SKILLS CHALLENGES FACING KEY SECTORS OF THE CANADIAN ECONOMY

A CONSULTATION REPORT

Strategic Policy Branch
Industry Canada

November, 1998

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Secretary of State's Preface

Canadians are now living in a global, knowledge-based economy where the determinants of success for individuals, businesses, regions and nations have become increasingly the development and innovative use of knowledge. The implications of this are pervasive and profound, especially when we consider what it means for our work force. The knowledge revolution has altered the skill sets and educational attainments that Canadians need to find and keep a job. There has been a steady increase in skill requirements in all sectors of the economy and for most types of jobs.

Canadian industrial and business sectors are continually adapting to maintain their competitive edge in the international, knowledge-based marketplace. The sectors that are now driving our economic growth and job creation are knowledge-intensive. Demand for highly skilled workers is growing, but many sectors are experiencing difficulties in finding and retaining such workers. At the same time, some of our recent graduates from universities and colleges are finding it difficult to find jobs in the fields for which they have trained. How does one then account for the difficulties in recruitment and retention that businesses are reporting?

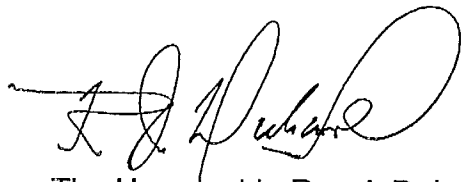
To understand better the dynamics at play and the nature and scope of the human resources problems being faced by Canadian employers, in Spring, 1998 I consulted with several key sectors of our economy, namely, environment, automotive, biopharmaceutical and aerospace. Over 110 leaders from industry, academia, labour, national sector councils, the granting councils, and the federal government participated in a series of dinners that I hosted. We engaged in a frank and open discussion of the nature of the skills-related challenges faced by their sectors and the various measures we might consider implementing to address these. This report summarizes the outcomes of our discussions.

Not only did I gain a better understanding of the nature of skills challenges in Canada, I also learned that the problem is global - G7 countries are all grappling with similar issues. Around the world, companies are not only fighting for market share, they are now competing for their share of skilled workers. Therefore, there is clearly a need for all stakeholders to do more. In developing additional measures, we need to ensure that our responses to the skills-related issues strike a balance between the need for short-term adjustment measures and long-term structural solutions. We also need to work in partnership -- no single player or any level of government has all the answers to meet Canada's skills challenge.

As part of its economic framework for growth, the government has focused on helping Canadians acquire skills so that we may build a more productive economy, foster better job opportunities and incomes for individuals, and establish the basis for life-long personal development. To supplement earlier measures, the 1998 Budget introduced the *Canadian Opportunities Strategy* which expands support to Canadians in their acquisition of

knowledge and skills. The Canadian Millennium Scholarships and Canada Study Grants, for example, will promote access to post-secondary education. While many important steps have been taken, more needs to be done.

This report provides guidance about some of those next steps that we must take. Through ongoing dialogue and partnerships, I am confident that we can develop creative and effective responses to Canada's skills challenges. To thrive, businesses have to be agile, innovative and adaptable to changing circumstances. We can do no less in responding to the need to equip Canadians with the means and opportunities to participate fully in a knowledge-based economy.



The Honourable Ron J. Duhamel, P.C., M.P.

1. Introduction

Between April to June 1998, the Honourable Ron Duhamel, Secretary of State for Science, Research and Development, chaired four dinner meetings to discuss the skills challenges facing key sectors of the economy, namely environment, automotive, biopharmaceutical and aerospace.[1] The objectives of the meeting were to:

- raise awareness of the scope and magnitude of the skills-related challenges;
- identify best practices;
- generate and test ideas on what additional measures might be considered (including short-term adjustment measures and long-term structural responses) to address the skills challenge; and
- build partnerships to address new ideas.

Various stakeholders participated in the consultations -- industry leaders, representatives from academia, labour, heads of the granting councils, representatives of the national sector councils, and senior federal government officials. In total, over 110 participants attended the dinner meetings.

Each dinner meeting was structured similarly. The Honourable Ron Duhamel began with a short introduction which set the context for the evening. He highlighted the importance of addressing the skills issue, briefly described the Government's track record on the skills front, provided a framework for examining the skills issue, and highlighted other skills-related policy initiatives currently underway.

The Honourable Ron Duhamel indicated that the skills issue is an important element of the government's agenda. He noted that lifelong learning was a key theme of the 1998 Budget. To supplement earlier measures, the Budget introduced a "Canadian Opportunities Strategy" to enhance Canadians' opportunities to acquire skills.

He suggested that the skills challenge may be framed as comprising three fundamental dimensions. The first dimension relates to *pre-employment skills acquisition*. He noted that there are clearly opportunities to make further advances in our learning

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[1]The Honourable Ron Duhamel also provided opening remarks and participated at the *IT Skills Crisis Workshop* on May 21, 1998 in Toronto. The event, which was industry-led, brought together approximately 75 high-level delegates representing the IT sector, universities, community colleges, private training institutes, and government policy makers. The objectives of the workshop were to collectively identify and agree on specific initiatives, identify who would take leadership and responsibility to initiate and manage initiatives, and create an informal structure to ensure ongoing broad-based and collaborative action. A number of specific outcomes were identified; the Software Human Resource Council (SHRC), the Information Technology Association of Canada (ITAC), and the Canadian Information Processing Society (CIPS) will assume collective leadership in developing a comprehensive, strategic plan.

institutions to ensure that our youth have the skills needed for employment, and to ensure that firms have access to a pool of skilled youth to remain competitive. The second dimension, *lifelong learning*, recognizes that preparation for employment can no longer stop after initial education and training, given that many workers who have left the formal education system need to enhance their skills or learn new ones. He suggested that we need to put more emphasis on continuously upgrading the skills and competencies of the workforce. The third dimension, *immigration and emigration*, recognizes the international flow of skilled labour. He noted that we need the right policies in place to position Canada to attract and retain highly skilled workers. He suggested that in developing solutions, we need to address each dimension.

Following the dinner, two expert presentations were made by industry leaders, and in some cases representatives from academia or the national sector councils. Together, the presentations provided perspectives from industry and academia on the nature of the skills challenge, best practices, and new measures that might warrant consideration. The presentations were followed by a general discussion, focussing primarily on the skills-related challenges facing the sector and how, in partnership, we can make further advances to address these challenges.

The following report draws on ideas presented during the general discussion, as well as the presentations of the guest speakers. Chapter 1 describes key issues and themes emerging from the consultations, makes reference to some best practices, and highlights new ideas put forward by participants on how best to respond to the challenges. Chapter 2 describes next steps, and Chapter 3 provides some concluding remarks. Sector-specific summary reports are contained in the annexes.

2. Main Messages & Key Outcomes

This section describes the key skills challenges that participants identified during the consultations, makes reference to some best practices, highlights some additional measures put forward by industry and academic participants on how best to respond to the challenges, and identifies common themes across the four sectors.

2.1 Skills Challenges

While each sector faces its own unique skills challenges, a number of common issues emerged during the consultations. The key challenges identified by participants were:

- skill shortages;
- attracting skilled workers from abroad;
- retaining skilled workers;
- the need to attract youth to specialized fields; and
- skills upgrading.

Skill shortages

Shortages of skilled workers were identified as a major challenge facing each sector. In fact, it was the only challenge common to all. While stakeholders suggested that they are experiencing shortages, the type of skill shortage differs for each sector, as does the primary reason for the shortage.

In the *environment* sector, there was strong consensus amongst industry stakeholders that there is room for improving the management and generic employability skills (e.g. interpersonal, communication, language) of current workers. The shortfall arises primarily because most practitioners have a technical background in science and engineering, which has not allowed for a focus on the development of "softer skills". Stakeholders representing the automotive sector suggested that they currently face shortages of skilled trades people, and they expect the situation to worsen over the coming years mainly because of the sector's demographics. A significant portion of skilled trades people currently employed in the automotive industry will be eligible to retire over the next two to seven years.

Stakeholders of both the *biopharmaceutical and aerospace* sectors reported shortages of experienced workers. For both sectors, the underlying factor was the same; industry growth has outpaced the available supply of skilled workers. In addition, each sector claimed to be experiencing specific shortages - regulatory affairs experts in the

biopharmaceutical industry and people with engineering, scientific and technical skills in the aerospace industry.

Attracting skilled workers from abroad

A key challenge identified by both the *biopharmaceutical and aerospace* sectors was attracting skilled workers from abroad. It was noted that immigrants represent a significant source of skilled labour, and that immigration can play an important role in alleviating critical skill shortages as well as meeting future skill needs. For both sectors, participants suggested that attracting skilled workers - particularly experienced workers - from abroad was difficult, as there are a number of problems associated with current immigration policies.

With respect to temporary workers, stakeholders representing both sectors view the current immigration process as lengthy and not flexible enough to meet urgent skill needs. Another significant barrier to attracting skilled labour from abroad cited by participants is the restriction on employment for spouses of foreign temporary workers.

A key concern voiced by some stakeholders from the *aerospace* sector pertained to the current selection system for permanent economic immigrants which presupposes that the skills and qualifications of successful applicants will be recognized once they arrive in Canada. Yet, many highly skilled immigrants experience difficulties in gaining access to trades and professions and, in particular, in establishing their equivalency to Canadian credentials.

While attracting skilled workers from abroad emerged as a primary issue facing both the biopharmaceutical and aerospace sectors, participants recognized that a focus only on immigration policy would be an incomplete solution to their skills-related challenges.

Retention of skilled workers

Retention of skilled workers also emerged as a major concern for the *biopharmaceutical and aerospace* sectors. While participants suggested that brain drain is occurring at all levels, it was noted that it is particularly acute for experienced workers, and that it is often the "best and the brightest" that are leaving, mainly to the U.S. A number of contributing factors were identified by both stakeholder groups, namely high personal income tax rates, more advanced technological challenges available in the U.S., the lower value of the Canadian dollar relative to the U.S., and an eroding Canadian science base due to inadequate federal funding.

Attracting youth

Attracting youth was identified as a challenge common to the *environment and automotive* sectors, but for somewhat differing reasons. For the environment sector, the need to attract youth stems mainly from anticipated growth of the domestic market, whereas for the automotive sector, the challenge arises from anticipated retirements. Both sectors agreed that there were two primary areas for action, improving youth's understanding of career opportunities and enhancing their sectors' images as providers of challenging career opportunities.

Skills upgrading

Stakeholders representing both the *environment and automotive* sectors agreed that they need to ensure that the skills of their employees are being continually upgraded. The industries must maintain an ongoing commitment to upgrading the skills of their workforce if they are to be able to respond to rapid technological change and maintain competitive positions.

2.2 Best Practices

During the consultations, participants shared a number of interesting and innovative solutions to Canada's skills challenge. These best practices are described in detail in the annexes; they serve only as illustrative examples of a host of success stories across Canada.

In many cases, the initiatives that were highlighted during the discussions demonstrate the effectiveness of partnerships, and the resulting synergies that can be exploited. The Windsor Experiment is one such example. The Windsor Experiment conducted studies to benchmark "best practice" training and education in Europe, and applied the results in innovative skills development programs for young Canadians. These best practices also illustrate the important work of Sector Councils in developing and delivering a number of skills-related projects. There is undoubtedly scope to broaden the application of these best practices, in particular to extend them beyond certain sectors or geographical regions.

2.3 Additional Measures to Address the Skills Challenges

A number of ideas were put forward by industry and academic participants representing all four sectors on how best to respond to the skills challenge. While the specific proposals stemming from each dinner meeting are contained in the annexes, it is

useful to highlight, for each sector, those ideas for which there was greatest consensus.

Environment Sector

- colleges/universities could add an additional year (year 4 or 5) to a program to teach generic employability skills or management skills
- industry needs to work more closely with the academic community to develop new programs in areas of high demand
- better information on career opportunities should be developed, and awareness of careers in the environmental field should be increased
- industry should provide more mentoring/coaching to its employees, particularly recent graduates

Automotive Sector

- increase awareness of youth of challenging career opportunities
- provide incentives for employer-based training (e.g. training tax credits based on training completion)
- federal government should quantify current skill shortages, forecast demand for occupations/skills (using sources such as Statistics Canada), and document the factors contributing to skills shortages
- disseminate information on best practices, in order to broaden their application

Biopharmaceutical Sector

- invest more in infrastructure to ensure that we are producing highly skilled graduates
- build more Centres of Excellence, and increase funding to existing Centres of Excellence
- provide work permits to spouses of qualified recruits
- provide tax incentives to select, highly skilled workers to retain them

Aerospace Sector

- industry and academic institutions need to collaborate more in the development of training programs (e.g. apprenticeship and internship programs, co-op programs)
- provide work permits to spouses of qualified recruits
- ease immigration rules that hinder timely recruitment of highly qualified individuals
- reduce personal income tax rates in order to retain skilled workers

Interestingly, there are some new measures identified that are similar across sectors. For example, participants of both the *environment and automotive* sector identified a clear need to develop better information on career opportunities, and increase

the awareness of youth of the opportunities in their sectors. A common measure of both the *environment and aerospace* sector was the need for industry and academic institutions to collaborate more in the development of new programs (e.g. co-op programs).

Participants of both the *biopharmaceutical and aerospace* sector identified two measures which would facilitate in attracting and retaining skilled workers, namely providing work permits to spouses of qualified recruits, as well as reducing personal income tax rates or providing tax incentives to highly skilled workers.

2.4 Key Themes

Two main themes were communicated by all sectors, namely that partnerships are key to addressing Canada's skills challenge as are long-term structural responses. With regard to partnerships, stakeholders agreed that no single sector or any level of government has all the answers to meet Canada's skills challenge. All must contribute. It was reiterated that an ongoing dialogue and a coordinated effort among the relevant players - industry, academia, government, and labour - will be required to ensure that industry meets its full economic and employment potential.

Stakeholders also agreed that while short-term adjustment measures are important, long-term structural responses will be essential to addressing the skills challenge. In this regard, they suggested that the education system is a critical element of any longer-term structural solution.

The *automotive and aerospace* sectors both conveyed a similar message about the role of the federal government. In their view, the federal government should play a catalyst role in addressing Canada's skills challenge, and facilitate the work of all stakeholder groups in developing additional measures to address issues.

While the four sectors shared similarities, each also had unique messages to convey. For example, current and anticipated shortages of skilled trades people are a key concern of the *automotive* sector. A recurring theme of *environment* sector dinner was the need for improved communication among all the stakeholder groups. In the case of the *biopharmaceutical* sector, participants communicated the need for a comprehensive strategy. They noted that while the skills issue is important, it should be addressed as part of a comprehensive strategy which examines all issues relevant to the industry (e.g. regulatory framework, ethical considerations). Stakeholders also reinforced the message that their industry demands a broad range of skills (e.g. technical, management), and that a firm has different skill needs as it progresses from a focus on R&D to one of commercialization.

Two key messages emerged from the *aerospace* sector dinner. First, the industry

is highly cyclical, which means that the industry's workforce experiences significant layoffs in a downturn and significant hiring in an upturn -- labour adjustment during the business cycles are therefore difficult. Second, prior learning assessment, which is a process that identifies, assesses and recognizes the skills, knowledge or competencies that have been acquired through work experience, is an important tool and should be used more widely.

3. Moving Ahead

It was recognized from the outset that these consultations, while useful in themselves, would be more effective if they contributed in an ongoing way to addressing Canada's skills challenges. In fact, there was consensus among the stakeholders about the need to build on the actions to date.

Clearly, all stakeholders can do more. In developing additional measures, we need to ensure that our responses to the skills-related issues strike a balance between the need for short-term adjustment measures and long-term solutions. We also need to work in partnership. A continued joint effort among the relevant players is essential to ensuring that Canadian industrial sectors meet their full economic and employment potential. This includes the provinces, as they are responsible for education and training.

3.1 Federal Government - Role & Responses

The Government of Canada, principally through Human Resources Development Canada (HRDC), currently supports skills development in a number of important ways. The *Sectoral Partnerships Initiative* creates national sectoral alliances among management, labour, governments and educators in order to develop comprehensive strategies that deal with the human resource challenges facing industry. The federal government serves as a catalyst, facilitating the creation of these alliances and providing start-up funding for their work. These alliances often take the form of national *sector councils* (e.g. Canadian Council for Human Resources in the Environment Industry), which undertake a variety of initiatives designed to improve human resource development on an industry-wide basis.

The federal government also plays an important role in providing labour market/career information. HRDC provides a host of labour market/career information products. One such product is *Job Futures*, a comprehensive up-to-date reference tool designed to help Canadians make better informed educational and career planning decisions.

Some more recent initiatives which the federal government has been engaged in, which address the broader skills issue, include the Human Resources Information Map and the Expert Panel on Skills. The *Human Resources Information Map*, which is in the initial phase of development, is an internet information product which will develop content and integrate the existing federal, provincial, municipal and private sector web-sites that address skills-related issues (e.g. occupational trends, training, education).

The *Advisory Council on Science and Technology (ACST)*[2] has recently structured an *Expert Panel on Skills* to examine three fundamental issues, namely the critical skills that strategic, knowledge-intensive sectors will require to improve or sustain their competitive position in the global economy, whether there are significant shortages (current and anticipated) of these critical skills, and how to address the challenges using both short-term and long-term measures. The panel will complete its work by August 1999, at which time they will submit a report to the ACST, which in turn will report to Cabinet. The report prepared by the panel, containing analysis and policy options, is expected to be made publicly available in September, 1999.

Looking ahead, participants identified five challenges during the consultations, namely skills upgrading, retaining skilled workers, the need to attract youth to specialized fields, attracting skilled workers from abroad, and skill shortages. The remainder of this section notes the progress we have made thus far, and points to areas where we need to focus in the near future.

Skills upgrading

Lifelong learning is essential in the knowledge-based economy. Preparation for employment can no longer stop after initial education and training. Many workers who have left the formal education system need to enhance their skills or learn new ones.

Canada needs to put more emphasis on continuously upgrading the skills and competencies of the workforce. Currently, Canada ranks 13th in the world in employer-based training.[3] Given Canada's training record, we need to better understand the impediments to employer-based training. Some progress has recently been made on this front. Recent research has been conducted by HRDC and Industry Canada which examines the determinants, evidence and barriers to employer-based training.

The federal government also needs to give priority to having the appropriate incentives in place to encourage knowledge-intensive industries to achieve their maximum growth potential. These incentives might include supporting and encouraging employer involvement in training, and providing support to stimulate systematic partnerships between industry and learning institutions.

Retaining skilled workers

Highly-skilled workers, especially those in knowledge-intensive sectors of the

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[2]In 1996, the Prime Minister established the ACST with a mandate to review Canada's performance in science and technology, identify emerging issues, and advise on a forward agenda.

[3]Among 53 countries considered in the 1998 Global Competitiveness Report prepared by the World Economic Forum.

economy, are becoming more mobile internationally as companies and countries compete to attract the best people. As such, brain drain of Canadian highly skilled workers, particularly to the U.S., has recently emerged as a concern to industry.

Some recent studies have attempted to get a better grasp of brain drain. The most recent data from Statistics Canada shows that, between 1990 to 1994, there were significant net losses of highly-skilled workers to the U.S.;[4] most notably engineers, health professionals, and managerial workers.[5] However, the data shows that the worldwide inflow of knowledge workers greatly exceeds the outflow to the U.S. In addition, Industry Canada has recently commissioned two studies, one of which will survey expatriate Canadian executives presently working in the U.S. to identify the determinants of emigration, and the second which will examine the outflow of skilled workers, both temporary and permanent leavers, to the U.S. Given that the brain drain issue is complex, more works needs to be done in this area. In particular, we need to better understand the skills, experience and knowledge being lost to Canada, the reasons why skilled workers emigrate, and the reasons for their return.

We also need to ensure that we have the right incentives in place to retain skilled workers. These incentives may include such things as a more competitive personal income tax system and research facilities that provide a stimulating environment for scientific excellence.

Need to attract youth to specialized fields

There are clearly opportunities to make further advances in our learning institutions to ensure that our youth have the skills needed for employment, and that firms have a pool of skilled youth from which to draw to remain competitive. This is not just an issue for the academic community, industry also needs to be clear on what skills and competencies it needs.

The federal government has made some major progress in this area. The Youth Employment Strategy (YES) is an action plan that builds on the Government of Canada's existing investment of over $2 billion in Canadian youth. YES is designed to help Canada's youth make the transition from school to work through partnerships with business, labour, industry, not-for-profit organizations, communities and other levels of government. The objectives are to provide work experience to unemployed or under-employed youth and students, and to provide youth with access to relevant labour market information.

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[4]These high skill occupations include engineers, computer scientists and mathematicians, natural scientists, health professionals, managerial workers, and teachers.

[5]On average, around 480 engineers, 1,114 health professionals, and 1,935 managerial workers moved to the U.S. every year during the period 1990-1994.

The federal government, primarily through HRDC, has also developed a wide range of labour market/career information products. These products are designed to assist youth in making informed decisions about their careers. In addition, sector councils deliver a number of initiatives which help young Canadians enter the labour market (e.g. youth internship projects).

While considerable progress has been made, there is scope for improvement. Additional efforts may include improving access to career information products, providing better/more information on career opportunities in specific sectors (e.g. environment, automotive), increasing partnerships between industry and learning institutions to facilitate the school-to-work transition, developing mentoring/coaching programs so that business can provide more structured work experience to interns and apprentices, and providing Sector Councils additional support to roll-out promising school-to-work programs.

Attracting skilled workers from abroad

The federal government is addressing this challenge in three ways, namely through the software development worker pilot project, through upcoming reforms to Canada's *Immigration Act*, and the spousal employment authorization pilot. The *Software Development Worker Pilot Project* was developed by the Software Human Resource Council, in conjunction with Citizenship and Immigration Canada (CIC), HRDC, and Industry Canada, largely in response to critical shortages of software development workers. This pilot was launched to test 'fast track' validation for specific senior software development workers. The pilot will operate until December 31, 1998. CIC and HRDC are currently reviewing the evaluation of the pilot with a view towards incorporating successful practices into new immigration policies.

The Government of Canada intends to reform Canada's *Immigration Act*. This is an important piece of legislation that directly affects the quality and quantity of the labour pool available to Canadian firms across the country. Two areas of particular interest to industry are temporary foreign workers and the selection system for permanent immigrants. The dinner meetings provided an important forum for stakeholders to influence the outcome of these reforms.

On September 30, 1998, the Honourable Lucienne Robillard, Minister of Citizenship and Immigration, the Honourable Pierre Pettigrew, Minister of Human Resources Development, and the Honourable John Manley, Minister of Industry, announced a national one-year pilot project that will give Canada a competitive advantage in attracting key highly-skilled foreign workers. The pilot, which commenced on October 15, 1998, allows the spouses of certain highly skilled people coming to Canada as temporary workers to accept employment with more ease and fewer administrative processes. The occupations covered by the pilot include professional occupations in business and finance, engineering, natural and applied sciences, and health, as well as managerial occupations.

Skill shortages

Skill shortages are not a new phenomenon in Canada. Employers, governments and the media have highlighted concerns of skilled worker shortages over the past half century. As expected, attention paid to skill shortages tends to coincide with periods of strong economic expansion, when demand for skilled workers is the strongest.

Industry Canada and Human Resources Development Canada have conducted research and analysis to better understand the issue. The findings show that while there is little evidence of a skill shortage economy-wide, there is evidence of specific skill shortages at the sectoral/occupational level (e.g. information technology workers, R&D performing firms).

At the sectoral level, national sector councils, including BIOTECanada Human Resource Council and the Canadian Council for Human Resources in the Environment Industry, are addressing the skills gap issue. In addition, current and anticipated shortages of skilled trades people are being addressed in the context of the Automotive Competitiveness Review, which was recently conducted by the federal government.

3.2 Industry Canada - Role & Proposed Sectoral Initiatives

Canada's skills challenge can only be addressed through creative and effective partnerships involving not only governments and the education system, but also firms, professional associations, sectoral organizations, private training institutions, unions, and individuals themselves. Industry Canada will play a catalyst role in addressing the skills challenges facing industrial sectors, and will facilitate collaboration among all stakeholder groups in developing additional measures to address the issues.

A number of sectoral initiatives have been proposed, in response to the consultations, which support this role. While we have identified some sectoral initiatives, it is important to recognize that this is a starting point, and will provide the basis for further work by all the relevant stakeholder groups in addressing Canada's skills challenge. Within the federal government, Industry Canada will work in close collaboration with HRDC in the implementation of many of these initiatives.

National Aerospace Skills Symposium: In response to the identified need to increase stakeholder communication and facilitate partnerships, Industry Canada is currently planning a national skills symposium for January 1999. The symposium will bring together several sector companies, some selected training institutions, labour and CAD/CAM systems providers. The desired outcomes would be to achieve a clearer understanding of the current situation and trends regarding the use of CAD/CAM in the factory and in the

classroom, and develop associated strategies that could be used by companies, training institutions and individuals to work more closely together and more effectively in meeting the competitive challenges of the future. Key stakeholders will be consulted during the planning of the symposium to ensure the focus is on the correct issues (e.g. skills standards) and the appropriate approach is being taken to address them.

National Aerospace Sector Human Resource Council: The skills dinner, as well as a recently completed sector study on the skills and training situation in the industry, pointed to the value of a better coordinated sector-wide approach to identify and act on the human resource needs that are most important to the aerospace sector. Some stakeholders have suggested that this could best be achieved by the establishment of a National Aerospace Sector Human Resource Council. To advance this initiative, Industry Canada will obtain stakeholder views on the merits of such a council and the ground work necessary to foster its creation at the national skills symposium.

Automotive Human Resources Coordinating Body: Industry Canada will facilitate the creation of an automotive human resources coordinating body that would bring together all the segments of the sector (assembly, parts manufacturing, retail, repair and service) as well as other key partners (academia, labour, governments). The coordinating body could provide a conduit for information on human resource-related initiatives across the sector, determine where there are opportunities for shared action among the various stakeholders, and undertake specific activities through the establishment of task-oriented working groups. It could also act as an industry advocate in developing and recommending to government long-term structural solutions to the anticipated shortage of skilled workers. Industry representatives are already exploring with Industry Canada whether this broad-based approach is feasible and what opportunities it may provide.

Automotive Career Information Products: To build on existing initiatives which promote career awareness in specific sub-sectors, Industry Canada will explore, with industry and other partners, the feasibility of a sector-wide approach to career information products, which would not only provide targeted audiences (students, teachers, counsellors, parents) with a full menu of challenging career options, but also demonstrate the potential for career mobility across the sector.

Canadian Biotechnology Strategy (CBS): Industry Canada will continue efforts underway to implement the Canadian Biotechnology Strategy (CBS) in partnership with the provinces, industry and other stakeholders. The CBS includes a comprehensive, long-term policy framework that provides for the overall growth and development of the biotechnology industry, a new external advisory board, and strengthened international machinery for coordinating the federal government's biotechnology activities. Creation of the new Canadian Biotechnology Advisory Committee, research and development, the regulatory system and international affairs have been identified as priorities for early consideration. Human resources are central to the latter three. In addition, actions which

address human resource issues will be implemented over the medium-term, and will focus on increasing the availability and skill sets of technical and managerial personnel, developing strategies to meet the skill needs in regulatory departments, and addressing the impediments to international recruitment of highly qualified personnel and experienced managers.

Support to BIOTECanada Human Resource Council (BHRC) and the Canadian Council for Human Resources in the Environment Industry (CCHREI): Industry Canada will continue to forge partnerships with the many stakeholders in the biotechnology and environment community to jointly formulate strategies that address skills challenges, and to provide support for many initiatives already underway. For example, we will support the work of the BHRC and CCHREI, which we see as a primary vehicle for working with industry in the development of new skills strategies and programs.

4. Concluding Remarks

In closing, the consultations brought stakeholders together to share experiences and perspectives on the nature of the skills challenge, share insights on what works, and consider the need for further actions to address Canada's skills challenge.

We have highlighted the progress the federal government has made to date on the skills front, and areas where we need to focus in the near future. We have also identified several sectoral initiatives that address some of the issues raised during the consultations. It is important to recognize that this is a starting point. It is also critical to understand that all stakeholders have a role to play in addressing Canada's skills challenge, and that we can only make advances in addressing the issues raised through creative and effective partnerships.

ANNEX A

ENVIRONMENT SECTOR SUMMARY REPORT

1. Background

On April 21, 1998, the Honourable Ron Duhamel chaired a dinner to discuss the skills challenge facing the environment industry (see Attachment A for agenda). It was the first of four dinners focussed on addressing the skills-related challenges of key sectors (environment, automotive, biopharmaceutical and aerospace). Various stakeholders attended the dinner meeting, namely industry leaders, academia and senior federal government officials.

The objectives of the dinner meeting were to:

- raise awareness of the scope and magnitude of the skills challenge facing the environment industry;
- identify best practices; and
- encourage a dialogue on what additional measures might be considered (including short-term adjustment measures and long-term structural responses) to address the skills challenge.

II. Skills-Related Challenges Facing the Sector

The Canadian environment industry is an emerging industry, and one which is relatively young. The industry is dependent upon a multi-disciplinary and cross-sectoral workforce. It employs a broad range of people encompassing a wide variety of skills and occupations. Many of those working in the industry are highly educated; according to the Canadian Council for Human Resources in the Environment Industry (CCHREI), 71 percent of environmental employers demand a university degree.

The industry also encompasses a wide range of different products and services. Many companies in the industry provide both environmental and non-environmental services. As a result, it is a difficult industry to classify and quantify. This, in turn, makes it difficult for industry to determine current and future skill requirements.

In recent years, progress has been made to define the industry and identify the skills-related challenges that it faces. During the dinner meeting, there was general consensus amongst the stakeholders that the key skills-related challenges are:

- skill shortages;
- the need to attract youth; and
- the need for skills upgrading.

Skill Shortages

There was broad consensus that the industry requires three broad types of skills, namely, technical skills, management skills, and generic employability skills. There was an implicit, but unstated assumption that the various academic and private institutions are doing a reasonable job of providing the appropriate technical skills. However, there was a strong consensus amongst industry stakeholders that there is a *lack of management skills* and *lack of generic employability skills* amongst current practitioners. It was noted that most practitioners have a technical background in science and engineering, and as a result do not possess some of the "softer" skills.

Management skills were viewed as critical to the competitiveness of the environment industry, particularly as firms grow from small businesses into larger organizations. Given that the industry is characterized by small, high growth firms, management skills will be key to reach the next stage in the development of the company.

There was also general consensus amongst stakeholders that there is a lack of generic employability skills. Generic employability skills include cognitive skills, interpersonal skills, language skills, and self-management skills.

Need to Attract Youth

Canada's domestic market for environmental goods and services is expected grow to $22 billion by the year 2000.[6] To respond to this growth, the industry will need to ensure it has a pool of skilled labour to draw upon. A key source of supply of skilled labour is youth.

Some participants suggested that there is a lack of understanding of environmental career opportunities by youth. This lack of awareness is inevitably affecting the fields of study that youth choose to pursue. It was noted that the challenge is not only to attract youth into the industry, but also to ensure that they possess the skills demanded by industry.

Need for Continuous Skills Upgrading

Rapid technological change, as well as changes in environmental legislation and regulation, are key characteristics of the industry. Continuous upgrading of skills is necessary to cope and benefit from these changes. It was noted that the industry requires an on-going commitment to upgrading the skills and knowledge of its workforce in order to maintain its competitiveness.

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[6] *A Strategy for the Canadian Environmental Industry*, Industry Canada and Environment Canada, 1994.

III. Best Practices to Address Skills Challenge

The Canadian Council for Human Resources in the Environment Industry (CCHREI) has implemented a wide range of initiatives to ensure that Canada has an adequate supply of people with the skills and knowledge required to meet the environmental human resource needs of the public and private sectors. The CCHREI has either completed or is currently working on developing national occupational standards for environmental jobs; certifying people who have environmental jobs; accrediting environmental courses and programs; helping young Canadians enter the environmental labour market; promoting communication and cooperation between industry, government and the academic community; and conducting research on the environmental labour market.

The CCHREI initiatives which solicited particular attention from the participants were those which facilitate the school-to-work transition. In particular, the *National Youth Internship Program* was highlighted as an effective program which ensures that students make a smooth transition from school to work by having the skills and knowledge relevant for environmental employment. The three-year cooperative program comprises one semester of college and two semesters of work experience each year. At the end of the program, graduates are eligible for certified technician status. Industry is involved in every aspect of the program, from student selection to curriculum design.

IV. Additional Measures to Address Skills Challenge

During the dinner meeting, a number of ideas were put forward by participants on how best to respond to the skills challenge. The solutions can be categorized as those which support ***pre-employment skills acquisition,*** and those which support ***lifelong learning***.

The suggestions that participants put forward that support ***pre-employment skills acquisition*** were:

- colleges/universities could add an additional year (year 4 or 5) to a program to teach generic employability skills or management skills;
- colleges/universities could modify the existing curricula of traditional sciences to incorporate environment and business issues;
- standards for educational programs should be developed and applied consistently by academic institutions across Canada;
- colleges and universities should specialize more -- currently there are too many institutions offering similar programs, with similar course content;
- better information on career opportunities should be developed, and awareness of careers in the environmental field should be increased;
- make role models more visible in order to inform and influence the career paths of youth;

- practitioners could teach courses in universities/colleges; and
- industry needs to work more closely with the academic community to develop new programs in areas of high demand, which will prepare students to work in industry.

The additional measures which support ***lifelong learning*** are:

- standards for training programs should be developed, and should be consistent from one organization to another;
- industry should provide more mentoring/coaching to its employees, particularly recent graduates; and
- develop strategies that ensure labour mobility.

V. Summary Remarks

The dinner meeting was considered successful by participants in a number of important areas. In particular, it was the first occasion where the various stakeholder groups met to discuss the skills issue, thus enabling participants to develop networks. The meeting also built momentum for further action.

A number of key themes emerged from the dinner meeting, namely:

Partnerships are key: A coordinated effort among the relevant players - industry, academia and government - will be required to ensure the industry meets its full economic and employment potential.

Long-term responses are key: While short-term adjustment measures are necessary, long-term structural responses will be key to addressing the skills challenge.

Communication is essential: The communication flows need to be improved on three fronts; between industry and academia, among departments within an academic institution, and between private sector training organizations and academic institutions.

ATTACHMENT A

AGENDA

April 21, 1998
6:30 p.m. - 10:00 p.m.

Industry Canada
235 Queen St., Ottawa
Executive Dining Room, 11th Floor East

6:30 - 7:00	**Reception**
7:00	**Welcome and Opening Remarks: Public Policy Backdrop** The Honourable Ron J. Duhamel, Secretary of State, Science, Research and Development
7:10	**Dinner**
8:00 - 8:15	**Overview of the Nature of the Skills Challenge** Paul Antle, President & CEO of SCC Environment, Member of NRTEE, Past Chair of the Canadian Environmental Industries Association
8:15 - 8:30	**Best Practices & Additional Measures to Address the Skills Challenge** Grant Trump, Executive Director & CEO, Canadian Council for Human Resources in the Environment Industry
8:30 - 9:50	**General Discussion**
9:50 - 10:00	**Closing Remarks** Kevin G. Lynch, Deputy Minister, Industry Canada

ANNEX B

AUTOMOTIVE SECTOR SUMMARY REPORT

I. Background

On May 7, 1998, the Honourable Ron Duhamel chaired a dinner meeting to discuss the skills challenges facing the automotive sector (see Attachment A for agenda). It was the second of four dinners focussed on addressing the skills issues of key sectors of the economy (environment, automotive, biopharmaceutical and aerospace). Various stakeholders attended the dinner meeting, namely industry leaders, academia, and senior federal government officials. The industry stakeholders represented vehicle assemblers, parts manufacturers, and retailers.

The objectives of the dinner meeting were to:

- raise awareness of the scope and magnitude of the skills challenges facing the automotive sector;
- identify best practices; and
- encourage a dialogue on what additional measures might be considered (including short-term adjustment measures and long-term structural responses) to address the skills challenges.

At the time of the dinner, the federal government, in partnership with the automotive industry, was conducting an Automotive Competitiveness Review (ACR). During the ACR, the industry identified a number of issues that potentially affect the competitiveness of Canada's automotive industry -- human resources was one of four issues identified.

The ACR was completed in June 1998. In fall 1998, the Automotive Advisory Committee will resume its activities and consider how it will address recommendations flowing out of the ACR.

II. Skills-Related Challenges Facing the Sector

Canada's automotive sector is one of the most successful and competitive in the world. The Canadian automotive sector is wide-reaching, employing about 536,000 Canadians in manufacturing plants producing light-duty vehicles, trucks, buses, and parts and accessories; vehicle dealerships; and after market retailing establishments located across Canada.

According to Statistics Canada, the automotive manufacturing sub-sector (includes motor vehicle assembly, motor vehicle parts and accessories, and trucks and buses) employed 159,600 people in 1997. The automotive retail sub-sector, which includes new car dealers, used car dealers and after market service and parts retailers, employed 376,500 people in the same year.

During the 1990s, the automotive sector invested heavily in new manufacturing processes and technologies, including just-it-time inventory systems, total quality management programs, computer-aided manufacturing and computer-aided design. The adoption of these new and more sophisticated and complex processes and technologies has increased the sector's need for a more highly skilled work force.

During the dinner meeting, there was general consensus among the stakeholders that the key skills-related challenges are:

- skill shortages;
- the need to attract youth; and
- the need for skills upgrading.

Skill Shortages

The lack of skilled trades people emerged as a key concern among participants. Skilled trades people - such as tool and die makers, industrial electricians, and general machinists - are currently in short supply and the industry anticipates future shortages. Of particular concern to some participants was the shortage of design engineers; it was noted that they are critical to creating jobs in the automotive industry.

Automotive retailers are facing a similar challenge in the area of skilled trades as they must attract highly skilled technicians that are able to service new vehicle technologies. Moreover, as retailing becomes a more technically complex and knowledge-intensive industry, entrepreneurial capacity is also viewed as a critical source of competitive advantage. Developing that capacity means ensuring that retailers are able to complement technical knowledge with softer skills in such areas as management, marketing and sales.

According to the Automotive Parts Manufacturers' Association (APMA), over the next 2-7 years the automotive parts manufacturing sector anticipates a loss of 2,600 skilled trades people through retirements and other attrition. At the same time, the sector will need an additional 300-500 trades people to manage anticipated growth. Combined, this will result in a demand for 3,000 to 4,000 skilled trades people in the sector. Without an adequate supply of skilled labour, parts manufacturers will not be positioned to grow into complete system suppliers, nor will they be able to expand their operations.

Need to Attract Youth

The need to attract youth was identified as a major challenge for vehicle assemblers, parts manufacturers and retailers. Participants representing both the vehicle assembly and parts manufacturing sub-sectors noted that current enrollment in skilled trades is insufficient to meet the anticipated demand. It was suggested that these sub-

sectors need to improve their image by raising awareness of the challenging career opportunities requiring high tech knowledge. It was also noted that students and their advisors (parents and educators) must be better informed of the career opportunities, and advisors should encourage youth to enter these areas of work.

Stakeholders representing the automotive retail sub-sector viewed the need to attract youth as the greatest skills-related challenge. It was suggested that the sub-sector needs to enhance its image as a provider of meaningful career opportunities for young Canadians at the secondary and post-secondary school level. It was noted that the image problem impedes the ability to attract new people into the sub-sector. It was also suggested that automotive retailers address their pay incentives, hours of work, and career growth opportunities.

Need for Skills Upgrading

As the technology-intensive Canadian automotive sector engages in more sophisticated technology implementation, it increasingly requires its labour force to be able to integrate competency in specific industrial skills and advanced computer technology with essential trade knowledge. In this regard, participants suggested that industry needs to commit to upgrading the skills of its workforce, in order to respond to rapid technological change and maintain its competitiveness.

III. Best Practices to Address Skills Challenge

The Canadian automotive sector has implemented a wide range of initiatives to respond to the skills challenge. The following best practices are those which were highlighted during the discussions. However, they serve only as illustrative examples of the many best practices that various stakeholders have implemented.

Windsor Experiment: Chrysler Canada, in partnership with government and educational institutions, has launched a number of initiatives collectively referred to as the Windsor Experiment. The Windsor Experiment conducted studies to benchmark "best practice" training and education in Europe, and applied the results in innovative skills development programs for young Canadians.

One outcome is the Automotive Manufacturing Skills Initiative (AMSI). This pilot project was launched at St. Clair College in Windsor in January 1998. It is spearheaded by Chrysler Canada Ltd., in conjunction with the Canadian Auto Workers (CAW), and supported by the federal government. AMSI is a unique approach to skills development which combines competency in specific industrial skills with essential trade knowledge and advanced computer technologies. It combines on-the-job and off-production learning approaches.

Successful participants will achieve dual qualifications, a St. Clair College Diploma in the relevant engineering specialty as well as a Certificate of Apprenticeship. Youth participants will earn a Certificate of Apprenticeship on completion of 7,904 hours of education and work experience.

Co-op programs: Co-op programs facilitate the school-to-work transition. It was noted at the dinner meeting that Canadian graduates with co-op experience are three times more likely to find employment in their field of study than graduates without co-op experience.

An illustrative example of an effective co-op program is the three-year Automotive Marketing Program offered at the Canadian Automotive Institute (CAI) at Georgian College. It is funded largely by industry and focuses on automotive careers.

Human Resources Study of the Canadian Automotive Retail Industry: In March 1998, Human Resources Development Canada (HRDC) and Industry Canada launched a ten-month study of human resource needs in the Canadian automotive retail industry. The study will assess the challenges facing employers and workers in Canadian new and used vehicle dealerships, automotive service centres, and after market parts retail outlets. It will also suggest directions for future actions.

HRDC is supporting the study with $539,000 from its Sectoral Partnerships Initiative, and industry will match this commitment through in-kind contributions of time, expenses and data. The study is an important early outcome of the Automotive Competitiveness Review.

Toyota Canada: Recently, Toyota Canada established Toyota University to organize and upgrade its previous department-specific training programs and implement an educational culture. This effort is linked to a long-term strategic planning/vision process to ensure new programs are adequate for the future. Major emphasis will be placed on distance learning techniques.

Georgian College: Georgian College is actively engaged in developing a Center for Automotive Expertise. The areas of focus will include auto parts design; auto parts manufacturing technology; auto marketing; skilled trades apprenticeships in tool and die, robotics and automation; and electronic system design and the more traditional trades.

IV. Additional Measures to Address Skills Challenge

During the dinner meeting, a number of ideas were put forward by participants on how best to respond to the skills challenge. The solutions can be categorized as those which address the challenges of the vehicle assembly and parts manufacturing sub-sectors, and those that address the retail sub-sector. They can be further classified as those which support ***pre-employment skills acquisition*** and ***lifelong learning***.

Proposed Measures Which Address Challenges of Automotive Vehicle Assembly and Parts Manufacturing Sub-Sectors

The proposed solutions which address ***pre-employment skills acquisition*** were:

- fund business-education partnership infrastructure;
- offer incentives for business-education partnerships;
- offer a tool tax deduction in order to encourage youth to become technicians;
- increase awareness of youth of challenging career opportunities;
- rethink the entrance level marks for engineering programs; and
- consider non-traditional styles of learning (e.g. tele-learning) as part of the solution.

The additional measures which support ***lifelong learning*** were:

- provide incentives for employer-based training (e.g. training tax credits based on training completion); and
- industry should implement training/mentoring programs.

The proposed solutions which address both dimensions of the skills challenge - ***pre-employment skills acquisition*** and ***lifelong learning*** - were:

- disseminate information on best practices;
- benchmark best practices that deal with skill shortages;
- implement a campaign to address the skills challenge;
- federal government should coordinate business, education and provincial efforts to alleviate shortages;
- federal government should quantify current skill shortages, forecast demand for occupations/skills (using sources such as Statistics Canada), and document the factors contributing to skills shortages; and
- federal government should address the need for ongoing funding to support skills development initiatives (e.g. apprenticeship programs).

Proposed Measures to Address Challenges of the Automotive Retail Sub-Sector

The ideas put forward by participants which address ***pre-employment skills acquisition*** were:

- improve existing web sites by including information on retailing careers and adding links to other sites;
- increase awareness of career opportunities in automotive retail sector in order to attract youth; and
- improve the image of the automotive retail sector in order to attract youth.

The additional measures which support ***lifelong learning*** were:

- extend R&D tax credits to include non-engineering and non-scientific research, thereby recognizing and supporting the innovation and potential spin-offs; and
- create a Centre of Excellence in Retailing -- the Centre would be part research, part laboratory, and part training ground.

The proposed solutions which address both ***pre-employment skills acquisition*** and ***lifelong learning*** were:

- broaden application of good industry initiatives presently underway which have to date been "localized" to either geography or particular associations or companies (e.g. UCDA's code of ethics and dealer training programs, CAJAD's educational tape programs and innovative employee testing systems); and
- compile a list of international best practices (particularly in the U.S.) which would enable Canadians to make more use of them.

V. Summary Remarks

A number of key themes emerged from the dinner meeting, namely:

Critical skill shortages: The current shortage and anticipated future shortage of skilled trades people are key concerns of the automotive sector. Solutions must be developed in order for the sector to maintain its competitiveness.

Partnerships are key: A coordinated effort among the relevant players - industry, academia and government - will be required to ensure the industry meets its full economic and employment potential.

Long-term responses are essential: While short-term adjustment measures are necessary, long-term structural responses will be key to addressing the skills challenges.

Role of federal government: The federal government should play a catalyst role in addressing the skills challenges, and should facilitate collaboration across levels of government in developing additional measures that address the challenges.

ATTACHMENT A

AGENDA

May 7, 1998
6:30 p.m. - 10:00 p.m.

Industry Canada
235 Queen St., Ottawa
Executive Dining Room, 11th Floor East

6:30 - 7:00	**Reception**
7:00	**Welcome and Opening Remarks: Public Policy Backdrop** The Honourable Ron J. Duhamel, Secretary of State, Science, Research and Development
7:10	**Dinner**
8:00 - 8:15	**Overview of the Nature of the Skills Challenge, Best Practices & Additional Measures to Address the Skills Challenge: Automotive Parts Manufacturing Sector** Gerald Fedchun, President of the Automotive Parts Manufacturers' Association
8:15 - 8:30	**Overview of the Nature of the Skills Challenge, Best Practices & Additional Measures to Address the Skills Challenge: Automotive Retail Sector** Brian Caldwell, Executive Director , Canadian Association of Japanese Automobile Dealers
8:30 - 9:50	**General Discussion**
9:50 - 10:00	**Closing Remarks** John Banigan, Assistant Deputy Minister, Industry Sector, Industry Canada

ANNEX C

BIOPHARMACEUTICAL SECTOR SUMMARY REPORT

I. Background

On June 9, 1998, the Honourable Ron Duhamel chaired a dinner to discuss the skills challenge facing the biopharmaceutical industry (see Attachment A for agenda). It was the third of four dinners focussed at addressing the skills-related challenges of key sectors (environment, automotive, biopharmaceutical and aerospace). Various stakeholders attended the dinner meeting, namely industry leaders, academia, senior representatives of the research councils, and senior federal government officials.

The overriding objective of the dinner was to build on what has been accomplished to date, namely the *Sixth Report of the National Biotechnology Advisory Committee (NBAC): Leading in the Next Millennium* and the plan for revitalizing the *Canadian Biotechnology Strategy (CBS)*. The dinner meeting also aimed both to encourage a dialogue on what additional measures might be considered (including short-term adjustment measures and long-term structural responses) to address the skills challenges, and to create momentum for meaningful action in a number of fora.

II. Skills-Related Challenges Facing the Sector

The Canadian biopharmaceutical industry is a young industry, still in its formative stages. As a result, Canadian companies perform a considerable amount of R&D, but only a few products have been marketed. There are currently over a hundred products in Canada's development pipeline. In contrast, the U.S. biopharmaceutical market is maturing, and dominates the global biopharmaceutical market.

Since 1990, growth has been particularly strong, such that there are now approximately 60 biopharmaceutical companies in Canada and the number is growing by about 10 percent per annum. The industry is expected to move increasingly into the commercialization stage over the next 5 years.

The industry employs about 4,000 people, of which 1,600 are highly qualified personnel directly involved in R&D.[7] The industry is dependent upon a multi-disciplinary workforce. It requires a ***broad spectrum of skills***, including financing, project management, intellectual property protection, expertise in taking new products through the regulatory process, strategic alliance building, marketing, research, and generic-employability skills (e.g. communication skills). Moreover, the industry has different skill needs as it progresses from a focus on R&D to one of commercialization.

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[7]Government of Canada (1998). Health Sector Consultation Document: Renewal of the Canadian Biotechnology Strategy.

During the dinner meeting, there was general consensus amongst the stakeholders that the key skills-related challenges were:

- shortages of experienced managers;
- shortages of regulatory affairs experts;
- retaining skilled workers;
- attracting skilled workers; and
- inadequate training at the university level.

Shortages of experienced managers

The rapid growth of the Canadian biopharmaceutical industry has outstripped the supply of skilled industry managers with the necessary scientific background. Further, the existing base of biopharmaceutical companies in Canada from which newer companies can draw experienced managerial talent is very limited. Senior managers are necessary to develop a biopharmaceutical company to maturity.

Managers must possess a broad range of skills, especially because the skill requirements change from start-up to maturity. Skilled managers must be able to manage the ongoing financing of R&D and company operations, develop effective strategies for management of technology and intellectual property, take new products through the regulatory process, negotiate and manage strategic alliances, as well as projects and human resources.

In light of the skill shortages, some participants suggested that they are recruiting managers and senior scientists from the U.S. It was noted that the U.S. is a more mature industry, and as such experienced managers possess the broad range of skills required by industry (for each stage of development).

Shortages of regulatory affairs experts

The biopharmaceutical industry is considered one of the most heavily regulated of industries. As more and more Canadian companies have products in later stages of development, the need is increasing rapidly for skilled personnel with knowledge of the domestic and international regulations pertaining to biopharmaceutical products.

There was consensus that the shortage of regulatory affairs experts in the biological area has led to inordinate delays in product approval times, placing Canadian companies at a disadvantage vis-à-vis international competitors. Furthermore, there has been a steady drain of experienced personnel from government into the private sector, leading to shortages of skilled regulatory personnel in government.

Retaining skilled workers

Retaining highly skilled workers required for a successful biopharmaceutical industry is proving to be a major challenge. It was noted that a number of highly skilled workers are moving to the U.S. For instance, according to the *Sixth Report of the National Biotechnology Advisory Committee (NBAC): Leading in the Next Millennium*, up to 1990 (the most recent compilation of statistics), Canada lost 30 percent of its star genetic researchers. The best scientists are critical to affecting both the pace of scientific diffusion, and the timing, location and success of its commercial applications.

A number of factors were identified as contributing to brain drain, namely the eroding science base due to the lack of federal funding, inadequate research facilities, personal income tax rates, and the value of the Canadian dollar. It was also noted that brain drain is having a significant impact on the growth of the industry.

Attracting skilled workers

Attracting skilled workers is another challenge facing the industry. It was noted that immigrants represent an important source of skilled labour. As such, immigration can play an important role in alleviating critical skills shortages as well as help meet future skill needs. In order to attract highly skilled workers from abroad, Canada needs the right policies in place.

Some concerns were expressed regarding current immigration policies. With respect to temporary workers, it was noted that the current immigration process is not flexible enough to meet urgent skill needs. It was suggested that the immigration process be fast tracked for select positions, such as medicinal chemistry, synthetic chemist, director of regulatory affairs, bio-informatician, mass spectrometry, pharmaco-kinetics, drug development, and process development. It was also noted that the inability of spouses to work is a barrier to attracting skilled labour.

However, some participants suggested that focussing on immigration policy as a key solution to skills-related challenges would be an incomplete approach, largely because it is a short-term solution. While short-term measures are necessary, a key theme was that long-term structural responses will be key to addressing the skills challenges.

Some participants noted that a key impediment to attracting skilled labour, particularly key executives, was high personal income tax rates. Other factors that were identified as making it difficult to attract skilled workers were the value of the Canadian dollar and decreased program funding.

Inadequate training at universities

There was general consensus that training at the university level was inadequate in two respects; namely, that graduates did not possess the range of skill required by industry (e.g. technical, financing, project management), and that the infrastructure was inadequately funded to ensure graduates have access to well-equipped labs.

It was noted that Canada has a lack of programs to nurture the management skills, such as product development, strategic alliance management, international regulation and technology transfer, required by Canadian biopharmaceutical companies. It was suggested that this multi-disciplinary training is available in the U.S., which places Canada at a competitive disadvantage.

There was strong consensus that the infrastructure is inadequately funded to foster skills development in Canada. Government funding constraints affecting basic research in universities, research institutes, and teaching hospitals have limited the capacity of universities to develop post graduates and to invest in facilities. This affects not only the quantity of scientific and technical graduates, but also the quality. While it was acknowledged that the 1998 Budget increased funding for the three granting councils, there was strong consensus that additional funding was necessary.

III. Best Practices to Address Skills Challenge

BIOTECanada Human Resource Council (BHRC)

The BHRC was established on April 1, 1997 in response to a series of recommendations proposed by *Building Long-Term Capability Now*, a joint industry-government study on the Canadian biotechnology human resources situation. The Council, in partnership with all stakeholders (industry, academia and government) helps to develop, train and retain a highly-skilled workforce to allow the sector to grow and increase its international competitiveness.

In order to fulfill its mandate, the BHRC is developing and delivering a number of projects, including:

> *University and College Programs Review:* BHRC is collecting data on the biotechnology and biotechnology-related programs offered by Canadian colleges and universities. This data will be used compare current program offerings with the competency requirements of industry in order to identify any gaps in post-secondary training. In addition, the BHRC will prepare a status report for universities and colleges, with a view to having a long-term impact on the design and content of new programs. The Programs Review and its analysis was completed in May 1998.

Biotechnology Skills Inventory: The BHRC is preparing an inventory, to be completed in fall 1998, of the skills required for a series of biotechnology job categories.

Biotechnology Careers and Programs Reference Guide: BHRC is developing a national guide to careers available in the biotechnology industry in Canada. This guide will describe the career opportunities available, educational training requirements, and the Canadian post-secondary institutions offering suitable training. The Guide will be available at the start of the 1998/99 school year.

Canadian Biotechnology Job Bank: The BHRC currently maintains a databank of resumés of skilled biotechnology employees and potential employees, and available biotechnology positions.

Training Program Series: Select training programs under consideration include: entrepreneurship/commercialization, scientific management, regulation and compliance, intellectual property strategies, biotechnology financing, essential skills (e.g. communication).

The BHRC is also establishing a number of task forces to focus on the specific training or knowledge requirements of different segments of the biotechnology community. The following task forces are being established: skills development, labour market research, standards/certification, career development, and immigration strategies. Each task force will serve an advisory role to the BHRC, evaluate data, and help coordinate the projects and activities targeted at their area communities.

Canadian Biotechnology Human Resources Study

Prepared by the Paget Consulting Group Inc., a study entitled *Building Long-Term Capability Now: Canadian Human Resources Study in Biotechnology* was released in May 1996. It was initiated by industry to improve understanding of the challenges the sector faces and to chart a future course for meeting its long-term human resource requirements.

National Biotechnology Advisory Committee:

In 1983, a National Biotechnology Strategy was launched in Canada and an external advisory body was formed to provide advice at the ministerial level. Since then, the National Biotechnology Advisory Committee (NBAC) has published five reports on the Canadian biotechnology industry. In 1998, the *Sixth Report of the NBAC: Leading in the Next Millennium* was published.

The report has five major elements, each of which is supported by recommendations. The report contains some 40 recommendations designed to pinpoint the specific changes members believe government should act on if Canada is to grow as a global leader in this field. Of these, among the top three priorities are the *availability of highly qualified human resources* (see Attachment B for a list of specific recommendations).

Concurrent Two Degree Programs

Canadian universities are beginning to respond to industry needs. A number of universities have recently developed concurrent two-degree programs to ensure that graduates acquire both technical skills and other skills (e.g. management). For example, the Department of Chemical and Biochemical Engineering at the University of Western Ontario (UWO) has developed a number of programs, effective September 1998, including B.E.Sc. and Honours Business Administration (5 years), B.E.Sc. and B.A. in Economics (5 years), B.E.Sc. and Law (6 years), B.E.Sc. and B.Sc. in Environmental Science (5 years), and a B.E.Sc. and B.Sc. Scholars Electives Program in Genetics.

IV. Additional Measures to Address Skills Challenge

During the dinner meeting, a number of recommendations were put forward by participants on how best to respond to the skills challenge. The solutions can be categorized as those which support ***pre-employment skills acquisition*** and ***lifelong learning***, and those that address ***immigration and emigration flows***.

The additional measures that participants put forward which support ***pre-employment skills acquisition*** were:

- invest more in infrastructure to ensure that we are producing highly skilled graduates;
- provide substantial funding to one or two designated universities that will dedicate the resources to scientific discovery in two or three scientific areas (e.g. genomics);
- invest in research facilities to make them world-class;
- federal government to work with the provinces on the skills issue, as the issue needs to be addressed at the K-12 level;
- build more Centres of Excellence;
- increase funding to existing Centres of Excellence;
- universities to provide more multi-disciplinary training; and
- develop innovative new curricula in biochemical engineering/biotechnology.

The solutions which address both ***pre-employment skills acquisition*** and ***lifelong learning*** were:

- provide better information on the Canadian labour market (e.g. demographics, trends, immigration/emigration flows, types of skills needed, skill shortages);
- understand if/how we can affect labour market trends in the short/middle term (e.g. compensation, taxes, education, training); and
- develop a biotechnology strategy for training at different levels, which includes high schools, community colleges, universities (undergraduate and graduate), continuing education, and university professors.

The additional measures that address ***immigration and emigration flows*** were:

- ease immigration rules that hinder timely recruitment of highly qualified individuals;
- expedite the immigration process for select positions such as medicinal chemistry, bio-informatician, mass spectrometry, pharmaco-kinetics, drug development, and process development);
- provide work permits to spouses of qualified recruits;
- educate visa officers in foreign offices; and
- provide tax incentives to select, highly skilled workers to retain them.

V. Summary Remarks

A number of key themes emerged from the dinner meeting, namely:

Need a comprehensive framework/strategy: While the skills issue is important, it should be addressed as part of a comprehensive strategy. The strategy should examine all issues of relevance to the biopharmaceutical industry (e.g. regulatory framework, ethical considerations). The government should take a strategic vision and approach to addressing the issues. Some issues can be addressed quickly, while others require long-term structural responses.

Focus on long-term solutions: While short-term adjustment measures are necessary, long-term structural responses will be key to addressing the skills challenges facing the biopharmaceutical industry.

Broad spectrum of skill needs: The industry requires a broad range of skills, including technical and management skills. In addition, a company has different skill needs as it progresses from a focus on R&D to one of commercialization. Canadian universities are beginning to respond, by offering a number of two degree programs (e.g. B.E. Sc. and Honours Business Administration). However, the infrastructure is inadequately funded to foster skills development in Canada.

Partnerships are key: A coordinated effort and the resulting synergy among the relevant players - industry, academia and government - will be required to ensure the industry meets its full economic and employment potential.

Need to increase public awareness: While biotechnology (and biopharmaceuticals) presents opportunities to enhance the quality of life and contribute to jobs and growth, some applications raise ethical and social questions. There is a need to foster public awareness and build public confidence, as well as develop new mechanisms to systematically incorporate socio-ethical considerations. Highly skilled workers are necessary to manage the socio-ethical considerations.

ATTACHMENT A

AGENDA

June 9, 1998
6:30 p.m. - 10:00 p.m.

Industry Canada
235 Queen St., Ottawa
Executive Dining Room, 11th Floor East

6:30 - 7:00	**Reception**
7:00	**Welcome and Opening Remarks: Public Policy Backdrop** The Honourable Ron J. Duhamel, Secretary of State, Science, Research and Development
7:10	**Dinner**
8:00 - 8:15	**Overview of the Nature of the Skills Challenge** Jean Leroux, Executive Director, BIOTECanada Human Resource Council
8:15 - 8:30	**Best Practices and Additional Measures to Address the Skills Challenge** Dr. Argyrios Margaritis, Professor and Chairman, Department of Chemical and Biochemical Engineering, University of Western Ontario
8:30 - 9:50	**General Discussion**
9:50 - 10:00	**Closing Remarks** Shirley Serafini, Associate Deputy Minister, Industry Canada

ATTACHMENT B

SKILLS-RELATED RECOMMENDATIONS OF THE SIXTH REPORT OF THE NATIONAL BIOTECHNOLOGY ADVISORY COMMITTEE (NBAC)

1. NBAC recommends that industry, business schools and community colleges work together with the Biotechnology Human Resources Council to design executive development programs, master of business administration courses and certificate programs on managing international biotechnology companies. Specialized material should initially cover international trade, investment and alliance strategies, as well as international regulatory affairs in the areas of agriculture and pharmaceuticals.

2. NBAC recommends that the federal government ease immigration rules that hinder timely recruitment of highly qualified individuals and launch a recruitment drive for highly qualified biotechnology managers, provide work permits to spouses of qualified recruits and work with the Biotechnology Human Resources Council to address urgent human resource issues.

3. NBAC recommends that, in the absence of bringing Canada's marginal income tax rates into line with those of its competitors, the federal government adjust the tax rules to permit companies to provide offsetting tax breaks, such as a two-year tax-advantaged savings plan, for newly recruited highly qualified scientists and managers to encourage them to come to Canada.

4. To encourage entrepreneurs and would-be entrepreneurs to pursue innovative ideas and products, NBAC recommends that Industry Canada do the following:

    - develop a "virtual network" to allow like-minded individuals to network and link with successful industry mentors and business/managerial information sources, and provide the platform for an employment/recruitment network that reaches out to expatriate Canadians.

    Industry, business schools and colleges should do the following:

    - develop undergraduate programs and an apprenticeship/internship program at the postgraduate level to give science students vital business experience.

    To address the more urgent short term issue of skills shortage, NBAC recommends that Citizenship and Immigration Canada do the following:

- expedite the fast-track immigration process for biotechnology scientists and technology-transfer specialists.

5. NBAC recommends that industry, government and educators work together to ensure that Canada's youth are aware of the exciting careers in biotechnology, and that classroom outreach and alternative educational mechanisms are expanded and vigorously supported to strengthen "science culture" in Canada and, in particular, awareness of biotechnology.

ANNEX D

AEROSPACE SECTOR SUMMARY REPORT

I. Background

On June 15, 1998, the Honourable Ron Duhamel chaired a working dinner to discuss the skills challenges facing the aerospace industry (see Attachment A for agenda). It was the fourth and final dinner he hosted to discuss the skills-related challenges of key sectors (environment, automotive, biopharmaceutical and aerospace). Various stakeholders attended the meeting, namely industry leaders, academia, labour, and senior federal government officials.

The overriding objective of the dinner was to achieve consensus on the key skills-related challenges facing the industry. The dinner meeting also aimed both to encourage a dialogue on what additional measures might be considered (including short-term adjustment measures and long-term structural responses) to address the skills challenges, and to encourage subsequent collaboration among the various stakeholders on the skills issue.

II. Skills-Related Challenges Facing the Sector

Canada is one of the few nations with a full range of aerospace design and manufacturing capabilities and expertise. According to the *Statistical Survey Report (1997)* produced by Industry Canada, total industry sales in 1997 were $13.4 billion, representing an approximate doubling of real output over the period 1984-1997. The Canadian aerospace industry employed about 60,000 workers in 1997.

The aerospace industry is heavily concentrated in the provinces of Quebec and Ontario. Nonetheless, it is a major contributor to the economies of other provinces as well. The industry is also unionized, the largest union being the Canadian Auto Workers (CAW).

Because the aerospace industry relies on intensive use of both R&D and labour, the quality of its human resources is a critical element of the industry's competitiveness. The industry demands highly skilled workers; 47 percent of those employed in the industry have a university/college degree or have completed an apprenticeship program. The industry employs a significantly higher proportion of engineers and technicians than most other manufacturing industries. The production workforce is concentrated in higher-skilled occupations, such as fabrication, assembly, machining and mechanical repair.

The global aerospace industry is highly cyclical, which means that the industry's workforce experiences significant layoffs in a cyclical downturn and significant hiring in an upturn. Labour adjustment during the business cycles is therefore a major challenge, particularly vis-à-vis the retention and recall of skilled workers. Currently, the industry is experiencing unprecedented growth worldwide.

During the dinner meeting, there was general consensus amongst the stakeholders that the key skills-related challenges can be characterized as:

- retaining skilled workers;
- attracting skilled workers; and
- skill shortages.

Retaining skilled workers

Retaining highly skilled workers is proving to be a major challenge for the aerospace industry. The retention challenge is two-fold; competition from foreign firms and competition among firms for skilled labour.

While brain drain is occurring at all levels, including recent graduates and experienced workers, it is particularly acute for experienced workers. The outflow of skilled workers is mainly to the U.S. A number of factors were identified as contributing to brain drain, namely high personal income tax rates, higher technological challenges available in the U.S. (level and quality of R&D carried out attracts talent), and climate (political and weather).

It was also noted that some small- and medium-sized enterprises (SMEs) experience difficulties in retaining employees. A number of reasons were put forward, including lower access to development and advancement opportunities, and the high cost of technical training often resulting in a narrow, specialized training program for the functions performed.

Attracting skilled workers

There was strong consensus that attracting skilled workers is a major challenge facing the industry. The challenge has two dimensions. First, attracting skilled, experienced workers from abroad is difficult, as there are a number of problems associated with current immigration policies. It was noted that while there was an adequate supply of graduates from Canadian institutions, the challenge is in attracting skilled immigrants that have at least a few years of work experience in the aerospace industry. Second, some small- and medium-sized enterprises (SMEs) are experiencing difficulties in attracting new employees.

Immigrants represent an important source of skilled labour. Immigration can also play an important role in alleviating critical skill shortages, creating new jobs, encouraging investment in Canadian firms, and increasing our international competitiveness. It was noted that immigrants represent a significant percentage of the current aerospace workforce, and that attracting immigrants is particularly important given that the industry is experiencing high growth. As such, Canada needs the right policies in place to attract

highly skilled workers from abroad.

A number of concerns were expressed regarding current immigration policies. While participants recognized that Canada's Immigration Act is under review, they wanted to reiterate some of their concerns. With respect to temporary workers, it was noted that the current immigration process is lengthy and is not flexible enough to meet urgent skill needs. It was also noted that the inability of spouses to work, while waiting for landed immigrant status (which typically takes 12-28 months), is a significant barrier to attracting skilled labour.

It was noted by several participants that a major problem with the current selection system for permanent economic immigrants is that it presupposes that the skills and qualifications of successful applicants will be recognized once they immigrate to Canada. Yet, many skilled immigrants experience difficulties in gaining access to trades and professions -- in particular, in establishing their equivalency to Canadian credentials. In most cases, this results in highly skilled immigrants receiving little or, most often, no credit for their training and/or experience. This problem is exacerbated by the fact that, in Canada, responsibilities for education and training standards reside with the provinces and therefore differ across the country. To address this problem, it was suggested that Prior Learning Assessment and Recognition techniques be used as a tool for assessing the skills, education and work experience of highly skilled immigrants.

Some participants suggested that focussing on immigration policy as a key solution to skills-related challenges would be an incomplete approach. It was suggested that facilitating the entry of highly skilled temporary workers is a short-term solution. While short-term measures are necessary, a key theme was that long-term structural responses will be key to addressing the skills challenges. Moreover, while this is an attractive solution when the industry is experiencing high growth, in cyclical downturns skilled workers will be unemployed.

It was also noted that some small- and medium-sized enterprises (SMEs) experience difficulties in attracting new employees. A number of reasons were put forward, including the image of a small employer, the salaries/benefits offered, limited training offered, and the job function is usually narrow and specialized.

Skill shortages

The skill shortage problem is widespread, affecting most aerospace firms to varying degrees. There was general consensus that there are shortages of *experienced workers* and shortages of people with *engineering, scientific and technical skills*. The skill shortages arise largely because the industry is experiencing unprecedented growth. In this regard, it was noted that aerospace industrial growth is higher than the increase in the supply of engineering/technical graduates.

While there was no discussion of the specific skills currently in short supply, a recent study by Underdown Associates, entitled *Assessment of the Skills and Training Situation in the Canadian Aerospace Industry*, noted a number of specific shortages, including:

- machinists, CNC programmers and CNC machinist programmers;
- tool and die makers;
- engineers and engineering technologists; and
- software, systems and electronics engineers and technologists.

III. Best Practices to Address Skills Challenge

Ontario Aerospace Council

The Ontario Aerospace Council (OAC) has undertaken a collaborative initiative with the Ontario provincial government and several community colleges to upgrade the skills of manufacturing employees. The OAC has recently developed two training programs, namely *program and contracts management* and *aerospace manufacturing skills*. The programs have been developed in collaboration with five community colleges (Algonquin, Mohawk, Sheridan, Sioux and Seneca) and the Canadian Steel Trade and Employment Congress.

While the curricula and outcomes of the program (a certificate) are standardized, there is flexibility in how the courses would be delivered. The community colleges will be responsible for administering the program and ensuring that standards are met. The provincial government is providing $250,000 to cover the cost of curriculum development and testing. The curricula will provide a basis for common understanding of skill requirements across aerospace companies and educational institutions, and will ensure that workers are trained to meet industry wide requirements which will facilitate their movement within industry.

École Nationale d'Aérotechnique

This school, which is part of Collège Édouard-Montpetit, is a good example of an academia-industry partnership. The school offers three aviation technology programs, namely aircraft manufacturing technology, aircraft maintenance, and avionics. The programs are designed specifically for the aerospace industry and are recognized by Transport Canada. There are approximately 1,500 students enrolled in the three programs, and another 1,000 students within its continuing education and CAD/CAM centre. About 150 students per year participate in co-operative education programs and 15 students per year participate in international internships in foreign aeronautical schools or companies.

École Nationale d'Aérotechnique has over $40 million worth of training equipment, a substantial amount of which has been provided by industry. Industry is represented on the Program Committee, which evaluates and modifies programs, and on the Advisory Committee which makes policy decisions. Further, the school offers compulsory internships to industry, and proficiency training for instructors to keep pace with new technologies and practices.

Co-op programs and apprenticeship programs

Co-op programs facilitate the school-to-work transition. The use of co-op programs, which involves collaboration between academic institutions and firms, are widespread. Apprenticeship programs have also proven to be an effective industry-based model that combines work experience and formal training. Aerospace-related apprenticeable trades include machinist, tool and die maker, and sheet metal worker. Apprenticeship programs are also a well known mechanism for ensuring that employee skills meet a widely accepted standard.

IV. Additional Measures to Address Skills Challenge

During the dinner meeting, a number of recommendations were put forward by participants on how best to respond to the skills challenge. The solutions can be categorized as those which support ***pre-employment skills acquisition*** and ***lifelong learning***, and those that address ***immigration and emigration flows***.

The additional measures that participants put forward which support ***pre-employment skills acquisition*** were:

- need to develop short, specialized programs (up to 1 year) to respond to technological change and to address critical skill shortages;
- industry and academic institutions need to collaborate more in the development of training programs (e.g. apprenticeship and internship programs, co-op programs);
- need to encourage youth to pursue engineering, math and computer science degrees, given that the percentage of graduates with these degrees are lower than most OECD countries;
- need to improve the image of the aerospace industry by raising the awareness of youth of the challenging, high skill career opportunities;
- all stakeholders (industry, universities/colleges and governments) must adjust education and training efforts to reflect the demands of this high technology, rapidly evolving global aerospace industry
    - universities/colleges must take the lead to ensure that their graduates meet industrial competency requirements;

- governments, in partnership with industry and educational partners, must provide further inducements to permit the establishment of additional apprenticeship and co-op programs, particularly focussing on engineering, scientific and technical positions; and
- offer a tax credit to encourage employers to provide training
  - tax credit should target those individuals in apprenticeship programs in the skilled trades and students registered in university and college co-op programs.

The proposed solutions which address ***lifelong learning*** were:

- institutions need to expedite the process of accreditation for experienced workers;
- to address the cyclical nature of the industry, industry and universities should collaborate in such a way that when the industry is experiencing a down cycle, industry could second workers to universities to conduct R&D, and when the industry is experiencing high growth/demand, universities could second workers to industry;
- industry needs to provide more coaching/mentoring;
- need to ensure skills upgrading (e.g. short-term programs);
- need to provide employer-based training;
- industry needs to collaborate with universities on R&D; and
- provide a tax credit to employers for training of older workers.

The additional measures that would address ***immigration and emigration flows*** were:

- provide work permits to spouses of qualified recruits;
- ease immigration rules that hinder timely recruitment of highly qualified individuals by streamlining the immigration process for short-term (up to 3 years) work assignments (visas, work permits);
- with respect to the selection of permanent economic immigrants, rather than focussing mainly on paper credentials, assess immigrants using the methodology of Prior Learning Assessment and Recognition techniques -- this approach would involve:
  - assess immigrants using culturally and linguistically transparent assessment tools (e.g. tests, demonstrations, skills portfolios) devised by subject content experts to determine whether candidates have the necessary skills, knowledge and attitudes to practice their trades or professions in Canada
  - provide candidates with the results of the assessment, identifying both strengths and weaknesses
  - direct the candidate to an appropriate source to address weaknesses
  - give candidates an opportunity to be retested and accredited once they have taken the appropriate training;

- to attract skilled workers to Canada, need to better promote the quality of life; and
- reduce personal income tax rates in order to retain skilled workers.

The additional measures that were put forward by participants which support all three dimensions of the skills challenge, ***pre-employment skills acquisition***, ***lifelong learning***, and ***immigration and emigration flows*** were:

- collectively stakeholders need to seriously consider a renewed effort to establish a HR Sector Council; and
- in developing solutions, need to recognize the commonality of issues and solutions across sectors (e.g. aerospace manufacturing certificate is closely modelled after a similar initiative in the steel industry).

V. Summary Remarks

A number of key themes emerged from the dinner meeting, namely:

Industry is highly cyclical: The aerospace industry is highly cyclical, which means that the industry's workforce experiences significant layoffs in a cyclical downturn and significant hiring in an upturn. Labour adjustment during the business cycle is therefore a major challenge. In addressing the skills challenges of the industry, all stakeholders need to take the cyclical nature of the industry into account.

Prior learning assessment important: Prior learning assessment is the process of identifying, assessing and recognizing skills, knowledge or competencies that have been acquired through work experience, which may be applied toward academic credit, toward the requirements of a training program, or for occupational certification. Prior learning assessment should be used more widely.

Partnerships are key: A dialogue and coordinated effort among the relevant players - industry, academia, labour and government - will be required to ensure the industry meets its full economic and employment potential.

Role of federal government: The federal government should play a catalyst role in addressing the skills challenges, and should facilitate the work of various stakeholders in developing additional measures that address the skills challenges.

Focus on long-term structural responses: While short-term adjustment measures are necessary, particularly now as the industry is experiencing unprecedented growth, long-term solutions will be key to addressing the skills challenges.

Lifelong learning is essential: There needs to be a commitment by both employers and employees to life-long learning.

ATTACHMENT A

AGENDA

June 15, 1998
6:30 p.m. - 10:00 p.m.

Industry Canada
235 Queen St., Ottawa
Executive Dining Room, 11th Floor East

6:30 - 7:00	**Reception**
7:00	**Welcome and Opening Remarks: Public Policy Backdrop** The Honourable Ron J. Duhamel, Secretary of State, Science, Research and Development
7:10	**Dinner**
8:00 - 8:15	**Overview of the Nature of the Skills Challenge, Best Practices & Additional Measures to Address the Skills Challenge: Industry Perspective** Ken Laver, President, Messier-Dowty Inc.
8:15 - 8:30	**Best Practices & Additional Measures to Address the Skills Challenge: Academia Perspective** M^{me} Lucie Cousineau, directrice, École nationale d'aérotechnique, Collège Édouard-Montpetit
8:30 - 9:50	**General Discussion**
9:50 - 10:00	**Closing Remarks** Shirley Serafini, Associate Deputy Minister, Industry Canada

LIST OF PARTICIPANTS

ENVIRONMENT SECTOR

Industry

Grant Trump
Executive Director & CEO
Canadian Council for Human Resources
in the Environment Industry

Paul Antle
President & CEO, SCC Environmental

Dr. Jane Pagel
Vice-President, Corporate & Government Affairs
Phillip Services Corporation

Dr. David DuBois
Principal, Golder Associates Ltd.

Robert J. McCharles
Manager, Porter Dillon

Edward Pessah
E. & J. P. Enterprises Inc.

Manon Laporte
Chief Executive Officer, Enviro Acces

Hans Gruenwald
President, Hans Gruenwald Enterprises

Dr. Carole Burnham
Director, Consulting Projects
Hatch Associates

Ronald Portelli
President
Canadian Environment Industry Association

Mr. David Hopper
President, Angus Environmental

Mr. Larry O'Brien
Chief Executive Officer
Calian Technology Services

Academia

Dr. Paul West
Director, School of Environmental Studies
University of Victoria

Dr. Alex Murray
Faculty of Environment Science
York University

Dr. Ivan Filion
Vice-President, Academic & Student Services
Cambrian College of Applied Arts & Technology

Dr. Mike Roy
Executive Director
The Centre of Forest & Environmental Studies
College of the North Atlantic

Dr. Jim Nicell
Associate Professor, Department of Civil
Engineering & Applied Mechanics
McGill University

Jon Ogryzlo
Director, Environment Horticulture & Agribusiness
Division
Niagara College

Government

The Honourable Ron J. Duhamel
Secretary of State
Science, Research & Development
and Western Economic Diversification

Viviane Farmer
Departmental Assistant
Office of the Secretary of State

Kevin G. Lynch
Deputy Minister
Industry Canada

Shirley Serafini
Associate Deputy Minister
Industry Canada

John Banigan
Assistant Deputy Minister, Industry
Industry Canada

Lucien Bradet, Director General
Environmental Affairs Branch
Industry Canada

Ian Green
Associate Deputy Minister
Human Resources Development Canada

Robert Slater
Senior Assistant Deputy Minister
Environment Canada

Dr. Arthur J. Carty
President
National Research Council Canada

Michelle Gravelle
Policy Analyst, Industry & Science Policy
Industry Canada

AUTOMOTIVE SECTOR

Industry

Mike Walker
Director, Government Affairs
Chrysler Canada Ltd.

Tayce Wakefield
Vice-President, Corporate Affairs
General Motors of Canada Ltd.

Vaugn Hibbits
Vice-President, Administration
Honda of Canada Manufacturing

Wayne Jefferey
Vice-President, Toyota University

Don Amos
Vice-President
Administration and Human Resources
Magna International Inc.

Steve Reko
President
Reko Tool & Mould (1987) Inc.

Richard Gauthier
President
Canadian Automobile Dealers Association

Brian Caldwell
Executive Director
Canadian Association of Japanese Automobile Dealers

Dan Bell
President, Canadian Automotive Repair and Service Council

Gerald Fedchun
President, Automotive Parts Manufacturers' Associations

Bryan Gill
Executive Vice-President
Mechanical Assemblies
Ventra Group Inc.

Del Bruce
President
Canadian Progressive Tool & Transfer Ltd.

Beverly Cook
Vice-President
Automotive Industries Association of Canada

Labour

Robert Chernecki
Assistant to National President
CAW Canada

Academia

John McGee
President
St. Clair College of Applied Arts and Technology

Dr. Ross Paul
President & Vice-Chancellor
University of Windsor

Patricia Lang
Vice-President, Academic and Student Services
Georgian College

Sheldon Levy
President, Sheridan College

Government

The Honourable Ron J. Duhamel
Secretary of State
Science, Research & Development
and Western Economic Diversification

France Robidoux
Acting Executive Assistant
Office of the Secretary of State

Viviane Farmer
Departmental Assistant
Office of the Secretary of State

John Banigan
Assistant Deputy Minister, Industry Sector
Industry Canada

Jerry Beausoleil
Director General, Strategic Policy Branch
Industry Canada

Slawek Skorupinski
Director General, Automotive & Transportation
Branch
Industry Canada

Don De Jong
Acting Director General, Human Resources
Partnerships
Human Resources Development Canada

Michelle Gravelle
Policy Analyst, Industry & Science Policy
Industry Canada

BIOPHARMACEUTICAL SECTOR

Industry

Jean Leroux
Executive Director
BIOTECanada Human Resources Council

Rick Walter
Vice-President, BIOTECanada

Brenda Drinkwalter
Executive Director
Canadian Drug Manufacturers Association

The Honourable Judy Erola, P.C.
President, Pharmaceutical Manufacturers' Association of Canada

Michael Grey
President, BioChem Therapeutic

Andrew Storey
Director, Quality Assurance and Regulatory Affairs
Cangene Corporation

Robert Aubrey
Vice-President, Marketing and Sales
Biomira Inc.

Dr. Henry Geraedts
President and CEO
Chromos Molecular Systems Inc.

Academia

Dr. Argyrios Margaritis
Professor and Chairman, Department of Chemical and Biochemical Engineering
University of Western Ontario

Dr. Alan Shaver
Dean of Science, McGill University

Dr. Barry T. Smith
Dean of Health Sciences, Queen's University

Dr. Michael Sharratt
Dean of Applied Health Sciences
University of Waterloo

Dr. William C. Leggett
Principal and Vice Chancellor
Queen's University

George Hood
Associate Vice Principal, Research
Queen's University

Dr. Tom Hudson
Montreal General Hospital Research Institute

Research Councils

Dr. Arthur Carty
President
National Research Council

Dr. Henry Friesen
President
Medical Research Council

Nigel Lloyd
Director General, Research Grants
Natural Sciences and Engineering Research Council of Canada

Government

The Honourable Ron J. Duhamel
Secretary of State
Science, Research & Development
and Western Economic Diversification

Viviane Farmer
Departmental Assistant
Office of the Secretary of State

France Robidoux
Acting Executive Assistant
Office of the Secretary of the State

Shirley Serafini
Associate Deputy Minister
Industry Canada

David Good
Assistant Deputy Minister, Human Resources
Investment Branch
Human Resources Development Canada

Alan Nymark
Associate Deputy Minister, Health Canada

John Banigan
Assistant Deputy Minister, Industry Sector
Industry Canada

Michelle Gravelle
Policy Analyst, Industry & Science Policy
Industry Canada

George Michaliszyn
Director & Manager, Bio-Industries
Industry Canada

David Hoye
Director & Manager, Health Industries
Industry Canada

Mauril Bélanger
MP (Vanier, Ottawa)

AEROSPACE SECTOR

Industry

Jean-Louis Poirier, Vice President
Human Resources
Bombardier Aerospace Group - North America

Michel Gagne
Manager, Human Resources Development
Pratt and Whitney Canada, Inc.

Louis Fortin
Vice President, Human Resources
Bell Helicopter Textron Incorporated

Hugh I. Mitchell
Vice President, Human Resources
CAE Électronique Limitée

Carey Smith
President, Lockheed Martin Canada

Steve Kirchgessner

Rodney I. Jones
Executive Director, Ontario Aerospace Council

Serge Tremblay
Directeur général
Association québécoise de l'Aérospatiale

Peter Smith
President
Aerospace Industries Association of Canada

Bill Weston
Executive Director
Canadian Aviation Maintenance Council

Stuart Sullivan
Executive Director, Aerospace Industries
Association of Nova Scotia

Vice-President, Government Relations
MacDonald, Dettwiler and Associates

Jo-Ann Ball
Director of Human Resources
Orenda Aerospace Corporation

Dennis Roberts
Director, Canadian Programs
AlliedSignal Aerospace Canada

Dale Hunt
Vice President, Avcorp Industries

Ken Laver
President, Messier-Dowty Inc.

D'Arcy Phillips
Coordinator, Manitoba Aerospace Human Resources Coordinating Committee
Manitoba Aerospace Association

Wendall Wiebe
Manager, Staff Development
Bristol Aerospace

Daniel Guertin
Manager, Government Programs
Canadian Marconi Company

Labour

Peter Kennedy
Assistant to Secretary Treasurer
CAW Canada

Academia

Lucie Cousineau
Directrice, École Nationale d'Aérotechnique
Collège Edouard-Montpetit

Michelle Nichols
Vice-President, Post-Secondary & Continuous Learning, Durham College of Applied Arts and Technology

Dr. Richard Kind
Professor, Department of Mechanical and Aerospace Engineering
Carleton University

Dr. Suong Hoa
Chairman, Department of Mechanical Engineering, Concordia University

Dave Mitchell
Associate Dean, Aviation Programs
British Columbia Institute of Technology

Government

The Honourable Ron J. Duhamel
Secretary of State
Science, Research & Development and Western Economic Diversification

Viviane Farmer

John Banigan
Assistant Deputy Minister, Industry Sector
Industry Canada

Ron Watkins
Director General, Aerospace and Defense

Departmental Assistant
Office of the Secretary of State

Shirley Serafini
Associate Deputy Minister
Industry Canada

David Good
Assistant Deputy Minister
Human Resources Investment Branch
Human Resources Development Canada

Branch
Industry Canada

Jerry Beausoleil
Director General, Strategic Policy Branch
Industry Canada

Michelle Gravelle
Policy Analyst, Industry and Science Policy
Industry Canada