables

PROGRAM 3: UNIVERSITY-INDUSTRY LINKAGE PROGRAM					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D3.22	**60-80 engineers and technicians from Thai enterprises trained on state-of-the-art topics in the various applied science and engineering disciplines.**				
	Dedicated Staff/Consultant Time: Honoraria/Fees Canadian				
	- 3 Canadian consultant/professors to organize and deliver of-the-art topics in various engineering disciplines	working day	600	90	54,000
	Total Honoraria/Fee				**54,000**
	Travel Related Expenses Canadian				
	- Travel to Thailand	person	3,400	6	20,400
	- Travel in Thailand	person	500	6	3,000
	- Accommodations	person day	120	120	14,400
	- Perdiem (meals, incidentals, taxis, communications, etc.)	person day	80	120	9,600
	Total Travel Related				**47,400**
	Allowance of Inflation Canadian				5,298
	Allowance of Inflation Thai				14,597
Grand Total Expenses					**121,295**
	Revenue Sources:				
	- CIDA				0
	- CUTC				32,298
	- SUT				0
	- Other - Thai				88,997
Grand Total Revenue					**121,295**

Details of Expenditures by Deliverables

PROGRAM 3: UNIVERSITY-INDUSTRY LINKAGE PROGRAM					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D3.31	**Framework and guidelines for participation in Expo, definition of Canadian participants and their commitment.**				
	Dedicated Staff/Consultant Time: Honoraria/Fees Canadian				
	- Consultant Fees	working day	600	10	6,000
	Total Honoraria/Fees				**6,000**
	Travel Related Expenses Canadian				
	- Travel to Thailand	person	3,400	1	3,400
	- Travel in Thailand	person	500	1	500
	- Accommodation	person day	120	15	1,800
	- Per diem	person day	80	15	1,200
	Total Travel Related				**6,900**
	Allowance of Inflation Canadian				320
	Allowance of Inflation Thai				325
Grand Total Expenses					**13,545**
	Revenue Sources:				
	- CIDA				3,570
	- CUTC				3,150
	- SUT				6,625
Grand Total Revenue					**13,345**

Details of Expenditures by Deliverables

PROGRAM 4: PROJECT MANAGEMENT					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D4.11	**Quarterly, semi-annual and annual reports on the progress, developments and activities of the project. The reports will also include budgetary cost items.**				
	Dedicated Staff/Consultant Time: Honoraria/Fees Thai				
	- Project Manager	person days	450	70	31,500
	- Project Coordinator	person days	240	200	48,000
	- Support Staff	person days	120	200	24,000
	Total Honoraria/Fees				**103,500**
	Allowance of Inflation Thai				10,881
Grand Total Expenses					**114,381**
	Revenue Sources:				
	- CIDA				0
	- CUTC				0
	- SUT				114,381
Grand Total Revenue					**114,381**

Details of Expenditures by Deliverables

PROGRAM 4: PROJECT MANAGEMENT					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D4.21	**Design, development, and implementation of customized training program. Recruitment and coordination of all Canadian consultants providing technical services in Thailand. Quarterly, semi-annual and annual progress reports to CEA.**				
	Dedicated Staff/Consultant Time: Honoraria/Fees Canadian				
	- Technical Advisor	working day	600	70	42,000
	- Project Manager	working day	600	160	96,000
	- Project Coordinator	working day	350	200	70,000
	- Support Staff	working day	200	300	60,000
	Total Honoraria/Fees				**268,000**
	Allowance of Inflation Canadian				28,172
Grand Total Expenses					**296,172**
	Revenue Sources:				
	- CIDA				177,703
	- CUTC				118,469
	- SUT				0
Grand Total Revenue					**296,172**

Details of Expenditures by Deliverables

PROGRAM 4: PROJECT MANAGEMENT					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D4.31	**Annual project review commitee's reports on the implementation of project activities and financial status.**				
	Dedicated Staff/Consultant Time: Honoraria/Fees Canadian				
	- Consultant Fees	person day	600	40	24,000
	Total Honoraria/Fees				**24,000**
	Travel Related Expenses Canadian				
	- Travel to Thailand	person	3,400	4	13,600
	- Travel in Thailand	person	500	4	2,000
	- Accommodations	person day	120	60	7,200
	- Perdiem	person day	80	60	4,800
	Total Travel Related				**27,600**
	Allowance of Inflation Canadian				3,904
	Allowance of Inflation Thai				1,453
Grand Total Expenses					**56,957**
	Revenue Sources:				
	- CIDA				30,907
	- CUTC				10,597
	- SUT				15,453
Grand Total Revenue					**56,957**

Details of Expenditures by Deliverables

PROGRAM 4: PROJECT MANAGEMENT					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D4.32	**Annual project review committee's reports on the implementation of project activities and financial status.**				
	Dedicated Staff/Consultant Time: Honoraria/Fees Thai				
	- Salaries/Benefits	person week	1,000	8	8,000
	Total Honoraria/Fees				**8,000**
	Travel Related Expenses Thai				
	- Travel to Canada	person	3,400	4	13,600
	- Travel in Canada	person	1,000	4	4,000
	- Living Allowance	person week	500	8	4,000
	Total Travel Related				**21,600**
	Allowance of Inflation Canadian				3,433
	Allowance of Inflation Thai				1,273
Grand Total Expenses					**34,306**
	Revenue Sources:				
	- CIDA				17,939
	- CUTC				7,084
	- SUT				9,283
Grand Total Revenue					**34,306**

Details of Expenditures by Deliverables

PROGRAM 4: PROJECT MANAGEMENT					
	COST ELEMENT	UNIT	UNIT COST	NUMBER OF UNITS	TOTAL
D4.33	**Quarterly, semi-annual and annual reports on the progress and implementation project activities**				
	Travel Related Expenses Canadian				
	- Travel to Thailand	person	3,400	8	27,200
	- Travel in Thailand	person	500	8	4,000
	- Accommodations	person day	120	120	14,400
	- Perdiem (meals, incidentals, taxis, communication, etc.)	person day	80	120	9,600
	Travel Within Canada:				
	- Toronto/Halifax/Guelph/Waterloo	trip	1,000	20	20,000
	- Accommodations in Canada	person day	120	60	7,200
	- Perdiem in Canada	person day	80	60	4,800
	Total Travel Related				**87,200**
	Allowance of Inflation Canadian				7,778
	Allowance of Inflation Thai				3,679
Grand Total Expenses					**98,657**
	Revenue Sources:				
	- CIDA				62,453
	- CUTC				4,525
	- SUT				31,679
Grand Total Revenue					**98,657**

APPENDIX IV:

QUARTERLY SCHEDULE OF EXPENSES AND REVENUE

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 1: INSTITUTIONAL CAPACITY BUILDING PROGRAM											
ACTIVITY										DELIVERABLE	
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION	COST DISTRIBUTION QRT 3	QRT 4	QRT 7	QRT 8			TOTAL	DESCRIPTION	TARGET DATE
1.2	**Development of Academic Programs and Curricula at SUT.**										
A1.21	**Provision of customized training in Canada for 6 SUT faculty members and coordinators**	12 weeks Canada Jul-Dec/93 Jul-Dec/94								D1.21 - Six trained SUT Chairs or Coordinators in curriculum development and planning in various areas of applied science and engineering disciplines. - Each Chair or Coordinator will develop a complete academic program plan for his/her discipline including program structure, course and curriculum design guidelines, laboratory design and equipment specification, laboratory manual guidelines and educational equipment specifications.	April 1995
	- Honoraria/Fees for 6 Canadian engineering professors at Waterloo, Guelph, TUNS and Ryerson assigned to design, deliver and suspervise the training programs.		18,000	36,000	36,000	18,000			108,000		
	- Thai Trainees Salaries/Benefits		12,000	24,000	24,000	12,000			72,000		
	Total Fees		**30,000**	**60,000**	**60,000**	**30,000**			**180,000**		
	Thai Travel Related Expenses										
	- Travel to Canada		3,400	6,800	6,800	3,400			20,400		
	- Travel in Canada		1,000	2,000	2,000	1,000			6,000		
	- Living Allowance		6,000	12,000	12,000	6,000			36,000		
	Total Travel Related		**10,400**	**20,800**	**20,800**	**10,400**			**62,400**		
	Allowance of Inflation Canadian		0	0	2,600	1,300			3,900		
	Allowance of Inflation Thai		0	0	1,440	720			2,160		
Total	**Expenses of Cost Element**		**40,400**	**80,800**	**84,840**	**42,420**			**248,460**		
	Revenue Sources										
	- CIDA		18,800	37,600	39,480	19,740			115,620		
	- CUTC		7,200	14,400	15,120	7,560			44,280		
	- SUT		14,400	28,800	30,240	15,120			88,560		
Total	**Revenue of Cost Element**		**40,400**	**80,800**	**84,840**	**42,420**			**248,460**		

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 1: INSTITUTIONAL CAPACITY- BUILDING PROGRAM											
ACTIVITY										DELIVERABLE	
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION	COST DISTRIBUTION QRT 3	QRT 4	QRT 5	QRT 6			TOTAL	DESCRIPTION	TARGET DATE
1.3	**Development of Institutional Support Services at SUT**										
A1.31	**Provision of customized training in Canada for 4 SUT support personnel in:**	6 weeks Canada Jul-Dec/93								D1.31 - Four trained SUT support personnel in the areas of library automation, managment information systems, and scientific equipment. - The SUT personnel will develop a planning document outlining their respective departments/units strategic plans, organizational structure, equipment specifications, systems and procedures.	April 1994
	- Library Automation (2)										
	- Management Information System (I)										
	- Scientific Equipment (I)										
	- Honoraria/Fees for 2 Canadian non-academic directors at Waterloo, Guelph, TUNS and Ryerson assigned to design, deliver and supervise the training programs		9,000	18,000		9,000			36,000		
	- Thai Trainees Salaries/Benefits		6,000	12,000		6,000			24,000		
	Total Fees		**15,000**	**30,000**		**15,000**			**60,000**		
	Thai Travel Related Expenses										
	- Travel to Canada		3,400	6,800		3,400			13,600		
	- Travel in Canada		1,000	2,000		1,000			4,000		
	- Living Allowance		3,000	6,000		3,000			12,000		
	Total Travel Related		**7,400**	**14,800**		**7,400**			**29,600**		
	Allowance of Inflation Canadian		0	0		760			760		
	Allowance of Inflation Thai		0	0		360			360		
Total	**Expenses for Cost Element**		**22,400**	**44,800**		**23,520**			**90,720**		
	Revenue Sources:										
	- CIDA		11,600	23,200		12,180			46,980		
	- CUTC		3,600	7,200		3,780			14,580		
	- SUT		7,200	14,400		7,560			29,160		
Total	**Revenue for Cost Element**		**22,400**	**44,800**		**23,520**			**90,720**		

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 1: INSTITUTIONAL CAPACITY- BUILDING PROGRAM												
ACTIVITY										DELIVERABLE		
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION	COST DISTRIBUTION						TOTAL		DESCRIPTION	TARGET DATE
			QRT 2	QRT 3	QRT 4	QRT 5						
A01	**Selection of Thai academic administration faculty and support Personnel**	3 weeks, Thailand, Apr-Jun/93								D01	Detailed report on the selected Thai candidates including their backgrounds (CVs) and the corresponding desired areas of training.	August 1993
	- Honoraria/Fee Thai's											
	- Vice-President Academic Affairs		3,000						3,000			
	- Vice-Rector Administration		3,000						3,000			
	- Vice-President, Planning and Development		3,000						3,000			
	Total Fees		**9,000**						**9,000**			
Total Expenses of Cost Element			**9,000**						**9,000**			
	Revenue Sources:											
	- CIDA											
	- CUTC											
	- SUT		9,000						9,000			
Total Revenue of Cost Element			**9,000**						**9,000**			

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 1: INSTITUTIONAL CAPACITY- BUILDING PROGRAM												
ACTIVITY										DELIVERABLE		
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION	COST DISTRIBUTION QRT 2	QRT 3	QRT 4	QRT 5			TOTAL		DESCRIPTION	TARGET DATE
1.1	**Development of Academic Administration and Management Framework at SUT.**											
A1.11	**Provision of customized training in Canada for 4 SUT academic administrators.**	6 weeks Canada, July-Dec/93								D1.11	- Four trained SUT academic administrators in the areas of academic planning, policy development, system of governance, curriculum development, research, administration, standards and promotions admissions, curriculum planning etc. - Each Administrator will produce an academic administration and management manual for his/her faculty.	March 1994
	- Honoraria/Fees for 4 Canadians engineering deans/chairs at Waterloo, Guelph, TUNS, and Ryerson assigned to design, deliver and supervise the training programs.			18,000	18,000				36,000			
	- Thai Trainees Salaries/Benefits			12,000	12,000				24,000			
	Total Fees			30,000	30,000				60,000			
	Travel Related Expenses for Thai's											
	- Travel to Canada			6,800	6,800				13,600			
	- Travel in Canada			2,000	2,000				4,000			
	- Living Allowance			6,000	6,000				12,000			
	Total Travel Related			14,800	14,800				29,600			
Total Expenses of Cost Element				**44,800**	**44,800**				**89,600**			
	Revenue Sources:											
	- CIDA			23,200	23,200				46,400			
	- CUTC			7,200	7,200				14,400			
	- SUT			14,400	14,400				28,800			
Total Revenue for Cost Element				**44,800**	**44,800**				**89,600**			

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 1: INSTITUTIONAL CAPACITY- BUILDING PROGRAM											
ACTIVITY										DELIVERABLE	
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION	COST DISTRIBUTION					TOTAL		DESCRIPTION	TARGET DATE
				QRT 3							
A1.42	**Study tour for 2 SUT English language teachers in Canada.**	4 weeks Canada Sep-Dec/93							D1.42	Two SUT faculty members trained in Canada to develop and offer ESL programs Detailed curriculum plan for English Language program at SUT.	Dec. 1993
	- Honoraria/Fees for 2 SUT English Language teachers to evaluate Thai teacher's needs and the design, delivery and supervision of customized training.			12,000				12,000			
	- Trainees Salaries & Benefits			8,000				8,000			
	Total Fees			**20,000**				**20,000**			
	Travel Related Expenses for Thai's:										
	- Travel To Canada			6,800				6,800			
	- Travel in Canada			2,000				2,000			
	- Living Allowance			4,000				4,000			
	Total Travel Related			**12,800**				**12,800**			
Total Expenses for Cost Element				**32,800**				**32,800**			
	Revenue Sources:										
	- CIDA			18,400				18,400			
	- CUTC			4,800				4,800			
	- SUT			9,600				9,600			
Total Revenue for Cost Element				**32,800**				**32,800**			

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 1: INSTITUTIONAL CAPACITY- BUILDING PROGRAM											
ACTIVITY										DELIVERABLE	
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION	COST DISTRIBUTION					TOTAL		DESCRIPTION	TARGET DATE
				QRT 5							
A1.43	**Joint offering of first English as a Second Language course at SUT by Canadian-Thai team.**	4 weeks Thailand Apr-Jun/94							D1.43	40 SUT students complete the first ESL program at SUT.	June 1994
	- Honoraria/Fees for 1 Canadian ESL faculty member to plan, develop, coordinate, train and contribute in the first ESL program offering			12,000				12,000			
	Total Fees			**12,000**				**12,000**			
	Canadians Travel Related Expenses:										
	- Travel to Thailand			3,400				3,400			
	- Travel in Thailand			500				500			
	- Accommodation			3,600				3,600			
	- Per diem (Meals, incidentals, taxis, etc)			2,400				2,400			
	Total Travel Related			**9,900**				**9,900**			
	Allowance of Inflation Canadian			770				770			
	Allowance of Inflation Thai			325				325			
Total Expenses for Cost Element				**22,995**				**22,995**			
	Revenue Sources:										
	- CIDA			11,130				11,130			
	- CUTC			5,040				5,040			
	- SUT			6,825				6,825			
Total Revenue for Cost Element				**22,995**				**22,995**			

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 1: INSTITUTIONAL CAPACITY- BUILDING PROGRAM												
ACTIVITY										**DELIVERABLE**		
	DESCRIPTION AND COST ELEMENT	**DATE VENUE & DURATION**	**COST DISTRIBUTION**						**TOTAL**		**DESCRIPTION**	**TARGET DATE**
			QRT 2	**QRT 3**	**QRT 4**	**QRT 5**	**QRT 6**	**QRT 7**				
A1.32	**Provision of 2 Canadian Technical Services to develop SUT institutional support services in library automation and management information systems (MIS).**	4 weeks Thailand Apr-Jun/94								D1.32	Detailed reports including recommendations concerning the development and implementation of the library automation system and the management information system for SUT outlining the corresponding strategic plan, organizational structure, equipment specifications, operation systems and procedures.	June 1994
	- Honoraria/Fees for 2 Canadian Consultants in MIS and Library Automation to assess and recommend on the development and the implementation of these systems.					6,000		6,000	12,000			
	Total Fees					**6,000**		**6,000**	**12,000**			
	Canadians Travel Related Expenses											
	- Travel to Thailand					3,400		3,400	6,800			
	- Travel in Thailand					500		500	1,000			
	- Accommodation					1,800		1,800	3,600			
	- Perdiem (meals, incidentals, taxis, communications, etc.)					1,200		1,200	2,400			
	Total Travel Related					**6,900**		**6,900**	**13,800**			
	Allowance of Inflation Canadian					470		470	940			
	Allowance of Inflation Thai					175		175	350			
Total	**Expenses for Cost Element**					**13,545**		**13,545**	**27,090**			
	Revenue Sources:											
	- CIDA					7,350		7,350	14,700			
	- CUTC					2,520		2,520	5,040			
	- SUT					3,675		3,675	7,350			
Total	**Revenue for Cost Element**					**13,545**		**13,545**	**27,090**			

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 1: INSTITUTIONAL CAPACITY- BUILDING PROGRAM											
ACTIVITY										DELIVERABLE	
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION	COST DISTRIBUTION					TOTAL		DESCRIPTION	TARGET DATE
				QRT 2							
1.4	**Establishment of English as a Second Language Centre at SUT**										
A1.41	**Evaluation of SUT English language capacity and needs by one Canadian**	3 weeks Thailand May-July/93							D1.41	Preliminary report on SUT capacity and needs in ESL.	Sept. 1993
	- Honoraria/Fees for 1 Canadian ESL Professor to evaluate SUT's English Language capacity and needs			9,000				9,000			
	Total Fees			**9,000**				**9,000**			
	Canadian Travel Related Expenses:										
	- Travel to Thailand			3,400				3,400			
	- Travel in Thailand			500				500			
	- Accommodations			2,400				2,400			
	- Perdiem (meals, incidentals, taxis communications, etc.)			1,600				1,600			
	Total Travel Related			**7,900**				**7,900**			
Total Expenses for Cost Element				**16,900**				**16,900**			
	Revenue Sources:										
	- CIDA			8,800				8,800			
	- CUTC			3,600				3,600			
	- SUT			4,500				4,500			
Total Revenue for Cost Element				**16,900**				**16,900**			

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 2: INTERNATIONAL ACADEMIC PROGRAM											
ACTIVITY										**DELIVERABLE**	
	DESCRIPTION AND COST ELEMENT	**DATE VENUE & DURATION**	**COST DISTRIBUTION**						**TOTAL**	**DESCRIPTION**	**TARGET DATE**
				QRT 5	**QRT 9**	**QRT 10**					
2.1	**International Applied Science and Engineering Undergraduate Programs**										
A2.11	**Academic program, planning & coordination. 3 visits to Thailand by 8 Canadian academic coordinators before the start of the academic year in 1994, 1995, and 1996 to assess all relevant issues concerning the planning and implementation of the four international undergraduate programs.**	4 weeks Thailand Jan-Mar/94 Apr-Jun/95 Jan-Mar/96								D2.11	- Report on the international applied science and engineering undergraduate programs, - Development of international program delivery guidelines for Thai students and faculty including: - curriculum planning and enrolment targets - human resource and academic work loads - Thai program accreditation eligibility - admissions and promotion policies - academic credit transferability - Canadian/Thai long-term cooperation plans and other relevant matters.
	- Honoraria/Fees for 8 Canadian Engineering Chairs to plan and coordinate the curriculum offering of the International Programs, admissions and promotions criteria, academic loading, accreditation requirements credit transfers, etc.			48,000	24,000	24,000			96,000		Oct/95
	Total Fees			**48,000**	**24,000**	**24,000**			**96,000**		
	Canadian Travel Related Expenses:										
	- Travel to Thailand			13,600	6,800	6,800			27,200		
	- Travel in Thailand			2,000	1,000	1,000			4,000		
	- Accommodations			14,400	7,200	7,200			28,800		
	- Perdiem (meals, incidentals, taxis, communications, etc.)			9,600	4,800	4,800			19,200		
	Total Travel Related			**39,600**	**19,800**	**19,800**			**79,200**		
	Allowance of Inflation Canadian			3,080	3,157	3,157			9,394		
	Allowance of Inflation Thai			1,300	1,332	1,332			3,964		
Total	**Expenses for Cost Element**			**91,980**	**48,289**	**48,289**			**188,558**		
	Revenue Sources:										
	- CIDA			44,520	23,373	23,373			91,266		
	- CUTC			20,160	10,584	10,584			41,328		
	- SUT			27,300	14,332	14,332			55,964		
Total	**Revenue for Cost Element**			**91,980**	**48,289**	**48,289**			**188,558**		

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 2: INTERNATIONAL ACADEMIC PROGRAM													
ACTIVITY											**DELIVERABLE**		
	DESCRIPTION AND COST ELEMENT	**DATE VENUE & DURATION**	**COST DISTRIBUTION**							**TOTAL**		**DESCRIPTION**	**TARGET DATE**
			QRT 6	**QRT 10**	**QRT 11**	**QRT 14**	**QRT 15**	**QRT 16**	**QRT 18**	**QRT 19**			
A2.12	**Curriculum implementation of the international applied science and engineering undergraduate programs. Teaching and supervision assignments by 32 faculty members from CUTC institutions in the period 1994-1997.**	4 weeks Thailand each year from 94/95 to 97/98									D2.12	- Admission of 80, 120, 160 and 200 Thai and South East Asian students in years 1 to 4 of the international applied science engineering and undergraduate programs with targets graduates of 60, 90, 120, and 150 in years 1 to 4. - Program delivery and evaluation by joint CUTC/SUT team. - Progress reports on the outcome of programs at the end of each academic year, 1 to 4.	June 1994 to June 1998
	- Honoraria/Fees for 32 Canadian Engineering professors from CUTC coordinating and and contributing to the provision of the four international engineering programs		48,000	60,000	48,000	60,000	24,000	48,000	60,000	36,000	384,000		
	- Salaries/Benefits of Thai Professors		240,000	300,000	240,000	300,000	120,000	240,000	300,000	180,000	1,920,000		
	Total Fees		**288,000**	**360,000**	**288,000**	**360,000**	**144,000**	**288,000**	**360,000**	**216,000**	**2,304,000**		
	Canadian Travel Related Expenses:												
	- Travel to Thailand		13,600	17,000	13,600	17,000	6,800	13,600	17,000	10,200	108,800		
	- Travel in Thailand		2,000	2,500	2,000	2,500	1,000	2,000	2,500	1,500	16,000		
	- Accommodations		14,400	18,000	14,400	18,000	7,200	14,400	18,000	10,800	115,200		
	- Perdiem (meals, incidentals, taxis, communications, etc.)		9,600	12,000	9,600	12,000	4,800	9,600	12,000	7,200	76,800		
	Total Travel Related		**39,600**	**49,500**	**39,600**	**49,500**	**19,800**	**39,600**	**49,500**	**29,700**	**316,800**		
	Allowance of Inflation Canadian		1,880	4,817	3,854	7,409	2,963	5,927	10,129	6,077	43,056		
	Allowance of Inflation Thai		14,500	37,156	29,725	57,139	22,855	45,711	78,121	46,873	332,080		
Total	**Expenses for Cost Element**		**343,980**	**451,473**	**361,179**	**474,048**	**189,618**	**379,238**	**497,750**	**298,650**	**2,995,936**		
	Revenue Sources:												
	- CIDA		14,280	18,742	14,994	19,680	7,872	15,744	20,664	12,398	124,374		
	- CUTC		25,200	33,075	26,460	34,729	13,891	27,783	36,465	21,879	219,482		
	- SUT		304,500	399,656	319,725	419,639	167,855	335,711	440,621	264,373	2,652,080		
Total	**Revenue for Cost Element**		**343,980**	**451,473**	**361,179**	**474,048**	**189,618**	**379,238**	**497,750**	**298,650**	**2,995,936**		

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 2: INTERNATIONAL ACADEMIC PROGRAM											
ACTIVITY										DELIVERABLE	
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION	COST DISTRIBUTION						TOTAL	DESCRIPTION	TARGET DATE
				QRT 5							
2.2	**Joint Scholarly Research and Ph.D Program**										
A2.21	**Selection of Thai supervisors and 10 Ph.D. students by 5 Canadian faculty members.**	2 weeks Thailand Apr-Jun/94								D2.21 List of the 10 successful Ph.D. candidates in specific areas of applied science and engineering research and corresponding list of Thai/Canadian supervisory teams.	August 1994
	- Honoraria/Consulting Fees Canadian Five Canadian Engineering Professors to conduct the selection process of the 10 Thai Ph.D. candidates and to form the corresponding supervisory teams.			30,000					30,000	Detailed plan for the jointly supervised study programs of the 10 Thai students.	
	Total Fees			**30,000**					**30,000**		
	Travel Related Expenses Canadians:										
	-Travel to Thailand			17,000					17,000		
	- Travel in Thailand			2,500					2,500		
	- Accommodation			9,000					9,000		
	- Perdiem (meals, incidentals, taxis, communications..etc.)			6,000					6,000		
	Total Travel Related			**34,500**					**34,500**		
	Allowance of Inflation Canadian			2,350					2,350		
	Allowance of Inflation Thai			875					875		
Total	**Expenses for Cost Element**			**67,725**					**67,725**		
	Revenue Sources:										
	- CIDA			36,750					36,750		
	- CUTC			12,600					12,600		
	- SUT			18,375					18,375		
Total	**Revenue for Cost Element**			**67,725**					**67,725**		

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 2: INTERNATIONAL ACADEMIC PROGRAM											
ACTIVITY										DELIVERABLE	
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION	COST DISTRIBUTION QRT 9	QRT 10	QRT 11	QRT 12			TOTAL	DESCRIPTION	TARGET DATE
A2.22	**Provision of Ph.D. courses for 10 Thai candidates in Canada and confirmation of research methodology**	18 months Canada July/94								D2.22 Interim progress reports on the course work and the comprehensive examinations for the 10 Thai Ph.D. candidates.	April 1996
	- Trainees Salaries and Benefits	Dec/95	45,000	45,000	45,000	45,000			180,000		
	Total Fees		**45,000**	**45,000**	**45,000**	**45,000**			**180,000**		
	Thai Travel Related Expenses										
	- Travel to and in Canada		40,000						40,000		
	- Accommodation and Living Expenses		45,000	45,000	45,000	45,000			180,000		
	Total Travel Related		**85,000**	**45,000**	**45,000**	**45,000**			**220,000**		
	Other Project Expenses										
	- Academic Fees		50,000	50,000	50,000	50,000			200,000		
	Total Other Project Expenses		**50,000**	**50,000**	**50,000**	**50,000**			**200,000**		
	Thai Allowance of Inflation		18,450	14,350	14,350	14,350			61,500		
Total Expenses for Cost Element			**198,450**	**154,350**	**154,350**	**154,350**			**661,500**		
	Revenue Sources:										
	- CIDA										
	- CUTC										
	- SUT		198,450	154,350	154,350	154,350			661,500		
Total Revenue for Cost Element			**198,450**	**154,350**	**154,350**	**154,350**			**661,500**		

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 3: UNIVERSITY-INDUSTRY LINKAGE PROGRAM											
ACTIVITY										DELIVERABLE	
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION	COST DISTRIBUTION					TOTAL		DESCRIPTION	TARGET DATE
				QRT 4							
3.1	**Development of Cooperative Education at SUT.**										
A3.11	**Provision of Customized Training in Canada for the SUT Co-op Program Coordinator.**	6 weeks Canada Jul-Sept/94							D3.11	SUT Coop Program Coordinator trained in policies, procedures and industrial liaison techniques adopted by Trip report and preliminary plan for SUT co-op program.	October 1994
	- Honoraria/Fees for Canadian coop coordinators at Waterloo, Guelph and TUNS to assess, design and deliver the training program			9,000				9,000			
	- Trainee Salary/Benefits Thai			6,000				6,000			
	Total Fees			**15,000**				**15,000**			
	Travel Related Expenses Thais										
	- Travel to Canada			3,400				3,400			
	- Travel in Canada			1,000				1,000			
	- Living Allowance			3,000				3,000			
	Total Travel Related			**7,400**				**7,400**			
Total Expenses for Cost Element				**22,400**				**22,400**			
	Revenue Sources:										
	- CIDA			11,600				11,600			
	- CUTC			3,600				3,600			
	- SUT			7,200				7,200			
Total Revenue for Cost Element				**22,400**				**22,400**			

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 3: UNIVERSITY-INDUSTRY LINKAGE PROGRAM											
ACTIVITY										DELIVERABLE	
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION	COST DISTRIBUTION					TOTAL		DESCRIPTION	TARGET DATE
			QRT 4								
3.2	**Joint University-Industry Cooperation and Training Initiatives**										
A3.21	**Development of guidelines and framework for 4-6 joint industrial training seminars in Thailand.**	2 weeks Thailand Feb/94							D3.21	Plan for 4-6 industrial in-service seminars in relevant technological disciplines to be implemented in Thailand.	Dec/97
	- Honoraria/Fee for 1 Canadian		6,000					6,000			
	Total Fees		**6,000**					**6,000**			
	Travel Related Expenses Canadian:										
	- Travel toThailand		3,400					3,400			
	- Travel in Thailand		500					500			
	- Accommodation		1,800					1,800			
	- Per diem		1,200					1,200			
	Total Travel Related		**6,900**					**6,900**			
Total Expenses for Cost Element			**12,900**					**12,900**			
	Revenue Sources:										
	- CIDA		3,400					3,400			
	- CUTC		3,000					3,000			
	- SUT		6,500					6,500			
Total Revenue for Cost Element			**12,900**					**12,900**			

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 2: INTERNATIONAL ACADEMIC PROGRAM											
ACTIVITY									DELIVERABLE		
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION	COST DISTRIBUTION QRT 11	QRT 12	QRT 13	QRT 14		TOTAL		DESCRIPTION	TARGET DATE
2.3	**Co-op Student Exchange Program**										
A2.31	**Provision of 16 weeks work placement and supervision for 10 Thai students in Canada by CUTC institutions.**	1 week supervision per student 1995-1996							D2.31	10 Thai coop students placed in Canadian industrial corporations. Student work placement reports to SUT and CUTC.	Work semesters 1994-97
	- Supervision Fees		7,500		7,500			15,000			
	- Trainees Salaries		40,000		40,000			80,000			
	Total Fees		**47,500**		**47,500**			**95,000**			
	Travel Related Expenses Thai										
	- Travel to and in Canada		20,000		20,000			40,000			
	- Living Expenses		24,000		24,000			48,000			
	Total Travel Related		**44,000**		**44,000**			**88,000**			
	Allowance for Inflation Canadian		9,379		14,422			23,801			
	Allowance for Inflation Thai		0		0			0			
Total	**Expenses for Cost Element**		**100,879**		**105,922**			**206,801**			
	Revenue Sources:										
	- CIDA		4,961		5,209			10,170			
	- CUTC		3,308		3,473			6,781			
	- SUT		0		0			0			
	- Other - Canadian		92,610		97,240			189,850			
Total	**Revenue for Cost Element**		**100,879**		**105,922**			**206,801**			

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 2: INTERNATIONAL ACADEMIC PROGRAM											
ACTIVITY										DELIVERABLE	
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION	COST DISTRIBUTION					TOTAL		DESCRIPTION	TARGET DATE
				QRT 11	QRT 12	QRT 13	QRT 14				
A2.32	**Provision of 16 weeks work placement and supervision for 10 Canadian students in Thailand by SUT.**	1 week supervision per student 1995-1996							D2.32	10 Canadian co-op students placed in Thai industrial corporations. Student work placement reports to SUT and CUTC.	Work 5 semesters 1994-97
	- Honoraria/Supervision Fees: Thais				2,000		2,000	4,000			
	- Trainees Salaries				24,000		24,000	48,000			
	Total Fees				**26,000**		**26,000**	**52,000**			
	Travel Related Expenses Canadian										
	- Travel to and in Thailand				20,000		20,000	40,000			
	- Living Expenses				24,000		24,000	48,000			
	Total Travel Related				**44,000**		**44,000**	**88,000**			
	Allowance of Inflation Canadian				0		0	0			
	Allowance of Inflation Thai				7,175		11,033	18,208			
Total Expenses for Cost Element					**33,175**		**37,033**	**70,208**			
	Revenue Sources:										
	- CIDA				0		0	0			
	- CUTC				0		0	0			
	- SUT				2,205		2,315	4,520			
	- Other - Thai				74,970		78,718	153,688			
Total Revenue for Cost Element					**77,175**		**81,033**	**158,208**			

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 2: INTERNATIONAL ACADEMIC PROGRAM										
ACTIVITY									DELIVERABLE	
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION	COST DISTRIBUTION QRT 14	QRT 15	QRT 16	QRT 17	TOTAL		DESCRIPTION	TARGET DATE
A2.23	**10 supervisory visits by 5 Canadain professors to conduct Thai/Canadian supervised research work in Thailand**	2 weeks Thailand Jul-Dec/96 Jan-Jun/97						D2.23	Progress reports on the thesis research work of each of the 10 Thai candidates and confirmation of their readiness to defend thesis in Canada.	June 1997
	- Honoraria/Consulting Fees Canadians Five Canadian Engineering Professors to supervise the development and progress of the thesis research work for the 10 Thai Ph.D. candidates		24,000	6,000	18,000	12,000	60,000			
	Total Fees		**24,000**	**6,000**	**18,000**	**12,000**	**60,000**			
	Travel Related Expenses Canadians									
	- Travel to Thailand		13,600	3,400	10,200	6,800	34,000			
	- Travel in Thailand		2,000	500	1,500	1,000	5,000			
	- Accommodation		7,200	1,800	5,400	3,600	18,000			
	- Perdiem (meals, incidentals, taxis, communications..etc.)		4,800	1,200	3,600	2,400	12,000			
	Total Travel Related		**27,600**	**6,900**	**20,700**	**13,800**	**69,000**			
	Other Project Expenses									
	- Academic Fees		16,000	4,000	12,000	8,000	40,000			
	Total Other Project Expenses		**16,000**	**4,000**	**12,000**	**8,000**	**40,000**			
	Allowance of Inflation Canadian		5,926	1,481	4,445	4,051	15,903			
	Allowance of Inflation Thai		4,729	1,182	3,546	3,232	12,689			
Total Expenses for Cost Element			**78,255**	**19,563**	**58,691**	**41,083**	**197,592**			
	Revenue Sources:									
	- CIDA		32,413	8,103	24,310	17,017	81,843			
	- CUTC		11,113	2,778	8,335	5,834	28,060			
	- SUT		34,729	8,682	26,046	18,232	87,689			
Total Revenue for Cost Element			**78,255**	**19,563**	**58,691**	**41,083**	**197,592**			

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 2: INTERNATIONAL ACADEMIC PROGRAM											
ACTIVITY									DELIVERABLE		
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION	COST DISTRIBUTION					TOTAL		DESCRIPTION	TARGET DATE
				QRT 18	QRT 19						
A2.24	**Ph.D. thesis defence in Canada**	2 weeks							D2.24	Upon completion of the research work and thesis manuscript preparation in Thailand, The Thai Ph.D. candidates return to Canada, together with their Thai co-supervisers to defend their Ph.D thesis report and research findings, and to graduate if such defense is successful. The unsuccessful candidates continue their work with the objective of completing their Ph.D. program within the following year.	March 1998
	- Co-Supervisors Salaries and Benefits	Canada Sep-Dec/97		6,000	4,000			10,000			
	Total Fees			**6,000**	**4,000**			**10,000**			
	Travel Related Expenses Thai's										
	- Travel to and in Canada			36,000	24,000			60,000			
	- Living Allowance			9,000	6,000			15,000			
	Total Travel Related			**45,000**	**30,000**			**75,000**			
	Allowance of Inlation Canadian			4,526	3,017			7,543			
	Allowance of Inflation Thai			6,465	4,310			10,775			
Total Expenses for Cost Element				**61,991**	**41,327**			**103,318**			
	Revenue Sources:										
	- CIDA			25,526	17,017			42,543			
	- CUTC			0	0			0			
	- SUT			36,465	24,310			60,775			
Total Revenue for Cost Element				**61,991**	**41,327**			**103,318**			

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 3: UNIVERSITY-INDUSTRY LINKAGE PROGRAM										
ACTIVITY								DELIVERABLE		
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION	COST DISTRIBUTION QRT 16	QRT 17	QRT 18	QRT 19	TOTAL		DESCRIPTION	TARGET DATE
A3.22	**Provision of 4-6 industry-based training seminars in Thailand for personnel from Thai industries and enterprises.**	3 weeks Thailand TBD						D3.22	60-80 eingineers and technicians from Thai enterprises trained on state-of-the-art topics in the various applied science and engineering disciplines.	TBD
	- Honoraria/Fees for 6 Canadian consultants		18,000	18,000	9,000	9,000	54,000			
	Total Fees		**18,000**	**18,000**	**9,000**	**9,000**	**54,000**			
	Travel Related Expenses: Canadians									
	- Travel to Thailand		6,800	6,800	3,400	3,400	20,400			
	- Travel in Thailand		1,000	1,000	500	500	3,000			
	- Accommodations		4,800	4,800	2,400	2,400	14,400			
	- Perdiem (meals, incidentals, taxis, communications, etc.)		3,200	3,200	1,600	1,600	9,600			
	Total Travel Related		**15,800**	**15,800**	**7,900**	**7,900**	**47,400**			
	Allowance of Inflation Canadian		1,419	1,939	970	970	5,298			
	Allowance of Inflation Thai		3,909	5,344	2,672	2,672	14,597			
Total	**Expenses for Cost Element**		**39,128**	**41,083**	**20,542**	**20,542**	**121,295**			
	Revenue Sources:									
	- CIDA		0	0	0	0	0			
	- CUTC		10,419	10,939	5,470	5,470	32,298			
	- SUT		0	0	0	0	0			
	- Other - Thai		28,709	30,144	15,072	15,072	88,997			
Total	**Revenue for Cost Element**		**39,128**	**41,083**	**20,542**	**20,542**	**121,295**			

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 3: UNIVERSITY-INDUSTRY LINKAGE PROGRAM											
ACTIVITY										DELIVERABLE	
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION	COST DISTRIBUTION					TOTAL		DESCRIPTION	TARGET DATE
				QRT 6							
3.3	**Technology Cooperation Initiatives.**										
A3.31	**Technical services by a Canadian consultant to develop the plan for Canadian participation in SUT Expo in 1994-95**	2 weeks Thailand 1994							D3.31	Framework and guidelines for participation in Expo, definition of Canadian participants and their commitment.	
	- Honoraria/ Consultant Fees			6,000				6,000			
	Total Fees			**6,000**				**6,000**			
	Travel Related Expenses: Canadian										
	- Travel to Thailand			3,400				3,400			
	- Travel in Thailand			500				500			
	- Accommodation			1,800				1,800			
	- Per diem			1,200				1,200			
	Total Travel Related			**6,900**				**6,900**			
	Allowance of Inflation Canadian			320				320			
	Allowance of Inflation Thai			325				325			
Total Expenses for Cost Element				**13,545**				**13,545**			
	Revenue Sources:										
	- CIDA			3,570				3,570			
	- CUTC			3,150				3,150			
	- SUT			6,825				6,825			
Total Revenue for Cost Element				**13,545**				**13,545**			

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 4: PROJECT MANAGEMENT												
ACTIVITY										DELIVERABLE		
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION		COST DISTRIBUTION Year 1 QRT 2-4	Year 2 QRT 5-8	Year 3 QRT 9-12	Year 4 QRT 13-16	Year 5 QRT 17-20	TOTAL		DESCRIPTION	TARGET DATE
4.1	**Provision of Project Management and Administraton in Thailand.**											
A4.11	**Thai Project Implementation Unit**	5 years								D4.11	Quarterly, semi-annual and annual reports	1993
	- Project Manager	1993/98		6,300	6,300	6,300	6,300	6,300	31,500		on the progress, developments and	to
	- Project Coordinator			9,600	9,600	9,600	9,600	9,600	48,000		activities of the project. The reports	1998
	- Support Staff			4,800	4,800	4,800	4,800	4,800	24,000		will also include budgetary cost items	
	Total Fees			**20,700**	**20,700**	**20,700**	**20,700**	**20,700**	**103,500**			
	Allowance of Inflation Thai			0	1,035	2,122	3,263	4,461	10,881			
Total Expenses for Cost Element				**20,700**	**21,735**	**22,822**	**23,963**	**25,161**	**114,381**			
	Revenue Sources:											
	- CIDA			0	0	0	0	0	0			
	- CUTC			0	0	0	0	0	0			
	- SUT			20,700	21,735	22,822	23,963	25,161	114,381			
Total Revenue for Cost Element				**20,700**	**21,735**	**22,822**	**23,963**	**25,161**	**114,381**			

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 4: PROJECT MANAGEMENT											
ACTIVITY										DELIVERABLE	
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION		COST DISTRIBUTION Year 1 QRT 2-4	Year 2 QRT 5-8	Year 3 QRT 9-12	Year 4 QRT 13-16	Year 5 QRT 17-20	TOTAL	DESCRIPTION	TARGET DATE
4.2	**Provision of Project Management and Administration in Canada.**										
A4.21	**Canadian Management Team and Project Implementation Unit**	5 years 1993/98								D4.21 Design, development, and implementation of customized training program. Recruitment and coordination of all Canadian consultants providing technical services in Thailand. Quarterly, semi-annual, and snnual progress reports to CEA.	
	Canadian Personnel										
	Honoraria/Fees: Canadians										
	- Technical Advisor			8,400	8,400	8,400	8,400	8,400	42,000		
	- Project Manager			19,200	19,200	19,200	19,200	19,200	96,000		
	- Project Coordinator			14,000	14,000	14,000	14,000	14,000	70,000		
	- Support Staff			12,000	12,000	12,000	12,000	12,000	60,000		
	Total Fees			**53,600**	**53,600**	**53,600**	**53,600**	**53,600**	**268,000**		
	Allowance of Inflation Canadian			0	2,680	5,494	8,448	11,550	28,172		
Total Expenses for Cost Element				**53,600**	**56,280**	**59,094**	**62,048**	**65,150**	**296,172**		
	Revenue Sources:										
	- CIDA			32,160	33,768	35,456	37,229	39,090	177,703		
	- CUTC			21,440	22,512	23,638	24,819	26,060	118,469		
	- SUT			0	0	0	0	0	0		
Total Revenue for Cost Element				**53,600**	**56,280**	**59,094**	**62,048**	**65,150**	**296,172**		

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 4: PROJECT MANAGEMENT											
ACTIVITY										DELIVERABLE	
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION	COST DISTRIBUTION	Year 1 QRT 2-4	Year 2 QRT 5-8	Year 3 QRT 9-12	Year 4 QRT 13-16	Year 5 QRT 17-20	TOTAL	DESCRIPTION	TARGET DATE
4.3	**Project Supervision and Coordination**										
A4.31	**Canadian Project Review Sub-Committee trips to Thailand**	2 weeks Thailand								D4.31 Annual Project Review Committee's reports on the implementation of project activities and financial status.	July 1994-1996
	- Honoraria/Fees Canadian	1994, 1996			12,000		12,000		24,000		
	Total Fees				**12,000**		**12,000**		**24,000**		
	Travel Related Expenses Canadian:										
	- Travel to Thailand				6,800		6,800		13,600		
	- Travel in Thailand				1,000		1,000		2,000		
	- Accommodations				3,600		3,600		7,200		
	- Per diem				2,400		2,400		4,800		
	Total Travel Related				**13,800**		**13,800**		**27,600**		
	Allowance of Inflation Canadian				940		2,964		3,904		
	Allowance of Inflation Thai				350		1,103		1,453		
Total	**Expenses for Cost Element**				**27,090**		**29,867**		**56,957**		
	Revenue Sources:										
	- CIDA				14,700		16,207		30,907		
	- CUTC				5,040		5,557		10,597		
	- SUT				7,350		8,103		15,453		
Total	**Revenue for Cost Element**				**27,090**		**29,867**		**56,957**		

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 4: PROJECT MANAGEMENT											
ACTIVITY									**DELIVERABLE**		
	DESCRIPTION AND COST ELEMENT	**DATE VENUE & DURATION**	**COST DISTRIBUTION**	**Year 1 QRT 2-4**	**Year 2 QRT 5-8**	**Year 3 QRT 9-12**	**Year 4 QRT 13-16**	**Year 5 QRT 17-20**	**TOTAL**	**DESCRIPTION**	**TARGET DATE**
A4.32	**Thai Project Review Sub-Committee Trips to Canada**	2 weeks Canada								D4.32 Annual Project Review Committee's reports on the implementation of project activities and financial status.	July 1995-1997
	- Thai Salaries/Benefits	1995, 1997				4,000		4,000	8,000		
	Total Fees					**4,000**		**4,000**	**8,000**		
	Travel Related Expenses Thais:										
	- Travel to Canada					6,800		6,800	13,600		
	- Travel in Canada					2,000		2,000	4,000		
	- Living Allowance					2,000		2,000	4,000		
	Total Travel Related					**10,800**		**10,800**	**21,600**		
	Allowance of Inflation Canadian					1,106		2,327	3,433		
	Allowance of Inflation Thai					410		863	1,273		
Total Expenses for Cost Element						**16,316**		**17,990**	**34,306**		
	Revenue Sources:										
	- CIDA					8,532		9,407	17,939		
	- CUTC					3,368		3,716	7,084		
	- SUT					4,416		4,867	9,283		
Total Revenue for Cost Element						**16,316**		**17,990**	**34,306**		

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 4: PROJECT MANAGEMENT											
ACTIVITY										DELIVERABLE	
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION	COST DISTRIBUTION							DESCRIPTION	TARGET DATE
				Year 1 QRT 2-4	Year 2 QRT 5-8	Year 3 QRT 9-12	Year 4 QRT 13-16	Year 5 QRT 17-20	TOTAL		
A4.33	**Annual visits by Canadian Project management team to Canadian and Thai Institutions**	2 weeks Thailand 1993/97								D4.33 Quarterly, semi-annual and annual reports on the progress, and implementation of project activities	1993-1997
	Travel Related Expenses: Canadians:										
	- Travel to Thailand				6,800	6,800	6,800	6,800	27,200		
	- Travel in Thailand				1,000	1,000	1,000	1,000	4,000		
	- Accommodations				3,600	3,600	3,600	3,600	14,400		
	- Perdiem (meals, incidentals, taxis, communications, etc.)				2,400	2,400	2,400	2,400	9,600		
	Travel Within Canada:										
	- Toronto/Halifax/Guelph/Waterloo				5,000	5,000	5,000	5,000	20,000		
	- Accommodations in Canada				1,800	1,800	1,800	1,800	7,200		
	- Perdiem in Canada				1,200	1,200	1,200	1,200	4,800		
	Total Travel Related				**21,800**	**21,800**	**21,800**	**21,800**	**87,200**		
	Allowance of Inflation Canadian				740	1,517	2,333	3,188	7,778		
	Allowance of Inflation Thai				350	718	1,103	1,508	3,679		
Total	**Expenses for Cost Element**				**22,890**	**24,035**	**25,236**	**26,496**	**98,657**		
	Revenue Sources:										
	- CIDA				14,490	15,215	15,975	16,773	62,453		
	- CUTC				1,050	1,102	1,158	1,215	4,525		
	- SUT				7,350	7,718	8,103	8,508	31,679		
Total	**Revenue for Cost Element**				**22,890**	**24,035**	**25,236**	**26,496**	**98,657**		

Quarterly Schedule of Expenses and Revenue by Activity/Deliverable Cost Element

PROGRAM 4: PROJECT MANAGEMENT											
ACTIVITY										DELIVERABLE	
	DESCRIPTION AND COST ELEMENT	DATE VENUE & DURATION		COST DISTRIBUTION Year 1 QRT 2-4	Year 2 QRT 5-8	Year 3 QRT 9-12	Year 4 QRT 13-16	Year 5 QRT 17-20	TOTAL	DESCRIPTION	TARGET DATE
4.4	**Project Communication**										
A4.41	**Communication among CUTC Institutions**	5 years 1993-1998									
	- Communication Costs			4,000	4,000	4,000	4,000	4,000	20,000		
	- Report Production Costs			1,200	1,200	1,200	1,200	1,200	6,000		
	- Orientation and Briefing for Participants			1,470	1,470	1,470	1,470	1,470	7,350		
	- Program Support Materials for Thais'			1,140	1,140	1,140	1,140	1,140	5,700		
	Total Other Expenses			**7,810**	**7,810**	**7,810**	**7,810**	**7,810**	**39,050**		
	Allowance of Inflation Canadian			0	320	656	1,010	1,381	3,367		
	Allowance of Inflation Thai			0	70	143	221	302	736		
Total	**Expenses for Cost Element**			**7,810**	**8,200**	**8,609**	**9,041**	**9,493**	**43,153**		
	Revenue Sources:										
	- CIDA			3,966	4,164	4,372	4,591	4,821	21,914		
	- CUTC			2,444	2,566	2,694	2,829	2,970	13,503		
	- SUT			1,400	1,470	1,543	1,621	1,702	7,736		
Total	**Revenue for Cost Element**			**7,810**	**8,200**	**8,609**	**9,041**	**9,493**	**43,153**		

APPENDIX V:

ACADEMIC QUALIFICATIONS AND EXPERIENCE OF PARTICIPATING CANADIAN AND THAI MANAGEMENT PERSONNEL

Thai/Canadian
Project Review Committee (PRC)

CURRICULUM VITAE

Name:		LERTPANYAVIT Tavee
Nationality:		Thai
Education:	-	B. Eng. (Hons.) in Mechanical Engineering, Chulalongkorn University, Bangkok, 1961
	-	Dr. Eng. University of Rome, Rome, 1967
Languages:		English Proficiency: Good Italian Proficiency: Fair
Present Position:	-	Acting Vice President for Academic Affairs, Suranaree University of Technology (SUT) (1991-Present)
	-	Acting Dean, Faculty of Industrial Technology, SUT (1992-Present)

ADMINISTRATIVE EXPERIENCES:

Appointment at Chulalongkorn University

Dean, Faculty of Engineering, (1983-1991)

Member, University Council, (1989-1991)

Head, Department of Mechanical Engineering (1979-1983)

Assistant Dean, Faculty of Engineering, (1976-1979)

Secretary, Office of the Vice President for Academic Affairs, (1974-1975)

Secretary, Office of the Vice President for Administration, (1973-1974)

Other Appointment

Member, Council of Private Institutions of Higher Education, Ministry of University Affairs, (1992-Present)

Member, Executive Board, The National Computer Software Training Center, Ministry of University Affairs, (1991-Present)

Member, Council of Mahanakorn College, Bangkok (1990-Present)

Member, National Committee for International Standard, Ministry of Industry, (1988-1990)

Secretary to the Minister, Ministry of Science, Technology and Energy, (1980)

PROFESSIONAL AFFILIATIONS:

Fellow, the Engineering Institute of Thailand under H.M. the King's patronage (E.I.T.)

Registered Professional Engineer, Board of Professional Engineers, Ministry of Interior

Member, American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE), USA

Associate Member, International Institute of Refrigeration (IIR), Paris

Secretary General, the Engineering Institute of Thailand under H.M. the King's Patronage (1992-1993)

Member, the Board of Professional Engineers, Ministry of Interior, (1986-1989)

Treasurer, the Board of Executive Committee, E.I.T. (1982-1983, 1986-1989)

Chairman, Mechanical Engineering Chapter, E.I.T. (1974-1977, 1980-1981)

KNOWLEDGE OF NORTH AMERICAN/ASIAN:

- Participant to the Pacific Summit Technology Symposium at Seattle, Organized by the Washington Centennial Commission, August 1989.
- Attended the XVIII International Congress of Refrigeration in Montreal, August 1991
- Head Delegate, representing the Engineering Institute of Thailand under H.M. the King's Patronage to the 10th Conference of Asian Federation of Engineering Organizations in Manila, the Philippines, November 1992.

Feb. 1993

3 Assoc. Prof. Kasem Prabriputaloong

Sex: Male

Age: 49

Education: B.Eng. in Chemical Engineering, Monash University (Australia)

Master of Applied Sciences in Chemical Engineering, University of Toronto

Ph.D. in Chemical Engineering, University of Toronto

Past Positions

- Head, Department of Chemical Engineering, Khon Kaen University and Director of Suranaree College Project.
- Vice President for Planning & Development, Khon Kaen University.
- Lecturer, Faculty of Engineering, Khon Kaen University
- Head, Department of Industrial Engineering, Khon Kaen University.

Present Positions

- Assoc. Prof. Department of Chemical Engineering, Faculty of Engineering, Khon Kaen University
- Acting Vice-Rector for Operation, Suranaree University of

4 Assoc. Prof. Terd Charoenwatana

Sex: Male

Age: 54

Education: Bachelor of Agriculture and Animal Husbandry (Honor), Kasetsart University
M.S. in Agronomy, The University of California
Ph.D. in Farm Crops, Oregon State University

Past Positions

- Vice-Rector for Planning, Khon Kaen University
- Vice-Rector for Academic Affairs, Khon Kaen University
- Rice Breeder Specialist, Rice Division, Ministry of Agriculture
- Chairman, Southeast Asian Universities Agroecosystem Network (SUAN), Khon Kaen University
- Project Coordinator: KKU-USAID Farming Systems Research Project, Khon Kaen University

Present Positions

- Director, Research and Development Institute, Khon Kaen University
- Director, Farming Project (under CIDA sponsership)
- Assoc.Prof. Department of Agronomy, Faculty of Agriculture, Khon Kaen Univerity

G.E. Schneider

Curriculum Vitae

20 March 1993

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G.E. SCHNEIDER

Curriculum Vitae

A. PERSONAL DATA AND BACKGROUND INFORMATION

I. Personal Data

NAME:	Schneider, Gerald (Gerry) E.
ADDRESS:	81 Culpepper Drive, Waterloo, Ontario, N2L 5K8
PHONE:	(519) 746-7182
BIRTH:	21/8/49, Kitchener, Ontario
MARITAL STATUS:	Married (1968)
CHILDREN:	Two Boys (1971, 1973)
HEIGHT:	5' 10"
WEIGHT:	170 lbs.
HEALTH:	Excellent
CITIZENSHIP:	Canadian

II. Education

Degree	University	Year	Department
B.A.Sc.	Waterloo	1973	Mechanical Engineering
M.A.Sc.	Waterloo	1974	Mechanical Engineering
Ph.D.	Waterloo	1977	Mechanical Engineering

III. Work Experience

1. Sunshine Mtrs. Ltd., repairman (part-time) 1966-71.

2. J.M. Schneider Ltd., maintenance mechanic, 1969.

3. Marsland Eng. Ltd., production coordinator, 1970-71.

4. University of Waterloo (Dr. M.M. Yovanovich), research assistant, 1971-73.

5. University of Waterloo, graduate student working under contract for the Communications Research Centre, Ottawa, Ontario 1973-77.

6. University of Waterloo, Project Engineer, working under contract for the Communications Research Centre, Ottawa, Ontario, 1974-77.

7. University of Waterloo, Adjunct Lecturer, Department of Mechanical Engineering, May - August, 1976.

8. University of Waterloo, Assistant Professor of Mechanical Engineering, July 1977 - July 1981.

9. Aerojet Electro Systems Co., Azusa, CA, Full-time On-site Consultant, January to April, 1980.

10. University of Waterloo, Associate Professor of Mechanical Engineering, July 1981 - 1985.

11. University of Waterloo, Professor of Mechanical Engineering, July 1985 - Present.

12. Old Dominion University, Norfolk, Virginia, Adjunct Professor of Mechanical Engineering, September 1987 -.

13. Old Dominion University, Norfolk, Virginia, Visiting Professor of Mechanical Engineering, September 1987 - August 1988.

14. NASA Langley Research Center, Computer Applications Branch, Visiting Researcher, September 1987 - August 1988.

15. University of Waterloo, Associate Dean of Engineering for Undergraduate Studies, May 1989 - Present.

IV. Extra Curricular Activities

1. Flying	-	Commercial Pilot's license
	-	Class I instrument rating
2. Squash	-	Ontario A level player
3. Music	-	Piano
	-	Drums

V. Other

1. Participant in the *Senior University Administrators' Course*, University of Western Ontario, June 21 - July 3, 1987.

2. Participant in the *Assessing Student Learning Outcomes* workshop, Orlando, Florida, October 11, 1990.

3. Participant in the *Developing Comprehensive Faculty Evaluation System* workshop, Orlando, Florida, October 12-13, 1990.

4. Member, ASME.

5. Associate Fellow, AIAA.

B. RESEARCH

I. Publications in Journals

1. Schneider, G.E. and Yovanovich, M.M., "Correlation of the Overall Thermal Resistance of Metallic O-rings Contacting Two Cylinders", Journal of Spacecraft and Rockets, Vol. 11, No. 3, pp. 206-208, March, 1974.

2. Strong, A.B., Schneider, G.E., and Yovanovich, M.M., "Thermal Constriction Resistance of a Disk with Arbitrary Heat Flux-Finite Difference Solution in Oblate Spheroidal Coordinates", presented at AIAA/ASME 1974 Thermophysics and Heat Transfer Conference, Boston, Massachusetts, AIAA paper No. 74-690; also published in AIAA Progress in Astronautics and Aeronautics, "Heat Transfer with Thermal Control Applications", MIT Press, Vol. 39, 1975, Editor, Dr. M.M. Yovanovich, pp. 65-78.

3. Schneider, G.E., "Thermal Resistance of a Cylinder With Two Diametrically Opposite, Symmetric, Isothermal Contacts", Journal of Heat Transfer, Vol. 97, Series C, No. 3, pp. 465-467, August, 1975.

4. Schneider, G.E., Strong, A.B., and Yovanovich, M.M., "Transient Heat Flow from a Thin Circular Disk", AIAA paper No. 75-707, presented at AIAA 10th Thermophysics Conference, May 27-29, 1975, Denver, Colorado; also published in AIAA Progress in Astronautics and Aeronautics, "Radiative Transfer and Thermal Control", Editor, A.M. Smith, American Institute of Aeronautics and Astronautics, Vol. 49, 1976, pp. 419-432.

5. Schneider, G.E., "Finite Element Formulation of the Heat Conduction Equation in General Orthogonal Curvilinear Coordinates", presented at the ASME Winter Annual Meeting, Houston, Texas, November 1975, ASME Paper No. 75-WA/HT-95; also published in ASME Journal of Heat Transfer, Vol. 98, Series C, No. 3, August 1976, pp. 525-527.

6. Schneider, G.E., Strong, A.B., and Yovanovich, M.M., "Transient Thermal Response of Two Bodies Communicating Through a Small Circular Contact Area", International Journal of Heat and Mass Transfer, 1976, pp. 301-308.

7. Yovanovich, M.M., and Schneider, G.E., "Thermal Constriction Resistance due to a Circular Annular Contact", presented at the AIAA 14th Aerospace Sciences Meeting, January 1976, also published in AIAA Progress in Astronautics and Aeronautics, "Thermophysics of Spacecraft and Outer Planet Entry Probes", Editor, A.M. Smith, American Institute of Astronautics and Aeronautics, Vol. 56, 1977, pp. 141-154.

8. Schneider, G.E., Yovanovich, M.M., and Wehrle, V.A., "Thermal Analysis of Trapezoidal Grooved Heat Pipe Evaporator Walls", presented at the AIAA 11th Thermophysics Meeting, July 17-19, 1976, San Diego, California, AIAA paper No. 76-481; also in Progress in Astronautics, "Thermophysics of Spacecraft and Outer Planet Entry Probes", Editor, A.M. Smith, American Institute of Astronautics and Aeronautics, Vol. 56, 1977, pp. 69-83.

9. Yovanovich, M.M., Schneider, G.E. and Tien, C.H., "Thermal Resistance of Hollow Spheres Subjected to an Arbitrary Flux over their Poles, AIAA paper No. 78-872, presented at the 2nd AIAA/ASME Thermophysics and Heat Transfer Conference, Palo Alto, California, May 24-26, 1978; also published in Progress in Aeronautics and Astronautics, "Thermophysics and Thermal Control" Editor, R. Viskanta, American Institute of Astronautics and Aeronautics, Vol. 65, 1978, pp. 120-134.

10. Schneider, G.E., "Thermal Constriction Resistance Due to Arbitrary Contacts on a Half-Space-Numerical Solution of the Dirichlet Problem", AIAA paper No. 78-870, presented at the 2nd AIAA/ASME Thermophysics and Heat Transfer Conference, Palo Alto, California, May 24-26, 1978; also "Thermophysics and Thermal Control", Editor, R. Viskanta, American Institute of Aeronautics and Astronautics, Vol. 65, 1978, pp. 103-119.

11. Schneider, G.E., Raithby, G.D., and Yovanovich, M.M., "Finite Element Procedures for Solving the Incompressible Navier-Stokes Equations Using Equal Order Variable Interpolation", Numerical Heat Transfer, Vol. 1, 1978, pp. 433-451.

12. Yovanovich, M.M., Tien, C.H., and Schneider, G.E., "General Solution of Constriction Resistance Within a Compound Disk", presented at the AIAA 17th Aerospace Sciences Meeting, New Orleans, Louisiana, January 15-17, 1979; also published in Progress in Astronautics and Aeronautics "Heat Transfer, Thermal Control, and Heat Pipes", Editor, W.B. Olstad, American Institute of Aeronautics and Astronautics, Vol. 70, 1979, pp. 47-62.

13. Schneider, G.E., and LeDain, B.L., "The Boundary Integral Equation Method Applied to Steady Heat Conduction with Special Attention Given to the Corner Problem", presented at the AIAA 17th Aerospace Sciences Meeting, New Orleans, Louisiana, January 15-17, 1979; also published in AIAA Progress in Astronautics and Aeronautics, "Heat Transfer, Thermal Control, and Heat Pipes", Editor, W.B. Olstad, American Institute of Aeronautics and Astronautics, Vol. 70, 1979, pp. 63-76.

14. Raithby, G.D., and Schneider, G.E., "The Numerical Solution of Problems in Incompressible Fluid Flow Treatment of the Velocity-Pressure Coupling", Numerical Heat Transfer, Vol. 2, 1979, pp. 417-440.

15. Zedan, M., and Schneider, G.E., "A Strongly Implicit Simultaneous Variable Solution Procedure for Velocity and Pressure in Fluid Flow Problems", AIAA paper 83-1569, presented at the AIAA 18th Thermophysics Conference, Montreal, Quebec, June 1-3, 1983.

16. Rozon, B.J., and Schneider, G.E., "A Physical Cancellation Procedure for Enhancement of MSI Procedure", AIAA paper 85-0984, AIAA 20th Thermophysics Conference, June 19-21, 1985, Williamsburg, Virginia.

17. Raw, M.J., and Schneider, G.E., "Preliminary Results of a Novel Computational Procedure for Incompressible Flow", AIAA paper 85-0985, AIAA 20th Thermophysics Conference, June 19-21, 1985, Williamsburg, Virginia.

18. Rozon, B.J., and Schneider, G.E., "A Control-Volume-Based Finite Element Model for Solid/ Liquid Phase Change Including Natural Convection", AIAA paper 86-0146, AIAA 24th Aerospace Sciences Meeting, January 6-9, 1986, Reno, Nevada.

19. Schneider, G.E., "Finite Difference Computation of Solid/Liquid Phase Change Energy Transport - Comparison With Experimental Data", AIAA paper 86-0067, AIAA 24th Aerospace Sciences Meeting, January 6-9, 1986, Reno, Nevada.

20. Schneider, G.E., "A Novel Co-located Finite Difference Procedure for the Numerical Computation of Fluid Flow", AIAA paper 86-1330, AIAA/ASME Joint Thermophysics and Heat Transfer Conference, June 2-4, 1986, Boston, Massachusetts.

21. Blahey, A.G., and Schneider, G.E., "The Numerical Solution of Elastohydrodynamic Lubrication of Elliptical Contacts with Thermal Effects", Proceedings of the 13th Leeds-Lyon Symposium on Tribology, Leeds, England, September 8-12, 1986.

22. Blahey, A.G., and Schneider, G.E., "A Novel Approach for the Solution of Newtonion Fluid Flow in Thin Films with Thermal Effects", ASME/ASLE Tribology Conference, Pittsburg, Pennsylvania, October 20-22, 1986.

23. Stefurak, G., Davidson, G.A., and Schneider, G.E., "Numerical Simulation of Lake Breeze Recirculations Incorporating a K - ε Turbulence Model", Proceedings of the International Conference on Energy Transformations and Interaction with Small and Mesoscale Atmospheric Processes, Swiss Federal Institute of Technology, Lausanne, Switzerland, March 2-6, 1987.

24. Blahey, A.G., and Schneider, G.E., "The Temperature Field in a Translating Half-Space due to a Rectangular Source", AIAA paper No. 87-1552, presented at the AIAA 22nd Thermophysics Conference, June 8-10, 1987, Honolulu, Hawaii.

25. Schneider, G.E., "Preliminary Results of a Novel Fluid Flow Prediction Procedure Applied to Axi-Symmetric Problems", AIAA paper No. 87-1539, presented at the AIAA 22nd Thermophysics Conference, June 8-10, 1987, Honolulu, Hawaii.

26. Schneider, G. E., and Kochavi, E., "The Influence of Artificial Viscosity on Stability of a Control Volume Based Finite Element Formulation for Compressible Flow", Fourth International Conference on Supercomputing, Santa Clara, California, April 30 - May 5, 1989.

27. Schneider, G. E., and Kochavi, E., "A Control Volume Based Finite Element Formulation of the Compressible Flow Equations with Application to the Schock Tube Problem", AIAA paper No. 89-1654, presented at the AIAA 24th Thermophysics Conference, June 12-14, 1989, Buffalo, New York.

28. Schneider, G.E. and Wittich, K., "Assessment of Boundary Condition Implementation Schemes Using the Spectral Method on the Heat Equation", AIAA paper No. 89-1685, presented at the AIAA 24th Thermophysics Conference, June 12-14, 1989, Buffalo, New York.

29. Schneider, G.E., Yagar, S. and Le Lievre, B., "Streaming Options for Co-Op in Engineering", Canadian Conference on Engineering Education, Toronto, Ontario, June, 1990.

30. Schneider, G.E., Yagar, S., and LeLievre, B., "Streaming Options for Co-Op in Engineering", Canadian Conference on Engineering Education, University of Toronto, Toronto, Ontario, June, 1990.

31. Schneider, G.E., and Wittich, K., "Evaluation of Explicit Versus Implicit Computational Schemes for the Spectral Method Applied to the Heat Equation", AIAA paper 91-0158, presented at the AIAA 29th Aerospace Sciences Meeting, Reno, Nevada, January 7-10, 1991 and the AIAA/ASME 5th Joint Thermophysics and Heat Transfer Conference, June 18-20, 1990, Seattle, Washington.

32. Schneider, G.E., and Wittich, K., "Evaluation of Explicit Versus Implicit Computational Schemes for the Spectral Method Applied to the Heat Equation", AIAA paper No. 91-0158, presented at the 29th Aerospace Sciences Meeting, January 7-10, 1991, Reno, Nevada.

33. Schneider, G.E., "A Computational Model for the Analysis of Diffusive Binary Alloy Solid/Liquid Phase Change Energy Transport", AIAA paper 91-1331, AIAA 26th Thermophysics Conference, June 24-26, 1991, Honolulu, Hawaii.

34. Schneider, G.E., and Naterer, G.F., "The Physical Influence of Integration Point Equations on a CVFEM for Two-Dimensional Compressible Flows", AIAA paper

92-0365, AIAA 30th Aerospace Sciences Conference, Reno, Nevada, January -10, 1992.

35. Schneider, G.E., "Multi-Media Instruction in the Graphics Laboratory at the University of Waterloo", Canadian Conference on Engineering Education, Laval University, Quebec City, Quebec, Canada, May 24-26, 1992.

36. Naterer, G.F., and Schneider, G.E., "Use of the Second Law in a Predictive Capacity for Compressible Fluid Flow Discrete Analysis", Naterer, G.F., and Schneider, G.E., AIAA 27th Thermophysics Conference, AIAA Paper No. 92-2942, July 6-8, 1992, Nashville, Tennessee.

37. Naterer, G.F., and Schneider, G.E., "Enthalpy-based Finite Element Model of Binary Alloy Solid-Liquid Phase Change", AIAA 31st Aerospace Sciences Meeting, AIAA Paper No. 93-0277, January 11-14, 1993, Reno, Nevada.

38. Naterer, G.F., and Schneider, G.E., "Species Redistribution During Solidification of Nuclear Fuel Waste Metal Castings", CNA and CNS 18th Annual Nuclear Sciences Student Conference, April 2-3, 1993, Ecole Polytechnique de Montreal, Montreal, Quebec, Canada.

III. Invited Works

1. Schneider, G.E., and Raithby, G.D., "Finite Element Analysis of Incompressible Fluid Flow Incorporating Equal Order Pressure and Velocity Interpolation", Computer Methods in Fluids, invited chapter, K. Morgan (ed.), Pentech Press, 1979, pp. 49-83.

2. Schneider, G.E., "Discrete Methods in Heat Conduction - A Review", Advances in Transport Processes, Hemisphere Publishing Co., pp. 118-204, 1984.

3. Schneider, G.E., "Recent Developments in the Discrete Solution of Incompressible Flow Problems", Proceedings of the 5th IMACS International Symposium for Advances in Computer Methods for Partial Differential Equations, pp. 165-173, 1984.

4. Schneider, G.E., "Finite Element Methods in Conduction Heat Transfer", Chapter for Heat Exchanger Design Handbook, 1987, 120 pages.

5. Schneider, G.E., "Elliptic Systems-Finite Element Method", Chapter 10 for Handbook of Numerical Heat Transfer, Wiley, 1988.

6. Raithby, G.D., and Schneider, G.E., "Elliptic Systems-Finite Difference Method", Chapter 7 for Handbook of Numerical Heat Transfer, Wiley, 1988.

2. Schneider, G.E., and Yovanovich, M.M., "Three-Dimensional Thermal Analysis of a High Capacity Heat Pipe with Circumferential Grooves", final report of a study performed for the Communications Research Centre, Ottawa, Canada, August, 1975.

3. Schneider, G.E., and Yovanovich, M.M., "Thermal Analysis of Trapezoidal Grooved Heat Pipe Walls", final report to the Communications Research Center, Ottawa, Canada, August 1975.

4. Schneider, G.E., and Yovanovich, M.M., "Study of the Heat Transfer Mechanism of Arterial Heat Pipes", final report to the Communications Research Center, Ottawa, Canada, August, 1975.

5. Schneider, G.E., "Heat Pipe/Radiator Feasibility Study for Multipurpose UHF Satellite", Final report to the Communications Research Center, Ottawa, Canada, December, 1976.

6. Schneider, G.E., and Raithby, G.D., "A Finite-Difference Model for the Prediction of Surface Discharges, Including Crossflow Effects", final report to Hydraulic Studies Department of Ontario Hydro, February 1, 1978.

7. Schneider, G.E., and DeVos, R., "Analysis of the Heat Transport Capability of Axially Grooved Heat Pipes", report to Canadian Chromalox Company, August 30, 1979.

8. Raithby, G.D., and Schneider, G.E., "A Finite-Difference Model for the Prediction of Surface Discharges Including Crossflow Effects: Part 2", Final Report to the Hydraulic Studies Department of Ontario Hydro, March, 1980.

9. SCAMP (Shaped Charge Anti-Mine Projectile), progress report to Aerojet ElectroSystems Company, March 11, 1980.

10. Investigation of the Thermal Environment and Penetration of the Foundation Structure for Queen Elizabeth Hospital in Prince Edward Island, final report to A.W. Cluff and P.J. Cluff, Architects and Planners, Toronto, Ontario, September, 1980.

11. Schneider, G.E., "Application of Phase Change Technology to Spacecraft Thermal Control", final report to Communications Research Center, Department of Communications, Ottawa, April, 1981.

12. Schneider, G.E., "Experimental and Numerical Investigation of Two-Dimensional Phase Change Technology for Spacecraft Applications", final report to Communications Research Center, Department of Communications, Ottawa, April, 1982.

13. Schneider, G.E., "An Examination of Three Passive Cooling Systems for OPM Cabinet Electronics Cooling", report to Bell Northern Research Limited, Ottawa, Ontario, July, 1983.

14. Schneider, G.E., and Raw, M.J., "A Control-Volume-Based Finite Element Procedure for Fluid Flow and Heat Transfer", Final Report to Atomic Energy of Canada Ltd., Chalk River, Ontario, January, 1984.

15. Schneider, G.E., "Discrete Simulation of Solid/Liquid Phase Change Energy Transfer Including Free Convective Motion", final report to Communications Research Centre, Department of Communications, Ottawa, August, 1984.

16. Raw, M.J., and Schneider, G.E., "A Control-Volume-Based Finite Element Procedure for Fluid Flow and Heat Transfer-Phase II", Final Report to Atomic Energy of Canada Limited, Chalk River, Ontario, January, 1985.

17. Schneider, G.E., "Development and Validation of Advanced Software for Phase Change Energy Storage Technology", final report to Communications Research Centre, Department of Communications, Ottawa, October, 1985.

18. Schneider, G.E., and Raw, M.J., "A New Control-Volume-Based Finite Element Procedure for the Numerical Solution of the Fluid Flow and Scalar Transport Equations", final report to Atomic Energy of Canada Ltd., December, 1985.

19. Schneider, G. E., "Finite Difference Computation of Solid/Liquid Phase Change Including Free Convection in the Melt - Comparison with Experimental Data", final report to NASA Langley Research Center, Materials Processing Division, August, 1989.

20. Schneider, G. E., "Numerical Formulation for the Prediction of Solid/Liquid Phase Change of a Binary Alloy", final report to NASA Langley Research Center, Materials Processing Division, July, 1990.

21. Schneider, G.E., "Numerical Formulation for the Prediction of Solid/Liquid Phase Change of a Binary Alloy", Final report to NASA Langley Research Center, Hampton, Virginia, July, 1990.

VI. Seminars

1. Finite Difference Modelling of the Heat Conduction Equation in General Orthogonal Curvilinear Coordinates, presented to the Thermal Engineering Group, University of Waterloo, February, 1974.

2. Thermal Constriction Resistance of a Disk-Finite Difference Solution in Oblate Spheroidal Coordinates, presented to the Thermal Engineering Group, University of Waterloo, September, 1974.

3. Finite Difference Modelling of the Heat Conduction Equation in General Orthogonal Curvilinear Coordinates Using Taylor Series Expansion, presented to the Thermal Engineering Group, University of Waterloo, July, 1975.

4. Three-Dimensional Thermal Analysis of a High Capacity Circumferentially Grooved Heat Pipe, presented at the Communications Research Center, Ottawa, Canada, April, 1974.

5. Thermal Analysis of Trapezoidally Grooved Heat Pipe Walls, presented at the Communications Research Center, Ottawa, Canada, December, 1975.

6. Simulation of Fluid Flows, presented to the 'Coastal Zone Effluent Plume Modelling Workshop', Canadian Center for Inland Waters, January 6, 1978.

7. Thermal Constriction Resistance Due to Arbitrary Contacts on a Half Space-Numerical Solution of the Dirichlet Problem, presented to the Thermal Engineering Group, University of Waterloo, June, 1978.

8. The Boundary Integral Equation Method, presented to the Thermal Engineering Group, University of Waterloo, February, 1979.

9. Thermal Resistance of Two-Dimensional Geometries Having Isothermal and Adiabatic Boundaries, presented to Petro-Canada Synthetic Crude and Minerals Research Division, July 17, 1980.

10. A Modified Strongly Implicit Procedure for the Numerical Solution of Field Problems, presented to the Department of Mechanical Engineering, University of Missouri at Rolla, Rolla, Missouri, April, 1981.

11. A Modified Strongly Implicit Procedure for the Numerical Solution of Field Problems, presented to the Department of Mechanical Engineering, Texas A & M University, College Station, Texas, May, 1981.

12. Phenomenon and Applications of Heat Pipes, presented to the CSME, ASME, and IME joint annual meeting, Burlington, Ontario, January, 1982.

13. A Control Volume Based Finite Element Procedure for Heat Transfer and Fluid Flow Problems, presented at Old Dominion University, September, 1987.

14. Numerical Prediction of Solid/Liquid Phase Change Energy Transport Including Free Convection in the Melt, presented at NASA Langley Research Center, March, 1988.

VII. Session Chair

1. Session Chair for the 'Applications to Heat Transfer session at the AICA International Symposium on Computer Methods for Partial Differential Equations, held at Lehigh University, Bethlehem, Pennsylvania, June, 1975.

2. Session Chair for the 'Aerodynamic Heating' session at the AIAA 17th Aerospace Sciences Meeting, New Orleans, Louisiana, January 15-17, 1979.

3. Session Chair for the 'Contact Resistance' session at the AIAA 14th Thermophysics Conference, Orlando, Florida, June 4-6, 1979.

4. Session Chair for the 'Thermal Contact Resistance and Effective Transport Properties' session at the AIAA 18th Aerospace Sciences Meeting, Pasadena, California, January 14-16, 1980.

5. Session Chair for 'Convective Heat Transfer' session at the AIAA 18th Aerospace Sciences Meeting, Pasadena, California, January, 1980.

6. Session Chair for 'Conduction Heat Transfer' session at the AIAA 18th Aerospace Sciences Meeting, Pasadena, California, January, 1980.

7. Session Chair for 'Conduction Heat Transfer and Thermal Contact Resistance' session for the AIAA 16th Thermophysics Conference, June 23-25, 1981, Palo Alto, California.

8. Session Chair for 'Conduction and Thermal Contact Resistance session for the AIAA/ ASME Joint Fluids, Plasma, Heat Transfer and Thermophysics Conference, June 7-11, 1982, St. Louis, Missouri.

9. Session Chair for 'Conduction Heat Transfer' session for the AIAA 21st Aerospace Sciences Meeting, Reno, Nevada, January 11-13, 1983.

10. Session Chair for 'Contact Conductance and Numerical Conduction Solutions' session at the AIAA 18th Thermophysics Conference, Montreal, Canada, June 1-3, 1983.

11. Session Chair for 'Computational Methods' session at the AIAA 22nd Aerospace Sciences Mtg., Reno, Nevada, January 12-14, 1984.

12. Session Chair for 'Conduction and Computational Methods' session at the AIAA 19th Thermophysics Conference, Snomass, Colorado, June 25-28, 1984.

13. Session Chair for 'Computational Methods' session at the AIAA 20th Thermophysics Conference, June 19-21, 1985, Williamsburg, Virginia.

14. Session Chair for 'Lasers' session at the AIAA/ASME 4th Thermophysics Conference, June 2-4, 1986, Boston, Massachussetts.

15. Session Chair for 'Phase Change I' session at the AIAA 22nd Thermophysics Conference, June 8-10, 1987, Honolulu, Hawaii.

16. Session Chair for 'Phase Change II' session at the AIAA 22nd Thermophysics Conference, June 8-10, 1987, Honolulu, Hawaii.

17. Session Chair for the 'Computational Heat Transfer' session at the AIAA 30th Aerospace Sciences Meeting, Reno, Nevada, January 7-10, 1992.

VIII. Technical Committees and Society Service

1. Member of AIAA Technical Committee on Thermophysics from 1977-1979.

2. Member of AIAA Publications Committee, 1979-1986.

3. Member of AIAA Operations subcommittee of the AIAA Publications Committee, 1979-1986.

4. Member of Technical Program Committee for the AIAA Aerospace Sciences Meeting, July, 1980.

5. Member of Technical Program Committee for the AIAA 16th Thermophysics Conference, June, 1981.

6. Member of AIAA Technical Committee on Thermophysics from 1982-1985.

7. Member of AIAA Pendray Literature Award Subcommittee of the AIAA Publications Committee, 1982.

8. Member of Technical Program Committee for the AIAA 18th Thermophysics Conference, June 1-3, 1983.

9. Member of Technical Program Committee for the AIAA 19th Thermophysics Conference, June 25-28, 1984.

10. Associate Editor of AIAA Journal of Thermophysics and Heat Transfer, 1986 - Present.

11. Education/Publications Liaison Officer for AIAA Publications Committee.

12. Member of Publications Subcommittee of AIAA Technical Committee on Thermophysics, June, 1985 -Present.

13. Member of Editorial Advisory Board for *Numerical Heat Transfer.*

14. Member of the Technical Program Committee for the AIAA 22nd Thermophysics Conference, June 8-10, 1987, Honolulu, Hawaii.

IX. Consulting

	Company	Date
1.	Kenebuc Industries	Aug - Sept. 1974
2.	Mitten Industries	May - Aug. 1976
3.	Long Manufacturing	March 1976
4.	Ontario Hydro	Sept. 1976 - Feb. 1980
5.	Thermal Sciences Ltd.	Sept. 1976 - Feb. 1980
6.	Thermowatt Inc.	Sept. 1977 - July 1980
7.	Energetex Engineering Ltd.	May 1978 - Aug. 1978
8.	Canadian Chromalox Corp.	Jan. 1979 - March 1980
9.	A.W. Cluff and P.J. Cluff	July 1980 - Sept. 1980
10.	Aerojet ElectroSystems Co.	Jan. 1980 - Present
11.	Valley Blades Ltd.	Oct. 1980 - Dec. 1980
12.	Communications Research Centre	Sept. 1983 - Present
13.	Bell Northern Research Ltd.	July 1983 - Sept. 1983
14.	Reliance Electric Co.	Dec. 1985 - Present
15.	Pratt and Whitney Canada Ltd.	Apr. 1986 - Present
16.	NASA Langley Research Center	Sept. 1987 - Present

X. Research Grants and Contracts

1	UWRG	1977	$ 4,000	
2	NRC	1978	$ 6,000	
3	NSERC	1979	$ 9,500	
4	WRI	1979	$ 12,000	
5	NSERC	1980	$ 10,430	
6	AES	1981	$ 3,500	
7	NSERC	1981	$ 11,474	
8	NSERC	1982	$ 17,700	
9	AECL	1982	$ 23,237	
10	NSERC	1983	$ 20,543	
11	AES	1983	$ 6,000	
12	NSERC	1983	$ 134,000	(Major Equipment with Adams)
13	AECL	1984	$ 17,837	
14	NSERC	1984	$ 21,570	
15	AECL	1985	$ 19,583	
16	NSERC	1985	$ 32,150	

17	NSERC	1986	$ 30,864
18	NSERC	1987	$ 30,864
19	NASA	1988	$ 17,000
20	MRCO	1988	$ 250,000 (with M.M.Yovanovich, etc.)
21	NSERC	1988	$ 31,334
22	NSERC	1989	$ 32,334
23	NASA	1989	$ 12,000
24	MRCO	1989	$ 250,000 (with M.M. Yovanovich, etc.)
25	NSERC	1990	$ 32,334
26	MRCO	1990	$ 250,000 (with M.M. Yovanovich, etc.)
27	NSERC	1991	$ 32,334
28	MRCO	1991	$ 250,000 (with M.M. Yovanovich, etc.)
29	NSERC	1992	$ 32,334
30	MRCO	1992	$ 250,000 (with M.M. Yovanovich, etc.)
31	NSERC	1993	$ 37,000

XI. Other

1. Paper Reviews

- 6 in 1977/1978
- 16 in 1978/1979
- 17 in 1979/1980
- 13 in 1980/1981
- 20 in 1981/1982, 1 book
- 18 in 1982/1983, 1 book
- 20 in 1983/1984, 1 book
- 25 in 1984/1985, 1 book
- 24 in 1985/1986, 1 book
- 27 in 1986/1987, 1 book
- 15 in 1987/1988, 1 book
- 7 in 1988/1989
- 10 in 1989/1990
- 10 in 1990/1991
- 15 in 1991/1992

2. Performed duties as assistant organizer for the Thermophysics Program for the AIAA 17th Aerospace Sciences Meeting, New Orleans, La., January, 1979.

3. AIAA Thermophysics Committee Historian, 1978 -Present.

4. Member of Editorial Committee for Heat Transfer, Thermal Control and Heat Pipes, AIAA Progress in Astronautics and Aeronautics, Vol. 70, 1980.

5. Member of Editorial Committee for 1980 Thermophysics Volume in the AIAA Progress in Astronautics and Aeronautics.

6. Member of organizing committee for the AIAA 16th Thermophysics Conference, June 23-25, 1981, Palo Alto, Calif.

7. Reviewed the book manuscript 'Computational Fluid Mechanics and Heat Transfer' for Hemisphere Publishing Corp., January, 1982.

8. Assistant Administrative Organizer for the AIAA 18th Thermophysics Conference, June 1-3, 1983, Montreal, Quebec.

9. Member of Editorial Committee for 1982 Thermophysics Volume in the AIAA Progress in Astronautics and Aeronautics.

10. Reviewed the book 'Heat Exchangers - Thermal Hydraulic Fundamentals and Design' for the ASME Transaction, 1983.

11. Listed in the Marquis 'Who's Who in Frontier Science and Technology', 1983.

12. Listed in 'Personalities of America', 1984.

13. Listed in 'Dictionary of International Biography'.

14. Listed in 'The Biographical Roll of Honor', 1984.

15. Listed in 'International Book of Honor', 1984.

16. Runner-up for 1985 Best Paper Award for AIAA paper 85-0404, "Computation of Heat Transfer with Solid-Liquid Phase Change Including Free Convection" by G.E. Schneider.

17. Reviewed the book 'Computational Fluid Mechanics and Heat Transfer' for the AIAA Journal, 1987.

18. Associate Editor of the AIAA Journal of Thermophysics and Heat Transfer, 1988-Present.

19. Member of Publications Subcommittee of the AIAA Thermophysics Technical Committee, 1988.

20. Member of Thermophysics Technical Committee, 1988/89.

21. Reviewed applications for Natural Sciences and Engineering Research Council of Canada (NSERC), 1988/89, 1990/91.

22. Reviewed abstracts for the AIAA Thermophysics Conference, 1990/91.

23. Reviewed abstracts for the AIAA 30th Aerospace Sciences Meeting, Reno Nevada, January 7-10, 1992.

24. Chair of the Computational Heat Transfer session at the AIAA 30th Aerospace Sciences Meeting, Reno, Nevada, January 6-9, 1992.

25. Technical Program Chair for the AIAA 28th Thermophysics Conference to be held in June, 1993 in Orlando, Florida.

C. TEACHING

I. Courses Taught

1. Five week course to University of Waterloo graduate students describing the use of finite element method in heat transfer and fluid flow problems, 1975.

2. Adjunct Lecturer, May-August, 1976, ME50, Thermodynamics I.

3. Adjunct Lecturer, May-June, 1977, ME50, Thermodynamics I.

4. Teaching as a U.W. Faculty Member is detailed below.

Course	Name	Term	Year	Enrollment
ME 126	Engineering Concepts 2	Winter	1992	90
		Winter	1993	89
ME 204	Numerical Analysis	Spring	1981	107
		Fall	1982	106
ME 212	Dynamics	Fall	1977	90
		Fall	1978	92
		Fall	1979	136
ME 250	Thermodynamics I	Spring	1977	73
		Fall	1977	51
		Spring	1980	128
		Fall	1982	69
		Spring	1986	78
		Winter	1988	40
		Spring	1988	35
ME 305	Partial Differential Equations	Spring	1982	87
		Winter	1984	90
		Spring	1984	90
		Winter	1986	73
		Winter	1987	70
		Winter	1989	74
ME 351	Fluid Mechanics I	Spring	1978	55
		Winter	1989	55
ME 353	Heat Transfer I	Fall	1978	78
		Fall	1979	85
		Fall	1987	30
		Winter	1988	35
		Fall	1988	73

		Winter	1989	73
ME 354	Thermodynamics II	Spring	1978	55
		Spring	1979	71
		Winter	1985	102
		Winter	1991	80
ME 456	Heat Transfer II	Spring	1979	28
		Spring	1980	25
		Spring	1981	26
		Spring	1982	44
		Spring	1983	39
		Spring	1984	27
ME 559	Finite Element	Winter	1985	55
	Methods	Spring	1985	36
		Spring	1986	45
		Spring	1987	45
		Spring	1988	35
		Fall	1988	25
		Fall	1989	25
		Winter	1990	25
		Spring	1990	25
		Fall	1991	40
		Fall	1992	40
ME 655	Industrial Heat Transfer	Winter	1979	13
ME 752	Industrial Heat Transfer	Fall	1981	17
ME 789	Special Topics	Fall	1981	42
	in Fluid Flow and	Fall	1982	30
	Heat Transfer	Fall	1983	20

II. Supervision of Final Year Undergraduate Projects

Term	Year	No. of Students
Spring	1978	6
Fall	1978	2
Winter	1979	6
Spring	1979	7
Winter	1980	6
Spring	1980	2
Fall	1980	3
Winter	1981	6
Spring	1981	6
Fall	1981	2

Winter	1982	9
Spring	1982	3
Fall	1982	2
Winter	1983	6
Spring	1983	5
Winter	1984	4
Spring	1984	3
Winter	1985	2
Spring	1985	3
Fall	1985	1
Winter	1986	1
Spring	1986	1
Winter	1987	4

III. Supervision of Undergraduate, Work-Term Students

i)	B. LeDain[1]	Spring 1978	
ii)	R. DeVos[2]	Spring 1979	Winter 1980
iii)	W. Tyler	Winter 1981	Fall 1981
iv)	B. Rozon	Fall 1983	

IV. M.A.Sc. Supervision

i)	J. Grond	Winter 1978	-	Winter 1980 (with G.D. Raithby, T.A. Brzustowski),
ii)	M. Zedan	Nov. 1979	-	April 1981
iii)	W. Tyler	Winter 1981	-	Spring 1984 (with G.A. Davidson)
iv)	P. Watson	Fall 1980	-	Winter 1981 (project)
v)	M. Raw	Fall 1982	-	Spring 1983 (transferred to Ph.D.)
vi)	P. Galpin	Fall 1983	-	Fall 1985 (with G.D. Raithby)
vii)	B. Rozon	Fall 1983	-	Fall 1985 (with G.D. Raithby)
viii)	G. Stefurak	Fall 1983	-	Spring 1985 (with G.A. Davidson)

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[1]. The work term efforts of B. LeDain resulted in a Journal Publication. In addition, her work report for that term won the Babcock and Wilcox Industry Award.

[2]. The work term efforts of R. deVos resulted in a Conference Publication and report.

ix)	K. Wittich	Spring 1988	-	Spring 1990
x)	G. Naterer	Fall 1989	-	Spring 1991
xi)	T. Smith	Fall 1990	-	Spring 1992 (with M.M. Yovanovich)
xii)	H. Karimian	Fall 1991	-	Spring 1992 (transferred to PhD program)

V. M.A.Sc. Thesis Evaluation

Term	Year	Student	Supervisor
Fall	1977	S. Watson	J.H.G. Howard
Winter	1978	C.H. Tien	M.M. Yovanovich
Spring	1978	D. Weckman	P. Niessen/R. Pick
		H.H. Wong	G.D. Raithby
Fall	1978	L.A. Prociw	T.A. Brzustowski
		M.J. Kozluk	R.J. Pick
		R. Trafford	C.F.A. Beaumont (member of M.Phil. committee, Appl. Math.)
Spring	1979	F.B. Russel	K.G.T. Hollands
Fall	1981	A. Blahey	A. Plumtree (Tevaarwerk)
Winter	1982	W.W. Kitscha	M.M. Yovanovich
Spring	1982	R.M. Corless	G.J. Lastman and R.B. Simpson (Appl Math)
		G.J. Patel	R.J. Pick (project)
Spring	1984	J. Brown	G.D. Raithby
		W. Tyler	G.A. Davidson
		A. Wielhouwer	E. Burnett (Civil Eng.)
Spring	1985	L. Kula	M.M. Yovanovich
Fall	1986	S. Song	M.M. Yovanovich
Spring	1987	M. Hodgson	J.H.G. Howard

VI. Ph.D. Supervision

i)	M. Zedan,	May 1981 - Dec. 1983
ii)	A. Blahey,	Aug. 1981 - Fall 1985 (with D.J. Burns)
iii)	M. Raw,	Sept. 1983 - Fall 1985
iii)	I. Sadreheghighi	May 1988 -
iv)	G. Naterer	Fall 1991 -

v) H. Karimian Spring 1992 -

VII. Ph.D. Comprehensive Committees

Term	Year	Student	Supervisor
Fall	1978	N.G.S. Freeman	D. Raithby
Spring	1979	D.A. Frazer	J.H.G. Howard/W.C. Lennox
Fall	1979	G.D. Stubley	A.B. Strong/G.D. Raithby
		Z. Mazhar	G.D. Raithby/P.R. Slawson
Spring	1980	C. Maliska	G.D. Raithby/P.R. Slawson
		J. Reardon	P.R. Slawson/A.B. Strong
Spring	1981	M. Rashwan	J.A. George (Computer Science)
Fall	1981	K. Iynkaran	K.G.T. Hollands
Spring	1982	J.P. Van Doormaal	G.D. Raithby
		M. Zedan	G.E. Schneider
Fall	1982	A. Hegazy	M.M. Yovanovich
		R. Huget	G.D. Raithby
Winter	1983	A. Blahey	G.E. Schneider/D.J. Burns
Winter	1984	J. DeVaal	M.M. Yovanovich
		K. Leung	R.J. Pick
Spring	1985	L. Simeza	M.M. Yovanovich
Winter	1989	R. Haywood	M. Renksizbulut/G.D.Raithby
Fall	1988	K. Jafarpur	M. M. Yovanovich
Winter	1992	K. Hong	D. Weckman./A.B. Strong

VIII. Defence Committees

Term	Year	Student	Supervisor
Fall	1980	S. ElSherbiny	G.D. Raithby/K.G.T. Hollands
Winter	1981	G.D. Stubley	A.B. Strong/G.D. Raithby
Fall	1981	C. Maliska	G.D. Raithby
Winter	1982	Z. Mazhar	G.D. Raithby/P.R. Slawson
Spring	1982	D.A. Fraser	J.H.G. Howard/W.C. Lennox
Winter	1983	V.W. Antonnetti	M.M. Yovanovich
Spring	1983	M. Rashwan	J.A. George (Computer Science)
Winter	1984	M. Zedan	G.E. Schneider
Spring	1984	B. Joe	R.B. Simpson (Computer Science)
Spring	1984	K. Iynkaran	K.G.T. Hollands
Fall	1985	R. Huget	G.D. Raithby
Winter	1986	J. Van der Maal	G.D. Raithby

Winter	1986	M.J. Raw	G.E. Schneider
Winter	1988	J. De Vaal	M.M. Yovanovich
Winter	1988	A. Hegazy	M.M. Yovanovich
Spring	1988	S. Song	M.M. Yovanovich/F.O. Goodman (Appl. Math.)

D. ADMINISTRATIVE AND RELATED

I. Department Faculty Member

1. Member of Student/Faculty Committee,

Fall	1977
Fall	1978
Spring	1979
Fall	1979
Fall	1984
Winter	1985
Spring	1985
Fall	1985
Winter	1986
Spring	1986
Fall	1986
Winter	1987
Spring	1987
Winter	1989
Spring	1990
Winter	1992
Winter	1993

2. High School Liaison Officer for Mechanical Engineering, 1978/1979.

3. Member of Engineering Faculty Council, January 1978 - December 1980.

4. Member of Faculty Undergraduate Affairs Committee, 1979.

5. Member of Mechanical Engineering Undergraduate Affairs Committee, 1979.

6. Engineering Faculty Council Representative to the HKLS Faculty Council, January 1980 - December 1980.

7. Mechanical Engineering Computer Representative, September 1980 - September 1984.

8. Secretary of Mechanical Engineering Task Force on Computing, May 1981 - July 1982.

9. Member of Mechanical Engineering 1st Year Task Force, October, 1981 - August, 1982.

10. Engineering Faculty Representative to Mathematics Faculty Council, January, 1982 - January, 1983.

11. Member of Engineering Faculty Graduate Studies Committee, January, 1982 - January, 1984.

12. Member of Engineering Faculty Graduate Studies Subcommittee 'A', January, 1982 - January, 1984.

13. Member of Mechanical Engineering Chair Selection Committee, 1982.

14. Member of Mechanical Engineering Computing Committee, July 1982 - Spring 1985.

15. Member of Engineering Computing Committee, January 1983 - December 1983.

16. Member of Committee to Review GE121, May 1984 - Spring 1985.

17. Member of Faculty Graduate Studies Committee, September 1984 - August 1987.

18. Member of Engineering Faculty Council, 1988-1989.

19. Member of Engineering Faculty Graduate Studies Subcommittee 'A', 1988.

20. Member of Tenure Committee (Mech. Eng.), 1988.

21. Member of Mechanical Engineering Computing Committee, 1988, 1989.

22. Member of the Complementary Studies Committee for Mechanical Engineering, 1988, 1989.

23. Member of the Mechanical Engineering Committee to examine the undergraduate curriculum experimental component, 1989.

24. Member of the Mechanical Engineering Computing Committee, 1989.

25. Member of the Mechanical Engineering Graduate Studies Committee, 1989.

26. Engineering Faculty Council Representative to the Graduate Studies Committee, 1989.

II. Associate Chair for Undergraduate Studies

1. Associate Chair for Undergraduate Studies (Mech. Eng.), September 1984 - August 1987.

2. Member of Appointments Committee (Mech. Eng.), September 1984 - August 1987.

3. Member of Tenure Committee (Mech. Eng.), September 1984 - August 1987.

4. Member of Promotion Committee (Mech. Eng.), September 1986 - August 1987.

5. Member of Faculty Committee to Review First Year Engineering, September 1984 - August 1987.

6. Chair of Mechanical Engineering Curriculum Review Committee, May 1986 - Aug 1987.

8. Member of Faculty Undergraduate Studies Committee, September 1984 - August 1987.

9. Member of Mechanical Engineering Experimental Program Task Force, 1988.

III. Associate Dean for Undergraduate Studies

1. Member of Academic Policy Committee, 1989-Present.

2. Member of Dean's Committee, 1989-Present.

3. Member of Engineering Faculty Council, 1989-Present.

4. Member of Engineering Faculty Council Agenda Committee, 1989-Present.

5. Member of Faculty Tenure Committee, 1989-1992.

6. Member of Faculty Promotions Committee, 1989-Present.

7. Member of Faculty Merit Review Committee, 1989-Present

8. Member of Senate Undergraduate Operations Committee, 1989-Present.

9. Member of Senate Undergraduate Council, 1989-Present.

10. Chair of the Faculty Undergraduate Studies Committee, 1989-Present.

11. Chair of the Faculty Operations Committee, 1989-Present.

12. Chair of the First Year Council, 1989-Present.

13. Chair of the Environmental Option Committee, 1989-1991.

14. Chair of the Environmental Engineering Program Committee, 1991-Present.

15. Front Line Counsellor on academic matters for the Departmental Associate Chairs, the Faculty Directors, Departmental Administrative Assistants, and students, 1989-Present.

16. Chair of the CEAB Response Committee, 1990-1991.

17. Prepared Undergraduate component of the 1989/90 Corridor Adjustment proposal.

18. Prepared Undergraduate component of the 1989/90 Program Adjustment Fund proposal.

19. Supervisor for Directors of Admissions, First Year Engineering, General Studies, and Exchange Programs, plus three demonstrators and three secretarial staff.

20. Served as Acting Dean during several periods of order weeks in duration, 1989/90, 1990/91, 1991/92.

21. Member of the University Liaison/Recruiting Committee, 1989-present.

IV. Other

1. Member of the University Promotions Committee, 1988, 1989, 1990.

2. Member of an ad hoc Promotion Appeal Committee for the Vice President, Academic, 1990.

3. Member of the University Database Management Project Evaluation Committee, 1989/90.

4. Mission Leader for a CIDA-HRD pre-proposal mission to Thailand for the development of a new university in Thailand.

5. Chair of the Project Review Committee for the Suranaree University of Technology - Canadian University Technology Consortium (Ryerson Technological Institute, University of Waterloo, Technical University of Nova Scotia, University of Guelph), pending successful awarding of contract.

Natural Sciences and Engineering Research Council of Canada / Conseil de recherches en sciences naturelles et en génie du Canada

PERSONAL DATA
RENSEIGNEMENTS PERSONNELS

Family Name & Given Names / Nom de famille et prénoms

Principal Investigator / Chercheur principal: CALEY, William F.

Your Name / Votre nom: CALEY, William F.

Family Name / Nom de famille	Given Names / Prénoms	Position / Poste	Tel. No. / N° de tél.
CALEY	William F.	Professor	(902)420-7608

FAX No. / N° de télécopieur	Department / Département	University / Université	City / Ville	Postal Code / Code postal
(902) 425-1037	Mining and Metallurgical Eng.	Technical University of N.S.	Halifax	B3J 2X4

I wish to receive correspondence in English [X] / Je désire recevoir la correspondance en français [ ]

Area of expertise: Discipline Code / Domaine d'expertise : code de discipline — Primary / Principal: 12505 — Secondary / Secondaire: 12516

Technique and Instrumentation Code / Code de techniques et d'appareillage: 0046 0091 0060

Degrees / Diplômes	College, University, Institution / Collège, université, établissement	Country / Pays	Discipline Code / Code de discipline	Year / Année
Bachelor's / Baccalauréat	Queen's University	Canada	12500	1967
Master's / Maîtrise	Queen's University	Canada	42500	1970
Doctorate / Doctorat	University of Toronto	Canada	12500	1972
Other / Autre				

If the year of completion of your master's or doctoral degree is the current or a future year, either: / Si l'année d'obtention du doctorat ou de la maîtrise est l'année en cours ou une année à venir,

a) enclose confirmation of degree completion / inclure une preuve d'obtention du diplôme en question

or / ou

b) specify the date of expected completion. / préciser la date d'obtention prévue.

ACADEMIC, RESEARCH AND INDUSTRIAL EXPERIENCE / EXPÉRIENCE DANS L'ENSEIGNEMENT, LA RECHERCHE OU L'INDUSTRIE

Positions Held / Postes occupés	Dates	Department / Département	Institution / Établissement
Associate Dean of Engineering	01/01/89-present	Faculty of Engineering	TUNS
Professor	07/01/87-present	Mining and Metallurgical Eng.	TUNS
Assoc. Professor	1980-1987	Mining and Metallurgical Eng.	TUNS
Department Head	1981-1986	Mining and Metallurgical Eng.	TUNS
Adjunct Professor	1978-1980	Mining and Metallurgical Eng.	TUNS
Assistant Research Officer	1973-1979	National Research Council	Halifax, NS
Postdoctoral Fellow	1972-1973	National Research Council	Halifax, NS

RESEARCH TRAINING / FORMATION DE CHERCHEURS

	Master's / Maîtrise	Doctorate / Doctorat	PDF / SPD
Number of graduate degrees conferred upon students and number of postdoctoral fellows (PDF) under the applicant's supervision during the last six (6) years. Details should be provided under section C. / Nombre de diplômes supérieurs obtenus par des étudiants et nombre de stagiaires postdoctoraux (SPD) sous la direction du candidat depuis six (6) ans. Fournir des détails à la section C.	10	2	
Number of graduate students and postdoctoral fellows currently supervised by the applicant. / Nombre d'étudiants de 2e et 3e cycles et de stagiaires postdoctoraux actuellement sous la direction du candidat.	3	0	

SIGNATURE

September 4, 1992
Date

Signature

Personal Information Bank Numbers: SER / P-PU-005 and 010. / Numéros des fichiers de renseignements personnels : RSG/P-PU-005 et 010.

Form / Formule 100 (1992)

04-06-1993 06:25PM FROM DEAN OF ENGINEERING TUNS TO 14169795352 P.02

Family Name & Given Names / Nom de famille et prénoms

Principal Investigator / Chercheur principal

CALEY, William F.

Your Name / Votre nom

CALEY, William F.

SIGNIFICANT RESEARCH CONTRIBUTIONS (last 6 years only, including this year) beginning with the most recent. Refer to sections A to F of the instructions. / CONTRIBUTIONS IMPORTANTES À LA RECHERCHE (6 dernières années seulement y compris cette année) en commençant par les plus récentes. Se référer aux sections A à F dans les instructions.

SECTION A

(1) Refereed Journal Publications (last six years):

* 1. Bryden, R.H., Konsztowicz, K.J., Kingston, P.W. and Caley, W.F. "Co-Dispersion of Mullite and Wollastonite in Aqueous Suspensions." Ceramic Engineering and Science Proceedings, 13 (9-10), 1058-1065, 1992.
2. Konsztowicz, K.J., Maksym, G., Maksym, T., King, H.W., Caley, W.F. and Vargha-Butler, E. "The Role of Surface Tension in Donut Shape Formation of Spray-Dried Granules." Ceramic Transactions, 26, 46-53, 1992.
3. Konsztowicz, K.J., Caley, W.F. and Vargha-Butler, E. "Apparent Surface Tension of Dense Aqueous Suspensions of Colloidal Mixtures of ZrO_2 and Al_2O_3 Particles." Ceramic Powder Science IV, 235-240, 1991.
4. Whiteway, S.G. and Caley, W.F. "Charles Robb Masson - Chemical Metallurgist (1922-1988)." CIM Bulletin, 84 (949), 1991.
5. Caley, W.F. and Whiteway, S.G. "The Measurement of Diffusion Coefficients in Solids at Elevated Temperatures." Can. Met. Quart., 29 (4): 319-323, 1990.
6. Kingston, P.W., MacKinnon, A. and Caley, W.F. "New Industrial Mineral Opportunities in Southeastern Ontario." CIM Bulletin, 83 (934): 92-100, 1990.
7. Caley, W.F., Whiteway, S.G. and Stewart, I. "Variation in the reactivity of FeS_2 in Eastern Canadian Coal as a Function of Morphology." Coal Preparation, 7, 37-46, 1989.
* 8. Kingston, P.W. and Caley, W.F. "Nepheline Syenite as a Synthetic Slag Addition in Secondary Steelmaking." Minerals Eng., 2 (2), 207-215, 1989.
* 9. Speelman, J.L., Caley, W.F. and Leewis, K.G. "Electrochemical Transport through a Lime-Silica-Alumina Slag." Met. Trans. B, 20B (Feb), 31-37, 1989.
10. MacKinnon, A., Kingston, P.W., and Caley, W.F. "Wollastonite in Eastern Ontario." CIM Bulletin, 82 (922), 61-67, 1989.
11. Verschuren, C.P., Caley, W.F., and Kingston, P.W. "Criteria for Quarry Development in Southeastern Ontario." CIM Bulletin, 82 (922), 55-60, 1989.
12. Whiteway, S.G., Stewart, I., Chan, E., Caley, W.F. and Adorjan, L.A. "Pyrolysis and Magnetic Separation: A Process for Reducing the Sulphur Content of Eastern Canadian Coal." N.S. Inst. of Sci., 38, 9-22, 1988.
13. MacIssac, L.M., Caley, W.F., Hancock, H.A. and Hollingshead, R.S. "Anodic Polarization of Nimocast 713 in Sulphate Melts Containing Zinc." Materials Science and Technology, 4, (Nov.) 1035-1038, 1988.
*14. Caley, W.F. and Whiteway, S.G. "Deterioration of Refractory Materials from the Combustion of Straw." Can. Met. Quart., 27 (2), 135-140, 1988.
*15. Caley, W.F., Kanary, L.E. and Clarke, D.B. "Reduction of Chemical Corrosion in Transfer Ladles by Application of a Basic Oxide Ceramic Coating." Can. Met. Quart., 26, 259-264, 1987.
16. Kanary, L.E., Caley, W.F., Hancock, H.A. and Hollingshead, R.S. "Use of Zinc as an Inhibitor for the Hot Corrosion of Nimocast 713 in Na_2SO_4 Fused Salt Mixtures." Materials Science and Technology, 3, 571-576, 1987.

04-06-1993 06:26PM FROM DEAN OF ENGINEERING TUNS TO 14169795352 P.03

Family Name & Given Names / Nom de famille et prénoms

Principal Investigator / Chercheur principal
CALEY, William F.

Your Name / Votre nom
CALEY, William F.

17. Caley, W.F. and Kingston, P.W., "Usage of Refractory Material in an Early Eastern Ontario Lead Smelter." Can. Mineralogist 24, 265-270, 1986.

(2) Articles Submitted/Accepted in Refereed Journals

1. Bryden, R.H., Konsztowicz, K.J. and Caley, W.F. "Dispersion Stability of Alumina-Wollastonite Aqueous Suspensions." Journal of Materials Science Letters, in press, July, 1992.
2. Caley, W.F., Kipouros, G.J. and Kingston, P.W. "The Potential Application of Natural Minerals in Ceramic and Metal-Matrix Composites." CIM Bulletin, in press, August, 1992.
3. Cameron, J. and Caley, W.F. "Dry Sintering of Refractory Oxides at Elevated Temperatures." J. Materials Eng. and Performance, submitted March, 1992.

(3) Other Refereed Contributions:

1. Caley, W.F., Kipouros, G.J. and Kingston, P.W. "Natural Minerals as Secondary Reinforcing Agents in Metal-Matrix Composites." Proceedings, 3rd International SAMPE Metals and Metals Processing Conference, Toronto, Oct., 1992, in press.
2. Caley, W.F., MacDonald, J.B. and Kingston, P.W. "Ladle Refractory Corrosion by Steelmaking Slags." UNITECR '91 Proceedings, The German Refractories Association, 120-123, 1991.
3. Hancock, P.J., Hancock, H.A. Caley, W.F. and Hollingshead, R.S. "A Review of Recent Studies of the Role of Zinc as an Inhibitor of Hot Corrosion from Molten Sulphates": In High Temperature Corrosion: Advanced Materials and Coatings 2, Proceedings of the 2nd International Symposium on High Temperature Corrosion of Advanced Materials and Coatings, Les Embiez, France, Editor R. Streiff, J. Stringer, R.C. Krutenat, M. Caillet, 313-318, 1989.
4. Caley, W.F., Kanary, L.E. Clarke, D.B. and Didyk, S.H. "Reduction of Chemical Corrosion in Transfer Ladles by Application of an Oxide Ceramic Coating." In Advances in Refractories for the Metallurgical Industries, ed. by M.A.J. Rigaud, Pergamon Press, Toronto, 299-303, 1988.
5. Stewart, I., Whiteway, S.G., Cleyle, P.J. and Caley, W.F. "Decomposition of Pyrite in a Coal Matrix during the Pyrolysis of Coal." In Mineral Matter and Ash in Coal, American Chemical Society Symposium Series No. 301, 1986.
6. Hancock, H.A., Caley, W.F. and Hollingshead, R.S. "Zinc as an Inhibitor for the Hot Corrosion of Superalloys in a Marine Environment at 700°C." 10th International Symposium on the Reactivity of Solids, Dijon, France. Monographs Series, Elsevier Science Publishers, August, 1984.

(4) Non Refereed Publications:

(i) Selected Conference Presentations 1986-92

1. Deveau, M., Bryden, R., Konsztowicz, K.J. and Caley, W.F. "Processing of Wollastonite-Mullite Composites from Dense Aqueous Suspensions." Fourth Canadian Materials Science Conference, Kingston, Ontario, June 16-19, 1992.

Family Name & Given Names / Nom de famille et prénoms

Principal Investigator / Chercheur principal

CALEY, William F.

Your Name / Votre nom

CALEY, William F.

2. Bryden, R., Konsztowicz, K.J., Caley, W.F. and Kingston, P.W. "Co-Dispersion of Mullite and Wollastontie in Aqueous Suspensions." 16th Annual Conference on Composites and Advanced Ceramics, Cocoa Beach, FL, January 7-10, 1992.
3. Tribe, T.S., Caley, W.F. and Kingston, P.W. "Use of Nepheline Syenite as a Flux in Ladle Metallurgy." Third Canadian Materials Science Conference, Kingston, Ontario, June 18-21, 1991.
4. Bryden, R.H., Konsztowicz, K.J. and Caley, W.F. "Optimization of Co-Dispersion of Mullite-Wollastonite and Alumina-Wollastonite Aqueous Systems." Third Canadian Materials Science Conference, Kingston, Ontario, June 18-21, 1991.
5. Caley, W.F., Didyk, S.H. and Kingston, P.W. "Reduction of Slag-Line corrosion in Secondary Steelmaking Ladles." Unified International Technical Conference on Refractories, Anaheim, Calif., November, 1989; also, UNITECR '89 Proceedings, American Ceramic Soc., Vol. 1, 430-437, 1989.
6. Caley, W.F. and Whiteway, S.G. "The Measurement of Diffusion Coefficients in Solids at Elevated Temperatures." 28th Annual Conf. of Metallurgists, Halifax, N.S., August, 1989.
7. Kingston, P.W., MacKinnon, A. and Caley, W.F. "New Industrial Mineral Opportunities in Southeastern Ontario." 91st Annual Gen. Meeting of CIM, Quebec City, May, 1989.
8. Caley, W.F., Kanary, L.E., Clarke, D.B. and Didyk, S.H. "Reduction of Chemical Corrosion in Transfer Ladles by Application of an Oxide Ceramic Coating." Annual Conf. of Metallurgists, Winnipeg, Manitoba, August, 1987.
9. Meagher, L.M., Caley, W.F., Hancock, H.A. and Hollingshead, R.S. "Anodic Polarization of Nimocast 713 in Sulphate Melts Containing Zinc." 11th Can. Met. Chem. Conf., Kingston, Ontario, June, 1987.
10. Kingston, P.W., MacKinnon, A. and Caley, W.F. "Wollastonite in Eastern Ontario." 89th Annual General Meeting of CIM, Toronto, May, 1987.
11. Goudie, N.F. and Caley, W.F. "Hot Corrosion of Refractory Metals by Molten Slag Formed from the Combustion of Straw." 10th Can. Met. Chem. Conf., Kingston, Ontario, June, 1986.
12. Pinhey, C.J., Leewis, K.G. and Caley, W.F. "The Effect of Titanium Oxide Additions on the Viscosity of Lead-Silicate Slags." 10th Can. Met. Chem. Conf., Kingston, Ontario, June, 1986.
13. Kanary, L.E., Caley, W.F., and Clarke, D.B. "Reduction of Chemical Corrosion in Transfer Ladles by Application of a Basic Oxide Ceramic Coating." 10th Can. Met. Chem. Conf., Kingston, Ontario, June, 1986 (won best student paper award).

(ii) **Reports**

1. Fluxes and Synthetic Steelmaking Slags, in Southeastern Resident Geologists District-1988, Ont. Geol. Survey Misc. Paper 142, pp. 364-365, 1989.
2. Nepheline Syenite as a Fluorspar Replacement in Secondary Steelmaking; Reports, December, 1987, September, 1988, March, 1989.
3. Reduction of Chemical Corrosion in Transfer Ladles by Application of a Basic Oxide Ceramic Coating; Reports, January, 1985, January, 1986, September, 1987, October, 1989, October, 1990, August, 1992.
4. Sulphur Transfer During Pyrolysis; Reports, October, 1984, July, 1985.
5. Hot Corrosion Resistance of Superalloy Materials; Reports, November, 1982, August, 1983, December, 1983, April, 1984, August, 1985, September, 1987.

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Family Name & Given Names / Nom de famille et prénoms

Principal Investigator / Chercheur principal

CALEY, William F.

Your Name / Votre nom

CALEY, William F.

(iii) **Theses**

1. L. Kanary, "Use of a Basic Veneer to Inhibit the Chemical Corrosion of Acidic Refractories." Ph.D., 1992.
2. P. Hancock, "Solubility of Zinc Oxide in Fused Sodium Sulphate and Metal Oxide-Sodium Sulphate Systems at 900°C." M.A.Sc., 1988.
3. N. Goudie, "Deterioration of Refractory Materials by Liquid Slags Formed from the Combustion of Straw." M.A.Sc., 1987.
4. E. Theriault, "Reduction of Refractory Corrosion in Iron and Steelmaking Transfer Ladles." M.A.Sc., 1987.
5. C. Pinhey, "The Effect of Titania Additives on the Viscosity of Lead-Silicate Slags." M.A.Sc., 1987.
6. K. Allen, "Low Pressure Burner Rig for Hot Corrosion Studies." M.A.Sc., 1987.
7. P. Cleyle, "Coal Beneficiation by Controlled Pyrolysis and Magnetic Separation." M.A.Sc., 1985.
8. L. Meagher, "Potentiodynamic Studies of the Sulphidation of Nimocast 713 Alloy in Fused Salt Mixtures." M.A.Sc., 1984.
9. J. Clements, "Reduction of Hot Corrosion of Nimocast 713 in Fused Salt Mixtures by Application of a Glass Ceramic Coating." M.A.Sc., 1984.
10. P. Meslage, "Interfacial Areas of Gas Bubbles during Aluminum Degassing Using a Water Model." M.A.Sc., 1984.
11. D. Craig, "Determination of the Effect of Slurry Additions on Sinter Production at Brunswick Mining and Smelting." M.A.Sc., 1984.
12. K. Griffin, "Reduction of the Lead Content of Lead Blast Furnace Slags by Forehearth Coke Fines Additions." M.A.Sc., 1983.
13. K. Leewis, (with C.R. Masson), "Electrochemically Enhanced Desulphurization in a Gas-Slag Metal System." Ph.D., 1983.

(5) **Patent:**

1. Caley, W.F. and Flengas, S.N. "Preparation of Metal Alloy Coatings on Iron Substrates." United States Patent 4,097,351. 27 June, 1978. A procedure for cladding metallic substrates - not in use.

(6) **Collaborations:**

(i) **Industrial** - With Sydney Steel Corp, Sydney, N.S., to investigate slag-refractory interactions at the ladle refining stage; specifically, to monitor refractory selection in the new (1990) process and to determine the effect of slag chemistry on refractory practice.
Collaborators: various company personnel.

(ii) **Government** - With the Ontario Ministry of Northern Development and Mines, to investigate metallurgical uses for industrial minerals (e.g., wollastonite, sillimanite, feldspars).
Collaborator: Dr. P.W. Kingston.

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Family Name & Given Names / Nom de famille et prénoms

Principal Investigator / Chercheur principal
CALEY, William F.

Your Name / Votre nom
CALEY, William F.

(iii) University - With Queen's University Department of Metallurgical Engineering, to investigate reaction kinetics between various metal oxide couples (e.g., MgO-Al_2O_3). Collaborator: Dr. J. Cameron.

SECTION B

With respect to the slag/refractory research, the main contribution of the applicant to the joint publications is in the field of mineralogical/chemical changes occurring at slag/refractory interfaces at elevated temperatures. Thus, both slag rheology and mineral constituents are of importance; such information is of interest both to those involved in the utilization of industrial minerals, and to those interested in maximizing ladle-lining life in steel making. The geologically-oriented information has been supplied by Drs. P.W. Kingston and D.B. Clarke.

As a result, contributions are in a variety of journals; the CIM Bulletin because it contains an industrial minerals section/committee, and more scientifically recognized journals (Can. Met. Quart., Minerals Engineering) for the experimentally-oriented research.

To date, eight industrial trials have been conducted at Sydney Steel to evaluate a variation in slag chemistry deemed in the laboratory to be promising. This transfer of laboratory experience to plant-scale has been undertaken with the support of an NSERC CRD grant.

SECTION C

In the past six years, one Ph.D. and ten M.A.Sc. candidates have been "trained"; of these, two have gone to other Canadian Universities to the Ph.D. level, two are employed in Canadian government institutions, five are with various Canadian industries, and one is with a ferroalloy company in the United States. The Ph.D. candidate now manages the Advanced Materials Engineering Centre in Halifax.

SECTION D

The applicant is one of the few pyrometallurgists in Atlantic Canada engaged in applied research related to slags and/or refractories. As a result, informal consultations ranging from refractory problems in a foundry (New Glasgow Foundry Ltd.) to metallurgical specifications for lime (Jacques-Whitford Consultants) occur on a regular basis. Nationally, the applicant was a member of the National Advisory Committee on Mining and Metallurgical Research for the period 1983-1986.

CURRICULUM VITAE

1. Biographical Data

Name: **James C.M. Shute**

Address: University of Guelph
Guelph, Ontario, Canada. N1G 2W1

Date and Place of Birth: Canadian

Formal Education

B.A.	Queen's University (Humanities), 1959.
M.A.	Michigan State University (Adult Education), 1964.
Ph.D.	Michigan State University (Comparative and International Development Education), 1967.

2. Employment Record

1992	-	Director, Centre for International Programs
1991-92	-	Acting Director, Centre for International Programs, University of Guelph.
1982	-	Professor, Department of Rural Extension Studies, University of Guelph.
1972-82	-	Associate Professor (Extension Education), School of Agricultural Economics and Extension Education, University of Guelph.
1970-79	-	Director, Ghana-Guelph Project.
1969-72	-	Associate Professor, Department of Extension Education, Ontario Agricultural College, University of Guelph.
1968-69	-	Regional Representative for West Africa, Canadian University Service Overseas (CUSO). (Leave of absence from University of Guelph).
1966-68	-	Assistant Professor, Wellington College, University of Guelph.
1964-66	-	Administrative Assistant, Office of International Programs, Michigan State University.

3. Related Experience

1989-90	-	Visiting Professor, School of Agriculture and Forestry, University of Melbourne, Australia.
1989	-	Visiting Professor, Education Unit, Lincoln University, Canterbury, New Zealand.
1981	-	Visiting Fellow, Centre for Development Studies, University of Bath, England.
1971-72	-	Coordinator of Teaching and Learning, University of Guelph.
1967-68	-	Visiting Lecturer in Comparative Education, Faculty of Education, University of Western Ontario.

4. University of Guelph Responsibilities

(a) Undergraduate Teaching

38-304 Communication Process
38-306 International Communication
38-404 Education and International Development
01-300 Field Trip in International Agriculture
01-360 The Rural Community
01-400 Seminar in International Agriculture

(b) Graduate Teaching

38-605 Adult Education: Principles and Practice
38-613 International Extension Studies
38-630 Student Research Seminar

(c) Guest Lectures

01-110 The Agri-Food System
01-410 World Food System
29-325 Tropical Crop Production
38-200 Introduction to Rural Extension
38-308 Technology in Extension
38-607 Foundations of Rural Extension
38-631 Extension Methods
45-355 Africa South of the Sahara
58-438 Tropical and Sub-Tropical Horticultural Crops
71-201 Nutrition and Society
71-210 Feeding the World

(c) Guest Lectures..continued

78-208 Introduction to the Third World
78-244 Government and the Media
78-262 Politics of Developing Countries
78-279 The Nature of the Non-Western World
78-300 Politics of Africa
78-695 International Telecommunication Policy
87-415 Decision-Making in Resources Management
95-603 International Rural Development Planning

(d) Graduate Student Supervision (1971-1992)

46 M.Sc. students (also member of M.A., M.Sc., Ph.D., committees in Family Studies, Sociology/Anthropology, Political Studies, Agricultural Economics and Business, Animal/Poultry Science, Rural Planning and Development, Horticultural Science, Crop Science, Consumer Studies). Ten M.Sc. students in progress (six full-time, four part-time).

(e) Special University Assignments and Responsibilities

Acting Director, Centre for International Programs, 1967-68.

Coordinator, Inter-University seminar series on International Development, 1967-68.

Feasibility Study Team Member, University of Guelph--University of Ghana Cooperation, February, 1969

Chairman, Regional Conference on Travel and Exchange, University of Guelph, May, 1970.

University of Guelph Representative, Wellington County Study on the Aims and Objectives of Education, 1971-73.

Coordinator of Teaching and Learning, 1971-72.

Editor, *Teaching Forum,* 1972-73.

(e) Special University Assignments and Responsibilities..continued

Director, Ghana-Guelph Project, 1970-89.

Instructor, Ontario Correctional Centre, Guelph (5 sessions), 1972.

Editor, *At Guelph* (International Programs Issue) Vol.6, No. 2, Fall, 1974.

Ph.D. and Ed.D. External Examiner, Ontario Institute for Studies in Education, (1973, 1978, 1980, 1981, 1982, 1983, 1984, 1986, 1987, 1988, 1991, 1992; University of Western Ontario (1983); University of Waterloo (1985).

Continuing Education non-credit course instructor for courses in 1967, 1970, 1974, 1983, 1988, 1989.

Member of Dean's Committee to design International Agriculture Minor in B.Sc. (Agr.) program, 1973-1974.

External Assessor for University of Ibadan, Nigeria (Dept. of Agricultural Extension), 1977; University of Toronto, (Dept. of Adult Education), 1984.

Interviewer for applicants for WUSC Seminar to China, University of Guelph, 1977.

Member of President's Advisory Committee in International Rural Development Training, 1977-78.

Chairman, Committee on Evaluation of Faculty Performance, School of Agricultural Economics and Extension Education, 1977-78.

Coordinator, CIDA/UNESCO Workshops on Teaching Methods, Guelph, 1978; Ghana, 1980; Guelph, 1982, Malaysia, 1984.

Reviewer for SSHRC grant applications and for *Canadian Journal of African Studies, Canadian Journal of Education, Canadian and International Education, Canadian Journal of Development Studies, Higher Education., Tropical Agriculture.*

(e) Special University Assignments and Responsibilities...continued

Conducted Teaching Skills Workshop for Office for Educational Practice, (September 13, 15, 20, 1982) and for Ontario Municipal Assessors (Continuing Education). Sessions Coordinator, Peace and Security Conference, October 27-30, 1983.

Short-term advisor to Sulawesi Regional Development Project, Indonesia, May-June, 1984.

Editor, *Occasional Papers in Rural Extension*, Department of Rural Extension Studies.

5. International Activity (in Canada and Abroad)

Member of Board of Directors, Canadian Bureau for International Education, 1970-82; Vice-President and member of Executive Committee, 1979-82; member of Emergency Fund Committee, 1972-1984.

Member of Board of Directors, Canadian Council for International Cooperation, 1971-73.

Consultant to AUCC International Resources Study, 1969. (Walmsley Report).

Participant in the Stanley House Seminar on Foreign Students, sponsored by the National UNESCO Commission, 1972.

Consultant to Toronto Miles for Millions Committee.

Consultant to CUSO National Orientation Program, 1967-68.

Consultant to Canadian Crossroads International Briefing Program, 1973.

Planning Committee Member, Canadian Association of African Studies Annual Conference, Waterloo, 1972, and Guelph, 1980, Regional Representative, Canadian Association of African Studies, 1972-1988.

5. International Activity (in Canada and Abroad)...continued

Member, Miles for Millions, Guelph, 1970-71, and Chairman, 1972-73.

Secretary, Canadian Hunger Foundation Regional Conference, Guelph, 1970.

Member of University of Guelph Study Group in China, 1974.

Member of the Board of Directors, Canadian Save the Children Fund and Chairman of the Program Committee, 1974-80; 1982-83.

Member, Ph.D. Awards Panel, IDRC, Ottawa, 1976, 1978.

Founding Member, Guelph International Resource Centre, 1979 and member of the Board of Directors, 1979-1982.

Consultant to World Bank/Government of Nigeria (Agriculture and Rural Management Training Institute, Ilorin, Nigeria, 1981).

Consultant to CIDA on the feasibility of establishing a Commonwealth Agricultural Extension Training Program in Sri Lanka, 1983 and the Aralaganwila Development Centre, 1986.

Participant in North-South Roundtable, Oiso, Japan, October 21-24, 1983.

Member, Governing Council, Society for International Development, 1982-1985.

Consultant to CIMMYT (International Maize and Wheat Improvement Centre) and the Ghana Grains Development Project on agricultural extension training and communication support, Kumasi, Ghana, 1984 and 1987, and on training trainers (December, 1987).

Leader/Instructor, Field Trip in International Agriculture, Jamaica (field study for undergraduate agriculture students), 1985 and 1986.

Consultant to Ontario International Corporation on sectoral proposals for Ghana, 1986.

5. International Activity (in Canada and Abroad)...continued

Associate of the Centre for International Programs, University of Guelph, 1986-1990.

Co-Chairman, International Workshop on Staff Development and Faculty Building for Higher Agricultural Education in Developing Countries, Brawijaya University, Malang, Indonesia, August 19-23, 1986.

Consultant to International Development Research Centre on Evaluation of the Fellowships and Awards Division, 1986-1987.

Consultant to CIDA on Human Resource Development in Agriculture, Pakistan, 1989.

External Examiner, Department of Agriculture Extension, University of the West Indies, 1986-1993; and to the School of Social and Economic Development, University of the South Pacific, Suva, Fiji, 1989.

Consultant to CIDA on SACCAR on Strengthening Faculties of Agriculture in Southern Africa (SADCC), 1990-91.

6. Publications

Books and Chapters

Shute, J.C.M. and G.A.B. Moore, *Teaching and Workshop Methods in Agriculture.* Guelph: University of Guelph, 1982.

Shute, J.C.M. (ed). *The Vitamin E. Story: The Medical Memoirs of Evan Shute.* Burlington: W.C. Welch Publishing Co., 1985.

Shute, J.C.M. and F.H. Cummings "Les Etudes du Developpement Rural International dans les Universites Canadiennes" in Havet, J. (ed.) *L'etude du Developpement International au Canada.* Montreal: L'Association canadiene-francaise pour l'avancement des sciences (ACFAS), 1987.

6. Publications

Books and Chapters...continued

van den Bor, W., J.C.M. Shute and G.A.B. Moore (eds.), *South-North Partnership in Strengthening Higher Agricultural Education.* Wageningen: PUDOC, 1989.

Shute, J.C.M. and G.A.B. Moore. "Improving Teaching and Learning: An Approach to Instructional Methodology" van den Bor, W., J.C.M. Shute and G.A.B. Moore (eds.) *South-North Partnership in Strengthening Higher Agricultural Education.* Wageningen: PUDOC, 1989.

Shute, J.C.M. "Toward a Renewed Role for Higher Agricultural Education", in van den Bor, W. J.C.M. Shute and G.A.B. Moore (eds.) *"South-North Partnership in Strengthening Higher Agricultural Education."* Wageningen: PUDOC, 1989.

Shute, J.C.M. "Technology and Human Resource Development" in Nef, Jorge, Jokelee Vanderkop and Henry Wiseman (eds.) *Ethics and Technology: Ethical Choice in the Age of Pervasive Technology.* Toronto: Wall and Thompson, 1989.

Arias, Roberto, Baffour Badu-Apraku, G.A.B. Moore and J.C.M. Shute. *Maize and Cowpea Production Guide for Ghana,* 1988. Kumasi, Ghana: Crop Research Institute, 1988.

Monographs, Reports and Proceedings

Shute, J.C.M. *Guidelines for International Programs at the University of Guelph.* Guelph: University of Guelph, 1967. (Mimeo).

Shute, J.C.M. (Editor), *Issues in African Development.* (Papers presented at the Annual Conference of the Canadian Association of African Studies, University of Waterloo), 1972.

Shute, J.C.M. *Ghana-Guelph Project Annual Reports*, 1971-1978.

Shute, J.C.M. "Lessons Learned From the Ghana-Guelph Project." Paper prepared for the Food Committee, Science Council of Canada, March 20, 1978.

Monographs, Reports and Proceedings...continued

Shute, J.C.M. *Report of a Workshop on Teaching and Extension Methods in Agriculture.* Guelph: University of Guelph, 1972.

Shute, J.C.M. *The Ghana-Guelph Project: A Story of International Cooperation.* Guelph: University of Guelph, 1979.

Shute, J.C.M. (Editor), *Ghana-Guelph Extension Studies.* Guelph: University of Guelph (School of Agricultural Economics and Extension Education Publication 80/5), 1980.

Shute, J.C.M. and G.A.B. Moore. *Teaching and Extension Methods in Agriculture: Report of a Workshop Held at the University of Guelph.* Guelph: University of Guelph, 1980.

Shute, J.C.M. *Training Resources for Agricultural Management in Nigeria: A Preliminary Inventory.* Report of a study on training resources conducted for the Agricultural and Rural Management Training Institute, Ilorin, Nigeria, 1981.

Shute, J.C.M. *Approaches to ARMTI's Educational Mission.* A training guide prepared for the Agricultural and Rural Management Training Institute, Ilorin, Nigeria, 1981.

Shute, J.C.M. *Ghana-Guelph Bibliography.* Guelph: University of Guelph, 1982.

Shute, J.C.M., D.G. Grieve, G.M. Jenkinson and R. Protz. *The Minor in International Agriculture: Review and Recommendations.* Guelph: Ontario Agricultural College, University of Guelph, May, 1983.

Shute, J.C.M., H.C. Abell and J.J. Saaltink. *Commonwealth Agricultural Extension Training Program: Sri Lanka.* Ottawa: CIDA, 1983.

Shute, J.C.M. *Towards a Training Strategy for the Sulawesi Regional Development Project.* Guelph: University of Guelph, 1984.

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Shute, J.C.M., J.M. Bell, A.L.A. Middleton and G.A.B. Moore. *Improving Instructional Methods in Agriculture in ASEAN Universities.* Guelph: University of Guelph (School of Part-time Studies and Continuing Education), 1984.

Shute, J.C.M. and W. van den Bor. *Statement of Intent Between the Department of Education and Teacher Training, Agricultural University of Wageningen and the Extension Education Unit, University of Guelph.* Wageningen: A.U.W., October, 1984.

Shute, J.C.M., G.A.B. Moore and R.B. Hunter. *The Kumasi Grains and Legumes Development Board Skills Transfer Workshop.* Guelph: University of Guelph, 1985.

Shute, J.C.M. and J.H. Burton. *Report on International Agriculture Field Studies.* Guelph: University of Guelph, 1985 (Mimeo).

Shute, J.C.M. and R. Protz. *Field Trip in International Agriculture.* Guelph: University of Guelph, 1986.

Shute, D.H., C.L. Gyles, D.G. Killam, E. Kwan, A.R. MacKinnon and J.C.M. Shute. *The Brief from the University of Guelph to the Special Joint Commons - Senate Committee on Canada's International Relations.* Guelph: University of Guelph, November, 1985.

Shute, J.C.M. *The Aralaganwila Development Centre in Sri Lanka: Review and Recommendations.* Ottawa, CIDA, 1986.

Stuart, K.L., A.A. MacDonald and J.C.M. Shute. *Report of the Board Review of the Fellowship and Awards Division, International Development Research Centre.* Ottawa: IDRC, 1987.

Zimmerman, K., D.J. Blackburn, J.C.M. Shute, and R.G. Kachanoski. *Tillage 2000 and Its Effect on Awareness of Conservation Tillage.* Department of Rural Extension Studies, University of Guelph, March, 1988 (and Summary Report, December, 1987).

Monographs, Reports and Proceedings...continued

Moore, G.A.B. and J.C.M. Shute. *Technology Transfer and Communication Training.* Guelph: University of Guelph, 1988.

Shute, J.C.M. and Mian, Mumtaz Ali. *Strategic Options for CIDA in Support of Human Resource Development in Agriculture in Pakistan,* Guelph and Islamabad, 1989.

Carley, Mary E.A., Douglas H. Pletsch and James Shute. *Facing the Nineties: Alumni Perceptions, Interests and Challenges.* Guelph: Department of Rural Extension Studies, 1989.

Lee, R. and J.C.M. Shute. "An Approach to Naturalistic Evaluation: A Study of the Social Implications of an International Development Project." Abstract in *New Perspectives for International and Cross-Cultural Evaluation.* Proceedings of the American Evaluation Association, San Francisco, October 19-21, 1989.

Shute, J.C.M. *(et al.). Strengthening Agriculture Faculties in the SADCC Region: Report of a CIDA/SACCAR Design Mission.* Guelph: University of Guelph Centre for Food Security, 1991.

Shute, J.C.M. and D.M. Mukunya. *Mid-Term Evaluation of the Kenya Agricultural Research Training Project.* Guelph: University of Guelph Centre for Food Security, June, 1992.

Shute, J.C.M. *Canadian Educational Institutions and Egypt. A Survey of Programs and Linkages.* Toronto: Foundation for International Training, June, 1992.

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Shute, J.C.M. "Canadian Volunteer Teachers in West Africa," *Teacher Education in New Countries,* 12 (1971), 45-52.

Shute, J.C.M. "CUSO Teachers in West Africa," *West African Journal of Education,* XV, 3 (1971), 191-194.

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Shute, J.C.M. "The Humanities and the Third World," *The Humanities Association Bulletin,* 22:3 (1971), 60-64.

Shute, J.C.M. "Canadian University Technical Assistance Programs in Africa," *Canadian Journal of African Studies.* VI, 3 (1972), 491-500.

Yeboah-Asuamah, B. and J.C.M. Shute. "A Profile of Cooperative Members," *Canadian Cooperative Digest,* 15,3 (1972), 39-43.

Shute, J.C.M. "Community Based Educational Objectives," *Education Canada,* 16,2. (Summer, 1976), 24-27.

Shute, J.C.M. "Cooperation Between Universities: Some Indicators of Success from Ghana," *International Development Review, (1978/2), 22-25.*

Shute, J.C.M. "Toward a World View in Continuing Education," Canadian Journal of University Continuing Education, V, 1 (Summer, 1978), 19-22.

Percival, S.G. and J.C.M. Shute. "A Study of Teacher Preparation for Overseas Work," *Canadian and International Education,* 7, 2 (December, 1978), 17-27.

Shute, J.C.M. "International Cooperation in Agricultural Development: Some Administrative Dimensions," *Agricultural Administration,* 7 (1980), 47-57.

Amaratunga, C.A. and J.C.M. Shute. "Extension and Adult Learning in a Ghanaian Community," *Canadian Journal of African Studies,* 16,3 (1982), 549-566.

Mathies, R.J.R. and J.C.M. Shute. "Evaluation of Voluntary Programs in Three African Countries: Perceptions and Concerns of Volunteers." *Canadian and International Education* 12,1 (1983), 36-46. (With R.J.R. Mathies).

Shute, J.C.M. "Education and Third World Rural Development." *Canadian and International Education.* 13,2 1984), 38-48.

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Heikinheimo, P.S. and J.C.M. Shute. "The Adaptation of Foreign Students: Student Views and Institutional Implications." *Journal of College Student Personnel,* 27,5 (September, 1985), 399-406.

Bender, P.J. and J.C.M. Shute. "Perceptions of Agricultural Extension in Santa Cruz, Bolivia: An Identity Crisis Revealed." *Canadian Journal of Development Studies*, 8,2 (1987).

Shute, J.C.M. "An Institutional Framework for the International Dimension of Continuing Education," *Canadian Journal of University Continuing Education,* XV, 1 (Spring, 1989), 120-129.

Drysdale, A.M. and J.C.M. Shute. "Efficiency and Effectiveness of the Agricultural Extension Service in Indonesia: A Case Study," *Journal of Extension Systems,"* 2,5 (December, 1989), 45-59.

Lee, Rebecca and J.C.M. Shute. "An Approach to Naturalistic Evaluation: A Study of the Social Implications on an International Development Project." *Evaluation Review,* 15,2 (April, 1991), 254-265.

van den Bor, W. and J.C.M. Shute. "Higher Education in the Third World: Status Symbol or Instrument for Development?" in *Higher Education*, 22,1 (July, 1991), 1-15.

Articles (Non-Refereed)

Shute, J.C.M. "International Revolution," *University Bulletin,* 20 (Winter, 1968), 68-81.

Shute, J.C.M. "A New Opportunity for Canadian Universities," *Exchange,* (Bulletin No. 19), 1969.

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Shute, J.C.M. "The Professional School Looks Abroad, A Case Study," *Exchange,* (Bulletin No. 20), 1970, 53-57.

Shute, J.C.M. "Observations on University Technical Assistance Programs in Africa," in Shute, J.C.M. (ed.), *Issues in African Development.* (Papers presented at the Annual Conference of the Canadian Association of African Studies, University of Waterloo, 1972), 211-219.

Shute, J.C.M. "An Extension Incident," *The Journal of Extension,* XI,2 (Summer, 1972), 7-8.

Shute, J.C.M. "Cooperation for Development," *Overseas Universities,* 20, (November, 1973), 27-29.

Shute, J.C.M. "Canada's Role in International Agriculture," *Notes on Agriculture,* X,1 (January, 1974), 11-12.

Shute, J.C.M. "China Observed," *Exchange Canada,* 3,1 (January, 1975), 4-5.

Shute, J.C.M. "Teaching About Learning in Agriculture," *Training for Agriculture and Rural Development,* No. 19 (1980), 46-52.

Shute, J.C.M. "The Ghana-Guelph Project in Retrospect," *Canadian University Experience in International Development Projects.* Ottawa: International Development Office, (1980), 39-44.

Ofusu, C.A.K. and J.C.M. Shute. "Evaluating Home Science Extension Training," in Shute, J.C.M. (ed.), *Ghana-Guelph Extension Studies.* Guelph: University of Guelph, SAEEE 80/5, 1980, 32-41.

Amichand, D.H., J.C.M. Shute and D.H. Upton. "Going Home: Coping with Re-Entry Shock," *University Affairs,* January, (1981), p.9.

Shute, J.C.M. "Human Resource Development: Who Put the 'R' in HRD?" *Worldscape,* 2,2 (Fall, 1988), 1-4.

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Shute, J.C.M. Review of Raper et al. Rural Development in Action. (Ithaca: Cornell University Press, 1970) in *Informadev,* 1,2 (August-September, 1971).

Shute, J.C.M. "Non-Formal Education: Review of a Trilogy," *Canadian and International Education,* 5,1 (December, 1976).

Shute, J.C.M. Review of Budd L. Hall and J. Roby Kidd (eds.), *Adult Learning: A Design for Action.* (London: Pergamon Press, 1978) in *Canadian Journal of University Continuing Education,* VI,2 (1980), 45-46.

Shute, J.C.M. Editor, *At Guelph,* 1,2 (Fall, 1974).

Shute, J.C.M. "An Alumnus in China." *Alumni News,* 14,1 (November, 1974).

Shute, J.C.M. "Extension Training in Ghana, *Feature Article Series.* Toronto: Ontario Ministry of Agriculture and Food, 1978.

Shute, J.C.M. "Partnership with Ghana," *Feature Article Series.* Toronto: Ontario Ministry of Agriculture and Food, 1978.

Shute, J.C.M. *A CBIE Chronology.* Ottawa: Canadian Bureau for International Education, 1982.

Shute, J.C.M. Review of Brian Wilcox *et al. The Preparation for Life Curriculum.* London: Croom Helm, 1984, in *Canadian Journal of Education,* 11,2 (1986), 205-210.

Shute, J.C.M. Review of Hugh Hawes and Trevor Coombe (eds.), *Education Priorities and Aid Responses in Sub-Saharan Africa.* London: Overseas Development Administration, 1986, in *Canadian Journal of African Studies,* 21,3 (1987), 441-443.

Shute, J.C.M. and G.A.B. Moore. *Needs Assessment.* Training Fact Sheet Ghana/CIDA Grains Development Project, December, 1987.

Reviews and Other Publications...continued

Moore, G.A.B. and J.C.M. Shute. *Setting Goals and Priorities: Nominal Group Technique.* Training Fact Sheet Ghana/CIDA Grains Development Project, December, 1987.

Moore, G.A.B. and J.C.M. Shute. *Role Playing and Simulations.* Training Fact Sheet Ghana/CIDA Grains Development Project, December, 1987.

Shute, J.C.M. and G.A.B. Moore. *Evaluation Techniques.* Training Fact Sheet Ghana/CIDA Grains Development Project, December, 1987.

Shute, J.C.M. and G.A.B. Moore. *Rapid Rural Appraisal.* Training Fact Sheet Ghana/CIDA Grains Development Project, December, 1987.

Shute, J.C.M. and G.A.B. Moore. *Conducting a Field Day.* Training Fact Sheet Ghana/CIDA Grains Development Project, December, 1987.

Moore, G.A.B. and J.C.M. Shute. *Designing Training Activities.* Training Fact Sheet Ghana/CIDA Grains Development Project, December, 1987.

Shute, J.C.M. Review of Poats, Schmink and Spring (eds.) *Gender Issues in Farming Systems Research.* Boulder: Westview Press, 1988, in *Canadian Journal of Development Studies,* IX,2 (1988), 336-337.

Shute, J.C.M. "World Three and World One: The Extension Connection." *Extension Information Bulletin,* 39 (Spring, 1989), 2-3.

Shute, J.C.M. Review of Howell, John (ed.), *Training and Visit in Practice.* London: Overseas Development Institute, 1988; and Farrington, John and Adrienne Martin. *A Review of Concepts and Practices.* London: Overseas Development Institute, 1988, in *Canadian Journal of Development Studies,* X,2 (1989), 324-325.

7. Conference Papers, Lectures and Symposia

"Observations on University Technical Assistance Programs in Africa." Paper presented at the Annual Conference of the Canadian Association of African Studies, University of Waterloo, 1972.

"Ghana's Food Problem." Symposium presented at the Annual Conference of the Canadian Association of African Studies, York University, 1975. (With J.H. Burton, E.V. Evans, D.J. Nsaarkoh and J.W. Tanner).

"African Students in Canada." Paper presented to the Annual Conference of the Canadian Association of African Studies, University of Ottawa, May 5, 1977.

"The Ghana-Guelph Project in Retrospect." Presentation to the Workshop on Canadian University Experience in International Development Projects, University of Guelph, October 18, 1979.

"The Ghana-Guelph Project." Presentation to the Workshop on Canadian University Experience in International Development Projects, University of Guelph, October 18, 1979. (With R.B. Hunter, L. Engberg, J. Burton, D.H. Pletsch and R.M. Barham). Summary published in *Canadian University Experience in International Development Projects*. Ottawa: International Development Office, (1980).

"Collaboration With the Third World." Paper presented to the Science Policy Discussion Series, University of Toronto, December 12, 1979.

"Canadian Cooperation With Hungry Nations: An African Case." Address to the Royal Canadian Institute, Toronto, February 23, 1980.

"Cost-Recovery Technical Assistance: The Nigeria/Canada Technical Education Program." Paper presented to the Annual Conference of the Canadian Association of African Studies, University of Guelph, May 8, 1980. (With F. Tuzo.)

7. Conference Papers, Lectures and Symposia...continued

"Institutional Cooperation With West Africa." Paper presented to the Annual Conference of the Canadian Bureau for International Education, Quebec, November 18, 1980.

"Manpower Training: Two African Case Studies." Paper presented to the Centre for Development Studies, University of Bath, England, May 1, 1981.

"Innovative Teaching Practices." A presentation to the Sweden-Canada Seminar on Research and Creative Teaching, University of Guelph, May 11, 1982. (With M.W. Waldron.)

"Canada and Third World Rural Development: Some Educational Issues." Paper presented to the Annual Conference of the Comparative and International Education Society of Canada, University of Ottawa, June 10, 1982.

"Technology Transfer to the Third World." A presentation to the Student Pugwash Movement, University of Guelph, July 14, 1982.

"Long-term Technical Assistance." Presented to the 25th World Congress of the Society for International Development, Baltimore, Maryland, July 20, 1982. (With R.B. Hunter and N. Williams.)

"Cross-Cultural Communication." Keynote address to AIESEC (International Association of Economics and Commerce Students) Regional Conference, May 14, 1983.

"Cost-Recoverable Technical Assistance: The Nigeria/Canada Technical Education Programme." Paper presented at the Annual Conference of the Comparative and International Education Society of Canada, U.B.C., June, 1983. (With David N. Wilson, Ontario Institute for Studies in Education.)

"Whither CBIE? Reflections on the Past, Present and Future of the Canadian Bureau for International Education." Invited paper presented to the Canadian Bureau for International Education, Montebello, Quebec, November 2-3, 1984.

7. Conference Papers, Lectures and Symposia...continued

"International Activity: Good Business or Foreign Aid? Paper presented to the Annual Conference of the Canadian Bureau for International Education, Quebec City, November 2, 1987.

"Human Resource Development." Presentation to Associate Seminar, Centre for International Programs, University of Guelph, May 17, 1987.

"Instructional Methodology for Higher Education in Agriculture in Developing Countries." Paper presented at the International Workshop on Staff Development and Faculty Building for Higher Agricultural Education in Developing Countries, Brawijaya University, Malang, Indonesia, August 19, 1986. (With G.A.B. Moore.)

"The Nature of International Development." Lecture to the Ethics and Global Understanding Series, University of Guelph, October 8, 1987.

"Appraisal Development and Charters." Invited Lecture to Academic Staff of Lincoln University, Canterbury, New Zealand, September 29, 1989.

"Agricultural Education at a Crossroads: A Canadian Example." Invited Seminar, School of Agriculture and Forestry, University of Melbourne, Melbourne, Australia, February 14, 1990.

"Issues in Agricultural Education." Invited Address to the Principals of the Victorian College of Agriculture and Horticulture, Healesville, Victoria, Australia, February 23, 1990.

"Curriculum Reform in Agriculture: A Canadian Perspective." Special Waite Lecture, Waite Agricultural Research Institute, Glen Osmond, South Australia, February 26, 1990.

"Academic Staff Performance Assessment" - Invited Staff Seminar University of Adelaide, Adelaide, Australia, February 27, 1990.

"Rural Extension Education: Training People How to Work with Rural Groups." Invited Seminar, Roseworthy Agricultural College, Roseworthy, South Australia, Australia, February 28, 1990.

7. Conference Papers, lectures and Symposia...continued

Curriculum Reform in Agriculture." Invited Seminar, Roseworthy Agricultural College, Roseworthy, South Australia, Australia, February 28, 1990.

"A Glimpse of the Future: The System of Staff Performance Appraisal at the University of Guelph." Invited Seminar, Roseworthy Agricultural College, Roseworthy, South Australia, Australia, February 28, 1990.

"Key Issues in Extension." Invited Presentation to Senior Extension Staff of the South Australian Department of Agriculture, Adelaide, Australia, March 6, 1990.

"Agricultural Curriculum Development: A Canadian Example." Invited Seminar, School of Agriculture and Forestry, University of Melbourne, Melbourne, Australia (and to the School's Curriculum Review Committee), May 7, 1990.

"Some Agricultural Manpower Problems in SADCC." Lecture to Society for International Development, Guelph Chapter, February 4, 1991.

"Rural Universities: Reflections From Four Continents." Department of Rural Extension Studies Colloquium, University of Guelph, March 8, 1991.

8. Research, Graduate Student and Project Funding
(Last 10 years)

YEAR	TYPE	SOURCE	AMOUNT	PURPOSE
1981-87	Individual	CIDA	$100,000	Third World Research Scholarships
1980-84	Group	UNESCO CIDA Commonwealth Secretariat	$356,735	Workshops on Instructional Development
1983	Group	CIDA	$ 80,000	Commonwealth Rural Training Study, Sri Lanka
1986	Individual	CIDA	$ 29,950	Extension & Training Study, Sri Lanka
1984, 1987	Group	CIMMYT	$ 53,844	Extension Staff Development and Communication Support
1986-87	Individual	IDRC	$ 13,000	Evaluation Study, IDRC Fellowships and Awards Division
1989	Group	CIDA	$ 15,000	Human Resource Development Study, Pakistan
1990	Individual	CIDA	$ 40,000	Higher Education Study in Southern Africa
1991-92	Individual	CIDA	$ 59,000	Evaluation Study, Kenya
1991-1992	With Students	CIDA	$ 50,000	Graduate Student Support
1992	Individual	CIDA	$ 5,676	Survey of Egypt-Canada Linkages

9. Professional Organizations

Canadian Society of Extension

Canadian Association for the Study of International Development

Canadian Association of African Studies

Canadian Association of Asian Studies

10. Professional Honours

Election to Phi Kappa Phi

Listing in Directory of Scholars, Canadian Commission for UNESCO

Listed in Duffy, J., J. Hevelin & S. Osterreicher (eds.), International Directory of Scholars and Specialists in Third World Studies. Waltham, Mass: Crossroads Press, 1981.

Distinguished Professor Award, University of Guelph Faculty Association, 1989.

11. References

Supplied on request.

ANNEX

As my Annual Activities Report makes reference only to activities associated directly with the department, this annex provides a listing of the principal activities I undertook as Acting Director, Centre for International Programs on September 1, 1991 to May 31, 1992:

- Oversaw the post-CRESAP personnel and budgetary adjustment of C.I.P. in relation to staff needs, new links with the Office of Research and the move of International Education Services to the Counselling and Student Resource Centre.

- Initiated discussions and participated in several new ventures in international cooperation such as the International Field Studies Grants, development of a Third World Semester, registration of the University of Guelph with the Asian Development Bank and cooperation with a private sector firm.

- Produced two issues of a new newsletter World At Guelph and a new news sheet, Fast Track.

- Participated in several re-structuring efforts including streamlining the Centre's advisory groups and moving more responsibility to three subcommittees of the Senate Committee on International Activities - Women in Development, Project Approval, and International Education. I serve on all four committees/subcommittees.

- Participated in on-going planning for the Sulawesi Project evaluation.

- Initiated an informal grouping of my counterparts in southern Ontario universities, holding the first meeting at Guelph in October, 1991, to exchange university concerns and experiences in international activity. Participated in subsequent sessions at Trent, Ryerson and McMaster.

- Represented the university at the annual ILO (International Liaison Officers) meeting, Queen's University, September 1991 and accompanied President Segal to the annual AUCC President's meeting a week later, at Queen's.

- Provided small grants to about five faculty members and several students to facilitate their participation in meetings of relevance to the University's international mission.

ANNEX...continued

- Prepared and presented to Senate the Centre's Annual Report for 1991/1992.

- Received visiting delegations from overseas (India, Uruguay, Thailand, Ukraine, Mexico and more) and from elsewhere in Canada.

- Officially welcomed, on behalf of the University, international participants in several workshops, short-courses and meetings on campus.

- Ushered through the university system a number of new agreements with institutions abroad, and helped to initiate others still under negotiation.

- Advised individually a number (possibly several dozen) faculty, undergraduate and graduate students on research and study opportunities abroad, funding sources and project initiatives.

- Was consulted by a substantial number of international students seeking counsel or information on a variety of issues of concern to them.

Canadian Technical Adviser

POSITION TITLE: Technical Adviser	**CANDIDATE:** Dr. Stalin Boctor Chair, Department of Electrical Engineering Ryerson Polytechnical Institute

RESPONSIBILITIES: The Technical Adviser will provide advice to the Canadian PIU on the following:

- design of customized training programs in Canada
- selection of Canadian consultants and professors for technical services assignments in Canada
- design of the international academic programs
- evaluation of outcomes of the various project activities
- participation in the Canadian sub-committee of the Project Review Committee

ACTIVITIES: Customized Training Programs to be Delivered in Canada

- Provide the Canadian Project Manager with recommendations on appropriate CUTC Universities to participate in the design and delivery of the various customized training programs.
- In collaboration with the program supervisors, design the guidelines for the deliverables of the various training programs.
- Participate in the coordination, supervision, and evaluation of the various phases of the training programs.

Technical Services Assignments in Thailand

- In consultation with the various Deans, senior faculty and administrators of CUTC, provide the Canadian Project Manager with recommendations on Canadian consultants and faculty for Technical Services assignments in Thailand.

International Academic Programs

- In consultation with the CUTC Deans, provide the Canadian Project Manager with proposals for the structure of the various international academic programs and a strategy for their implementation.
- Participate in the coordination, supervision, and evaluation of the activities in the four programs.

Evaluation of the Outcomes of the Various Project Activities

- Design the evaluation instruments for the outcomes/deliverables of the various project activities.
- Participate in the debriefing sessions on the completion of the training programs for Thais in Canada and Canadians on return from Technical Services assignments in Thailand.

Project Review Committee

- Participate in meetings of the Canadian sub-committee of the Project Review Committee.
- Attend Project Review Committee Meeting in Thailand/Canada as required.

OUTPUTS:	• Terms of reference for the various customized training programs to be delivered in Canada. • Terms of reference for the evaluation instruments for the outcomes/deliverables of the various project activities. • Quarterly progress reports submitted to the Canadian Project Manager on all training activities in Canada, the implementation of the four international academic programs in Thailand and Canada, Technical Services assignments in Thailand. • Input into the Annual Project Management Plan regarding the activities to be scheduled for that period.

We hereby commit to participate in the project.

Prof. Sam Mikhail
Director
Ryerson International

Dr. Stalin Boctor
Chair, Department of Electrical Engineering
Ryerson Polytechnical

CURRICULUM VITAE

DR. STAL BOCTOR

CURRICULUM VITAE

PERSONAL

Name:	Boctor, Dr. Stalin A.
Date of birth:	January 31, 1943
Citizenship:	Canadian
Address:	62 Brownlow Avenue Toronto, Ontario Canada M4S 2K7
Telephone:	Home: (416) 488-7397 Office: (416) 979-5140

ACADEMIC QUALIFICATIONS

1. B.A.Sc. (Honour) 1964 (Electrical Engineering)	Cairo University, Electronics and Communications (First Class Honours, Distinction Grade)
2. M.A.Sc. 1967 (Electrical Engineering)	University of Waterloo, Semiconductor Device Physics
3. Ph.D. 1970 (Electrical Engineering)	University of Waterloo, Nonlinear Network Modelling (Microwave Semiconductor Devices)

SPECIALTY FIELDS

1. Fibre-Optics Communications Systems
2. Circuits and Systems Theory
3. Active and Passive Network Synthesis
4. Semiconductor Devices (Modelling)

TEXTBOOKS

1. Authored "Electric Circuit Analysis" Prentice-Hall, Englewood Cliffs, N.J., Copyright 1987, 1st Edition Copyright 1992, 2nd Edition
2. Authored "Network Analysis", McGraw-Hill Ryerson, Toronto, Canada, Copyright 1991
3. Co-authored "Introduction to Electrical Engineering", to be published by Prentice-Hall, expected in 1993.

PROFESSIONAL AND TECHNICAL ASSOCIATIONS

1978	Elected Senior Member of I.E.E.E. (for contributions to the advancement of the science of Electronic Engineering)
1976	American Society for Engineering Education (A.S.E.E.) member
1969	Institute of Electrical and Electronic Engineers (I.E.E.E.), member
1967	Association of Professional Engineers of Ontario (A.P.E.O.), member, P.Eng.

ACTIVITIES

Technical Reviewer for the Circuits and Systems Society of the I.E.E.E. (Transactions on Circuits and Systems)

Member of the Local Arrangements Committee of the 1973 International Symposium on Circuits and Systems, Toronto, Canada

Member of the Technical Program Committee of the 1983 ISCAS, Montreal, Canada

Member of the Admissions and Advancement Committee of the I.E.E.E., 1990

HONOURS

Bell-Northern Research, 10th Anniversary Silver Patent Award(1981)

Senior Member of the Institute of Electrical and Electronic Engineers (1978)

NRC Postdoctoral Fellowship (1970)

Province of Ontario Research Fellowship (1968-1970)

Egyptian Government Undergraduate Excellence Awards (1959-1964)

ACADEMIC EXPERIENCE

1971 to present	Ryerson Polytechnical Institute Professor (Network Analysis and Synthesis)
1970 - 1971 (1 year)	University of Toronto Postdoctoral Fellow (Semiconductor Circuits and Active Filters Synthesis)
1966 - 1970 (4 years)	University of Waterloo Teaching and Research Assistant (Semiconductor Physics and Network Analysis)
1964 - 1966 (2 years)	Cairo University Instructor (Applied Mathematics and Physics)

ADMINISTRATIVE EXPERIENCE

1986 to present	Chairman, Electrical Engineering Department -Provide Academic and Administrative leadership to the departments, with 38 faculty members and 7 support staff, serving over 640 undergraduate students.
1983 - 1986	Program Director of Photonics, Center for Advanced Technology Education at Ryerson -Established eight academic course curriculum and the supporting eight state-of-the-art technical laboratories ($1.6 million) in Fiber Optics (4), Lasers (2), Data Communications and Digital Signals Processing. This curriculum is used to serve practising engineers (seminars) and the senior undergraduates, including Thesis Projects.
1973, 1981 - 1986	Chairman of the Electrical Engineering Departmental Council, Ryerson Polytechnical Institute -Responsible for Academic curriculum, Budget planning, Appointments and Awards Committees.

OTHER ACTIVITIES AND ADMINISTRATIVE RESPONSIBILITIES AT R.P.I.

Course and Laboratory Co-ordinator for ELT364, ELT502, ELT742, EET012, EET022, EET032: Networks and Systems Stream Co-ordinator

Member of Ryerson Polytechnical Institute Academic Council (1973 - 1974)

Member of the President's Task Force:

1. Task Force Committee on Internal Processes (Budget Analysis and Timetabling)

2. Chairman of the Task Force Committee on Applied Research and Project Development, authored "Task Force Report on Applied Research and Project Development at Ryerson Polytechnical Institute".

- Member of various departmental committees on curriculum review, budget planning and post-diploma review and planning.

- Authored "Lecture Notes for EET012", 1983

- Authored "Lecture Notes for EET022", 1984

- Co-Authored "Overview of Photonics: Fiber Optics and Lasers in Communications and Industry"
  Seminar Lecture Notes, C.A.T.E., 1984

- Co-Authored "Overview of Optical Fiber Communications"
  Seminar Lecture Notes, C.A.T.E., 1985

- Member of the Reedyk Committee on the "Appointments of Academic Administrators" at Ryerson, 1991.

INDUSTRIAL, CONSULTING AND RESEARCH EXPERIENCE

1982 (1 year)	Mitel Semiconductor Inc., Ottawa Canada Consultant Engineer, Research and Development in - Automatic Test Equipment - Programmable Universal Filters

INDUSTRIAL, CONSULTING AND RESEARCH EXPERIENCE (continued)

1978 - 1981 (4 years)	Bell-Northern Research, Ottawa Consultant Engineer and Technical Supervisor/Research and Development in Fibre Optic Communication Systems -Drivers using LED and lasers for low and high bit rates -Thermoelectric cooling system for Lasers -Preamplifiers for Optoelectronic Receiver for low and high bit rates, analog and digital, using APDS -Receiver System Design, DS-3 and DS-1 -Multiloop, nonlinear control system stability analysis -Long Wavelength Receivers for FD3 and FD3A (90 MB/s) Fibre Optic Transmission Systems -PIN-Ga As FET Transimpedance Preamplifiers for the Long Wavelength Receivers
1973 - 1975 (3 years)	Bell-Northern Research, Ottawa, Canada Consultant Engineer and Technical Supervisor/Research and Development in: -Active Filters for Communication Systems -New Filter Structures, -Evaluation and Comparative Analysis of different filter structures, -Functionally Tunable Filters
1970 (1 year)	University of Toronto, Toronto, Ontario, Canada Postdoctoral Fellow (Passive and Active Filter Synthesis)
1966 - 1970 (4 years)	University of Waterloo, Waterloo, Ontario, Canada Research Assistant (Semiconductor devices: Modelling and Physical Properties)
1965 (1 year)	L.M. Ericsson Telephone Company (Sweden and Cairo office) Consultant Engineer and Technical Supervisor (Telephone Traffic)

PATENTS

1973	Bell-Northern Research "Novel Second Order Canonical RC-Active Filter: U.S. Patent #3993959
1974	Bell-Northern Research "Functionally Tunable Active Filter Section" U.S. Patent #3946328
1979	Bell-Northern Research "New Versatile Transimpedance Preamplifier for Fibre-Optic Communication System" Patent Owned by BNR
1981	Bell-Northern Research "Wideband PIN-GA As FET Transimpedance Preamplifier for Long Wavelength Fibre Optic Receivers" Patent Owned by BNR

RESEARCH THESIS AND TECHNICAL REPORTS

1982	Mitel Semiconductor Inc., Technical report, S.A. Boctor, "Active Compensated Universal Programmable Filters"
1981	Bell-Northern Research Technical Report, S.A. Boctor, "Receiver and Linear Channel Considerations for Long Wavelength and High-Bit-Rates Applications"
1980	Bell-Northern Research Technical Report, S.A. Boctor, "47.7 Mb/s Receiver for Fibre Optic Digital Communication Systems-Design Criteria and System Evaluation"
1979	Bell-Northern Research Technical Report, S.A. Boctor, "44.7 Mb/s Receiver for Fibre Optics Communication Systems"

RESEARCH THESIS AND TECHNICAL REPORTS (continued)

1979	Bell-Northern Research Technical Report, S.A. Boctor, "On the Design of a 3.088 Mb/s Receiver for Fibre-Optic Digital Communication Systems"
1979	Bell-Northern Research Technical Report, S.A. Boctor, "A Versatile Transimpedance Amplifier for Fibre Optics Communication Systems"
1978	Bell-Northern Research Technical Report, S.A. Boctor, "Thermoelectric Cooling System for Lasers"
1974	Bell-Northern Research Technical Report, S.A. Boctor, "A New Low Sensitivity Low-Pass-Notch Canonical RC Active Filter"
1973	Bell-Northern Research Technical Report, S.A. Boctor, "A General Tuning Procedure for Active RC Low Pass Elliptic Filers"
1970	Thesis: Ph.D. in Electrical Engineering "Frequency Multipliers Using Charge Storage-Step Recovery Diode in the Series Mode of Operation"
1967	Thesis: M.A.Sc. in Electrical Engineering "An Analysis of Double Stream Diffusion with Variable Trapping and Releasing Rates and Diffusion Coefficient"

REFEREED CONFERENCE TECHNICAL PAPERS

Represented Ryerson Polytechnical Institute in the following conferences, presenting the research papers indicated.

November 1977	The 11th Asilomar Conference on Circuits and Systems, Pacific Grove, California, U.S.A.
	Boctor, S.A. "Active Realization of a Negative Inductor"

REFEREED CONFERENCE TECHNICAL PAPERS (continued)

November 1975	The Ninth Asilomar Conference on Circuits and Systems, Pacific Grove, California, U.S.A.
	Boctor, S.A. "Functionally Tunable High-Pass-Notch, All-Pass Single Amplifier Filter"
April 1975	I.E.E.E. International Symposium on Circuits and Systems, Boston, Mass., U.S.A.
	Boctor, S.A. "Single Amplifier Functionally Tunable Low-Pass-Notch Filter"
April 1974	I.E.E.E. International Symposium on Circuits and Systems, San Francisco, California, U.S.A.
	Boctor, S.A. "Design of a Third Order Single Amplifier Filter"
	I.E.E.E. International Symposium on Circuits and Systems, San Francisco, California, U.S.A.
	Boctor, S.A. "A Novel Second Order Canonical RC Active Realization of High-Pass Notch Filter"
November 1973	I.E.E.E. Workshop on Active Filters, Harriman, New York, U.S.A.
	Boctor, S.A. "Design and Tuning Procedure for a Fifth Order Low-Pass Elliptic Filter Using Two Unity Gain Amplifiers"
November 1971	The Fifth Asilomar Conference on Circuits and Systems, Pacific Grove, California, U.S.A.
	Boctor, S.A. and Sedra, A.S. "Synthesis of Second-Order RC Vand-Pass Filters"

REFEREED CONFERENCE TECHNICAL PAPERS (continued)

November 1970	The Fourth Asilomar Conference on Circuits and Systems, Pacific Grove, California, U.S.A.
	Boctor, S.A. and Roulston, D.J. "Design and Performance of the Series Mode Frequency Multipliers Using the Step recovery Diode", Conference Records pp. 224-230

REFEREED JOURNAL PUBLICATIONS

November 1975	Boctor, S.A., "Single Amplifier Functionally Tunable Low-Pass-Notch Filter", IEEE Trans. on Circuits and Systems, Vol. CAS-22, No.11
May 1975	Boctor, S.A., "A Novel Second Order Canonical RC Active Realization of High-Pass-Notch Filter", IEEE Trans. on Circuits and Systems, Vol. CAS-22, No.5, pp. 397-404
April 1975	Boctor, S.A., "Design of a Third Order Single Amplifier Filter" IEEE Trans. on Circuits and Systems Vol. CAS-22, No.4, pp. 329-334
July 1972	Boctor, S.A. and Sedra, A.S., "On the Synthesis of RC Band-Pass Filters", IEEE Trans. Circuit Theory, Vol. CT-19, No.4, pp.329-334
November 1971	Boctor, S.A. and Roulston, D.J., "The Effect of Idlers on the Step-Recovery Diode Frequency Multipliers in the Series-Mode of Operation", International Journal of Electronics, Vol.31, No.5, pp. 485-491
October 1971	Boctor, S.A. and Roulston, D.J., "Design and Performance of the Series Mode Frequency Multipliers Using the Step-Recovery Diode", International Journal of Electronics, Vol.31, No.4, pp. 335-351

REFEREED JOURNAL PUBLICATIONS (continued)

July 1971	Boctor, S.A. and Sedra, A.S., "Realization of Non-Minimum Phase Transfer Functions Using Twin-T RC Networks", IEEE Trans. Circuit Theory, Vol.CT-18, No.4, pp.471-475
June 1970	Boctor, S.A. and Watt, L.A.K., "An Analysis of Double Stream Diffusion with Variable Trapping and Releasing Rates and Variable Diffusion Coefficient", Journal of Applied Physics, Vol.41, No.7, pp.2844-2853
September 1969	Boctor, S.A. and Roulston, D.J., "Forward Transient Circuit Behaviour of Step Recovery Diodes", International Journal of Electronics, Vol.27, No.3, pp.265-281
August 1969	Boctor, S.A. and Hanson, J.V., "Envelope Detection at Low Signal to Noise Ratios", Proc.IEEE, Vol.57, No.8, pp.1463-1464
April 1969	Boctor, S.A. and Roulston, D.J., "High Efficiency Conditions for an Ideal Nonlinear Capacitor Frequency Multiplier", Proc.IEEE, Vol.57, No.4, pp.668-689
February 1969	Boctor, S.A. and Roulston, D.J., "Multiple Conduction in a Series Type Frequency Multiplier Using an Ideal Step-Recovery Diode" Proc. IEEE, Vol.57, No.2, pp.238-239

Thai/Canadian
Project Implementation Units (PIUs)

POSITION TITLE:	Project Manager, Thai PIU	**CANDIDATE:**	Dr. Sam-arng Srinilta Acting Vice President for Academic Planning and Development, Suranaree University of Technology

RESPONSIBILITIES: The Project Manager is responsible for the following:

- In cooperation with SUT academic administrators and the Thai PIU, the conceptualization, design and implementation of all project activities.
- Ensuring that the project is implemented according to the terms of reference in the contract between the CEA and Ryerson Polytechnical Institute on behalf of SUT administration.
- Ensuring efficient and responsible administration of project funds, including financial reports and disbursements to SUT administration to support the implementation of project activities.

ACTIVITIES:

- Meet with SUT administration to conceptualize and design various project programs and activities.
- Cooperate in the preparation of project documents and reports for submission to the SUT administration, including the following:
  - Annual Project Management Plan
  - Evaluation reports of project programs and activities
- In cooperation with SUT administration, asses and select participating professors, staff and students.
- Facilitate the link between Thai and Canadian enterprises.

OUTPUTS:

- Project programs activities designed, implemented and evaluated.
- Project documents developed, produced and submitted.
- Project deliverables assessed and incorporated into SUT's academic programs and administration systems.
- Implementation of activities involving the participation of Thai universities and the private sector and CUTC and Canadian enterprises.

I hereby commit to participate in the project.

Dr. Sam-arng Srinilta
Acting Vice President for Academic Planning and Development
Suranaree University of Technology

POSITION TITLE:	Project Coordinator, Thai PIU	**CANDIDATE:**	Dr. Chalida Rojanawathana Wuthi, Chief, External Relations Division, SUT

RESPONSIBILITIES: The Project Coordinator will provide the following:

- assistance for the Thai Project Manager
- support for the implementation of project activities
- coordinate the preparation and production of project reports and documents
- programs of orientation, briefing and debriefing for all project participants travelling overseas

ACTIVITIES:

- Assist the Thai Project Manager in discharging his responsibilities including the preparation of the Annual Project Management Plan and budgets.
- Coordinate the preparation and production of project reports, and various documents for submission to SUT administration and Project Review Committee.
- Provide planning and logistical support for the implementation of project activities.
- Design, organize and implement programs e.g., orientation, briefing, and debriefing for all project participants travelling overseas.
- Provide liaison between CUTC, SUT, and CEA on project activities.

OUTPUTS:

- Logistical arrangements made for Thais coming to Canada and Canadians travelling to Thailand.
- All project reports produced and submitted to SUT administration and the Project Review Committee.
- Programs of orientation, briefing and debriefing implemented and all participants provided with appropriate briefing materials.
- CUTC, SUT, and CEA informed of project activities.

We hereby commit to participate in the project.

Dr. Sam-arng Srinilta
Acting V.P. Planning and Development
Suranaree University of Technology

Chalida Roj. W.

Dr. Chalida Rojanawathana Wuthi Wuthi
Chief, External Relations Division
Suranaree University of Technology

POSITION TITLE:	Finance Officer Thai PIU	**CANDIDATE:**	Dr. Anawah Kittiudon Chief, Finance and Accounting Division, SUT

RESPONSIBILITIES: In keeping with the regulations for financial administration of SUT, carry out the following:

- The design and development of budget allocation and control documents.
- Reconciliation of all project expenses.
- Preparation of financial reports for submission to SUT administration.
- Arrangements for the audit of the project's financial affairs.

ACTIVITIES:

- Design and develop budget allocation and control documents.
- Reconcile project expenses.
- In consultation with the Project Manager and Project Coordinator, prepare the financial reports for submission to SUT administration.
- Arrange for the audit of the administration of the project's finances.

OUTPUTS:

- Budget allocation and control documents designed, produced, and distributed to Thai PIU.
- Financial reports prepared for submission to SUT administration.
- Auditor's Report prepared and available for submission to SUT administation and the Project Review Committee.

We hereby commit to participate in the project.

Dr. Sam-arng Srinilta	**Mr. Anawah Kittiudon**
Acting V.P., Planning and Development	**Chief, Finance and Accounting Division**
Suranaree University of Technology	**Suranaree University of Technology**

POSITION TITLE:	Project Support Staff Thai PIU	**CANDIDATE:**	Ms. W. Poomcharoen Ms. A Kamchu Ms. S. Pisuttipilaipong Mrs. P. Sonsuk Mr. N. Sombat

RESPONSIBILITIES:

- Provide logistical support to the Project Manager and Coordinator.
- Production of project documents and reports.
- Preparation of all briefing materials for project participants.

ACTIVITIES:

- Provide support to the Project Manager and Coordinator in the scheduling and coordination of all project meetings and activities.
- Produce and distribute project documents and reports.
- Prepare briefing materials for Canadian consultants travelling to Thailand on technical assistance assignments and for Thais coming to Canada on customized training programs.

OUTPUTS:

- Project documents and reports produced and distributed.
- Project meetings and activities planned and coordinated.
- Briefing materials forwarded to project participants.

We hereby commit to participate in the project.

Ms. W. Poomcharoen
Suranaree University of Technology

Ms. A. Kamchu
Suranaree University of Technology

Ms. S. Pisuttipilaipong
Suranaree University of Technology

Mrs. P. Sonsuk
Suranaree University of Technology

Mr. N. Sombat
Suranaree University of Technology

Dr. Sam-ang Srinilta
Acting Vice President for Academic Planning and Development
Suranaree University of Technology

Curriculum Vitae

1 Name : Sam-ang Srinilta Citizenship : Thai Sex : Male

2 Educational Attainement

2.1 Bachelor of Science in Agriculture cum laude ; University of Philippines, Philippines ; April 1959.

2.2 Master of Science in Soil Science (Soil Physics) ; University of California at Berkeley, U.S.A. ; January 1964.

2.3 Doctor of Philosophy in Soil Physics ; Iowa State University ; U.S.A. ; August 1967.

3 Language Proficiency :

Language	Degree of Proficiency		
	Speaking	Reading	Writing
Thai	Good	Good	Good
English	Good	Good	Good
Tagalog	Fair	Fair	Poor

4 Length of Service and Employment Status with present Institution : one week ; permanent

5 Present Employer and Position in the Institution : Suranaree University of Technology ; Associate Professor and Acting Vice President for Planning and Development.

6 Pertinent Experience :

6.1 Faculty member, Department of Soil Science, Faculty of Agriculture, Kasetsart University ; 1959-1988.

6.2 Post-doctoral Research Fellow, National Research Council of Canada ; 30 November 1970-28 October 1971.

6.3 Visiting Assistant Professor of Soil Science, University of the Philippines ; 1 November 1973 - 29 September 1976.

6.4 Coordinator, Japanese Grant Aid for Kasetsart University Development Project ; 1977-1982.

6.5 Vice President (in charge of Kamphaengsaen Campus), Kasetsart University ; 1981-1982.

6.6 Vice President (in charge of Planning and Development), Kasetsart University ; 1982-1985.

6.7 Deputy Director, Southeast Asian Ministers of Education Organization Regional Center for Graduate Study and Research in Agriculture (SEARCA) ; 2 November 1985 - 31 October 1992.

6.8 Executive Secretary, Asian Association of Agricultural Colleges and Universities (AAACU) ; September 1986-to date.

6.9 Visiting Associate Professor of Soil Science, University of the Philippines ; 15 September 1986 - 31 May 1989.

6.10 Visiting Professor of Soil Science, University of the Philippines ; 1 June 1989 - 31 May 1993.

7 History of Employment and Assignments :

7.1 Associate Professor of Soil Science, School of Agricultural Technology, Suranaree University of Technology ; 1 February 1993-to date.

7.2 Acting Vice President for Planning and Development, Suranaree University of Technology ; 1 February 1993-to date.

7.3 Deputy Director, Southest Asian Ministers of Education Organization Regional Center for Graduate Study and Research in Agriculture ; 2 November 1985 - 31 October 1992.

7.4 Vice President (in charge of Planning and Development), Kasetsart University ; 1982-1985.

7.5 Vice President (in charge of Kamphaengsaen campus), Kasetsart University ; 1981-1982.

7.6 Chairman, Department of Soil Science, Faculty of Agriculture, Kasetsart University ; February 1978 - April 1981.

7.7 University Registrar (Chief, Educational Services Division, Office of the President) ; Kasetsart University ; 1977-1980.

7.8 Coordinator, Japanese Grant Aid for Kasetsart University Development Project ; 1977-1982.

7.9 Associate Professor of Soil Science, Kasetsart University ; 1 September 1981 - 31 October 1988.

7.10 Lecturer in Soil Science, Kasetsart University ; 29 October 1968 - 31 August 1981.

7.11 Junior Lecturer in Soil Science, Kasetsart University ; 29 April 1961 - 28 October 1968.

7.12 Assistant Lecturer in Soil Science, Kasetsart University ; 29 April 1960 - 28 April 1961.

7.13 Instructor in Soil Science ; Kasetsart University ; May 1959 - 28 April 1961.

8 Service in and Knowledge of Asian countries :

8.1 As SEARCA Deputy Director (2 November 1985 - 31 October 1992), the duty station was on the campus of the University of the Philippines Los Banos in Los Banos, Laguna, Philippines and the primary responsibility was to manage the Agricultural manpower Development Assistance Program with member countries of SEAMEO, i.e., Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand and Vietnam. The nature of the tasks required at least one visit per year to each of the countries other than the Philippines, except Cambodia, Laos, and Vietnam, which were inactive in the Program during the tour of duty.

8.2 As Executive Secretary of AAACU (September 1986-to date), the primary responsibility is to organize and undertake activities on issues pertaining to agriculture and agricultural higher education that are of common interest or concern among the AAACU member institutions. One regular activity is the biennial conversations, which takes place every two years with all member and affiliate member institutions having the privilege to attend and for which member institutions take turn in playing host. The latest biennial conversation was hosted by Kasetsart University in Bangkok, Thailand on 24-27 November 1992. At present, AAACU has 49 members and 4 affiliate members from 16 countries in Asia.

Curriculum Vitae

1. Name : Mrs. Chalida Rojanawathanavuthi

2. Educational Attainment :

   2.1 Bachelor of Arts ; Chulalongkorn University

   2.2 Master of Arts ; Chulalongkorn University

   2.3 Doctor of Philosophy in Thai Linguistics ; University of Copenhagen

3. Language Proficiency :

Language	Degree of Proficiency		
	Speaking	Reading	Writing
Thai	Good	Good	Good
English	Good	Good	Good
Danish	Poor	Fair	Poor

4. Length of Service and Employment Status with present Institution ; 3 months ; permanent

5. Present Employer and Position in the Institution : Suranaree University of Technology ; Acting Chief, External Relations Division

6. Pertinent Experience :

   6.1 Instructor, Faculty of Education, Khon Kaen University,(1971-1972)

   6.2 Lecturer, Department of Thai, Faculty of Arts, Chulalongkorn University, (1977 - 1978)

   6.3 Lecturer, Department of Linguistics, Faculty of Arts,Chulalongkorn University, (1978 - 1992)

Curriculum Vitae

1. Name : Anawach Kittiudom Citizenship : Thai Sex : Male

2. Education Attainement :

   2.1 Bachelor of Business Administration ; Major Accounting ; Thammasat University, Bangkok, Thailand ; June 22, 1972

   2.2 Master of Business Administration : Major Financial Management ; Marshall University , W.Virginia, U.S.A. ; August 18, 1978

3. Language Proficiency :

Language	Degree of Proficiency		
	Speaking	Reading	Writingg
Thai	Good	Good	Good
English	Fair	Fair	Fair
Chinese	Poor	N/A	N/A

4. Length of Service and Employment Status with Present Institution : Started Feb. 22, 1992, permanent

5. Present Employer and Position in the Institution : Suranaree University of Technology : Chief Financial and Accounting Department

6. Pertinent Experience :

   6.1 Manager of the Accounting & Finance and Income Tax for Thai Hut Restaurant, W.Covina, CA., 1990-1992

   6.2 Consultant for the Universal Capital Funding, Pasadena, CA., 1988-1991

   6.3 Consultant for the KVS Real Estate and Finance, Los Angeles, CA., 1988-1990

   6.4 Manager of the Angel Realty,San Gabriel, CA., 1986-1992

   6.5 A member of the National Association of Realtor, and the California Association of Realtor, U.S.A. ; 1986-present

   6.6 Consultant for the General Accounting System and Personnal Income Tax, Several Self-Employ in Los Angeles, CA. 1984-1992

6.7 Controler for the Accounting & Finance Department of the J.Herman Co., Los Angeles, C.A., 1982-1988

6.8 Job Cost Analysis and Auditor for the Poole & Kent Co. Baltimore, MD. 1980-1981

6.9 An Internal Auditor and Accountant for the Thai Teak Wood Manufacturing Bangkok, 1973-1977

7. History of Employment and Assignments

7.1 Design, Implementation and Compling Computerized Accounting System, 1982-1988

7.2 Supervision Account Payable and Cash Disbursement, 1972-to date

7.3 Supervision Account Receivable And Collecting Division , 1972- to date

7.4 Job Cost Analysis and Standard Cost, 1972-1988

7.5 Budgeting and Cash Flow Actual VS Forecast , 1972-to date

7.6 Auditing and Financial Reports, 1972-to date

7.7 Filling Income Tax both Business and Personnal , 1982-1992

8. Service in and Knowledge of Asian Countries : None

Curriculum Vitae

NAME : Wantanee Poomcharoen

CITIZENSHIP : Thai

SEX : Female

EDUCATION :

- Bachelor of Arts (Honors) in Political Science (Public Administration), Thammasat University, May 1975
- Master of Arts in Applied Linguistics (Teaching), Mahidol University, September 1992

LANGUAGE PROFICIENCY

	Degree of Proficiency		
Language	Speaking	Reading	Writing
Thai	good	good	good
English	good	good	fair

EMPLOYMENT EXPERIENCE

Dec 1992 - Present : Foreign relation officer, Suranaree University of Technology, Nakornrachasima, Thailand
- Perform the university activities concerning international affairs.

1989 - 1990 : Curriculum writer, The Consortium, Phanat Nikhom, Chonburi, Thailand
- Wrote teaching activities for advanced level curriculum.

1987 - 1989 : Teacher trainer, The Consortium, Phanat Nikhom, Chonburi, Thailand
- Conducted trainings of English teaching skills and gave consultations to ESL teachers on daily lesson plans.

1984 - 1987 : ESL Teacher, The Consortium, Phanat Nikhom, Chonburi, Thailand

- Taught literate and non-literate refugee students, Participated in group trainings, administered formal tests of the Center for Applied Linguistics (CAL) to Indochinese refugee students.

1981 - 1984 : English language teacher, Lopburi commercial school, Lopburi

- Taught English grammar, listening speaking and translation skills to vocational students, developed standardized tests.

ACADEMIC PUBLICATION : The Curriculum for Advanced Level Students, The Consortium, Phanat Nikhom, Chonburi, Thailand (1989 - 1990)

ACADEMIC RESEARCH : An Experimental Study of the Effectiveness of Using Printed Texts as a Learner Support Strategy in the Teaching of Listening Comprehension, a thesis submitted in partial fulfilluent of the requirements for the degree of Master of Arts (Linguistics), Faculty of Graduate Studies, Mahidol University, 1992.

Resume of

Ankana Kamchu
352/3 Prayapayap Rd.
Phrapradaeng, samutprakarn 10130

Personal Data :

:	Sex	:	Female
:	Age	:	27 years old
:	Height	:	5 ft.
:	Weight	:	47 kgs.
:	Health	:	Good
:	Nationality	:	Thai
:	Marital Status	:	Single

Education : 1984-1988, Faculty of Liberal Arts (English), Thammasat University.

Some courses taken : Translation I, II, III
Critical Reading , Speech Improvement
Intermediate Writing Technigue II

Extra Curricular Activities :
- Country developing camp volunteer at Lampang Province
- English Club Committee member

Hobbies : Reading, Skale Drawing, Swimming

Experience : October 12-17, 1987, a liaison for the Malaysian deligates who attended the 78th Inter-parliamentary conference in Bangkok, Thailand.

April - September 1988, ESL teacher for Indochinese refugee students supported by the Consortium of World Education, Experiment in International Living and Save the Children at Panat Nikom, Chonburi.

October 1988 - March 1989, tour staff, World Travel Service Ltd., Bangkok.

August 1989 - January 1990, secretary to the Deputy Marketing Manager, J&D Enterprise, Samutprakarn.

January-July 1990, executive secretary to the Technical and Production Manager, Siam Perstorp Ltd., Bangkok

July 1990 - May 1992, language and cross culture trainer at Peace Corps of the United States of America/Thailand.

September 1992 to present, External Relations officer, Suranaree University of Technology, Nakon Ratchasima

References : Mr.David G. Russell, Instructor, English Language Center, Thammasat University.

Dr. Alf Hasselqvist, Production & Technical Manager, Siam Perstorp Ltd. Bangkok.

Mr.Robert Horvath, Project Director, Peace Corps of the United States of America/Thailand.

Curriculum Vitae

1.Name : Sommai Pisuttipilaipong Citizenship : Thai Sex : Female

2.Educational Attainement : Bachelor of Arts in English ; Khon Kaen University ; Thailand ; April 1989

3.Language Proficiency :

Language	Degree of Proficiency		
	Speaking	Reading	Writing
Thai	Good	Good	Good
English	Good	Good	Good
Japanese	Fair	Poor	Poor

4.Length of Service and Employment Status with Present Institution : 5 months; Permanent

5.Present Employer and Position in the Institution : Suranaree University of Technology : an officer in External Relations Division

6.History of Employment and Assignments :

1. An officer in External Relations Division, Suranaree University of Technology ; November 9, 1992 - to date
2. Japanese Expert Secretary, Agricultural Development Research Center ;Khon Kaen; December 2, 1990 - December 1, 1992
3. Technical and Foreign Affairs Staff, Faculty of Agriculture, Khon Kaen University ; July 4, 1990 - November 30, 1990
4. Japanese Expert Secretary, Agricultural Development Research Center, Khon Kaen ; September 20, 1989 - June 30, 1990
5. Permanent Translator, Foster Parents Plan International, Khon Kaen ; April 2, 1989 - September 18, 1989.

Curriculum Vitae

1. Name : Mrs.Pornprapa **Sonsuk**
   Citizenship : Thai
   Sex : Female

2. Educational Attainment :

   2.1 Bachelor of Science in Agriculture (Agronomy) ; Kasetsart University, Thailand ; 1982

   2.2 Master of Science in Agriculture (Agricultural Extension) ; Kasetsart University, Thailand ; 1991

3. Language Proficiency :

Language	Degree of Proficiency		
	Speaking	Reading	Writing
Thai	Good	Good	Good
English	Fair	Fair	Poor

4. Length of Service and Employment Status with present Institution : two months; permanent

5. Present Employer and Position in the Institution ; Suranaree University of Technology ; Officer in Research and Development Institute

6. Employment Experience :

   6.1 Project Coordinator Assistant ; Thai-German Land Settlement Promotion Project (TG-LPP), Land Self-Help Division, Department of Public Welfare, Ministry of Interior (1983-1991)

   6.2 Agriculturist, Occupation Promotion Sub-Division, Land Self-Help Division, Department of Public Welfare, Ministry of Interior (1992)

Curriculum Vitae

1. Name : Nisit Sombat Citizenship : Thai Sex : Male

2. Educational Attainment :

   2.1 Bachelor of Education in English and Educational Administration ; Sr Srinakharinwirot University (1982)

   2.2 Master of Science in Technology of Environmental Management ; Mahidol University (1991)

3. Language Proficiency :

Language	Degree of Proficiency		
	Speaking	Reading	Writing
Thai	Good	Good	Good
English	Good	Good	Fair

4. Length of Service and Employment Status with present Institution : two months ; permanent

5. Present Employer and Position in the Institution : Suranaree University of Technology; Officer, Research and Development Institute

6. Employment Record :

   Instructor, Department of English and Department of Social Studies, Khemarat Pittayakhom School (1977-1993)

7. Publications :

   1. Nisit Sombat. "Anisotera Costata", Journal of Environment and Appropriate Technology (Formerly:-Journal of Environment). (January 1987) pp. 48-50.

POSITION TITLE:	Project Manager, Canadian PIU	**CANDIDATE:**	Prof. Samih Mikhail Director, Ryerson International

RESPONSIBILITIES: The Project Manager is responsible for the following:

- In cooperation with CUTC academic administrators and the Canadian PIU, the conceptualization, design and implementation of all project activities.
- Ensure that the project is implemented according to the terms of reference in the contract between the CEA and Ryerson Polytechnical Institute on behalf of CUTC.
- Ensure efficient and responsible administration of project funds, including financial reports and disbursements to CUTC universities to support the implementation of project activities.
- Provide the Project Review Committee with advice on policy and administrative issues regarding the project.

ACTIVITIES:

- Meet with CUTC academic administrators to conceptualize and design various project programs and activities.
- In cooperation with CUTC academic administrators and with the support of the Canadian PIU, supervise the administration and implementation of all project programs and activities.
- Supervise the preparation of project documents and reports for submission to the CEA and Project Review Committee, including the following:
  - Annual Project Management Plan
  - Evaluation reports of project programs and activities
- In cooperation with CUTC academic administrators, asses and select participating professors, consultants and students.

OUTPUTS:

- Project programs and activities designed, implemented and evaluated.
- Project documents developed, produced and submitted.
- Project deliverables assessed and incorporated into SUT's academic programs and administration systems.
- Implementation of activities involving the participation of Thai universities and the private sector and CUTC and Canadian enterprises.

I hereby commit to participate in the project.

Prof. Samih Mikhail
Director
Ryerson International

POSITION TITLE:	Project Coordinator, Canadian PIU	**CANDIDATE:**	Marsha McEachrane-Johnson Associate, Project Management & Development Ryerson International

RESPONSIBILITIES: The Project Coordinator will provide the following:

- assistance to the Canadian Project Manager
- support for the implementation of project activities
- coordinate the preparation and production of project reports and documents
- programs of orientation, briefing and debriefing for all project participants travelling overseas
- attend the Project Review Committee meetings as required

ACTIVITIES:

- Assist the Canadian Project Manager in discharging his responsibilities including the preparation of the Annual Project Management Plan and budgets.
- Coordinate the preparation of production of project reports, and various documents for submission to the CEA, and Project Review Committee.
- Provide planning and logistical support for the implementation of project activities.
- Design, organize and implement programs of orientation, briefing, and debriefing for all project participants travelling overseas.
- Provide liaison between CUTC, SUT, and CEA on project activities.

OUTPUTS:

- Logistical arrangements made for Thais coming to Canada and Canadians travelling to Thailand.
- All project reports produced and submitted to SUT administration and the Project Review Committeee.
- Programs of orientation, briefing and debriefing implemented adn all participants provided with appropriate briefing materials.
- CUTC, SUT, and CEA informed of project activities.

We hereby commit to participate in the project.

Prof. Sam Mikhail
Director
Ryerson International

Marsha McEachrane-Johnson
Associate Project Management & Development
Ryerson International

POSITION TITLE:	Finance Officer Canadian PIU	**CANDIDATE:**	Ms. Aimee Horii Finance Officer Ryerson International

RESPONSIBILITIES: In keeping with the terms of reference for financial administration of project funds as specified in the contract between Ryerson and ARA, carry out the following:

- design and development of budget allocation and control shells
- reconciliation of all project expenses
- preparation of financial reports including advance requests for submission to the CEA

ACTIVITIES:

- Design and develop budget allocation and control documents.
- Reconcile project expenses.
- Ensure transfer of funds to participating CUTC institutions to support the implementation of project activities.
- In consultation with the Project Manager, Technical Adviser, and Project Coordinator, prepare the financial reports including advance requests for submission to the CEA.

OUTPUTS:

- Budget allocation and control documents designed, produced, and distributed to Canadian PIU.
- Financial reports including advance requests prepared for submission to CEA.

We hereby commit to participate in the project.

Prof. Sam Mikhail
Director
Ryerson International

Ms. Aimee Horii
Finance Officer
Ryerson International

POSITION TITLE:	Project Support Staff Canadian PIU	**CANDIDATE:**	Lynne Berard Jennifer Sherwood Ryerson International

RESPONSIBILITIES:

- Provide logistical support to the Project Manager and Coordinator.
- Production of project documents and reports.
- Preparation of all briefing materials for project participants.

ACTIVITIES:

- Provide support to the Project Manager and Coordinator in the scheduling and coordination of all project meetings and activities.
- Produce and distribute project documents and reports.
- Prepare briefing materials for Canadian consultants travelling to Thailand on technical service assignments and for Thais coming to Canada on customized training programs.

OUTPUTS:

- Project documents and reports produced and distributed.
- Project meetings and activities planned and coordinated.
- Briefing materials forwarded to project participants.

We hereby commit to participate in the project.

Prof. Sam Mikhail
Director
Ryerson International

Lynne Berard
Ryerson International

Jennifer Sherwood
Ryerson International

CURRICULUM VITAE

1. PERSONAL PROFILE

- **Name** — Samih William Mikhail
- **Present Address** — 64 Keewatin Ave.
  Toronto, Ontario
  M4P 1Z8
  Telephone: (416) 487-9882
- **Date and Place of Birth** — May 5th 1941
  Cairo, Egypt
- **Family Status** — Married
- **Business Address** — Ryerson International Development Centre
  350 Victoria Street
  Toronto, Ontario M5B 2K3
  Telephone: (416) 979-5026
  Fax: (416) 979-5352

2. EDUCATION

DATE/DEGREE/INSTITUTION/SPECIALIZATION

1963	**B.A.Sc.** **Electrical Engineering** **Cairo University** Telecommunication Engineering
1968	**M.A.Sc.** **Electrical Engineering** **University of Toronto** Electromagnetic Radiation and Propagation, Antenna Design and Microwave Engineering
1976	**Biomedical Electronics** **University of Toronto** Biomedical Instrumentation and Medical Imaging Technology
1968 - 1984	**Continuing Education in Electrical Engineering** George Washington University -1984 University of California - 1980 University of Toronto - 1975-1980 University of Michigan - 1972 University of Wisconsin - 1968
1988	**Ph.D (In Progress)** **Comparative Higher Education** **Ontario Institute for Studies in Education** **University of Toronto**

3. HISTORY OF EMPLOYMENT

DATES/TITLES/INSTITUTION	RESPONSIBILITIES
1992 - Present **Director** **Ryerson International,** **Ryerson Polytechnical Institute**	• Management of Ryerson's International Programs. • Development and Management of International Cooperation Projects. • Research and Consultancy Work in Higher Education and Training.
1985 - 1992 **Associate Director** **Ryerson International Development Centre (RIDC)** **Ryerson Polytechnical Institute, Toronto, Canada**	• Management of RIDC's projects in developing countries. • Development of new initiatives and proposals for funding agencies. • Undertaking research studies in higher education; education technology; and technology transfer.
1981-1985 **Assistant Chairman** **Department of Electrical Engineering** **Faculty of Engineering and Applied Science** **Ryerson Polytechnical Institute, Toronto, Ontario**	• Development of department's academic programs. • Supervision of departmental initiative to upgrade its program to integrated full-time degree status. • Development of departmental policies on student affairs. • Development of departmental policies on applied research.
1967-1981 **Faculty Member** **Department of Electrical Eng.** **Ryerson Polytechnical Institute Toronto, Ontario**	• Teaching Courses in Circuit Theory, System Theory, Analog and Digital Electronics, Electronics Instrumentation and Electromagnetic Fields. • Coordination of curriculum development in Analog and Digital Electronics and Electronics Instrumentation.
1965-1967 **Staff Engineer** **Bell Telephone Company of Canada** **Toronto, Ontario**	• Staff Transmission Engineer involved in the design and testing of Bell's toll system in Southern Ontario.
1964-1965 **Project Engineer** **Projects Consulting Eng. Inc.** **Beirut, Lebanon**	• Design Engineer for CATV and telecommunication installation.
1963 - 1964 **Project Engineer** **Ministry of Telecommunication** **Cairo, Egypt**	• Project Engineer involved in project management of post office automation systems.

Other Consulting Assignments

1983 **Project Coordinator** **Centre for Advanced Technology Education (CATE)** **Ryerson Polytechnical Institute** **Toronto, Canada**	• Participated in the feasibility study for the establishment of CATE.
1974-1977 **Consulting Engineer** **Ryerson Applied Research Limited (RARL)**	• Project Consulting Engineer with RARL.
1968-1969 **Continuing Education Consultant** **Canadian Standard Association (CSA)**	• Developed customized training programs in semi-conductor electronics for CSA.

4. PUBLICATIONS IN ELECTRONIC ENGINEERING

- **Oct., 1985** S.W. Mikhail, "An Intelligent Home Controller"; IEEE Electronicom '85 Conference; Toronto, Canada.
- **Mar., 1985** S.W. Mikhail, "A Digitally Controlled Battery Conditioning Solid State Load"; Annual IEEE Instrumentation and Measurement Technology Conference; Tampa, Florida.
- **Mar., 1985** S.W. Mikhail, "Graphic Display Module for Biomedical Computing Applications"; Annual IEEE Instrumentation and Measurement Technology Conference; Tampa, Florida.
- **June, 1983** S.W. Mikhail "Satellite Communication for Economic Development" Session Chairman and Organizer; First Canadian Domestic and International Communication Conference; Ottawa, Ontario, June, 1983.
- **Oct., 1974** S.W. Mikhail, "Semiconductor Devices" Encyclopedia Britannica; 15th Edition.
- **Sept., 1969** S.W. Mikhail, "Operation And Characteristics of Loop Coupled Log Periodic Dipole Antennas"; IEEE International Electronics Conference; Toronto.
- **Sept., 1969** K. G. Balmain & S. W. Mikhail, "Loop Coupling of Periodic Dipole Arrays"; IEE (Electronics Letters); IEE - England.
- **July, 1968** S.W. Mikhail "Experimental Study of Loop Coupled Log Periodic Dipole Antennas"; University of Toronto Press.

5. INTERNATIONAL EXPERIENCE

DATE/ACTIVITY/LOCATION	RESPONSIBILITIES
1992 - 1993 **World Bank Missions** **Yemen**	Member of a World Bank Mission to develop a framework for a Community College System for Yemen.
1990-Present **Executive Director** **CIDE-RYERSON CORPORATION** **Toronto/Montreal, Canada**	Overall management of CIDE-RYERSON CORPORATION, a private non-profit consortium which is the executing agency for an $8 million, 4-year program of technical cooperation and technical human resources development between Canada and Brazil.
1991 **World Bank Mission to Malawi**	Participated as Consultant in World Bank mission undertaking a study of Post Secondary education in Malawi.
1989 **CIDA Human Resources Development Project** **Brazil**	Mission leader of participating Canadian Institutions which undertook a feasibility study for the establishment of three technology centres in the chemical, food processing and wood transformation technologies in the Northeast.
1989 **World Bank Engineering Education Project** **Egypt**	Participated as an Engineering Education Consultant in a number of World Bank Missions to Egypt to develop the framework and terms of reference of the Bank's Technical Education Project.
1988 **World Bank Technical Education Sector Study** **Egypt**	Participated in a World Bank's Mission as a technology specialist to develop strategic plan for Egypt's Technology Education.
1985-1989 **Development of Engineering and Technology Programs** **College of Engineering** **University of Bahrain** **Bahrain**	Team Leader and Project Coordinator of a Ryerson faculty team that acted as education consultants in a four-year program to provide technical assistance to the faculty and administration at University of Bahrain. Assistance development of one-track, system for technology and engineering education at University of Bahrain.
1985-1989 **Development of Computer Technology** **Shanghai University of Technology**	Project Coordinator for a Program of institutional cooperation between Ryerson and Shanghai University of Technology (SUT) to upgrade SUT's programs in Computer Technology.
1988 **Needs Assessment Mission** **Nur University** **Santa Cruz, Bolivia**	Undertook a needs assessment and evaluation study for CIDA and developed a proposal for institutional cooperation between Ryerson and University of Guelph as Canadian Partners, and Nür University in Bolivia.
1988 **Needs Assessment Mission** **Harare and Bulawayo Polytechnics** **Zimbabwe**	Participated as a mission leader of a team of Canadian consultants in a needs assessment and evaluation study for CIDA, and developed proposals for institutional cooperation between Zimbabwean institutions.

1988 **Needs Assessment Mission Government Organization for Vocational and Technical Training (GOTEVOT)** **Saudi Arabia**	Participated as a technical coordinator in a mission, at the invitation of the Government of Saudi Arabia, to develop a program of institutional cooperation between GOTEVOT and Canadian Institutions.
1988 **Needs Assessment Mission Grenada College** **Grenada**	Mission leader of a Canadian team from Ryerson develop a framework for the development of Grenada College.
1987 **Higher Education Mission Public Authority for Applied Technical Education (PAET)** **Kuwait**	Participated in an education mission led by the Minister of Colleges and Universities of Ontario to Kuwait, to discuss relevant issues of cooperation in the field of higher education.
1987 **Fellowship Program in Digital Control Systems for Brazilian Trainees from the National Industrial Apprenticeship Service (SENAI)** **Sao Paulo, Brazil**	Developed, implemented and managed a special fellowship program for Brazilian trainees from SENAI Sao Paulo on modern digital control systems techniques.
1986 **Needs Assessment and Development of Training Program for the Chemical Process Industries in Brazil**	Mission leader of a Canadian team which carried out a needs assessment study for SENAI - Sao Paulo in the area of training advanced technicians for the Chemical Process industry. Mission developed new training strategies to incorporate modern techniques in SENAI's training programs.
1985 **Needs Assessment of Engineering Programs - Shanghai University of Technology (SUT)** **Shanghai** **People's Republic of China**	Participated in a mission to SUT to evaluate their engineering education programs, and develop proposals for a program of institutional cooperation between Ryerson and SUT.
1984 **Needs Assessment Mission Gulf Polytechnic** **State of Bahrain**	Mission leader of a Canadian team which carried out a needs assessment study to evaluate training and education requirement in Bahrain. Mission developed a strategic master plan that was later used as the basis of a new system for technology and engineering selection at the University of Bahrain.
1984 **Feasibility Study and Development of Educational Master Plans for a Yemeni Polytechnic, Sana'a** **Yemen Arab Republic**	Participated in a World Bank/CIDA mission to study the feasibility of the development of a Polytechnic in Yemen. Acted as a project coordinator to develop the educational master plan for the proposed Polytechnic.

6. PUBLICATIONS IN HIGHER EDUCATION

- **April 1992** S. W. Mikhail. "The Impact of Technological Change on Technical Education and Vocational Training Systems," A Paper presented at the Latin American Regional Conference organized by the Economic Development Institute (EDI) of the World Bank, Salvador, Bahia, Brazil.

- **March 1993** S. W. Mikhail, "Diversification in Higher Education: A Framework for Comparative Analysis," Comparative and International Education Society, Kingston, Jamaica.

- **1992** S.W. Mikhail, "The Non-University Sector of Higher Education in Developing Countries: A Survey of Recent Developments", A World Bank Working Paper, Washington D.C.

- **1991** S.W. Mikhail, "Human Resource Development in Malawi: Middle-Level Education and Training", Working Paper, The World Bank, Washington D.C.

- **Aug., 1991** S.W. Mikhail, "Education and Training for Advanced Technology", Workshop in Issues in Technological Education and Training, Salvador, Brazil

- **June, 1990** S.W. Mikhail, "Technology and Engineering Education in Brazil: A Review of Recent Developments", The American Society for Engineering Education (ASEE) Annual Conference, Toronto, Canada.

- **June, 1989** S.W. Mikhail, "A Comparative Cross-National Typology of Short-Cycle Higher Education Institutions", The VIIth World Congress of Comparative Education, Montreal, Canada.

- **Jan., 1989** S.W. Mikhail, "Trends in the Development of Short-Cycle and Non-University Institutions of Higher Education", Conference on Higher Education and Employment Sponsored by the Economic Development Institute (EDI) of the World Bank, Kuwait.

  S.W. Mikhail, "Education for the Professions: Problems, Trends and Innovations", Conference on Higher Education and Employment sponsored by the Economic Development Institute of the World Bank.

- **Dec., 1988** S.W. Mikhail, "The Role of Vocational and Technical Education in Economic Development: The Case of the Arab Republic of Egypt. Ontario Institute for Studies in Education, Toronto, Ontario, Canada

- **July, 1988** S.W. Mikhail, "Comparative Analysis of Programs in Engineering Education in Japan and the U.S.A." Ontario Institute for Studies in Education, Toronto, Ontario, Canada

- **June 1986** "Engineering and Technology Programs at Gulf Polytechnic - State of Bahrain"; ASEE annual conference, Cincinnati, Ohio.

- **May 1986** "Undergraduate Applied Research and Development: A Novel Product Oriented Approach"; Canadian Conference on Engineering Education; University of Western Ontario, London, Ontario.

- **Sept., 1985** "Satellite Communication for Development - A case study of Canada and Brazil"; National Brazilian Informatics Conference (Informatica '85); Sao Paulo, Brazil.

- **April, 1984** "Issues in the Transfer of High Technology", Conference on Canada and the Third World - Association for the advancement of Policy, Research and Development; Toronto, Ontario.

- **Oct., 1983** "The Role of National Research and Consulting Engineering Centres in Technology Transfer" Association for the Advancement of Policy, Research and Development; New Port Beach, California.

7. MEMBERSHIP IN SCIENTIFIC AND PROFESSIONAL SOCIETIES

- Association of Professional Engineers of the Province of Ontario, APEO
- Institute of Electronics and Electrical Engineers,IEEE
- American Society for Engineering Education, ASEE
- Association for the Advancement of Policy, Research and Development, Washington, DC
- Canadian Association for the Advancement of Science
- Comparative and International Education Society (CIES)

8. REFERENCES

Dr. Jamil Salmi
Economist, Population and Human Resources
The World Bank
1818 H Street, NW
Washington D.C. 20433
Tel: (202) 473-3445

Dr. Peter Reich
Chair - Department of Linguistics
University of Toronto
Robarts Library - St. George Campus
Toronto, Ontario
Tel: (416) 978-2011

Dr. A. Oatridge
Director - Centre for Advance Technology Education
Ryerson Polytechnical Institute
350 Victoria St.
Toronto, Ontario, M5B 2K3
Tel: (416) 979-7200

MARSHA MCEACHRANE-JOHNSON

1. PERSONAL INFORMATION

Address: Townhouse #21
4230 Fieldgate Drive
Mississauga, Ontario
L4W 2M5
Telephone: Res: (416) 238-1656
Bus: (416) 979-5000,ext. 6995

Citizenship: Canadian
Birthdate: 02/12/55

2. EDUCATION

Primary and Secondary:

- University of the West Indies Staff School 1960-1966
- St. Augustine Girls High School 1966-1972
  General Certificate

Post Secondary:

- Trinidad and Tobago Hotel School 1972-1974
  Diploma in Hospitality and Tourism Management

3. WORK EXPERIENCE

Associate, Project Management and Development 1988-present
Ryerson International (RI), Ryerson Polytechnical Institute

Project Management

- Manage international activities of participating institutions, consultants and their representatives.
- Control of project budgets, scheduling, implementation and monitoring.

Project Development

- Establish links with private and public sector organizations for mutually beneficial international activities.
- Identify funding agencies to support international activities/projects within bilateral and multilateral agreements.

Other Responsibilities

- Development of Business Plan for closer ties between RI and private sector corporations.
- Within management committee, establish policy, planning strategies and procedures of RI for links within RPI community and external to it.

Specific Project Involvement

- Canada-Brazil Technical Cooperation Project (1990-1996)
  Funded by: CIDA
  Responsibilities: Project Coordination
- Advanced Technology Training for SENAI-SP (1992-1993)
  Funded by: International Labour Office
  Responsibilities: Project Coordination
- Bolivia Institutional Development and Academic Program Upgrading at Nur University
  Funded by: CIDA
  Responsibilities: Project Coordination

Co-owner 1986-1988
Culture Trade and Tourism Development International Network Limited
- Provided support to the Associate Director, RI in the pre-feasibility phase of various projects.
- Consultant to the Ottawa Commonwealth Club.

Manager, Promotions Department 1984-1986
Trinidad and Tobago Tourism Board
Trinidad and Tobago
- Planning and coordination of government conferences.
- Negotiations with wholesale tour companies and incentive tour houses for tourism programs to Trinidad and Tobago.
- Planning and coordination of national tourism events/activities.

Tourism Development Officer 1982-1984
Trinidad and Tobago Tourism Board
Trinidad and Tobago
- Management of Tourism Board public facilities.
- Planning and coordination of a bed and breakfast program for Trinidad and Tobago.
- Participation in development guidelines for the rating of hotels, inns, guesthouses.

Tourism Sales Representative 1980-1982
Trinidad and Tobago Tourism Board
Toronto, Ontario
- Liaison with Canadian wholesale tour companies and airlines.
- Planning and coordination of educational tours to Trinidad and Tobago.

Restaurant Manager 1978-1980
Delta Chelsea Inn
Toronto, Ontario
- Responsible for all aspects of the operations, including budget control, personnel, special events, etc.

Assistant Food and Beverage Manager 1974-1978
Trinidad Hilton Hotel
Trinidad and Tobago
- Personnel administration.
- Banquet/special event planning and coordination.
- Budget control.

RESUME

Aimee Horii
385 The Westway
Etobicoke, Ontario
M9R - 1H3

Residence: (416) 247-0724
Business: (416) 979-5000
ext 7108

EDUCATIONAL BACKGROUND:

August 1987 - June 1991
The Society of Management Accountants of Ontario
Certified Management Accountant designation obtained in June 1991

September 1983 - April 1987
Ryerson Polytechnical Institute, Toronto
Business Administration Program
Accounting-Finance major
Diploma in Business Administration (1986)
Bachelor of Business Management Degree (1987)

September 1987 - January 1983
C. W. Jeffery's Secondary School, Toronto
OSSHGD

EMPLOYMENT HISTORY:

April 1988 - present
Ryerson Polytechnical Institute, Toronto
Intermediate Project Accountant

Duties:

- To provide the Ryerson International Development Centre (RIDC) and Ryerson with an integrated control system and services in the financial management of RIDC projects and centre accounts
- To administer all RIDC project accounts and provide a direct link between the Centre and Ryerson's Finance department
- Analyze and recommend financial guidelines for the implementation of new projects in consultation with the RIDC management group
- Prepare quarterly cash flow and financial statements for RIDC centre and project accounts of approximately 6 million annually

EMPLOYMENT HISTORY: (con't)

May 1987 - April 1988 — **Ryerson Polytechnical Institute, Toronto**
Audit Assistant

Duties:
- Assisted in the overall planning and review of work on the assigned segments of the audit
- Performed audits in accordance with the approved audit program
- Prepared draft reports and assisted in the preparation of formal audit reports

June 1986 - March 1987 — **Hudson's Bay Company, Toronto**
Merchandise Systems Associate

Duties:
- Entered purchase orders into the corporate merchandising system
- Analyzed orders for accuracy and completeness

April 1985 - December 1986 — **Royal Bank of Canada, Toronto**
Customer Service Representative

Duties:
- Customer Service
- All facets of transactions
- Credit application information
- Daily cash handling ($10,000)

August 1985 - June 1986 — **Simpsons Limited, Toronto**
Data Entry Operator

Duties:
- Same as Hudson's Bay Company
  Transferred from Simpsons to The Bay

SPECIAL SKILLS:

- Knowledge of the IBM PC, Wordperfect, Lotus 123

Curriculum Vitae

Lynne Berard

1914-2 Secord Avenue, Toronto, Ontario, M4C 2C3
Bus.(416) 979-5000 ext. 7598 Res. (416) 699-8024

WORK EXPERIENCE

1984 - Present

Ryerson International
Technology Specialist

- supervision of Production Unit
- specialized technology services including: assessment, evaluation and recommendation of office automation and technical support systems; design and delivery of customized computer skills development training programs;
- coordination and execution of production support services
- desk top publishing services
- logistical and administrative support
- preparation and reconciliation of travel documentation
- development of systems for assessment and maintenance of production requirements
- liaison and coordination for Brazilian technical fellowship activities
- orientation delivery for Brazilian technical fellowship trainees

Special Overseas Assignments
***Technical Consultant* (1989, 1991, 1992)**

- delivery of customized computer training programs to support the development of administrative staff at the Regional Department of SENAI and a new centre of excellence
- development of administrative procedures for the Regional Department of SENAI
- technical support for Brazil Needs Assessment Mission (1989)

1980 - 1984

Equion Securities Corporation/Opus Financial
Paraplanner

- preparation and implementation of financial statements including client expense, cash flow, balance sheet, net worth, liquidity and asset position and financial independence and sensitivity analysis
- administration of mutual fund and/or life insurance including calculation of revenue receivables
- preparation and reconciliation of invoices/receivables

Mutual Funds Administrator

- processing of mutual funds sales and redemption for Toronto and five Canadian securities offices
- compilation and balancing of weekly sales reports and sales update
- reconciliation of mutual funds revenues
- coordination and preparation of dealer and sales personnel commission statements
- preparation of quarterly mutual fund summaries profiling the comparison of investment funds by assets and performance
- maintenance of client records in accordance with Ontario Securities Commission regulations

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1978 - 1980 **Self-Employed**
Seamstress

- designed garments to client specifications including patterns drawing, selection and purchasing of fabrics, handling of fine sewing, cutting, machine stitching and alterations

1975 - 1978 **The Art Shoppe**
Senior Accounts Receivable Clerk

- preparation and reconciliation of daily cash receipt journal
- assessment of client credit information and bank verification
- credit collections

1972 - 1975 **Crown Life Corporation**
Administrative Assistant - Investment Administration

- office administration operations
- verification on calculation of investments and preparation of daily investment statement
- courier and liaison between Crown Life and investment corporation for trading of up to $1 million in negotiable bonds

1971 - 1972 **Seiko Time Corporation**
Secretary

- reorganization and maintenance of corporate information systems
- accounts receivable and payable reconciliation on IBM Mini Computer accounting system

EDUCATION AND COURSE STUDIES

1985 PageMaker Desk Top Publishing Software
1984 WordPerfect, Introduction & Advanced Computer Training
1981 Lotus 1-2-3, Introduction & Advanced Computer Training
1982 WordStar, Introduction & Advanced Computer Training

1968 - 1971 **Eastern High School of Commerce**
Business and Commercial

Jennifer Sherwood
200 Roselawn Avenue
Toronto, Ontario
(416) 481-2448

Education

Post-graduate Certificate Program Magazine Journalism	In progress Ryerson Polytechnical Institute
Bachelor of Arts (Honours) English Major	May 1992 Queen's University Kingston, Ontario

Employment

January-Present May 1991-September 1991 May 1992-December 1992	Secretary to the Director Administrative and Project Support Ryerson International *Responsibilities include: preparing and transcribing correspondence for Director and other Associates; proofreading and editing of various reports and papers; preparing travel arrangements for Director, Associates and other visitors; planning and coordinating for visiting delegations; recording, preparing and editing of Advisory Board minutes; liaising with production staff to support them in preparing reports and other documentation; following up with contacts (internal and external to Ryerson) on new business initiatives on behalf of Director and Associate, New Business Initiatives.*
May 1990-August 1990	Travel Counsellor Ontario Ministry of Tourism *Responsibilities included: handling switchboard with up to 200 telephone calls daily; counselling customers on travel in Ontario; preparing correspondence and documentation on travel in Ontario for potential visitors; representing Ministry at various functions.*
June 1987-June 1989 (Full time summers/ part time during school)	Secretary, Receptionist, Document Control Clerk BEP International *Responsibilities included: setting up and maintaining filing system; preparing and distributing routine correspondence for executives and brokers; faxing; photocopying; maintaining archive system for files.*

Volunteer Experience

- Literacy Tutor with Kingston Literacy (working with new Canadian citizens at improving their English literacy)
- Chair of Queen's University Speakers Committee ($25,000 annual budget)
- Reporter for Queen's weekly student television news program
- Writer for Queen's bi-weekly student newspaper
- Member of Amnesty International; Founder of North Toronto C.I. chapter
- Editor of weekly high school newspaper

Skills

- WordPerfect 5.1; Lotus 1-2-3; Pagemaker
- Dictaphone; Fax machines; Photocopiers; Typing 50 wpm
- Fluent in French; limited Spanish
- Public speaking workshop completed

References Available Upon Request

APPENDIX VI:

CANADIAN AND THAI PARTNERS INTERNATIONAL EXPERIENCE

International Experience of CUTC Member Institutions

University of Waterloo

The University of Waterloo has an established reputation in the field of international development. With active projects in China, Ethiopia, Indonesia, India, Latin America and the Caribbean, Nigeria and Sahel, the University of Waterloo's international work currently involves its' Faculties of Environmental Studies and Engineering and Departments of Co-operative Education & Career Services, Geography and Biology.

Technical University of Nova Scotia (TUNS)

TUNS has been involved in a wide range of projects in the field of international development. Currently TUNS has nine human resource development projects in the fields of agriculture engineering, industrial engineering, mechanical engineering, energy studies, environment, urban planning, and water resources. TUNS is also involved in research projects in small scale water supplies, low cost housing, fish processing equipment, solar water heaters, small scale fluidized bed combustors and circulating fluidized bed boilers. TUNS is involved in each continent and the following countries: Guyana, Trinidad, Peru, Columbia, Nigeria, Kenya, Egypt, India, Pakistan, and China. It has 400 international students from over 50 countries admitted to its programs.

University of Guelph

The University of Guelph's strengths in international development are focused on agricultural technology and human resource development. Projects undertaken over the years have largely been carried out on behalf of the Canadian International Development Agency, World Health Organization, Food and Agriculture Organization and the International Development Research Centre. The University of Guelph's international experience has spanned the globe, with current projects and programs in Latin America, Africa, Asia, and Europe.

Ryerson Polytechnical Institute

Ryerson Polytechnical Institute is engaged in a wide range of international activities and programs with institutions in the US, Europe, Asia, Latin America, the Caribbean, and the Middle East. Ryerson International (RI) provides services such as education and training, applied research, human resource development, policy development, and organizational planning to support the development of capacity building of institutions in developing countries.

UNIVERSITY OF WATERLOO
OFFICE OF RESEARCH

Needles Hall
University of Waterloo
Waterloo, Ontario N2L 3G1

Tel. (519) 885-1211
Fax (519) 746-7151
Telex 069-55259

UNIVERSITY OF WATERLOO CURRENT INTERNATIONAL DEVELOPMENT PROJECTS 1992-93

China

Canada-China Management Education Program (Phase II)

Tsinghua University
Southeast University
Dalian Institute of Technology

UW Faculty of Engineering: Departments of Management Sciences and Systems Design

Canada-China University Linkage Program:
Introduction of the Co-operative Education System

Shanghai University of Engineering and Science

UW Faculty of Engineering and Department of Co-operative Education & Career Services

Ethiopia

Freshwater Fisheries Development

University of Addis Ababa

UW Department of Biology

Indonesia

Environmental Management Development in Indonesia

University of Gadjah Mada

UW Faculty of Environmental Studies

India

Environmental Management and Impact Assessment

University of Madras

UW Department of Geography

Latin America and Caribbean

Argentina: Groundwater Management - La Plata

Bolivia: Groundwater - Cochabamba Valley

Brazil: Groundwater Contamination - Sao Paulo

Mexico: Aquifer Development - Valley of Mexico

Nicaragua: Aquifer - Managua

Latin American Urban Hydrgeology Network

UW Centre for Groundwater Research

Cyclone-Resistant Housing

University of the West Indies

UW Department of Civil Engineering

Nigeria

Local-Level Mapping (Phase II)

University of Lagos

UW Department of Geography

Sahel

Wind Energy for Water Pumping in the Sahel (Phase II)

Niger, Mali, Burkina Faso

UW Department of Mechanical Engineering

UNIVERSITY OF WATERLOO
OFFICE OF RESEARCH

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Waterloo, Ontario N2L 3G1

Tel. (519) 885-1211
Fax (519) 746-7151
Telex 069-55259

INTERNATIONAL COLLABORATION AND EXCHANGE AGREEMENTS

Australia

Deakin University
Griffith University, Brisbane
Monash University, Clayton, Victoria
Queensland University of Technology, Brisbane
Royal Melbourne Institute of Technology
University of Technology, Sydney

Austria

Karl-Franzens University, Graz

China

North China Institute of Electric Power
Southeast University, Nanjing
Tianjin University, Tianjin

Croatia

University of Zagreb

Denmark

Technical University of Denmark, Lyngby

France

Compiegne University of Technology
Micefa-Triade
Unversity of Nantes
Ontario/Rhone-Alpes Exchange Program

Germany

Technical University of Braunschweig
Technical University of Hamburg-Harburg
University of Karlsruhe
University of Mannheim
University of Paderborn
University of Stuttgart
Ontario/Baden-Wurttemberg Exchange Program

Hungary

University of Miskolc

India

University of Rajasthan

Italy

University of Chieti, Pescara

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INTERNATIONAL COLLABORATION AND EXCHANGE AGREEMENTS

Japan

Kyoto University
Tottori University
Co-operative Education Program

Korea

Pohang Institute of Science and Technology

Netherlands

Christelijke Hogeschool
Eindhoven University of Technology
University of Utrecht

Poland

Warsaw University of Technology

Slovenia

University of Ljubljana

Switzerland

University of Lausanne
Swiss Federal Institute of Technology, Lausanne

Taiwan

National Chiao Tung University

Ukraine

Dnipropetrovsk Institutions
Kiev Polytechnic Institute

United Kingdom

University of Hull
University of Leeds
Oxford Polytechnic
University of Sussex
University of Ulster

United States

University of Cincinnati
General Motors Institute, Detroit
University of Michigan
Rochester Institute of Technology
University of South Florida New College, Sarasota

TUNS International Programs 1990

International Development Research Centre

- Establishment of a Test Facility For Circulating Fluidized Bed Technology	India
- Seismic Resistant Local Construction Technologies	Peru
- Research in Affordable Housing	Guinea

Canadian International Development Agency

Educational Institutions Program

- Human Resource Development in Agricultural Engineering at the University of Nigeria (Nsuka)	Nigeria
- Human Resource Development at University of Alexandria	Egypt
- Human Resource Development in Agricultural Engineering at the Institute of Applied Science and Technology	Guyana
- Upgrading of the Industrial Engineering Program at the University of the West Indies	Trinidad
- Establishment of a Centre of Combustion Studies at the Indian Institute of Technology in Kharagpur	India
- Transfer of Circulating Fluidized Bed Technology to Zhejiang University	China
- Environment and Water Resources Studies, jointly with Dalhousie and Tsinghua University	China

Subconsultant

- Subconsultant to Delcan in the design of a bridge	Pakistan

Past Projects

- Establishment of and development of courses for a faculty of Industrial Engineering (CIDA)
- Construction Project Management Seminars at UWI (CIDA)
- Placement of senior students as engineering and architectural assistants to three Caribbean governments (CIDA)
- National irrigation plans (FAO)
- Fisheries training (CIDA)
- Fish processing equipment (IDRC)
- Small scale water supplies and sanitation training (World Bank)
- Conferences on regional technical training (CIDA)
- Design of FRP water storage tanks for solar water heaters (CIDA)
- Survey of Caribbean Biomass Resources (CIDA)
- Placement of senior architecture students in developing countries (IDRC)
- Establishment of a faculty of Industrial Engineering (CIDA)
- Exploration of strategies for future major projects (CIDA)
- Engineering Management Seminars

UNIVERSITY OF GUELPH - INTERNATIONAL ACTIVITIES AND PROJECTS

Project Name	Country	Department	LOA	Agency	From	To	DONOR
Cooperative Veterinary Science Training	Brazil	Vet. Micro. & Immun.		CIDA	1993	1998	975,577
Animal Production	Honduras	Animal & Poultry Sci.		CIDA	1993	1998	1,042,174
Rural Family Extension	Colombia	Socio. & Anthropology		CIDA	1992	1994	160,998
Diploma in Agriculture	Cameroon	Rural Extension Studies	Sep.91	CIDA	1991	1997	1,021,410
International Education Programs	Canada	IES	Oct.91	CIDA	1991	1994	222,856
Marine Research Assistance	Zanzibar	Zoology	Oct.91	ICOD	1991	1994	290,000
Veterinary Epidemiology Training	Kenya	Population Medicine	Mar.90	CIDA	1990	1996	986,500
Sulawesi Rural Development Phase II	Indonesia	USRP&D		CIDA	1990	1995	25,000,000
Wageningen Cooperative Exchange	Netherlands	International Programs	Aug.90		1990	1995	
Sound Growth Field Studies	Canada	IES	Jul.90	CIDA	1990	1991	95,962
Human Resource Development: Women's Training	Cameroon	Rural Extension Studies	Jan.90	CIDA	1989	1994	596,490
Post Harvest Production	Argentina	Horticulture	Mar.89	CIDA	1989	1993	650,000
Guelph/CIDA Scholarship Awards Training Program	Canada	International Programs	Mar.89	CIDA	1989	1993	373,200
Hasanuddin Training Program	Indonesia	Geography	Jan.89	CIDA	1989	1992	490,583
Veterinary Science Program	Costa Rica	OVC	May.88	CIDA	1988	1997	730,022
Plant and Animal Health	Caribbean	Population Medicine	Sep.88	CIDA	1988	1992	0
Rural Family Development	Colombia	Socio. & Anthropology	Aug.87	CIDA	1988	1991	547,984
Wageningen Cooperative Exchange	Netherlands	International Programs	Mar.88		1988	1990	
Training the Trainers	New Guinea	Political Studies	Jun.87	CIDA	1988	1990	385,726
Apiculture Training Workshop	Malaysia	Env. Biology	Jul.87	CIDA	1988	1988	149,335
Nepal Planning Mission	Thailand	Political Studies	Aug.88	AUCC	1988	1988	4,700
Home Science Program	Ghana	Family & Consumer Studies	Aug.86	CIDA	1987	1993	558,961
Caldas/Colombia Extension	Colombia	Socio. & Anthropology	Sep.87	CIDA	1987	1990	547,984
Apiculture Training Course	Malaysia	Env. Biology	Jul.87	CIDA	1987	1990	149,335
Guelph/Beijing Cooperation	China	International Programs		CIDA	1986	1991	497,286
Rural Women's Training	Caribbean	Socio. & Anthropology	Sep.86	CIDA	1986	1990	320,000
International Education Programs	Canada	IES		CIDA	1986	1989	131,500
Soil and Plant Analysis Training	Nigeria	Land Resource Science	Jul.86	CIDA	1986	1989	74,787
Preservation of Oral Literature/Teacher Training	Cameroon	English	Aug.86	CIDA	1986	1988	460,367
Agriculture Planning Mission	Caribbean	Engineering	Aug.86	CIDA	1986	1987	43,935
EDI Training Program	Canada	Ag. Econ. & Ext. Ed.		WORL	1986	1986	70,000
Science & Technology Conference	Canada	Continuing Education	Aug.86	CIDA	1986	1986	25,000
Africa Forum Project	Canada	International Programs	Mar.86	CIDA	1986	1986	15,450
Farming Systems Research	Caribbean	Ag. Econ. & Bus.	Nov.86	IDRC	1986	1986	57,500
Guelph/Beijing Cooperation	China	International Programs		CIDA	1985	1986	328,950
Confined Animal Production Workshop	China	Animal & Poultry Sci.	Feb.84	CIDA	1985	1985	101,705
GIAM VII Biotechnology Conference	Finland	External Projects Int'l	Jan.85	CIDA	1985	1985	23,700
Training of Public & Civic Servants	New Guinea	Political Studies	Jul.85	CIDA	1985	1985	5,500
Rural Women Training	Brazil	Socio. & Anthropology	Oct.84	CIDA	1984	1989	134,418
Family Rural Development	Colombia	Socio. & Anthropology	Feb.84	CIDA	1984	1987	250,000

UNIVERSITY OF GUELPH - INTERNATIONAL ACTIVITIES AND PROJECTS

Project Name	Country	Department	LOA	Agency	From	To	DONOR
Trout Farming Phase II	Costa Rica	Zoology	Feb.84	CIDA	1984	1987	99,601
Aquaculture Farming Project	Costa Rica	Zoology	Feb.84	CIDA	1984	1987	99,601
Preservation of Oral Literature/Teacher Training	Cameroon	English	Mar.84	CIDA	1984	1986	201,405
Apiculture Development Project	Colombia	Env. Biology	Jan.84	CIDA	1984	1986	51,676
Guelph/Beijing Cooperation	China	International Programs	Sep.84	CIDA	1984	1985	177,070
Maize Feasibility Study	Caribbean	Crop Science		CIDA	1984	1984	70,000
Arid Lands Planning Mission	Egypt/Israel	International Programs		CIDA	1984	1984	18,126
Veterinary Immunology Training Course	Malaysia	Vet. Micro. & Immun.	Jan.84	CIDA	1984	1984	43,666
Veterinary Immunology Training Course	Malaysia	Vet. Micro. & Immunology	Jan.84	CIDA	1984	1984	43,666
Management Development Seminar	New Guinea	Political Studies	Jan.84	CIDA	1984	1984	
Wageningen Cooperative Exchange	Netherlands	International Programs		CIDA	1984		
Management Supplement	New Guinea	Political Studies	Jul.84	CIDA	1984		25,000
Apiculture Training Project	Costa Rica	Env. Biology	Jun.83	CIDA	1983	1985	59,723
Preservation of Oral Literature/Teacher Training	Cameroon	English	Oct.83	CIDA	1983	1984	58,581
International Education Series	Canada	International Programs		CIDA	1983	1984	
Soil Plant Analysis Training Course	Nigeria	Land Resource Science	Nov.83	CIDA	1983	1984	59,975
International Rural Development Conference	Netherlands	Rural Planning & Dev.	MSep.82	CIDA	1983	1983	2070
International Rural Development Conference	Canada	Rural Planning & Dev.	Mar.82	CIDA+	1983	1983	52,117
Agricultural Extension Training	Caribbean	Ag. Econ. & Ext. Ed.	May.83	CIDA	1983	1983	6,790
Traditional Food Conservation	India	Food Science	Oct.83	CIDA	1983	1983	4,675
Adult Education Seminar	Sierre Leone	International Programs	May.83	CIDA	1983	1983	6,192
Literacy Planning Mission	Sierre Leone	International Programs	May.83	CIDA	1983	1983	4,617
Apis Cerana Planning Mission	Sri Lanka	Env. Biology		IDRC	1983	1983	5,000
Guelph/Beijing Cooperation	China	International Programs	Sep.82	CIDA	1982	1984	92,091
Oral Literature Preservation/Teacher Training	Cameroon	English	Feb.82	CIDA	1982	1983	95,266
International Education Series	Canada	International Programs		CIDA	1982	1983	6,000
CARDI Evaluation Mission	Caribbean	Geography		IDRC	1982	1983	3,680
Soil and Plant Analysis Training Course	Nigeria	Land Resource Science	Dec.82	CIDA	1982	1983	58,896
Apiculture Project	Panama	Env. Biology	Sep.82	CIDA	1982	1983	58,296
Rural Family Life Workshop	Brazil	Socio. & Anthropology	Jun.82	CIDA	1982	1982	2,660
Teaching Methods in Agriculture	Canada	Ag. Econ. & Business		CIDA+	1982	1982	71,850
Diagnostic Microbiology Training Program	Tanzania	Vet. Micro. & Immun.	Sep.81	CIDA	1982	1982	24,875
Diagnostic Microbiology Training Program	Tanzania	Vet. Micro. & Immunology		CIDA	1982	1982	24,875
Rural Family Life Workshop	Costa Rica	Socio. & Anthropology		CIDA	1982		40,361
Apiculture Mission	Panama	Env. Biology	Feb.82	CIDA	1982		4,451
Development Education Program	Canada	International Programs		CIDA	1981	1983	62,515
International Education Series	Canada	International Programs	Nov.81	CIDA	1981	1982	6,000
Soil Plant Analysis Training Course	Nigeria	Land Resource Science	Aug.81	CIDA	1981	1982	48,950
Trainer Teaching Missions	Cameroon	Int'l Programs	Jan.81	CIDA	1981	1981	8,010
IDRC Conference	Canada	International Programs		IDRC	1981	1981	23,540

UNIVERSITY OF GUELPH - INTERNATIONAL ACTIVITIES AND PROJECTS

Project Name	Country	Department	LOA	Agency	From	To	DONOR
Teaching Methods in Agriculture	Caribbean	Educational Practice	Jan.81	CIDA	1981	1981	41,708
Kerala State Literacy Mission	India	International Programs	Sep.80	CIDA	1981	1981	3,000
Kerala State Literacy Mission	India	International Programs	Sep.80	CIDA	1981	1981	3,000
Intercultural Exchange	Canada	International Programs		CIDA	1980	1981	9,608
International Education Series	Canada	International Programs		CIDA	1980	1981	5,375
Development Education Program - Bilingual	Canada	International Programs		CIDA	1980	1981	2,730
Tema Handbook	Canada	Ag. Econ. & Bus.	Aug.80	UNESC	1980	1980	2,000
TMA Planning Mission	Caribbean	Educational Practice	Apr.80	CIDA+	1980	1980	5,400
Apiculture Training Mission	Colo/Kenya	Env. Biology	Jun.80	CIDA	1980	1980	9,800
Apiculture/Pisciculture Mission	Colombia	Zool/Env.	Mar.79	CIDA	1980	1980	2,068
Teaching Methods in Agriculture	Ghana	Ag. Econ. & Extension		CIDA+	1980	1980	46,700
Veteterinary Microbiology Workshop	Sri Lanka	Vet. Micro. & Immun.	May.80	CIDA+	1980	1980	25,500
Apiculture Mission	Tonga	Env. Biology	Aug.80	CIDA	1980	1980	3,300
Aquaculture Study	Costa Rica	Zoology	Sep.79	CIDA	1979	1983	50,000
International Education Series	Canada	International Programs		CIDA	1979	1980	4,770
Development Education Program	Canada	International Programs		CIDA	1979	1980	3,345
Apiculture Project	Belize	Env. Biology	Mar.79	CIDA	1979	1979	1,500
Evaluation & Assessment Workshop	Canada	International Programs	Sep.79	CIDA	1979	1979	20,900
World Lagomorph Conference	Canada	Zoology		CIDA	1979	1979	8,000
Maize Feasibility Study	Caribbean	Crop Science	Mar.79	CIDA	1979	1979	7,925
Apiculture/Pisciculture Mission	Colo/Kenya	Zool/Env.	Mar.79	CIDA	1979	1979	2,100
Diagnostic Virology Training	Malaysia	Vet. Micro. & Immunology	Jul.79	CIDA+	1979	1979	9,347
Animal Health Care	St.Vincent	OVC, Large Animals	Apr.79	CIDA	1979	1979	15,000
Training Assistance University of Campinas	Brazil	International Programs	May.78	CIDA	1978	1983	600,000
International Education Series	Canada	International Programs		CIDA	1978	1979	4,350
Development Education program	Canada	International Programs		CIDA	1978	1979	6,575
Tropical Hostein Cattle	Caribbean	Animal & Poultry Sci.	Dec.77	CIDA	1978	1979	21,299
Teaching Methods in Agriculture	Canada	Ag. Econ. & Business		CIDA+	1978	1978	38,360
Animal Diseases Workshop	Canada	OVC		CIDA+	1978	1978	56,020
Diagnostic Microbiology Course	Malaysia	Microbiology	Jan.78	CIDA	1978	1978	8,325
Winter Triticale Ph. III	Canada	Crop Science		IDRC	1977	1981	204,200
International Education Series	Canada	International Programs		CIDA	1977	1978	2,545
Assistance Pig Industry-Jamaica	Caribbean	Animal & Poultry Sci.	Oct.75	CIDA	1976	1979	156,255
Better Family Living Conference	Canada	Family Studies	Nov.75	CIDA	1976	1976	4,500
Assistance Pig Industry	Jamaica	Animal & Poultry Sci.	Oct.75	CIDA	1975	1979	156,255
Winter Triticale Research	Africa	Crop Science		IDRC	1974	1980	443,600
Winter Triticale Program	Canada	Crop Science		IDRC	1974	1978	148,800
Apiculture Project	Kenya	Env. Biology	Aug.71	CIDA	1971	1971	52,635
Agricultural Engineering UWI	Caribbean			CIDA	1970	1978	250,000

RYERSON INTERNATIONAL

INSTITUTIONAL DEVELOPMENT PROJECTS

Project: Institutional Development and Academic Program Upgrading at Lanzhou Railway Institute (LRI)

Country: China

Funding Source: Canadian International Development Agency (CIDA)

Duration: 1990 - 1994

The purpose of the project is to strengthen the Lanzhou Railway Institute's management infrastructure and increase its capacity to educate and train students and personnel of the Northwest Railway System in computer applications. Project activities include:

- Revising and developing of up-to-date curriculum and course materials on computer applications such as CAD/CAM and Management Information Systems (MIS).
- Assisting with the set-up of microcomputer local area networks (LANs) and the upgrading of institutional and library management systems and staff.
- Upgrading LRI faculty and staff at Ryerson and in China in computer technology and applications.
- Assisting LRI in the further development of continuing education programs for women and technical personnel, especially those from minority groups.

Project: Institutional Development and Academic Program Upgrading at Nur University

Country: Bolivia

Funding Source: CIDA

Duration: 1989 - 1993

This project involves institutional development and academic program upgrading at Nur University, Santa Cruz, Bolivia. Activities include technical assistance consultancies by Canadian faculty at Nur University, fellowship programs for Nur University administrators and faculty delivered in Canada, educationally relevant workshops, and equipment procurement for specified programs. Expected results of the project are the development of academic and administrative master plans for the university, upgrading of program guidelines and curricula, and strategies for links with the productive sector and outreach programs to outlying areas.

Project: Support for Development of Clinical Nutrition Programs at Dr. Sun Yat-Sen University of Medical Sciences

Country: China

Funding Source: CIDA

Duration: 1988 - 1994

The project is supporting the development of a Department of Clinical Nutrition at the Dr. Sun Yat-Sen University of Medical Sciences. The program of study will include community nutrition, clinical dietetics, food service management, food science, and toxicology. Support for the department is facilitated through an on-site consultant and through annual short-term technical assistance by visiting faculty. RIDC is managing the participation of faculty from Ryerson.

Project: Support for the Development Communications Program at Chiang Mai University

Country: Thailand

Funding Source: CIDA

Duration: 1988 - 1992

This four-year project focusses on developing a program in development support communications in the Department of Mass Communications at Chiang Mai University. The project includes:

- Program planning, curriculum development.
- Faculty fellowship and upgrading program through a customized fellowship program at Ryerson and other Asia-Pacific training centres.
- Definition and development of relevant infrastructure and networks for the increased use of communications in regional development work in the northern region of Thailand.
- Strengthening of the campus-based radio station both to improve student training and serve the community.

Institutional Development Projects - Asia-Pacific Broadcasting

Project: Asia-Pacific Project for Broadcasting in Development

Country: Asia-Pacific Region

Funding Source: Canadian International Development Agency (CIDA) and National Broadcast Organizations in Asia and the Pacific

Duration: 1986 - 1991

The project is based on a co-operative partnership among Ryerson International Development Centre, the Asia-Pacific Institute for Broadcasting Development (AIBD), and the national broadcasting organizations (NBOs) in India, Indonesia, and Papua New Guinea. RIDC manages the project and has established a regional project office at AIBD (in Kuala Lumpur, Malaysia), with Canadian and local staff in residence.

A major focus of the project has been the establishment of development broadcasting units (DBUs) within the partner broadcasting organizations at the local and regional station level and the strengthening of the overall capacity of the NBOs to provide effective support to local development through community broadcasting. The mandate of each DBU is to produce and broadcast programs on development issues. The project has helped to develop and promote a participatory approach to the production of development programs, involving producers, researchers, subject-matter specialists, and the local communities in a creative partnership.

More broadly, the project team has worked closely with NBO partners in undertaking major changes in policy, organizational structure, approaches to programming, and staff development to improve their capacity to better meet the development needs of local communities.

Canadian and regional consultants with broad experience in development and broadcasting have trained staff of the partner broadcasting organizations in all aspects of development broadcasting, including formal research methods and community animation. Canadian consultants include faculty from the Radio and Television Arts program at Ryerson and broadcasters from the Canadian Broadcasting Corporation. The project has also taken important initiatives in the design and implementation of research methods to support development broadcasting. In order to do this, it has drawn on a network of expertise from research organizations throughout Asia and the Pacific.

Since its inception in 1986, the project has trained about 300 radio and television broadcasters and the DBU approach is being adopted as official policy by the national broadcasting organizations and broadcast training institutions. A significant output of the project will be a complete training package for training development broadcasters, including written and video materials designed for use by participants and trainers. The training package will detail the process of establishing a DBU, including planning considerations and training and research needs for development broadcasting.

Institutional Development Projects - Technical Co-operation in Brazil

Project: Canada-Brazil Technical Co-operation

Country: Brazil

Funding Source: Canadian International Development Agency (CIDA)/ Brazilian National Industrial Apprenticeship Service (SENAI)

Duration: 1990 - 1995

This project supports the work of the Brazilian National Industrial Apprenticeship Service (SENAI) in supporting three industrial sectors and specialized regional training centres in Northeast Brazil. The first is a chemical process and instrumentation technology centre in Salvador, Bahia; the second is a food processing technology centre in Petrolina, Pernambuco. The third is a fund for training and professional development in the field of wood processing technology.

To facilitate the administration of the project, RIDC and its partner, the Quebec-based Consortium of International Development in Education (CIDE), have formed a private non-profit corporation, the CIDE/Ryerson Corporation (CRC). CRC brings the institutional capacities of more than ten colleges in Quebec, Ontario, Alberta, and British Columbia to the project, with RIDC managing the activities delivered at various educational institutions in Ontario, Alberta, and British Columbia. The project also includes private-sector participants, such as the Canadian Plastics Institute.

Over the next five years, 28 Brazilians from the SENAI regional department of Bahia, 11 from Pernambuco, and 30 from other Brazilian states will come to Canada for custom-designed fellowship programs; 25 consultants from the RIDC-managed group (all faculty members of the participating educational institutions) will go to Salvador and 18 from Quebec to Petrolina and other states in Brazil.

In the first sub-project, fellowships include orientation to Canada, English language and technical teacher training, technical upgrading, institutional attachments, and visits to relevant industries. Areas of study include electronics technology, instrumentation technology, chemical process technology, and training for support personnel in such areas as library systems, labour market studies, and institutional administration. Recognizing the importance of women in development, CRC has allocated one fellowship and one consultancy for study on this issue.

The Canadian consultants join the SENAI instructors in Brazil on an annual basis to work on the development of curriculum for the new training centres, participate in academic review workshops, assist with the planning of fellowship programs, and design seminars and short courses for industry. In this manner, the project team aims to develop ongoing Canadian-Brazilian partnerships.

The training centres will not only provide industry with better trained technicians through upgraded full- and part-time programs and in-house training; they will also provide technical assistance to small- and medium-sized enterprises in the region and carry out applied research for these enterprises. In addition, the centres will operate as technical information resource centres for industry.

Project: Development of Early Childhood Education Programs at the Jaipur Women's Polytechnic.

Country: India

Funding Source: CIDA

Duration: 1988 - 1992

The project entails a four-year program carried out by a team of faculty, staff, and graduates from Ryerson and Jaipur Women's Polytechnic Early Childhood Education Program in Jaipur, Rajasthan. Jaipur faculty come to Canada for work/study sessions at Ryerson and Ryerson faculty deliver short courses for pre- and in-service training in Jaipur. Outcomes of the project are expected to be a jointly developed model curriculum and preschool program relevant to India, a self-sufficient demonstration preschool at Jaipur Women's Polytechnic, and a Rajasthan Preschool Association as a branch of the Indian Preschool Association.

Project: Engineering Curriculum Design and Development at the University of Bahrain

Country: Bahrain

Funding Source: University of Bahrain (formerly Gulf Polytechnic), Government of Bahrain

Duration: 1985 - 1990

RIDC provided assistance in the development of curricula in engineering and technology at Gulf Polytechnic as recommended in the evaluation phase of the project (1983-84). Courses, course outlines, and course management structures were designed for diploma and degree programs in three engineering and nine diploma programs. Major Ryerson team visits occurred annually, with continuing communication on curriculum questions throughout the year. The work in Bahrain was conducted in co-operation with the American University of Beirut.

Project: Support for Institutional Development at Shanghai University of Technology

Country: China

Funding Source: CIDA

Duration: 1985 - 1990

The project involved the development of new courses at Shanghai University of Technology in computer applications, communications technology and computer-aided learning, as well as in international trade and business communications. All courses were developed and offered by Ryerson faculty. In addition, the agreement provided fellowship programs for SUT faculty members at Ryerson, emphasizing professional development and applied research. The project also involved consultancy on library and computer facilities.

Project: Short-Cycle and Non-University Institutions of Higher Education in Developing Countries: An Overview of Recent Developments

Country: Selected countries in Africa, the Middle East, Central and South America, Asia, and South-East Asia

Funding Source: World Bank

Duration: 1991

The objectives of this research paper are to develop a typology of short-cycle and non-university institutions of higher education and to undertake a comparative study of recent developments of non-university institutions (NUIs) in selected countries. Issues to be examined include policy issues, the structure and organization of NUIs, their academic character, mission, governance, finance, links with the external environment, and the social acceptance of NUI graduates.

Project: Comparative Analysis of Policy Making, Program Development and Implementation in Overseas Development Assistance, with Particular Reference to Human Resource Development

Country: Canada, U.K., Netherlands, U.S., Japan, Germany, Sweden

Funding Source: Ryerson, RIDC, Japan Foundation

Duration: ongoing

A long-term research project focussing on human resource development (HRD) as an area of major significance to international development. The project also looks at HRD as a way in to understanding the workings and processes of aid agencies/ministries. The study is part of a broader-based resesarch program on the aid process. In addition to monographs and articles on HRD, one of the major outputs will be a book on how aid agencies work.

Topics examined include:

- The steps that have been taken to strengthen the expertise of aid agency professionals and policy makers in delivering human resources development programs with a different focus than was typical in the 1970s and 1980s.
- The role of specialists and specialist units within and outside the aid agency/ministry.
- The way in which growing emphasis on HRD fits with other policy shifts and directions within each donor agency in the years since 1975.
- The character and appropriateness of overall agency management and organizational patterns and systems — as a means to plan and deliver effective HRD programs (i.e., the fit between the project cycle and concerns about support for long-term capacity-building efforts).
- The extent to which aid agencies have acted to strengthen and nurture national capacities (i.e., outside the aid ministries/agencies) to manage and deliver HRD programs at home and overseas to respond to development priorities.
- The extent of the impact of decision makers and informed professionals in the developing countries in the shaping of the aid programs considered, with particular attention to their role in the planning of HRD initiatives.
- The influence of the World Bank, UNDP, and other multilateral donors and international financial institutions in the shaping and dissemination of central themes in HRD within the donor community.
- The mechanisms introduced by the aid agencies to ensure quality in the programs delivered and the lessons learned in this area.
- Efforts within each of the donor states to nurture and strengthen national capacities outside central government for appraising, managing, delivering, and monitoring or evaluating HRD programs.
- Efforts at inter-donor co-ordination both at the OECD/DAC and multilateral level, as well as consultation regarding programs for individual developing countries.

Project: Conference on Higher Education and the Problem of Employment in the Arab World

Country: Kuwait

Funding Source: World Bank/Canadian International Development Agency (CIDA)

Duration: 1989

The conference was organized by the Economic Development Institute (EDI) of the World Bank. An RIDC consultant was one of the keynote speakers and gave papers on "The Development of Short-cycle Institutions in the Arab World" and "Problems and Issues in Professional Education in the Arab World: A Comparative Study of Engineering, Medicine, and Management."

Project: Technologies in Education and Training "From Books to Satellites" and "Summary of Canadian Activities"

Country: Global and Canada

Funding Source: World Bank/Economic Development Institute (EDI)

Duration: 1988

Two discussion papers for the EDI seminar on "Using Technologies for Education and Training" were prepared. One paper was a survey and assessment of technologies used in distance learning ranging from print materials to advanced electronic technologies. The other paper highlighted Canadian uses of technologies with particular relevance to developing countries.

Project: Sector Policy Paper on Development Communications

Country: Canada

Funding Source: Canadian International Development Agency (CIDA)

Duration: 1988

This CIDA-commissioned study included an extensive survey of the various media and their importance in the development process; an examination of the role that development communications plays in various sectors, e.g. literacy, women in development, health promotion, and agriculture; and an analysis of how the media have supported development in various CIDA projects. The paper includes extensive strategies and objectives for the integration of development communications in CIDA projects.

Project: Asia-Pacific Project for Broadcasting in Development

Country: Asia-Pacific Region

Funding Source: CIDA and National Broadcast Organizations in Asia and the Pacific

Duration: 1986 - 1991

RIDC commissioned Ryerson faculty members to undertake research studies on women and development, the environment, and human settlements in the second year of the project. These were broad benchmark surveys of the issues as they pertained to the Asia-Pacific region.

Extensive research has also been carried out by and for the development broadcasting units (DBUs) in the participating national broadcasting organizations (NBOs) and was integrated at each step of the project's activities. RIDC worked with other research organizations in the participating countries to develop the research capabilities of the NBOs and support the broadcast training institutes in the development of innovative research methodologies.

Field-based research included audience surveys and development impact studies. Program research was another major research component of the project. Innovative methodologies were developed for measuring the impact of programming.

The project review process also generated a significant amount of research in the form of studies that reviewed the research and research methodology used in each participating country.

Training and Fellowship Programs

Project: Advanced Technology Training for SENAI - SP

Country: Brazil

Funding Source: International Labour Office (ILO)

Duration: 1993

RIDC is designing customized fellowship programs in advanced technology for the Brazilian National Industrial Training Service in Sao Paulo state (SENAI - SP). The program involves the training of 11 Brazilian technicians and engineers in computer technology, chemical instrumental analysis, process control and instrumentation, and biotechnology at Ryerson, Lambton College, and Seneca College in Ontario.

Project: Engineering Education Preparatory Program for the Government Organization for Technical Education and Vocational Training (GOTEVOT)

Country: Saudi Arabia

Funding Source: GOTEVOT, Government of Saudi Arabia

Duration: 1990 - 1991

RIDC designed and delivered a customized fast-track program in engineering education for 13 Saudi Arabian teachers from GOTEVOT to facilitate their admission as advanced standing students in engineering programs at Ryerson. The program involved intensive English as a Second Language training, mathematics and science review, and technical upgrading.

Project: Management Training

Country: China

Funding Source: Canadian International Development Agency (CIDA)/Association of Canadian Community Colleges (ACCC)

Duration: 1988 - 1989

The primary objective of the agreement with ACCC was to develop and deliver training programs on 1) entrepreneurship and 2) personnel development and organizational behaviour at the China Enterprise Management Training Centre at Chengdu. The secondary objective was to provide consulting services on management issues to Chinese enterprises.

Project: Fellowship Training in Development Communications

Country: Tanzania

Funding Source: CIDA

Duration: 1987 - 1988

A fellowship program was specifically designed for a Tanzanian professional in the areas of communication techniques and methods, with particular emphasis on supporting womens' programs.

Project: China/WUSC Program

Country: China

Funding Source: CIDA

Duration: 1984 to present

The program involves Chinese scholars studying in Canada under the CIDA/World University Service of Canada, Canada-China Human Resources Development Program. These scholars are young professionals working for major government ministries and state corporations. Each undertakes a 3-month industrial/commercial placement as part of the fellowship. Ryerson facilitates the placement of the trainees with the appropriate faculty and department within Ryerson.

Project: Women and Development, Caribbean Region

Country: Jamaica/Barbados

Funding Source: CIDA

Duration: 1981 - 1983

RIDC assessed the capacity and additional resources required by the Women and Development Unit at the University of the West Indies to deliver programs on women and development in the Caribbean region.

Project: Technical Education Sector Study

Country: Egypt

Funding Source: World Bank

Duration: 1988

RIDC participated in a number of World Bank missions. The first mission undertook a vocational and technical education sector study. The second and third were preappraisal missions to develop the framework for the Bank's educational loan to Egypt.

Project: Pre-Feasibility Study for Institutional Upgrading and Program Development at Harare Polytechnic

Country: Zimbabwe

Funding Source: Association of Universities and Colleges of Canada (AUCC)

Duration: 1988

A pre-feasibility study to investigate issues associated with the upgrading and development of business and engineering programs at Harare Polytechnic and Bulawayo Technical College.

Project: Television Training Needs Survey

Country: Sri Lanka

Funding Source: International Development Resource Centre (IDRC)

Duration: 1986, 1988, 1989

In co-operation with the Asia-Pacific Institute of Broadcasting Development, RIDC assessed the training needs and undertook the planning of development broadcasting courses for the Sri Lanka Television Training Institute. A second component of the project involved developing a plan for a resource centre and a curriculum plan for producers.

Project: Commonwealth Satellite Distance Learning Project — Preliminary Feasibility Study

Country: Canada and Commonwealth

Funding Source: Department of Communications (Canada)

Duration: 1986

Feasibility study for the development of four distance learning co-operative projects between Canadian institutions and counterpart organizations in other Commonwealth countries. The projects are to contribute to the development of models for co-operation among educators and institutions throughout the Commonwealth.

Project: North Yemen Polytechnic Feasibility Study

Country: Yemen Arab Republic

Funding Source: Canadian International Development Agency (CIDA)

Duration: 1984 - 1985

Feasibility study for the establishment of Yemen's first polytechnic. This study conducted by RIDC and Educansult Ltd. of Toronto included an evaluation of the country's technical education system, as well as the development of a broad education plan for the new institution.

Project: Engineering Education Assessment Program at Gulf Polytechnic

Country: Bahrain

Funding Source: Gulf Polytechnic (University of Bahrain), Government of Bahrain

Duration: 1983 - 1984

Broad-based evaluation of the engineering curriculum and academic administration at the Gulf Polytechnic, and assessment of the current and future labour demands of industry. The evaluation included a review of the secondary school system, the changing labour market, the skill and knowledge requirements of industry, and the aspirations of young Bahrainis. The study included major recommendations for academic and administrative changes at Gulf Polytechnic.

Project: Feasibility Study for the Development of a Community College System in Yemen

Country: Yemen

Funding Source: MENA Division - World Bank

Duration: 1993

A pre-feasibility study of the development of the community college system in Yemen. Governance policies, the legal framework, and norms and standards for the system were developed as well as detailed master plans for individual institutions, including physical resources (buildings, facilities, and equipment), human resources (administrators, teachers, and support staff), and financial resources (government grants, student fees, and sources of funding).

Project: Diversification in Higher Education: The Choices and Implications for the Arab World

Country: Arab Countries

Funding Source: Economic Development Institute (EDI) - World Bank

Duration: 1992-1993

This paper developed a comparative methodology for second-sector (non-university) institutions (SSIs) of higher education. The methodology consists of a comparative classification typology and a set of performance indicators to assess the capacity, impact, quality, and efficiency of SSIs in comparison to universities and other institutions. The paper also reviews the choices and implications available for higher educational planners in Arab countries.

Project: The Impact of Technological Change on the Technical Education and Vocational Training Systems in Latin America

Country: Brazil, Venezuela, Mexico, Chile, Equador, Colombia

Funding Source: Economic Development Institute - World Bank

Duration: 1992

The introduction of knowledge-based, information-driven technologies in all productive enterprises of a country's economy has had a major impact on the occupational profiles of all groups in the labour force and especially middle-level paraprofessional groups. This paper examined the impact of technological change on the knowledge and skills of middle-level personnel in Latin America and the implications for the technical education and vocational training systems in seven countries in the region.

Project: Education Sector Study: The Middle-Level Institutions of Higher Education in Malawi

Country: Malawi

Funding Source: World Bank

Duration: 1992

This working paper provided input to a sector study on higher education in Malawi. The paper surveyed all the non-university post-secondary institutions in the country and assessed their capacity, quality, impact, and efficiency.

Project: Short-Cycle and Non-University Institutions of Higher Education in Developing Countries: An Overview of Recent Developments

Country: Selected countries in Africa, the Middle East, Central and South America, Asia, and South-East Asia

Funding Source: World Bank

Duration: 1991

The objectives of this research paper were to develop a typology of short-cycle and non-university institutions of higher education and to undertake a comparative study of recent developments of non-university institutions (NUIs) in selected countries. Issues examined included policy issues, the structure and organization of NUIs, their academic character, mission, governance, finance, links with the external environment, and the social acceptance of NUI graduates.

Project: Comparative Analysis of Policy Making, Program Development and Implementation in Overseas Development Assistance, with Particular Reference to Human Resource Development

Country: Canada, UK, Netherlands, US, Japan, Germany, Sweden

Funding Source: Ryerson, RI, Japan Foundation

Duration: ongoing

A long-term research project focusing on human resource development (HRD) as an area of major significance to international development. The project also looks at HRD as a way into understanding the workings and processes of aid agencies/ ministries. The study is part of a broader-based research program on the aid process. In addition to monographs and articles on HRD, one of the major outputs will be a book on how aid agencies work.

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Country: Asia-Pacific Region

Funding Source: CIDA and National Broadcast Organizations in Asia and the Pacific

Duration: 1986 - 1992

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Extensive research has also been carried out by and for the development broadcasting units in the participating national broadcasting organizations (NBOs) and was integrated at each step of the project's activities. RI worked with other research organizations in the participating countries to develop the research capabilities of the NBOs and support the broadcast training institutes in the development of innovative research methodologies.
Field-based research included audience surveys and development impact studies. Program research was another major research component of the project. Innovative methodologies were developed for measuring the impact of programming.
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