

Task force encourages diffusion of microelectronics in Canada

Task Force on Micro-electronics and Employment issued 30 recommendations designed to maximize the positive and minimize the negative impact of new technology on union-management relationships, training and education, and quality of worklife

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Constant technological change has long been an important characteristic of industrial evolution in the Western world. We are now witnessing the emergence of microelectronics technology. It is different from the previous technological innovations in that it can be adopted in practically all sectors of the economy, and thereby affect a wide range of activities from production to distribution to consumption. Microelectronics promises to bring about unprecedented socio-economic transformations in both work and nonwork activities. In 1982, a Task Force on Micro-electronics and Employment was established to examine the implications of the use of microelectronics technology on Canadian workers.¹

The task force was instructed to examine the impact of microelectronics technology on office workers,² both union and nonunion, covered by the Canada Labour Code, as well as health and safety concerns related to office equipment. It issued 30 recommendations designed "to maximize the positive impacts and minimize the negative consequences, thus ensuring a more equitable distribution of burdens and benefits of microelectronics."³

This article summarizes some of the recommendations of the task force, and discusses the rationale behind the proposals.

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Diffusion of microelectronics urged

The task force clearly and unequivocally endorsed the introduction of microelectronics technology in Canada. It recommended that Canada encourage and support the continued development of high technology industries. This recommendation is based on the belief that microelectronics technology has the potential to create jobs, increase productivity, improve economic growth, and enrich personal development.

The task force believes a direct link exists between microelectronics technology and jobs, and that to resist the adoption of this technology would be counterproductive. Several studies commissioned by the task force and public presentations⁴ clearly indicated that Canadians would lose more jobs by resisting the introduction of microelectronics technology than by adopting it; Canada's export dependence would be severely and adversely affected (about 30 percent of Canada's output is sold in foreign markets); and autonomy of decisionmaking (which in turn affects the quality of management jobs and research and development) would be seriously affected because firms would not have control over such technology.

The most important recommendation of the task force called for establishment of a federally funded center of technology, work, and human priorities, with representation from labor, management, government, academia, and other sectors of the economy. Among other duties, the center would promote job creation by encouraging high technology

industries to locate in Canada, and by providing assistance to small and medium-sized microelectronics businesses willing to locate in economically depressed areas; carry out information programs to assure better appreciation of the need for and acceptance of microelectronics, and conduct research on the short- and long-term impact of microelectronics on productivity; and monitor the implementation of the task force's recommendations.

In April, the establishment of such a center, to be called the National Centre for Productivity and Employment Growth, was announced in the budget speech by Canada's finance minister. In August, the federal government appointed a steering committee to make proposals concerning the objectives, mandate, role, structure, and financing of the center.

Industrial relations

One task of the proposed National Centre for Productivity and Employment Growth will be to encourage continuous consultations between labor and management. Microelectronics technology cannot be implemented efficiently in an environment of confrontation and agitation resulting from a conflict between "management's prerogatives" and workers' concern for job security. Labor-management cooperation is essential because the fast changing microelectronics technology requires joint problemsolving; society holds business and labor accountable for acting responsibly; there is a call for greater participation of the rank-and-file in the direction of collective bargaining and for some form of "industrial democracy" within both union and management; and sustained rapid productivity growth requires cooperation among workers, unions, and management (as productivity growth is vital to all three parties). In addition, there is greater acceptance of individual and group entitlements and rights as indicated by three recent developments in Canada: the enactment of human rights statutes, the Charter of Rights and Freedoms as part of the newly repatriated Constitution, and the Freedom of Information legislation.⁵

Based on these assumptions, the task force recommended that:

- The current (1972) definition of technological change in the Canada Labour Code be amended and broadened to ensure that discussion between labor and management is started as soon as management proposes to introduce any new equipment or material which could affect, either directly or indirectly, the working conditions or job security of any employee.⁶
- Mandatory joint technology committees be established in both union and nonunion establishments of 50 or more employees under the jurisdiction of the Canada Labour Code. These committees would deal with issues such as training, retraining, redundancy, worksharing, productivity improvements, and other matters related to technological changes at the workplace.⁷

- Employers be required to give a minimum of 180 days notice of a proposed technological change (instead of the present requirement of 90 days). This would act to ease the negative effects of a technological change on the employment of all workers.
- Disputes concerning the powers and functions of joint technology committees or the adequacy of proposed plans be settled by binding arbitration.

The most important and far-reaching industrial relations-related recommendation calls for establishment of a joint technology committee at all enterprises of 50 or more employees under federal jurisdiction. However, this recommendation merely extends existing legislation. For example, in 1979, a federally appointed Commission of Industry Inquiry on redundancies and layoffs recommended "effective joint consultation" on a regular basis at the enterprise level, and suggested that a standing "works council" be established for initiating such consultation. The resulting legislation, the Labour Adjustment Benefits Act (an Act to provide for the payment of benefits to laid-off employees and to amend the Canada Labour Code) goes beyond the Commission's recommendation. Under the Act, if an employer plans to terminate 50 or more employees within a 4-week period, a joint planning committee must be established. (In case of mass layoff, the employer is required to provide 16 weeks of advance notice.) In nonunion establishments, employees can choose one-half of the committee members. If the committee fails to agree on all issues within 6 weeks, the unresolved issues may be submitted for arbitration. The arbitrator may first try to mediate but, if this effort is not successful, must decide on the outstanding issues within 4 weeks. This legislation establishes a bargaining relationship, as opposed to the consultation process envisioned by the Commission of Industry Inquiry. The Task Force on Microelectronics and Employment, convinced that technological change can only be successful if workers are consulted in advance of a change, went one step further and recommended mandatory joint technology committees.

The task force decisions regarding industrial relations were influenced by policy developments in Western Europe, and especially in the Scandinavian countries⁸ where employers are required to provide detailed information and to consult with their employees prior to introducing a technological change. The mandatory creation of bipartite committees, operating at the level of individual establishments, to help plan for change is a common feature of the regulatory schemes. Most schemes provide for dispute settlement, and many provide for compensation for displaced workers, either through a layoff plan or through a general redundancy fund.

Employment

At the enterprise level, joint technology committees are viewed as a mechanism to design plans to offset any antic-

ipated negative employment effects of technological change. At the macro level, however, two different views have evolved on the impact of microelectronics technology on employment and on mechanisms to deal with this impact. One, a pessimistic view, might be called "massive unemployment"; the other is an optimistic, or "business as usual," view.⁹

The perceived problems of massive unemployment resulting from microelectronics technology haunt the pessimists. They believe new technology by and large does not create new jobs or services, but only increases productivity, thus destroying jobs.¹⁰

The optimists, on the other hand, believe that the effect of technological change on employment is very difficult to measure. The employment effects are indirect and diffused because technological change does not take place in isolation. Technological changes interact with, and are modified by, other factors that affect employment, such as changes in output, consumer tastes, and international competition. There is, however, abundant evidence in the last three decades to indicate that as long as the economy has expanded and demand increased, steady technological advance has been compatible with rising employment.¹¹

Consensus on the question of the net job balance created by the development and expansion of the new technologies will not be possible without further study. There have been no serious efforts, over time, to determine the possible effects of even one aspect of the new technology on employment totals. Such an analysis would have to include not only the direct net employment effects, but also the effects of the technology on the infrastructure and on companies connected to new technology by forward and backward linkages, on the general form of employment associated with the provision of services to all enterprises, and on employment derived from expenditures or incomes earned by all the factors of production participating in the technological change. Most forecasts to date relate only to the effects on the infrastructure of the technology and on companies connected to the new technology that have been extrapolated to the whole economy.¹²

The task force leaned toward "cautious optimism" regarding the effect of microelectronics on employment. On the one hand, such technology creates new jobs such as "systems analysts, programmers, software researchers and designers, and data analysts. These positions require high qualifications. The hardware area needs skilled people with an electrical engineering background to design the chips and their applications, whereas the software area is booming with openings for those who understand control, production, and operational systems."¹³

On the other hand, microelectronics technology can cause job destruction in very specific segments of the labor market, such as for new labor force entrants, older workers—who have less flexibility in retraining, reeducation, and relocation—middle managers, and lower-level skilled workers.

Women are particularly vulnerable because they are clustered in a few job ghettos, such as clerical, sales, and service occupations, which are largely nonunion and generally offer low wages, little job security, and poor benefits. Moreover, existing skills of many female workers may not be those that will be needed in the future.¹⁴

While microelectronics may not lead to massive unemployment for workers, it will have important implications for their training, especially in the case of the worker groups noted above. In the past, technology has created enough new employment opportunities to enable societies to adjust to economic changes within reasonable periods of time. If this is to persist as a pattern in the future, training, retraining, and other adjustment policies will be needed.

The task force recommended that Statistics Canada (a government agency) regularly collect and publish data on the age, sex, educational characteristics, occupation, industry, region, and mobility of the labor force. Such information would allow more accurate employment projections, and thereby assist in mounting appropriate training and retraining programs.

Training and education

The task force believes that all Canadian citizens should be given equal opportunities to upgrade skills for the purpose of getting and holding jobs and to participate in broader, higher-education programs to better understand the process of change. It concluded that adapting to change is an individual concern, but that governments, employers, and educators are obligated to adjust the systems and structures of society so that no person is left technologically illiterate.¹⁵

The task force made several recommendations concerning education and training, including:

- Establishment of educational policies and programs that emphasize flexibility and adaptability to change by promoting a philosophy of lifelong learning and the teaching of such lifetime skills as problemsolving and decision-making.
- Establishment of a Registered Training and Education Leave Saving Plan to help individuals plan and pay for their educational and training needs.
- A requirement that unions negotiate educational leave provisions in collective bargaining agreements.
- Training for displaced workers to assist them in developing new and marketable skills.
- The addition of courses on computer literacy to school curricula.

Quality of worklife

The task force also examined the impact of microelectronics technology on quality of working life issues such as health and safety of video display terminal operators, measurement of work performance, and the organization of work time.

Health and safety. Video display terminals are being used increasingly in workplaces, amid growing concern about the potential effects of their use on the health and well-being of operators. Not surprisingly, the area of greatest concern in the submissions to the task force involved the possible effects of low-level radiation emission from the terminals.¹⁶

Extensive research has been conducted on radiation emissions by video display terminals. Results show that radiation emissions are so low as to be negligible, and that there is more natural radiation in the general environment than emitted from the terminals. However, several presentations to the task force pointed out miscarriages among pregnant operators. Therefore, the fear is real.

The task force concluded that the available research indicates very little about the long-term effects of exposure to low-level radiation. However, if the task force was to err, it wanted to do so on the side of caution. It therefore recommended the implementation of "interim precautionary measures" until conclusive evidence could be obtained. The choice of these measures was based on the assumption that no level of exposure to radiation is absolutely safe and that it would be best to reduce avoidable x-ray exposure to an absolute minimum. At the same time, the task force urged continued funding of medical and other research by the federal and provincial governments on the adequacy of standards for currently acceptable levels of radiation and the methods of testing for radiation emission, as well as testing and research concerning other possible risks.

Additional physical complaints of video display terminal operators include increased visual load (relative to typing); head, shoulder, and neck problems; and back and wrist problems due to postural immobility. Some of these physical problems might be caused by ergonomic considerations related to either the equipment itself or the worksite, such as legibility of the display screen, nonadjustable office furniture (especially seating), and the general standard and layout of illumination, to name a few.

The task force issued interim guidelines for employers of video display terminal operators until health, safety, and ergonomic standards for office automation and equipment and workplaces are adopted:

- Pregnant operators can request reassignment to other positions without loss of pay, seniority, or benefits.
- The time spent working at a terminal should not exceed 5 hours per day.

- Rest breaks must be provided hourly.
- Initial eye tests, followed by annual retesting, must be conducted at the employer's expense.
- Corrective lenses specially adapted to the visual demands of terminal work must be provided, where necessary.

Electronic monitoring. The task force believes that the most serious drawback of the new electronic office equipment is the use of such technology for monitoring the quantity of work performance. This type of monitoring limits workers' freedom to move around; they appear to be tied to their machines under the ever-watching and ever-recording devices.

The task force regards close monitoring of work as an employment practice based on mistrust and lack of respect, an infringement of the rights of individuals, and an undesirable precedent that, unless restricted, might be extended to other environments.¹⁷ It recommended that close electronic monitoring be prohibited as inconsistent with human rights legislation.

Worktime. Additional concerns addressed by the task force included organization of worktime and isolation caused by shift work, part-time work, and home work. The introduction of microelectronics technology is expected to result in an increase in part-time work and in the number of individuals working from home ("cottage industry"). This can be a positive development because part-time work can provide opportunities for training, retraining, and promotions. In addition, working from home could be an ideal setup for some workers, including specialized professionals, disabled workers, those living in rural areas, and women with young children. However, part-time work and working from home can also have deleterious effects if part-time workers do not receive wages and benefits commensurate with the hours they spend on the job, and otherwise forgo benefits of unionization. There is a serious danger of exploitation of home workers in the absence of effective labor standards governing wages, working conditions, and sickness, accident, and pension benefits.

To address these concerns, the task force recommended that (1) those working at home with microelectronics equipment be assured proper conditions of work and benefits by employers; (2) those who work at home be protected by minimum labor standards; and (3) part-time workers receive prorated benefits. □

—FOOTNOTES—

¹ The members of the task force were: E. Margaret Fulton, Mount Saint Vincent University, Halifax, Nova Scotia; Harish C. Jain, McMaster University, Hamilton, Ontario; Jeannine David McNeil, École des Hautes Études Commerciales, Montreal, Québec; Ratna Ray, Women's Bureau, Ottawa, Ontario; and Zavis Zeman, Institute for Research on Public Policy, Toronto, Ontario.

² The task force did not seriously study the impact of microelectronics technology on factory workers because of lack of time and resources.

However, more than 50 percent of Canadian workers are employed in offices.

³ The recommendations are published in *In the Chips: Opportunities, People, Partnerships* (Ottawa, Ontario, Task Force on Micro-Electronics and Employment, 1982).

⁴ The task force commissioned research on the Canada Labour Code, employment concerns, health and safety concerns, triggering technologies, and case studies of several industries under federal jurisdiction, such as

banking, transportation, and communications. Whereas in the United States, a majority of the labor force falls under federal jurisdiction as far as legislative enactments are concerned, in Canada, only about 10 to 15 percent of the labor force comes under federal jurisdiction. However, the indirect effect of federal legislation is that it helps to establish precedents and influences provincial enactments.

The task force held hearings in Toronto, Montreal, Halifax, Vancouver, Edmonton, and Ottawa. Also, it received numerous oral and written presentations from trade unions, employers, women's organizations, federal government departments and agencies, and citizens.

⁵*In the Chips.*

⁶A recent decision by the Canada Labour Relations Board, a study commissioned by the task force, and oral and written presentations by trade unions and other groups pointed out that the current technological change provisions of the Canada Labour Code (1) contain numerous examples of ambiguous language, (2) do not cover all types of changes that may result from an introduction of technology, (3) have too many "opting out" provisions relieving an employer of the statutory obligation to give notice or to recommence bargaining, and (4) allow management to provide inadequate information about its plans to introduce new technology.

⁷Statistics show that the majority of agreements in the federal jurisdiction contain neither procedural nor substantive provisions on technological change. For instance, 72 percent of the agreements make no provision for prior notice of a technological change. A much higher percentage have no substantive provisions for adjustment to change such as training, retraining, relocation allowances, labor-management committees, and so forth. A part of the reason for this lack of provisions may be that Canadian unions, for the most part, have not given high priority to microelectronics technology. This may be due to resistance by management to discuss such issues, and the reactive approach taken by unions in bargaining which has prevented them from dealing with the matter until it creates a crisis in the work force and affects their members. See Stephen G. Peitchinis, "The attitude of trade unions towards technological changes," *Relations Industrielles*, Vol. 38, No. 1, 1983, pp. 104-19. Also see Wilfred List, "Unions ignoring high-tech's impact," *Globe and Mail*, May 1983, p. B2. Thus, the results of the last 10 years of experience with the current legislative approach suggest that a permissive approach confined to the bargaining area is no longer sufficient.

⁸For instance, union-management rights and obligations are spelled out in Sweden's Co-Determination at Work Act, the Norwegian Work Environment Act, and the agreement in Denmark on new technology, signed by Denmark's central union and employer organizations.

The Swedish Act gives the local trade unions the right to information about their company's production, finances, investment plans, and personnel policies, and this information must be kept current by the employer. In addition, union representatives may request to see and audit relevant company books and accounts. Also, the employer must negotiate with the unions before deciding on important changes in production, administration, or other matters that substantially affect working conditions or terms of employment.

The Norwegian Act treats technology, working conditions, and the work environment as a synergistic issue, and requires a legal synthesis of "management prerogatives" and employees' "proprietary interests" in rights over the jobs. Under the act, a working environment committee is mandatory in all enterprises that normally employ at least 50 workers. Employers who intend to make significant changes to the working environment must consult with this committee beforehand and provide sufficient time and proper worker involvement, joint decisionmaking, and training for meeting the requirements of the changes.

The Danish agreement covers the introduction of, and any significant alterations to, production technology, including data-based technology and systems. It provides for specially created "new technology committees" and obliges employers to inform these committees in advance of any technological plans or changes and to discuss their likely consequences for workers in the undertaking.

⁹*In the Chips.*

¹⁰*Ibid.*

¹¹*Ibid.*

¹²*Ibid.*

¹³*Ibid.*

¹⁴Similar forecasts have been made in the United States. Eleanor Holmes Norton, head of the National Council on the Future of Women in the Workplace, indicated that many of the occupations traditionally held by U.S. women, including much of the clerical work, are becoming obsolete, and that jobs such as keypunchers and simple programmers are likely to disappear almost entirely due to microelectronics. She suggested that job opportunities will be greatest in the more skilled occupations for which women are not receiving the education and training they need to fill these jobs. See *Newsletter* (University of Hawaii, Industrial Relations Center, March/April 1983).

¹⁵*In the Chips.*

¹⁶*Ibid.*

¹⁷*Ibid.*