

**WOMEN IN HIGH TECH FIELDS
IN SCIENCE AND TECHNOLOGY
IN BRITISH COLUMBIA**

FACT SHEET AND SUMMARY

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**Prepared for the
Women in Science, Technology, Trades and Engineering
Steering Committee
By**

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FACT SHEET – WHERE ARE THE WOMEN?

- A high proportion of both men and women are largely satisfied with their careers in science and technology.
- Between 1991 and 1996 employment in science and technology increased by 20 per cent.
- Between 1991 and 1996 employment in the high tech field increased by 30 per cent.
- Only 15.7 per cent of employees in science and technology in 1995 were women.
- Only 14.4 per cent of employees in the high tech field in 1995 were women.
- Representation of women in high tech industries increased by only one to two per cent between 1991 and 1996.
- The proportion of women obtaining degrees in applied sciences and engineering increased by five to seven per cent between 1991 and 1996 up to approximately 20 per cent.
- Women, as compared to their male colleagues in science and technology, tend to have the following characteristics:
 - Are slightly younger on average
 - Are more likely to have a university degree
 - Are less likely to be married and have children
 - Are more likely to work part-time
 - Are more likely to have made a career change into the high tech field
 - Earn less on average – in some occupations 33 per cent less on average

- Consider family in career decisions and desire flexibility in jobs to accommodate this
- Consider harassment to have been a factor at some time in their career
- Place value on working for an ethical company

STUDY SUMMARY

Historically, women have been under-represented in the science and technology work force, and in recent years efforts have focussed on encouraging the participation of women in these areas. Increased training of women in disciplines relevant to the growing demand in the high tech fields could help fill the shortage of qualified workers.

Employment in science and technology in BC has been growing dramatically. In 1996, 20 per cent more people worked in science and technology occupations than had in 1991; 93,000 employees in 1996 compared to 77,000 in 1991. In the high tech field, which includes those industries involved in the development and manufacturing of high technology products including software, the 30 per cent increase in the number of employees between 1991 and 1996 was even greater than that of all science and technology areas. With 37,000 employees, this high tech sector represents approximately one-third of the total science and technology work force in BC. The growth of the high tech field also increased in demand for a highly trained work force and in many cases employers have had to look outside the province and the country to fill vacant positions.

The Study reports on the participation of women in science and technology fields in BC. The study involved a descriptive analysis based on Statistics Canada Census data: telephone surveys of more than 300 employees (divided evenly between males and females), and telephone surveys of 50 employers. In addition, it helped elucidate the personal experiences and perceptions of women employed or preparing for employment in science and technology. The purpose of this study was to evaluate the participation and satisfaction of women in the high tech industry, and to compare the proportion of women working in this industry to that of women in relevant university and college programs.

PARTICIPATION OF WOMEN IN SCIENCE AND TECHNOLOGY OCCUPTATIONS

The first clear message is that the proportion of women workers in science and technology occupations is low, and it is slightly lower in BC than the average in the rest of Canada (Table 1).

Table 1. Percentage of women in science and technology occupations in 1995.

Employment share	BC	Canada
All industries	15.7	17.7
High Tech Field	14.4	16.0

Source: 1996 Census of Canada. HRDC special runs.

The number of women employed in the high tech field of science and technology occupations increased by 48 per cent between 1991 and 1996. Areas where there were particularly high increases in the number of women employed were forestry technologists, biologists, mechanical engineers and computer engineers. While the numbers of women employed have increased, the increase in women's share of employment over this time has generally been limited to one to two per cent. In computer services, an industry with particularly strong employment growth, women's share of the employment actually declined from 20.4 per cent in 1991 to 18.5 per cent in 1996. The representation of women is highest in occupations related to biology and chemistry: 32 to 40 per cent of total employees.

EDUCATIONAL PREPARATION OF WOMEN IN SCIENCE AND TECHNOLOGY

How women prepare for entry into science and technology occupations is very important. The proportion of women receiving degrees in engineering and applied sciences increased modestly from 1991 to 1995 (Table 2).

Table 2. Percentage of women among those granted degrees for engineering and applied sciences in 1991 and 1995.

	B.Sc.		M.Sc.		Ph.D.	
	Canada	BC	Canada	BC	Canada	B.C
1991	14.6	12.6	14.7	13.2	9.1	14.6
1995	20.3	19.1	20.1	19.2	9.4	7.5

Source: Statistics Canada Cat. No. 81-229

In 1995 in British Columbia, women represented 20 per cent of the students receiving bachelor's degrees in Computer Science, 33 per cent in Chemistry, 39 per cent in Mathematics and 56 per cent in Biology.

If the percentage of women receiving advanced degrees (Table 2) represents the available pool of women to be hired, we can conclude that in 1995, women were employed (Table 1) to a large degree in proportion to their representation in the potential work force.

The proportion of women taking science courses in high schools in BC increased only slightly between 1993 and 1998 (zero to three per cent). Of Grade 12 students completing examinations, women represent 65 per cent of biology students, 50 per cent of chemistry students, 47 per cent of math students and 30 per cent of physics students. In Grade 12 Physics, 27 per cent of women and 24 per cent of men received letter grade A on their final exams. This shows the ability of women to succeed in the sciences.

PROFILE OF WOMEN IN THE HIGH TECHNOLOGY SECTOR

Based on statistics from the Census of Canada, women in the science and technology workforce, and particularly in the high tech sector, tend to be younger than their male colleagues with approximately half of the women in the professional and technical categories less than 35 years old. Female managers, although low in number, also tend to be younger than their male counterparts. More women than men in the professional and technical categories of both the high tech field and all other science and technology industries, worked part-time in 1995 – approximately 40 to 50 per cent of women compared to 30 to 40 per cent of men. Approximately 25 per cent of men and women in the high tech sector were self employed compared to 15 to 17 per cent of those in all industries. In all science and technology occupations, the educational attainment of young women less than 34 years old tends to be slightly higher than that of men, with 55 per cent of the women having a university degree compared to 45 per cent of the men.

Fewer women than men employed in science and technology are married and fewer women have children. Of 333 men and women interviewed in the employee survey, half of the women and more than two-thirds of the men were married. Thirty per cent of the women and 41 per cent of the men interviewed had children. The observation that fewer women were married and had children may reflect their younger age among those interviewed, with 77 per cent of the women and 61 per cent of the men being less than 39 years old.

EARNINGS

Perhaps the most striking difference in the statistical comparison of men and women working in science and technology based on the Census of Canada is revealed by the ratio of men's earnings to women's. Of professional workers, women's salaries were from 74 per cent to 115 per cent of men's. Women in pharmaceutical manufacturing earned more than men, although salaries in this sector were among the lowest of those reported. The deviation between men's and women's salaries was greatest in engineering and architectural services – \$54,785 for men and \$40,530 for women. Female mechanical and chemical engineers earn only two-thirds as much as their male colleagues.

Many of the women who participated in the focus groups had characteristics in common. These were an early fascination with how things worked, and a strong determination not to be discouraged from pursuing their goals. They had a range of interests and many acknowledged the support of family and teachers. Most had followed complex career paths to their current occupations. While some of these women felt there had been obstacles to their being hired, most were quite satisfied in their careers.

THE WORK ENVIRONMENT

Both women and men in the employee survey were quite satisfied with their career progress and approximately 90 per cent were mainly or completely satisfied. Of those not satisfied with their careers, 40 per cent of women and only 14 per cent of men were dissatisfied with the workplace culture and policies. Of the total group surveyed, 22 per cent of women and only seven per cent of men felt that harassment had been a problem in their careers. Perhaps it is not surprising that those interviewed are satisfied with their career progress since they have not quit their jobs and 91 per cent of men and 82 per cent of women intended to stay in their line of work. Of those few individuals considering changing fields, none of the males gave family responsibilities or the need for more flexible time as a reason for changing jobs, while 19 per cent of the women who wanted to change fields gave family as the reason.

When asked about turnover in professional and technical positions over the past two years, two-thirds of employers felt it had been about equal for men and women, 23 per cent higher for men, and 12 per cent higher for women. This would seem to indicate that women are staying in their positions. Interestingly, a higher proportion of women (31 per cent) than men (18 per cent) had made a career change into high tech occupations.

A characteristic of science and technology occupations is that most (90 per cent) of supervisors are men. Twelve per cent of both male and female employees suggested that internal communication and more support from management would improve the work place and 10 per cent of the women felt that more flexible work scheduling and the possibility for telecommuting would improve work conditions.

Of the more than 300 employees interviewed, sixty-eight of the employees interviewed worked part-time. Part-time work was a choice for 84 per cent of the women interviewed but only for 58 per cent of the men. Combining work and study or the seasonal nature of the work, were the most common reasons for part-time work for both men and women. Sixteen per cent of the women also listed combining work with parenting which none of the men did.

Working for an ethical company was an issue that arose in the focus groups. Some believed that by having their own companies they would be better able to determine culture of the work place and time, and type of projects they were involved with. Companies were criticized in the focus group discussions for putting profit above all other considerations.

FINDING EMPLOYEES

Of the 50 employers interviewed, 79 per cent thought that the demand for professional and technical workers will increase over the next two years and none thought it would decrease. One of the most surprising results from this study however, was the difference between how employees found jobs and how employers advertised jobs. The methods of job advertising used by employers were the newspaper (70 per cent) followed by on-campus recruiting (56 per cent) and employee referral (54 per cent). Employees reported that the most successful method for finding a job was through friends and associates (32 per cent) followed by the newspaper (16 per cent).

Companies also recognized that the most successful method for finding staff was through employee referral. Therefore, although vacant positions are being publicly advertised, in reality much of the hiring seems to be based on personal contacts.

A survey of university and college graduates indicated that 59 to 61 per cent of the graduates from applied sciences were able to find jobs relatively easily but slightly more women (15 per cent) than men (9 per cent) considered job finding difficult. Fewer (45 to 50 per cent) male and female science graduates considered job acquisition easy, and again slightly more women than men found it very difficult to get a job. The “who you know” component of finding jobs may influence the difficulty and/or ease it is for women to find employment and could slow the integration of women into science and technology occupations. Preparation in applied sciences was advantageous in finding a job.

A crucial issue in preparing for a career is actually getting some experience beyond the classroom. Employers generally felt that universities prepared students well. Some students wished their courses had contained more practical information. Both students in the graduate survey and women in the focus groups expressed enthusiasm for co-op programs that help introduce students to the work environment.

WHERE ARE THE WOMEN?

The good news of this study is that employment in science and technology occupations has increased in BC and this continues to be a growth area. The representation of women in this sector however, has not increased dramatically in most areas. Women who study physics and math in high school do as well as men, but at the university level, not many women are attracted to computer sciences and physics. It would appear that certain types of careers in the high tech field and in science and technology are not appealing to women. Women seem to prefer flexibility in work schedules and perhaps they view jobs in high tech as being incompatible with family and other interests. The fact that a lower proportion of women than men in science and technology are married and have children may indicate a social cost of working in this area. On the other hand, women in this sector are slightly younger on average than men and this may contribute to the difference.

If women are to be attracted to the high tech field of employment, it will be necessary for employers to consider ways of making the work environment more “people friendly” for both men and women.

The employers interviewed in this study also identified flexible work options, interesting and challenging projects, and a friendly, respectful, non-intimidating, harassment-free environment as ways of retaining qualified female employees. The increased participation of women in science and technology will require employers to meet the two goals of improving the working environment and conveying this message to students in high schools. The future should be bright for all people in the science and technology work force if growth in employment and improvement in working conditions go hand in hand.

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