

Effective Job Skills Training in Changing Labor Market

— Competency-Based Training in Mexico —

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1. Introduction—Increasing Demand for Skills Development—

Human capital plays the central role in the creation and effective use of knowledge. As countries around the world become more integrated into the world market, and face competition at the global level, many developing countries recognize the need to strengthen their human capital to achieve faster economic growth. To a greater or lesser extent, each country faces the challenge of building “an economy where the principal driver of economic growth is not increases in factor inputs, but the expanded flow and use of knowledge derived from trade opening and global flows of foreign capital and technology, made possible by the introduction of a new class of information and communication technologies.” (Tan and López-Acevedo 2003) Mexico is not an exception.

Mexico started the process of structural reform in mid-1980s. Liberalization began in 1984 and accelerated as Mexico joined the General Agreement on Tariffs and Trade (GATT) in 1986. The government initiated a radical policy reform in 1989, reducing government regulation and liberalizing trade. Mexico then experienced dramatic changes during the 1990s, including economic shocks from the currency depreciation of 1994, trade opening and growing integration into North America with the launch of the North America Free Trade Agreement (NAFTA). Inflow of foreign direct investment (FDI) increased significantly, and the diffusion of new information and communication technology into the industries accelerated.

Introduction of NAFTA resulted in a structural change in the Mexican economy. Sectoral composition of the export changed with the share of manufacturing export increasing from 35% at the time of NAFTA signing in 1992 to close to 90% today. With the opening of its market to international competition, technology has now become the heart of Mexican economic activity. Globalization-induced competition has made firms increase the speed and efficiency of new technology adoption. It has also inspired firms to increase research and development budgets. (López-Acevedo 2002)

Through the liberalization process, however, the income inequality in Mexico has widened. The Gini coefficient at the national level rose from 0.47 in 1984 to 0.53 in 1998 as shown in Table 1. One

explanation for such a trend is an increasing wage gap between skilled and unskilled workers.

Table 1 Inequality in Mexico, Measured by Gini Coefficient

Year	National	Urban	Rural
1984	0.47	0.44	0.45
1989	0.52	0.50	0.44
1992	0.53	0.50	0.43
1994	0.53	0.51	0.42
1996	0.52	0.49	0.45
1998	0.53	0.50	0.48

Source: López-Acevedo (2002)

López-Acevedo (2002) found that with technological adoption, firms tend to hire more high skilled workers and pay them better. Furthermore, demand for highly skilled workers increased after the adoption of technology, not before. During the subsequent period after technological adoption, demand for highly skilled, skilled, and semi-skilled workers rose notably, but the share of unskilled workers tended to diminish after the adoption of technology. The study also found that training and increases in human capital magnify technology-driven productivity gain. Overall, the evidence presented in López-Acevedo (2002) supports the “skilled-biased technological change” explanation for the sharp increase in the wage inequality during the last decade in Mexico.

Empirical link between human capital and productivity/wage is strong. Extensive literature exists on the impact of human capital (both schooling and training) on wages. There is also limited, but growing empirical evidence linking human capital (training) and firms’ performance.

López-Acevedo (2003) analyzed wage and productivity determination in Mexico, using a unique linked employer-employee data from the manufacturing sector, which allowed explicit control of both worker characteristics and characteristics of firms. Her findings show standard results such as increases in wage premium with years of schooling and years of labor market experience. She also finds that both employers and employees benefit from job training. Particularly, external training (provided through programs outside the firm) not only benefited the workers through higher wages, but employers who utilized external training also enjoyed higher levels of productivity by an average of 14%.

Another study analyzed the impact of in-firm training on productivity and wages in the Mexican manufacturing sector in the 1990s. (Tan and López-Acevedo 2003) Using firm-level panel data, they found evidence that training had large and statistically significant wage and productivity outcomes, and that joint training and R&D investment yielded larger returns than investments in just one or

the other. Furthermore, they found that both training and technology investment enabled firms to improve their relative position in the wage and productivity distributions between 1993 and 1999. More specifically, their findings include:

- * Over the decade of the 1990s, not only did the incidence of employer provided training become more widespread among manufacturing enterprises, but a higher proportion of the workforce, including less skilled production workers, received training within firms.
- * External training provided by private sector providers (such as private companies, industry associations, chambers of commerce, consultants, and equipment suppliers) accounted for much of this increase in training incidence.
- * Between technology and trade, technology seems to be the principal driver of training trends. Technology proxied by R&D spending was a consistently important determinant of in-firm training in both 1992 and 1999. Over time, R&D contributed to the increase in training incidence not only through a greater share of firms conducting R&D, but also through greater propensity to train conditional on doing R&D.
- * Trade was hypothesized to provide exporting firms with access to new technology and know-how from foreign markets. However, Tan and López-Acevedo (2003) found that trade did not seem to have created strong demand for in-firm training. Trade, however, may have indirectly affected training through technology, since exporting firms tend to have a higher likelihood of R&D.
- * Schooling was also found to play a major role in shaping post-school skills- development in firms. A rise in years of schooling of the workforce is associated with an increased propensity for in-firm training. Furthermore, the proportion of workforce with tertiary education has a statistically significant, positive effect on training for all occupational groups, both low-skilled as well as high-skilled. The authors postulate that one interpretation of this finding could be that effective use of new and complex technologies requires high reliability in all steps of the production process so that all workers, including low-skilled ones, need to receive in-firm training.
- * They also find that employers' training investments have large positive effects on firm-level wages. Findings indicate that returns to in-firm training are largest for the most highly skilled groups. When training and R&D are jointly determined, combined investments in training and technology seem to yield the largest wage returns, larger than investments in just one or the other. Investments in training and technology also impact wages and total factor productivity (TFP) over time.
- * The evidence indicates that both training and technology investments enabled firms to improve

their relative position in the productivity and wage distribution between 1993 and 1999. While there is considerable persistence over time in firms' TFP ranking by quartile, training inhibited the probability of having future TFP fall below the sample mean. Among firms that train, continuous training reduced this probability even more.

As demonstrated by the evidence above, it is apparent that effective skills upgrading through training is critically important for the realization of Mexico's growth potential.

Human capital, as defined to include both formal schooling and job training, can contribute to economic growth through raising the productivity of workers and facilitating the adoption and effective use of new technologies. However, the growth rate of labor productivity in Mexico has been found to be low compared to other developing countries at a similar developmental stage.

The Mexican private sector has been characterized by growing duality: a large traditional sector coexisting alongside an expanding modern sector. The former, consisting primarily of micro-enterprises and small and medium-sized enterprises employ a large portion of the labor force, but accounts for a much smaller portion of output and exports. Despite the potential demonstrated by the findings above on training-productivity correlation, labor productivity growth in the Mexican manufacturing sector as a whole has been slow.

One explanation may be that Mexican workers have on average a lower educational level, which results in inefficiency in human capital accumulation on the job once they enter the labor market. This hypothesis can be supported by the fact that experience-wage profile for Mexican workers is flatter than those estimated for workers in other countries. (Minowa 2000)

Fully cognizant of the challenge of strengthening the productivity of its labor force, the government of Mexico initiated an ambitious reform of its technical education and job skills training programs in the early 1990s. The remainder of this paper describes competency-based training reform being implemented in Mexico. It also reviews the key assessment results of Mexico's reform efforts in order to evaluate what impact the reform has achieved so far.

2. Competency-Based Training in Mexico

With the technical and financial assistance of the World Bank, the government of Mexico developed and initiated implementation of the "Technical Education and Training Modernization Project" in 1995. The objective of the project was to "improve the quality of the technical education and training in Mexico so that it meets the critical needs of the productive sector in a flexible manner." More specifically, the project was to (1) provide a universal measure (a new system of competency standards and certification) with which effectiveness and quality of different training

programs could be evaluated; (2) increase the flexibility and relevance of the training system by redesigning training programs into modular courses based on the new standards; (3) promote private sector initiative and participation in training design and provision, by providing incentives to individuals and enterprises for their participation in the proposed training reform; and (4) establish the necessary information system and undertake studies to improve the implementation of the new training orientation. (World Bank 1994)

In Mexico, the public sector has been providing technical education and training through both formal and informal programs. Formal job-skills training consists of lower secondary-level training centers with no academic prerequisite for enrolment (CECATI), upper secondary-level programs with middle-school requirement (CETIS and CONALEP), and undergraduate and graduate-level university education. Upper secondary-level public programs are divided into terminal technical/vocational programs (technical professional degree) and academic technical programs (technical baccalaureate degree) which let graduates advance to a university-level education. In addition to these formal programs, there are various informal, short courses provided by the public sector.

Skills development for workers after they enter the labor market is left to employers. However, employer-provided training for workers has traditionally been very limited in Mexico. As discussed in the first section of this paper, employer-provided training (both in-firm and external) has seen increases in recent years. However, in the early 1990s, the government had a clear concern that the lack of worker skills and low productivity of the labor force in Mexico would prevent the country from realizing the benefit of economic liberalization. The system of technical education and training needed to be reformed to generate clear incentives for both workers and employers to invest in their human capital.

The analysis of the existing training system then pointed to three issues that needed to be addressed: (1) supply-driven, inflexible training programs; (2) the lack of output standardization and uneven quality of training programs; and (3) the lack of private sector involvement in design and provision of training.

The most often heard criticism of the publicly-provided training programs is that their program content does not reflect the true needs of the labor market. Although many of the training institutions maintain a nominally tripartite governing board, consisting of representatives of employers, workers and the government, employers often complain that these training institutions do not respond flexibly and efficiently to their training needs. Employers express their dissatisfaction with the existing training system because they claim it does not respond to the fast-changing needs of the global market. Much discussion takes place regarding the institutional framework that could produce high quality technical training. Some claim that private training programs are better accepted by workers and employers alike and produce better outcomes than public training programs.

However, such a claim may only be true in the case of better quality private providers, considering a wide variation in the quality of private training programs. (Flores Lima 2003)

The concept of competency-based training and skill certification was one solution to the challenge created by the lack of pertinence of technical education and skills-training programs. The key to this approach is that technical skills are defined in terms of outcome-based competency standards, which are to be defined by those who demand those skills. Such demand-driven standards can be used to test and certify the skill level of each worker, thus providing needed information in the labor market regarding the quality of both training programs and workers. Clear competency standards and a skills certification system are expected to improve the matches between workers and employers, and also encourage investment in technical education and training. Clear market signals in terms of the quality of training program (via graduates' certification performance) are also expected to encourage training providers to improve their program quality and pertinence.

Mexico's reform followed the experience of the National Vocational Qualification (NVQ) system in the United Kingdom. The NVQ was initiated in 1981 and provides for the development of skill or competency guidelines recognized at the national level. In the UK, the new system is reported to have enhanced the credibility of vocational practice. Evidence suggests that the skills and competency of the British labor force have increased in recent years, with a positive impact on the quality of goods and services produced.

The project in Mexico consisted of four components; (A) establishment of the national system of competency standards, skills testing and certification; (B) modernization of the training programs; (C) stimulation of demand for competency-based training and certification; and (D) establishment of an information system, and the carrying out of studies related to the project. The project received initial funding through a World Bank loan of US\$265 million, which was to supplement the government's own funding of US\$118 million over the project implementation period of 5 years. More detailed description of each of the four project components is presented in Appendix.

3. Assessment of the Outcomes of the Training Reform

The World-Bank-financed "Technical Education and Training Modernization Project" completed its implementation and closed in June 2003 (three years after the originally expected closing date of September 2000). Both the Mexican government and the World Bank conducted a review of the project implementation and outcomes and prepared a draft report. However, the report has not yet been made public.

Together with the World-Bank-financed project, the government of Mexico also developed a complementary project which was funded by the Multilateral Investment Fund (MIF) of the Inter-

American Development Bank. The “Pilot Skills Standards and Certification Project” received US\$3 million funding and technical assistance from the MIF to develop a comprehensive methodology and build market buy-in to the standards and certification process through industry-specific pilots led by companies who piloted the use of standards within their workplaces. The project was approved in 1996 and had a 36-month execution period which was extended by an additional 18 months.

The MIF identified the support for the development of skills standards and certification system as one of the key goals of its overall strategy for promoting human resource development in Latin America and the Caribbean region. Skills standards system was considered to provide many elements that address human resources needs in a competitive marketplace. Certification and credentialing systems based on skills standards focus on the competencies required for success in the workplace. They recognize that skills and knowledge are the currency for employment and career advancement, and that industry-relevant skills and knowledge can be acquired in many different ways not only through formal training programs. (Kappaz and Siegel 2002)

Competency certification makes more information available on the skills and qualifications of the workers, benefiting both employers and workers. The system provides objective information on workers’ skills, which can reduce recruitment costs for employers and enhance their ability to manage human resource development of their workers. The system also helps workers by increasing their competitiveness in the market since they can demonstrate their skills acquired in any context and not only through formal education or training, thus increasing their marketability and job mobility.

Kappaz and Siegel (2002) reviewed the outcomes of the MIF-funded initiative in skills standards and certification over the past ten years not only in Mexico, but more broadly in Latin America and the Caribbean region. Starting with the project in Trinidad and Tobago in 1995, the MIF had financed a total of 17 projects in the area of skills standards by the time of their review. The Mexico project, approved in 1996, was the MIF’s first effort at supporting the comprehensive development of a multi-sector standards certification system at a national level. The following assessment of the outcomes of Mexico’s reform effort is based mainly on the findings of Kappaz and Siegel’s review, with additional figures taken also from the World Bank sources.

The combination of the World Bank-funded project and the MIF pilot project resulted in the establishment of the institutional framework and infrastructure for the system. The Council for Normalization and Certification of Competency Standards (*Consejo de Normalización y Certificación de Competencia Laboral, CONOCER*) was established for development and certification of sector-specific national competency standards. As of June 2003, CONOCER had approved 613 norms for 5 levels of employment in 12 broad sectors of the economy (agriculture, mining, construction, mechanical/electrical/electronic, telecommunications, manufacturing, transportation, sales of goods and services, financial services, health and social protection, social communication, and knowledge development). It

is reported that out of this universe of approved norms, 62% were for “level 2” occupational qualifications (corresponding to “qualified workers”) and 24% for “level 3” (corresponding to “qualified technicians”). It is also reported that out of these approved norms, about 54% were actively used by the employers.

For the definition and approval of these norms, CONOCER established 66 Competency Standardization Committees (*Comités de Normalización, CN*) and 10 subcommittees, which consisted of a wide spectrum of the sector-specific stakeholders, such as entrepreneurs, experts and representatives of workers’ organizations. CONOCER accredited 1,413 individuals, public and private sector institutions and enterprises as Skills Testing Centers (*Centro de Evaluación Acreditado, CEA*). To certify acquired skill levels specified by the approved norms and evaluated by CEAs, CONOCER licensed 32 private and public sector institutions and enterprises as Certification Agencies (*Organismos de Certificación, OC*). The World Bank reports that a total of 87,442 certificates have been granted to approximately 67,438 individuals at the time of their report.¹

With respect to the modernization of training programs, the project established a competency-based curriculum in 727 public technical-upper-secondary schools (about 54% of the total universe of 1,339 schools), which benefited 754,424 students during the life of the project. Out of these students, 62,891 (8.3% of those enrolled in the new curriculum) certified their acquired competencies. High costs of certification testing may be one of the reasons for this low certification rate.

Unfortunately, no rigorous evaluation has been conducted which compared the labor market outcomes of those students trained and certified for their skills compared to a control group of students without certification. The only available study to date is López-Acevedo (2001), which conducted an assessment of CONALEP schools. Using matched pair methods, she evaluated the labor market performance of graduates of *Colegio Nacional de Educación Profesional Técnica (CONALEP)*, Mexico’s largest upper-secondary technical education system. Among other aspects, the study assessed the impact of the innovation introduced in 1991, which is the introduction of modular programs. CONALEP’s decision to introduce a competency-based model in their education program, however, took place only in 1994. Therefore, the López-Acevedo study does not directly evaluate the impact of this new approach to CONALEP’s education programs. Nonetheless, modular programs are considered to be the forerunner of the competency-based education and training, and López-Acevedo’s findings provide some indication of a possible effect of competency-based training. Results of the study indicate that graduates from the pre-reform program (1994 survey) search longer for a job compared to those of the post-reform program (1998 survey). Moreover, graduates

1 Kappaz and Siegel (2002) report different numbers. They report that a total of 538 standards (norms) have been developed, 32 certification agencies created, and 870 evaluation centers accredited. They also report that approximately 128,000 competencies have been certified representing about 42,000 certified individuals. These differences in numbers can be partly explained by different timing of their evaluations.

from the post-reform program have a 45% greater probability of finding a job than those from the pre-reform program. The study found that the 1994 survey cohorts earned higher initial hourly earnings than the 1998 survey cohorts. However, this may be explained by the fact that Mexico's real wages decreased by almost 40% from 1994 to 1998.

In terms of stimulating demand for competency-based training and certification, evaluation findings suggest several issues: 1) High cost of the certification is a big bottleneck, preventing a wider use of certification by a large number of workers. 2) Firms that value competency-based training are willing to have their workers evaluated and trained, but are not willing to absorb the full cost of certification. However, it is not necessarily unreasonable that employers should refuse to assume the full cost, since part of the benefit of certification accrues to the workers themselves. 3) Some employers fear that certified workers may demand higher wages. Again, in the long run, certified workers should be paid higher wages than those without certification since they have successfully demonstrated their skills. However, it will take more time before the market can adjust itself to properly reflect the value of certification in its wage structure. 4) Cost of certification represents a financial burden for the employers, and many of them refuse to assume that burden. 5) Some workers do not see the immediate benefit of certification.

Mexico is now past its pilot phase and is implementing the competency standards and skills certification system at the national level. As Kappaz and Siegel (2002) conclude, the key challenge facing the Mexican system is the ability of CONOCER to increase market adoption of the system. Although the project was designed specifically to increase private sector leadership and participation in the process, in practice, the project in Mexico has been very much driven by CONOCER and is characterized by strong public sector initiative. This is particularly true when we compare Mexico's case with other skills standards and certification projects funded by the MIF in other Latin American countries.²

Kappaz and Siegel (2003) report some examples of success cases where there was very active participation and leadership by private sector companies. However, on average, penetration of the new system of skills standards and certification has been less than expected. It is also reported that the number of competencies certified has not been growing.

Both the World Bank and the MIF evaluation seem to coincide in pointing out that a major problem of the new system is that the process is difficult to understand and the norms themselves are difficult to read because of the complex and highly structured methodology. The success of the reform in Mexico will depend very much on whether the long and complex process driven by the public sector (or CONOCER) can be changed to a more flexible user-friendly system that can be

2 Other countries where skills standards and certification projects were financed by the MIF include Brazil, Chile, Argentina, and countries in the Caribbean Region.

useful for a wider market. Kappaz and Siegel (2002) report a case in which a participating company initiated its own separate process by developing standards in parallel to its participation in the CONOCER pilot. In sharp contrast to the CONOCER pilot, the other efforts within the company were implemented very quickly and the resulting standard was a brief document. The company gave its support to the simpler process rather than the one led by CONOCER.

4. Prospects for the Future

We hear positive news about Mexican economy these days. GDP is projected to grow by 4% in 2004—forecasts have been upgraded as the year has progressed. Inflation is expected to stay within the Bank of Mexico's upper limit target of 4%. The Mexico City Stock Exchange shows strong performance and the depreciation of the peso against the dollar over the past two years has helped exporters. Mexico's link to the US economy is now so strong that investors seem to have little to worry about. The correlation between industrial production on the two sides of the border is now reported to be almost perfect and almost immediate. Thanks to the free-trade reforms of the 1990s, the Mexican economy seems to have become very resilient, at least as long as the US economy stays healthy.

According to the Financial Times, between October 2000 and March 2002, Mexico's *maquiladoras*—factories that assemble imported parts for re-export—lost 270,000 jobs, or more than one in five, sparking fears that Mexico had permanently lost ground to China. However, the trend apparently has sharply reversed more recently. In the year ending in May 2004, *maquiladora* exports rose by 21.8%, showing the strongest monthly rise in almost four years. Employment is at its highest since 2001. The link between Mexican and US industrial production is stronger than ever, and the *maquiladoras* are now totally integrated into the US industrial production process.

According to the figures of the Mexican labor ministry, about 300 manufacturing companies relocated to China from Mexico between 2001 and 2003. Many of these companies made products for which shipping costs are minimal. Some garment makers also fled to Central America, escaping Mexico's relative high wages. According to INEGI, Mexico's national statistics institute, job losses have continued over the last two years in labor-intensive sectors such as textiles, furniture, toys and leather goods. However, in other sectors, investment is coming back.

Latest investments are different from old style *maquiladora* which relied on cheap labor. For example, a high tech company such as Motorola, which opened its first *maquiladora* in Mexico in 1966, now invests in a new generation of plants specializing in "just in time" production. The manager of Motorola explained that the decision to expand in Mexico was based on its rapid access to the US market and the supply of qualified labor. According to him, "Mexico is staying very competitive" when it comes to plants with "short production runs and quick turnaround that are

more technology-intensive.” Decades of experience apparently produced a pool of skilled workers and managers who know how to communicate with their American counterparts. (Financial Times, July 19, 2004)

This is just one example suggesting that Mexico is starting to successfully fight back the threat of China. As we have seen at the beginning of this paper, investment in worker training combined with the investment in R&D magnify the productivity gains for the firm, which also translates into wage increases for the workers. Incidence of employer-provided training seems to be increasing as Mexico deepens its ties with the US and the world market, suggesting a wider recognition among employers of the importance of continuous skills upgrading for workers. Whether the large, expensive project intended to reform the technical education and training system in Mexico can successfully prepare a solid ground for the next leap for the Mexican labor force is not yet certain at this point. While the original intention may have been in the right direction, the heavy bureaucratic burden may render the government-led reform ineffective and redundant. If the private-sector-led effort to strengthen worker training moves ahead regardless of the government interventions, the market forces will be ahead of the government efforts. However, with a large investment already made to establish the skills standards and certification system, the government needs to find the right way to let the private sector take the lead so as not to waste the state's enormous financial investment—not to mention the precious investment in human capital.

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Appendix: Technical Education and Training Modernization Project Components

Component A. National System of Competency Standards, Skills Testing and Certification

Subcomponent A.1 National System of Competency Standards (SNC)

Create a Council for Normalization and Certification of Competency Standards with a Governing Board representing the employer associations, workers organizations, and the government. Establish Competency Standardization Committees to carry out the development of competency standards.

Subcomponent A.2 Skills Testing and Certification System (TCS)

Select and license independent certification agencies (OC), whose role is to develop skills testing and certification criteria and testing instruments, and conduct skills testing directly and indirectly through accredited testing centers (CEA).

Component B. Modernization of Training Programs

Subcomponent B.1 Pilot Training Modernization Programs

Help selected public training institutions (CONALEP, CETIS, CECATI) convert their training programs to competency-based, modular programs. Specifically, redesign curricula, instructional materials and textbooks, retrain instructors, and replace obsolete equipment.

Subcomponent B.2 Development of Training Materials

Develop training materials based on a first set of competency standards. Allocate funds for development of teaching materials through a competitive process managed by the Project Administration Unit.

Component C. Stimulation of Demand for Competency-Based Training and Certification

Subcomponent C.1 Promotion of SNC

Promote the new system of competency-based training through promotion activities and public campaigns targeted at apex level employers and workers organizations, sectoral chambers, industry-sponsored training institutions, and firms at the local level.

Subcomponent C.2 Pilot Testing of CBT in Enterprises

Provide financial support for the development of competency-based training programs within selected enterprises for validation and demonstration purposes.

Subcomponent C.3 Training and Certification Incentives

Provide financial incentives (in the form of stipends and fee reductions) to selected user groups,

including micro, small and medium-sized enterprises and disadvantaged workers, such as youth entering the labor market, unemployed workers, adults with educational and training deficiencies.

Subcomponent C.4 Program for Equipment Purchase and Instructor Training

Finance the purchase of training equipment and instructor training and certification for the delivery of competency-based training courses for competitively selected training institutions.

Component D. Information System, Studies, and Project Administration

Subcomponent D.1 Information Systems

Develop various information systems that are necessary for promotion, monitoring, evaluation, and planning of the project implementation.

Subcomponent D.2 Studies

Conduct studies to support the development and implementation of the project, including studies on: financial solvency of the Council and OCs; assessment of basic skills of Mexican labor force; identification of success factors of certification; graduate tracer studies comparing the labor market outcomes of traditional versus competency-based training graduates.

Subcomponent D.3 Project Administration

Establish the Steering Committee with representatives of the education, labor, and finance ministries within the government and the Council to coordinate the implementation of the project.

Source: World Bank, *Staff Appraisal Report, Mexico Technical Education and Training Modernization Project*, October 5, 1994.