

PRODUCTIVITY CENTER IN JALISCO

(TC-96-05-01-7)

EXECUTIVE SUMMARY

EXECUTING AGENCY: Instituto de Fundición y Maquinado de Jalisco

OBJECTIVES: The objective of the project is to improve the productivity and competitiveness of small metal-working firms in the state of Jalisco. To achieve this, a local industry association for foundry and machinery firms will be strengthened to enable it to provide training, as well as technological and technical assistance services, to firms in order to improve the efficiency of their processes and design of their products. The goal will be to assist them to produce higher quality, and more competitively priced, products and as a result link them with growing domestic and export markets.

As part of this process, small firms will be supported in improving their environmental practices, which will also help link them with larger firms that already adhere to international standards in environmental management.

DESCRIPTION: Component #1: Production Process and Quality Control

a. Technical assistance and training in the production process

Technical assistance. This will involve the transfer of technical know-how in the manufacture of metal parts. Objectives will be to (i) upgrade the knowledge of manufacturing techniques, and (ii) provide participants with the necessary skills to adapt to technological innovation and new work processes as these are introduced into the work place. Specific services will include, but not be limited to, diagnostics and re-engineering of plant layout, production processes, and product design; assistance to understand and execute manufacturing drawings and process control procedures, and quality control methods; on-the-job-supervision of production staff to correct and improve job performance; and one-on-one consultations to clarify production techniques.

Training. Firms will be trained in (i) the development and implementation of quality assurance plans (including ISO 9000 for total quality management); (ii) dissemination of, and means of compliance with, environmental norms and standards (including ISO 14000); and (iii) the development and implementation of marketing, strategic and business plans to reach growing domestic and export markets for metal products..

b. Quality control: laboratory services for physical and chemical testing of materials and for dimensional metrology.

To reach international markets, firms will be provided access to such laboratories to control the quality of their products and processes. Services offered will include physical testing, which permits the analysis and certification of resistance of materials to traction, flexion, compression, fatigue testing, hardness, and roughness; metallography analysis, which permits the analysis and certification of the chemical composition of materials, and dimensional metrology, which permits the measurement of the dimensions of parts and equipment to determine if they are within the parameters of specified and acceptable ranges of tolerance and dimension. Through this process, the production and measurement equipment of firms can be routinely calibrated, allowing for both better control of production processes and quality of the end-product.

Component #2: Capacity Building

Training of project staff. This will consist of staff training and study tours in appropriate institutions that are identified, including laboratories with which alliances are formed. As a result, the skills of the project staff will be strengthened, and up-to-date methodologies in technical assistance and technological service will be transferred to the Instituto de Fundición y Maquinado.

External support to the Executing Organization. In order to establish the laboratories and rapidly reinforce the quality of the services of the Executing Organization, institutional strengthening services will be contracted.

FINANCING: Modality: Grant
MIF: US\$1,767,550
Recipient: US\$ 977,830 (may include approximately US\$250,000 from IMH in-kind)
Total: US\$2,745,380

IMPLEMENTATION SCHEDULE: Execution Period: 48 months
Disbursement Period: 54 months

ENVIRONMENTAL CLASSIFICATION: The Environmental Management Committee, at its meeting of December 17, 1996, classified this as a Category III operation.

CONTRACTUAL CONDITIONS: Conditions prior to first disbursement:

1. Operating regulations agreed upon with the Bank approved by the IFM
2. Project Director hired
3. Establishment of Special Bank Account

Condition of disbursement of funds toward laboratory services for quality control component (#1.2):

4. Laboratory space required for the Project must be renovated, conditioned and furnished in accordance with technical specifications required for the equipment provided under this Project.

EXCEPTIONS TO CONTRACTING PROCEDURES: There exist links between the Executing Organization and an institute in the Basque Autonomous Community, the Instituto de Máquina Herramienta, which is specialized in automated production technology. It is proposed that this institute - which has a successful track record of providing technological assistance and training to manufacturing firms with smaller, less continuous processes similar to that of Mexican firms - will be directly contracted by the Executing Organization to provide specialized assistance to strengthen the organization and develop its capacity to deliver technical assistance in quality control, automated production, and metal-working.

Due to the relatively large number of consulting contracts required for this operation, consulting services for amounts less than US \$10,000, and for periods of not more than 60 days, shall be reviewed on an ex-post basis.

PROJECT TEAM: Nadine Schiavi (RE2/MGR), Team Leader; Hans Schulz

Executive Summary
Page 4 of 4

(RE2/FI2); Pilar Suescum (LEG/OPR); José Lanusse and
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I. COUNTRY ELIGIBILITY

- 1.1 Country eligibility for Mexico was approved on January 23, 1994 by the Donors Committee based on a Memorandum of Country Eligibility prepared by the Bank.

II. BACKGROUND

- 2.1 A strong manufacturing sector is vital to Mexico's economic recovery. Low productivity is curbing growth in the sector, however. One constraint, along with insufficient financial and infrastructure development and investment in research and development, is the dominance of less productive, smaller firms. Firms with under 100 employees represent over 97% of establishments in the manufacturing sector, and 38% of employment. Manufacturing productivity of small firms grew by only 1% between 1984 and 1989, according to one study, compared to an overall average increase of 5.6%. Factors that lower small firm productivity are: tighter constraints on financing and lower profits to invest in technology and research and development; smaller plant size which limits economies of scale in production; and less investment in worker training.
- 2.2 For the most part only a small number of larger, more productive firms are reaching world markets for manufactured goods. One study indicated that 293 of the top "500" Mexican companies were responsible for 70% of all exports. In 1995 manufactured products accounted for 84% of total exports, up from 22% in 1985. As large manufacturing firms increasingly make production improvements to meet this surge in export demand, and become proficient at making products that meet international standards, the gap in productivity levels with smaller firms is only likely to widen further.
- 2.3 The difficulty of firms in producing internationally-competitive manufactured goods is marked in the machinery and metal products sub-sector. Case studies for the auto-parts industry, for example, show 66% of vehicle motor exports concentrated in the top 3 firms. One study of productivity by firm size of eight manufacturing sub-sectors in Mexico found that small metal-working firms had the second-to-worse productivity performance, with half the productivity of large firms. Small firms in the sub-sector are typically technologically obsolescent, using equipment on average 26 years old. The high level of imports points to their low levels of competitiveness. For example, 50% of the auto-parts market is made up of imports, despite the fact that there are over 20 vehicle-producing companies in Mexico.
- 2.4 Jalisco is one of Mexico's most important manufacturing and metal-working states, with a concentration of employment in small firms. Firms with less than 100 employees account for 98% of manufacturing establishments - as well as 52% of employment in the sector compared to 38% nationally. Manufacturing accounts for one-third of the state's GDP, as compared to the sector's 23% contribution to

national GDP. Within manufacturing in Jalisco, one in five firms and one in five employees operate in the metal-working sub-sector, which is highly diversified and concentrated in the state capital, Guadalajara. 66% of firms and 75% of employment are in the greater metropolitan area. In terms of employment production of metal parts by foundries account for 3% of jobs; machinery spare parts, 3%; the auto industry, including auto-parts, 11%; and machinery - agricultural and other - 3%. Overall, foundry and machinery firms account for 55% of jobs in the metal-working sub-sector in Jalisco.

- 2.5 The diversification and concentration of activity in Guadalajara has led to the development of high levels of sub-contracting between foundry and machinery firms. The local car industry, for example, is one important end user of spare machinery parts, such as ball bearings and rivets. Despite these signs of dynamism, however, most of the small firms' products are relatively rudimentary and their processes outdated. One 1995 study of Jalisco's metal-working firms found antiquated technology and lack of product quality, and the sub-sector operated at 65% efficiency, versus 80%-90% industrial efficiency in the state as a whole. As a result, as is true nationally, the lower productivity of the majority of metal-working firms in Jalisco impedes them from producing high-quality, competitively-priced products for growing export-oriented markets.

III. PROJECT

A. Frame of Reference

- 3.1 As part of the analysis to design the project, a detailed evaluation of the Jalisco metal-working sub-sector was conducted. A survey of 28 metal-working firms and providers of technical assistance in Jalisco was carried out by two international consultants hired by the Bank to assess the nature and scope of the challenges faced by the firms and gain a preliminary measurement of their demand for services in response to those challenges. In addition, two international experts in automated production, from the Instituto de Máquina Herramienta in Spain and the National Institute of Standards and Technology in the United States respectively, were engaged to visit Jalisco and assess the need of small firms for technological support.
- 3.2 A total of 17 firms were interviewed. Of these, 13 were small machinery and foundry firms, and four were larger, exporting firms that sub-contract from the smaller firms. A few exceptional small firms were found to be exporting world-class products - such as SUDISA, which exports 95% of the trailer axle it makes to Asia and Latin America.
- 3.3 On a whole, however, small firms visited were found to be using out-of-date production methods to manufacture products of too low quality to meet international standards. As a result, they cannot

meet growing international demand for a number of metal products. Growth markets cited by the small firms were metal parts for machinery, motor parts, valves and metal containers. Data from the local metal-working chamber of commerce supports this, indicating 77% growth between 1993 and 1995 in machinery spare parts exports; 48% growth in car motor parts exports; 43% growth in exports of metal containers; and 36% growth in sales abroad of valves.

- 3.4 Two main problems were identified: (a) the need for amelioration of manufacturing processes, in terms of production technology, plant lay-out, and organization of the firms; and (b) the need for better control of the quality of the metal parts produced.
- 3.5 In terms of manufacturing processes, the need was found for: (1) technological services such as diagnostics and re-engineering of plant layout, production processes, and product design; and (2) management training in competitiveness, productivity, and adherence to environmental norms. Specific services needed vary according to industry. Foundry firms, which produce various metal parts and structures, are more in need of advice on plant layout, as on a whole they have fixed line flow production processes in contrast to car-part makers that have flexible job shop layouts. Manufacture of auto, motor and other machinery parts is, in turn, product-design-driven and the need for product design support was most often seen by firms in these industries.
- 3.6 In terms of quality control, the firms showed a need for (1) assistance in implementation of quality norms and programs, and (2) access to laboratories to assist in the control the quality of their products and processes. These would include a physical testing laboratory, where tests are made of the physical and chemical structure of metals and other raw materials; and a dimensional metrology laboratory, where parts are measured and the production and measurement equipment of firms is routinely calibrated, allowing for better control of production processes and quality of the end-product.
- 3.7 Small firms need access to such laboratories to be able to comply with international quality standards, including the norms of ISO-9000, and reach foreign markets. Their larger, exporting clients often require documentation of the use of the laboratory services. Most small firms are unable to buy the equipment to conduct the tests and calibrations in-house, as larger firms do, and there are few external providers of such services in Jalisco. Small firms cite that for lack of options, physical testing of materials is sometimes provided informally as a favor between firms. Larger client firms also occasionally conduct physical testing for their suppliers. Neither option is readily accessible to all firms or offers systematic learning opportunities. The supply of dimensional metrology services in Guadalajara is very limited; only one company, a machine-tool supplier, Mitutuyo, was identified as a ready supplier of this service, but at a much higher precision and

higher price than suitable for small Jalisco metal-working companies.

- 3.8 Larger clients of small firms surveyed included Siemens, which produces autoparts and engine housings at its Guadalajara site; Honda, which produces cars, motorcycles, and agricultural machinery parts; and Keystone Valves. Siemens and Honda export between 70% and 90% of their products, and Keystone exports 25% of its valves. All three sub-contract a significant portion of their production, mostly from overseas. Siemens and Honda contract 5% locally, whereas Keystone Valves sub-contracts over 50% locally. As all use "just-in-time" inventory management, scheduling delivery of small lots of inputs immediately before needed, they cited pressure to outsource more production locally, and a number had programs to develop their local supplier base. In August 1996 for example, Keystone Valves instituted a national program to identify high-quality local suppliers for its Mexican plant.
- 3.9 In terms of their suppliers, the larger firms cited the need for: (1) better quality of materials - harder and less porosity of metal for example, (2) better delivery time, (3) better process control, and (4) better tooling production capability - the ability to make molds which in turn are used to form metal parts.
- 3.10 Of the actual or potential providers of services to small firms that were interviewed, the two principal programs are governmental: the Programa de Calidad Integral y Modernización (CIMO), and the Colegio Nacional de Educación Profesional Técnica (CONALEP). CIMO provides training and technical assistance to small firms in different sectors to improve their productivity. Through CIMO firms undergo a business diagnosis to identify causes of lower productivity, and then are linked with private sector executives who provide services. While nation-wide evaluations indicate the success of CIMO in responding flexibly to the needs of constituent firms, in Guadalajara its intermediation of services to the metal-working sector is very limited, representing only 3.5% of CIMO financial outlays in Jalisco in 1995. CONALEP is the leading governmental institution for professional technical post-secondary education, and has set up six Centros de Asistencia y Servicios Tecnológicos (CASTs) in Mexico to address needs for productivity improvement, including one in Guadalajara. These centers provide specialized training in advanced technology, technical assistance, technological services, and advice on environmental controls to small businesses. As they have only been operating approximately two years, information evaluating their performance is not available. However, anecdotal evidence suggests that the CASTs are not as flexible as client firms would like, delivering few services on-site or tailored to specific business needs. Further, management of the Guadalajara CAST informs that its provision of services to the metal-working sector has been circumscribed by scarce resources to pay the salaries of appropriately-qualified staff.

B. Project Concept

1. Objectives

- 3.11 The objective of the project is to improve the productivity and competitiveness of small metal-working firms in the state of Jalisco. To achieve this a local industry association for foundry and machinery firms, the Instituto de Fundición y Maquinado de Jalisco (IFM), will be strengthened to enable it to provide to firms (a) training and technical assistance services in order to improve the efficiency of their processes and design of their products, and (b) laboratory services in order to control the quality of their processes and processes. The goal will be to assist firms to produce higher quality, and more competitively priced, products and as a result link them with growing domestic and export markets.

2. Components

- a. Component #1: Technical assistance and training in production process, and quality control services

(1) Technical assistance and training in the production process

- 3.12 **Technical assistance.** This will involve the transfer of technical know-how in the manufacture of metal parts. Objectives will be to (i) upgrade the knowledge of manufacturing techniques, and (ii) provide participants with the necessary skills to adapt to technological innovation as these are introduced into the work place.
- 3.13 Specific services will include, but not be limited to, diagnostics and re-engineering of plant layout, production processes, and product design; assistance to understand and execute manufacturing drawings, process control procedures, and quality control methods; on-the-job-supervision of production staff to correct and improve job performance; and one-on-one consultations to clarify production techniques.
- 3.14 Services will be delivered through: (i) in-firm technical assistance tied to production practices and (ii) workshops on, and demonstrations of, new technologies delivered at the IFM, as well as the facilities and plants of cooperating companies and institutions where demonstration equipment is available.
- 3.15 To lower costs and facilitate administration, it is envisaged that technical assistance will be delivered in modules, including business diagnostics, basic and specialized technical assistance, and courses on technological processes (see Annex 3 for detail).
- 3.16 **Training.** Firms will be trained in (i) the development and implementation of quality assurance plans (including ISO 9000 for

total quality management); (ii) dissemination of, and means of compliance with, environmental norms and standards (including ISO 14000); and (iii) the development and implementation of marketing, strategic and business plans to reach growing domestic and export markets for metal products.

- 3.17 Training and technical assistance services will be offered through contracting of institutions, firms and individuals in the private sector with the required specialization. An effort will be made to identify the institutions and larger firms that are the market leaders in the sub-sector, and individual consultants and consulting firms with experience and a good reputation in the market. A data base will be elaborated with information on providers of service.
- 3.18 The University of Guadalajara and the Guadalajara campus of the Instituto Tecnológico de Estudios Superiores de Monterrey (ITESM) in particular are two potential contractors to the executing organization, as they are already strong providers of technology services to the private sector. High-performing students in the two universities will be selected as un-paid interns to work on a short term basis at the Executing Organization; an effort will be made to identify appropriately qualified female candidates for the internships.
- 3.19 Assistance contracted from large local exporting firms will include instruction by engineers and production supervisors in design facilities and plants. Technical know-how transferred will help bring the small firms' processes and products more in line with the demand of large local firms; in the process business relationships between small and large firms can develop. 1/

(2) Quality control: Laboratory services for physical and chemical testing of materials and for dimensional metrology

- 3.20 Services offered by the IFM will include:
- a) **Physical testing**, which permits the analysis and certification of resistance of materials to traction, flexion, compression, fatigue testing, hardness, and roughness. Testing determines if the material tested complies with required technical norms or specifications.
 - b) **Metallography analysis**, which permits the analysis and certification of the chemical composition of materials. Here too

1/ A review of the design of technology transfer institutions in Asia indicates that the most successful use private sector providers of services to the greatest degree possible (see Annex 6 - List of Publications on Lessons Learned in Technology Transfer Projects).

testing determines if the material tested complies with required technical norms or specifications.

c) **Dimensional metrology**, which permits the measurement of the dimensions and angles of parts and equipment to determine if they are within the parameters of specified and acceptable ranges of tolerance and dimension.

- 3.21 As noted earlier, small firms need access to such laboratories to be able to comply with international quality standards, including the norms of ISO-9000, and reach international markets through direct or indirect exports.
- 3.22 The laboratories will be run to maximize revenue, with a strong private sector orientation. To strengthen the credibility of the laboratories within the private sector, as well as their technical capability, they will need to be certified by the National Center of Metrology (CENAM), which is part of Mexico's National System of Testing Laboratories (SINALP). Also, alliances will be developed with international firms that run well-reputed private physical testing and dimensional metrology laboratories. Similar alliances have been successfully developed in Asia, for example in Taiwan between a governmental quality assurance agency, the Bureau of Commodity Inspection and Quality, and Underwriter Laboratories.

b. Component #2: Capacity Building

- 3.23 As the IFM has recently begun operating as a service providing entity, it will require some assistance during the course of project implementation. Training and technical assistance will be needed to transfer technical know-how in the manufacture of metal parts, and to strengthen the human resources sufficiently so that they will be able to continue to provide services beyond the execution period of the project. Only by creating a strong, effective staff will continuity be assured.
- 3.24 **Training of project staff.** This will consist of staff training and study tours in appropriate institutions that are identified, including laboratories with which alliances are formed. As a result, the skills of the project staff will be strengthened, and up-to-date methodologies in technical assistance and specialized technological service will be transferred to the IFM.
- 3.25 **External support to the Executing Organization.** Technical assistance will include partnering arrangements with international institutions that provide manufacturing assistance in order to enable the staff to progressively build capacity in providing manufacturing services to small firms, and awareness of market opportunities and technologies in different countries. One partnering arrangement has already been reached between the Executing Organization and an institute in the Basque Autonomous Community of Spain which is specialized in automated production

technology and has a successful track record of providing technological assistance and training to manufacturing firms with smaller, less continuous processes similar to that of Mexican firms.

- 3.26 Over the four-year duration of the project this institute, the Instituto de Máquina Herramienta (IMH), will be directly contracted by IFM to provide ongoing specialized assistance and industrial design equipment to strengthen its management and develop its capacity to deliver technical assistance in areas that would include quality control, automated production, and metal-working. In addition, the IMH has agreed to contribute laboratory equipment valued at approximately US\$250,000 which would be used in Component #1 of this project. Further partnering arrangements with other international institutions will be sought by the Executing Organization during project execution.
- 3.27 In addition, in order to establish the laboratories and rapidly reinforce the quality of the services of the Executing Organization, the project will finance institutional strengthening services through the contracting of national consultants.

3. Marketing Plan

- 3.28 In order to determine the financial sustainability of the project over the four-year execution period the market for the services of the IFM was identified. There exists in Jalisco a market of 1,000 small metal-working firms with between 5 and 100 employees. In total these firms employ approximately 18,000 workers. Further, while the services and financial projections of this project have been developed to target this market segment, small firms that seek to buy these same services coming from other market segments and other states will also be given access to IFM's services.
- 3.29 Before laboratory equipment is purchased and services developed, the IFM will contract a specialized consulting firm to conduct a market research study to further refine the definition of services in demand by firms in the targeted market segment, including potential demand over the next five years. The market study will help identify segments of the metal-working sub-sector for which demand of services is greatest. The IFM will develop its services progressively in response to this demand. Ties developed with the large local firms that subcontract from the small firms will also contribute to the development of services in demand and tailored to the needs of the market.
- 3.30 Initially the IFM will focus its marketing, training and technical assistance activities on raising the awareness of small firms of existing technological and market challenges and opportunities, and the services it offers to help them meet these. Subject to the results of the demand analysis of the market research study, it is projected that by the beginning of the second year, the IFM will promote the services of material testing and dimensional metrology

as well as technological services of a higher level of complexity. Once services are offered, a marketing campaign will be maintained intensely in the first months of the second year and "maintenance" marketing campaigns will be conducted in the following years.

- 3.31 Each year the IFM will conduct a market research study to determine its positioning in the market, as well as customer opinion of the services it is providing, in terms of need, price and quality.

4. Institutional Framework

- 3.32 The Executing Organization will be the Instituto de Fundición y Maquinado de Jalisco (IFM), which is an industry association that was created in May 1996. Members of the IFM include small owners of small businesses in the foundry and machinery sectors of Jalisco; the Sociedad de Fundidores de la Región Occidente (SFRO); the Unión de Crédito de los Fundidores y Maquinadores S.A. de C.V. (UCREFUN); and the Cámara de la Industria Metálica de Guadalajara (CIMEG). It is foreseen that before the project is implemented, a total of 100 firms will have become members of the IFM. Currently, the organization has 60 members.
- 3.33 In order to ensure that the Board of Directors of IFM is representative of the sector, it will include at least two of the small business owners who founded the IFM, one representative each of SFRO, UCREFUN and CIMEG, one representative of a larger local firm that has joined the IFM as a dues-paying member, and at least one representative of a local university selected by IFM. The Board of Directors will impart to the project and IFM its general operational policy and will approve the Project Operating Regulations, a draft of which is included in Annex 4.
- 3.34 Staff funded by the Bank will include a Project Director, a Senior Technician specialized in laboratories and dimensional metrology, a Senior Technician specialized in physical-chemical testing and the Junior Technician who will run these laboratories; and two technical advisors, whose basic function will be to promote the services of the IFM and stimulate the business owners to upgrade the efficiency and competitiveness of their firms. They will also, in coordination with management staff, conduct the task of selling and contracting services with the appropriate institutions, firms and consultants. All office equipment and administrative support required will be provided by the IFM.
- 3.35 The Project Director will be selected in accordance with Bank procedures. Selection of a highly motivated and competent Director with ample familiarity with the sector and management of service delivery projects will be key to the success of the project. As part of the Director's responsibility to administrate the Project, he or she will be responsible for the strategic planning of the Project's activities, overseeing the accomplishment of the Project's objectives, overseeing the Project's operations, and preparing the terms of reference of the firms, consultants and

institutions that will be contracted as part of implementation of the Project. The salary of the Director will be paid by the Project with MIF funds. The Director's draft Terms of Reference are included in Annex 5.

- 3.36 An annual business plan and its corresponding budget will need to be developed, including a cash flow forecast, and implementation calendar, in which the responsibilities and goals to achieve within each project component are defined. The plan agreed upon by the Board of Directors will need to be submitted for the consideration of the Bank for its approval. The project resources will be disbursed to the Executing Organization through the procedure of projection of use of funds established in the Agreement that the Executing Organization will reach with the Bank. These funds will be deposited in a special account opened for this purpose.
- 3.37 The annual business plan will to the extent possible : (a) link a portion of the Project Director's salary to the extent to which the primary benchmarks for measuring the success of the project, including financial performance, are met; these benchmarks are contained in the logical framework in Annex I; and (b) link a portion of the salary of the two technical advisors, whose basic function will be to promote the services of the IFM, to sale of services.
- 3.38 The establishment of the project site for the technical and administrative project staff, and for the operation of equipment of the physical testing and dimensional metrology laboratories, will be provided by the IFM. Preparation of the site of the testing and calibration laboratories will include renovation, furnishing and implementation of the necessary conditions to assure it meets the technical specifications to house the equipment provided under this Project. Costs in this category will be covered by local counterpart funds.
- 3.39 Revenues generated from service delivery will have to be accounted for as they are received and deposited in a special interest-bearing account for the project.

5. Expected Results

- 3.40 It is projected that firms will be repeat users of services, with firms on average using some services at least two times a year. It is also projected that a minimum of 300 firms, or roughly 30 % of the targeted market, will receive services from the IFM. Based on the projections, over the four years of project execution there will be a total of 2,024 "service deliveries" between laboratory services, technical assistance and training (see Annex 3 for detail). Services and training will be provided in the following manner:

a) **Laboratory services.** 620 firms will receive laboratory services over the 4 years of the project; 200 in material testing, 200 in chemical testing, 150 in metrology services and 70 in metrology services with the coordinate measuring machine.

b) **Technical Assistance Services.** 244 firms will receive technical assistance services over the 4 years of the project; 110 in business diagnostic, 90 in basic technical assistance and 44 in specialized technical assistance.

c) **Training.** 1,160 firms will receive training in various programs over the 4 years of the project; 560 firms in management and environmental training, 320 in technological processes with national instructors and 280 in technological processes with foreign instructors.

6. Cost and Financing of the Project

- 3.41 The total cost of the project is US\$ 2,745,380 of which US\$ 1,767,550 will be provided in nonreimbursable MIF resources from the Small Enterprise Development Facility (Facility III). 23% of the MIF contribution is for equipment. The MIF contributions decrease over the life of the project (see Annex 2, Budget); contributions from service users increase progressively.

Summary estimated budget (Thousands of US Dollars)			
ITEM	PROJECT TOTALS		
	MIF	LOCAL	TOTAL
1. Manufacturing Technical Assistance	848,070	460,550	1,308,620
a. Production Process	332,370	65,000	397,370
Facilitators of Technical Assistance	99,000	0	99,000
Industrial Design Equipment	150,000	65,000	215,000
Service delivery	83,370	0	83,370
b. Quality Control	515,700	395,550	911,250
Running Costs	252,000	0	252,000
Testing Equipment	263,700	395,550	659,250
2. Capacity Building	373,000	0	373,000
Staff Training	43,000	0	43,000
Technical Assistance	330,000	0	330,000
Institutional Framework and Marketing Plan	355,750	509,280	865,030
Renovation and use of premises	0	200,000	200,000
Office equipment and furniture	0	45,750	45,750

Administrative cost	0	150,680	150,680
Market research	50,000	0	50,000
Promotion	65,000	0	65,000
Project Director	222,000	0	222,000
Support Staff	0	106,600	106,600
Personnel Recruitment	18,750	6,250	25,000
Evaluation/Audit	60,000	8,000	68,000
Contingencies	130,730	0	130,730
Total	1,767,550	977,830	2,745,380
Share (%)	64%	36%	100%

- 3.42 The local counterpart contribution totals US\$ 977,830, of which 47% is for equipment and 53% for staff and operating costs.
- 3.43 Gross revenues for sale of services reach US\$ 668,150 over the life of the project.
- 3.44 In establishing fees for the services to be provided by the IFM, a gradual system has been planned, so that firms pay an increasingly larger share of the cost of the services they receive. It should be noted that some services are able to recover their costs in the third and fourth years, and others generate a profit in the third and fourth years. Full financial sustainability is reached in the fifth year. In sum, the revenues generated from service delivery will gradually supplement the resources invested by MIF (see Annex 3, Detailed Budget).

7. Environmental Aspects

- 3.45 This project recognizes the linkages that exist between environmental quality, efficient processes, and adherence to environmental standards in order to tap into growing international markets for certain metal products. The IFM will place particular emphasis on environmental matters by orienting small firms toward the incorporation of "cleaner technologies." Positive environmental effects will be sought through technical assistance services supporting the adoption of new production techniques such as: improved systems for gas emissions; the use of recycled inputs; improved waste management; and the identification of inefficient processes, including inefficiencies in the use of water, energy and raw materials. Firms will be supported in the use of cleaner technologies which not only reduce contamination but also reduce production costs and increase product quality.
- 3.46 In addition, the project will offer environmental training. Studies undertaken as part of an environmental program at the University of Guadalajara have identified key issues in the metal-working sector of Jalisco and measures to address them. Critical

environmental "factors" that were identified in the metal-working sector were (i) the management and use of hazardous wastes, (ii) residual waters, principally in the metal coverings sub-sector, and (iii) emissions in the atmosphere, principally in the foundry, thermal treatments and electrostatic covering sub-sectors; with corresponding needed training being: (i) dissemination of, and assistance in compliance with, environmental norms, (ii) transfer of alternative technologies to firms, (iii) applications of methods and systems to make processes more efficient.

- 3.47 Accordingly, the project will disseminate, and assist small metal-working firms to comply with, the municipal, state and national laws and norms they are subject to which regulate solid and hazardous waste management; industrial noise; and emissions in the air, soil, water. The compliance of firms with these regulations is monitored by governmental bodies at all three levels. Currently, monitoring is based partly on self-reporting by firms. For example, to obtain a license to operate (licencia de funcionamiento) firms need to submit a "registro de descarga de aguas residuales", a "manifiesto de residuos peligrosos" and a manifiesto de residuos no peligrosos". The Executing Organization will work and coordinate with the statal environmental authority to disseminate norms applicable to the metal-working sector, and assist firms to comply with them. This authority is the Administration for Environmental Management and Verification, within the State Commission of Ecology in the Government of the State of Jalisco.
- 3.48 The project will also offer small metal-working firms training in the ISO 14000 standards. Many of the large local exporting firms have adopted the ISO 14000 standards for environmental management, and as a result require that their suppliers of metal parts also adhere to environmental norms. ISO 14000 are international standards that establish requirements and guidance for a company to design and implement the internal policies and objectives of an environmental management system, including compliance with applicable legislation and regulations, pollution prevention measures, and provisions for continual improvement. In recognition that the adoption of ISO 14000 standards typically represents a multi-step, somewhat costly, process, small firms will be allowed flexibility in the adoption of ISO 14000 standards. It is estimated that roughly one in four training and technological assistance modules will be dedicated to environmental activities. As a portion of the total cost of services delivered, this would mean the cost of services delivered dedicated to environmental activities would total roughly \$141,510.
- 3.49 To offer the services noted above, the Executing Organization will contract consultants to provide environmental technical assistance and training. Supervision of the delivery of these services will be reflected in both monitoring and evaluation of the proposed project. In addition, small firms will be classified, in function

of their possible environmental impact, according to the following categories: (a) of neutral environmental impact; (b) with a possible moderately negative environmental impact (c) with a possible significant negative environmental impact, this being an indispensable condition for continued access to the services of the Project. For those with b and c classifications, firms will need submit "compromisos" noting the mitigation measures they plan to take to address possible negative impact of their activities. The consultants will work with the Executing Organization to prepare "cartillas" that can be readily disseminated to small firms with suggested mitigation measures specific to different sub-sectors of the metal-working industry. Specific suggested mitigation measures are included in Annex 7.

- 3.50 A consultant will be hired to refine the design of the environmental training. Specifically, the responsibilities of the consultant, which will be elaborated in his or her terms of reference, will include: (a) identify the various governmental environmental regulatory authorities and agencies that issue norms impacting small firms in the Guadalajara metal-working sector, (b) evaluate the enforcement of local norms and make recommendations as needed on how their application could be improved, (c) design, and provide rough budget estimates for, environmental components appropriate for the training and technical assistance to be delivered, (d) identify incentives to be disseminated in marketing plan (see paragraph 3.31) to promote participation in ISO 14,000, (e) refine the environmental classification and selection criteria of firms noted in paragraph 3.50, (f) identify indicators for monitoring the environmental effects of the program, and (g) refine and elaborate the mitigation measures to be taken by small firms to address the possible negative environmental impact of their activities. The draft Terms of Reference of the environmental consultant are included in Annex 9.

8. Monitoring

- 3.51 The Executing Organization will need to present to the Bank's satisfaction semi-annual reports on the progress of the activities of the project. These reports will need to include the results in the different areas of service delivery, and steps taken to achieve these results. They will also include: a) the performance of the IFM, the laboratories and the extent to which they are meeting demand; b) size and area of specialization of beneficiary; c) the types of services most requested; d) the structure of fees charged for services and the contribution of service delivery revenue toward the financial sustainability of the service provision; e) the performance and development of institutions and firms providing services; f) possible environmental effects; and g) impact of services on the targeted firms in the metal working segment in terms of employment generated, exports, and other information of interest.

- 3.52 The IFM will also need to present the results of the effectiveness surveys which it will be carrying out in the second, third and fourth years. This survey should assist in enabling the best possible execution of the project.

9. Viability and Risks of the Project

- 3.53 Possible risks result from: i) the fact that the Executing Organization is relatively new which prevents it from having significant experience in administering this type of project, ii) the possibility that actual demand for the services provided will be lower than projected, and iii) the financial situation in Mexico which could curtail firms, given their own financial constraints, from participating in the project.
- 3.54 The project includes a series of measures in the institutional strengthening component to support the Executing Organization. These comprise an intense process of training of the project staff and the contracting of external assistance to the IFM. A marketing plan of the services has been included as part of project design to stimulate use of services. Further, the projected viability of the project is based in part on a deficient and scarce supply of public and private institutions that lend technological and business services to small firms in the metal-working sub-sector.
- 3.55 Selection of the Project Director is crucial; the successful carrying-out of the project's objectives will be highly dependent on the person in this position. Along with a strong technical background, the candidate for this position will need to have experience working as part of a team. The participation of the Project Team in the selection process is recommended.

IV. COMPLIANCE WITH PROJECT ELIGIBILITY CRITERIA

- 4.1 The project is consistent with the eligibility criteria of the MIF, and the general purposes of the MIF as stated in the Agreement establishing the MIF, in particular regarding (a) the generation of increasing levels of private sector participation and of employment opportunities; and (b) the creation and strengthening of small businesses. In addition it is an innovative project that will have an important demonstration effect in the private sector in Mexico and the region.

V. CONSISTENCY WITH THE BANK'S COUNTRY PROGRAM

- 5.1 The current strategy for Mexico (1995-1997) calls for activities and programs focussed on stimulation of the private sector and productive employment, along with a more efficient public sector and better allocation of resources. The project proposes to improve the quality and accessibility of technical assistance and training to small metal working firms, and to encourage private

sector participation in technical assistance and training, and therefore is complementary and coherent with the Bank's 1995-1997 operating program in Mexico.

VI. AVAILABILITY OF MIF RESOURCES

- 6.1 The project is expected to be financed through a grant based on the following points: (i) Mexico's eligibility which was received on January 23, 1994; (ii) Mexico's compliance with the criteria of eligibility for obtaining grant resources at the country level (Article III, Section 5(b) of the MIF Agreement) detailed in Section III paragraphs 3.1-3.4 of the Eligibility Memorandum for each country; and (iii) the catalytic impact the proposed project is expected to have on investment flows, as required under Article III, Section 5(a) by facilitating increased productivity in the small- and medium-scale industry sector in Mexico.

VII. EVALUATION

- 7.1 During the execution of the Project the Executing Organization, following the procedures accepted by the Bank, will contract, with resources of the contribution, an external consulting firm for the evaluations of the project, which will be carried out: the first, to be finished 9 months from the first disbursement, the second at the end of 18 months, the third at the end of 36 months and the fourth, once the execution of the project has been finalized. The objective of the external evaluations is to verify the effectiveness and efficiency of the services offered, and of the administration of the resources to propose the adjustments necessary to meet the objectives of the Project.
- 7.2 The first evaluation will focus on the launching of the project, compliance with procedures for staff recruitment and training and the specified required local counterpart contribution, and the beginning of promotion of services of the IFM. The second and third evaluations will focus on the establishment of the laboratories, progress toward achievement of the specified objectives of the project, including environmental monitoring, and of the annual business plans prepared by IFM. The fourth and last evaluation will need to present the results of the project, extent of achievement of objective, and difficulties encountered in its execution. It will need also to recommend the necessary adjustments to assure the best continued operation of the IFM once MIF support ceases. Within the first six months of execution of the Project, the executing organization will define the methodology of the evaluations, which will need to be submitted for approval of the Bank. Criteria for the evaluations are set forth in the logical framework of this document.

Annex I - Logical Framework

Description	Measures of Achievement	Sources of Data	Assumptions
Project Goal			
Increased competitiveness and productivity of small metal-working firms in Jalisco, Mexico	Increased sales of small metal-working firms in Jalisco, Mexico, in the domestic and foreign markets	Impact evaluation of participating entities, using baseline data prior to participation and end of project data	Mexican Government maintains a positive economic policy, and a commitment to export development; exchange rates are relatively stable Foreign and domestic sales of Mexican manufactured metal products remain strong
Specific Objectives			
Strengthen the Instituto de Fundición y Maquinado (IFM) de Jalisco to enable it to provide laboratory services, technical assistance and training to small metal-working firms in order to upgrade their production processes and product quality	IFM generating sufficient revenue to continue to operate at same program level. Increased range and quality of support services; increased number of export ready firms; increased skills and competency in business development	Project progress reports; Cámara de la Industria Metálica de Guadalajara (CIMEG) export reports; end of project report	Small firms recognize the need for external services and training in order to meet increased sales opportunities
Outputs			
Laboratory services: physical/chemical testing and metrology with the objective of improving the quality of the products of the firms, thereby enabling adherence to quality norms of national and international markets	Laboratories set up, certified by the National Center of Metrology (CENAM) and providing services; regular use of laboratories by small firms.	Semi-annual reports on services lent and firms assisted. Annual evaluations. End of project report	Small firms recognize the need to produce higher quality goods
Technical assistance and management training services for the upgrading of their processes, product quality and competitiveness of their prices	Technical assistance and training program implemented: training delivered on marketing, business planning and quality control systems; technical assistance delivered for business diagnostics, basic and specialized technical needs, and by national and foreign experts on technological processes Consultants, managers/technical staff of larger firms, and other others contracted to provide services	Baseline data and follow-up questionnaires; project progress reports	Small firms are disposed to contract technical assistance and training to meet internal needs
Institutional strengthening of IFM to enable it to administer project in a sustainable manner	Improved financial performance, an increasing membership base with corresponding increased financial support from members, increased ability to identify and respond to client and member training and service needs Exposure to methods of successful service and training provision through visits to appropriate national and international institutions, staff training and external assistance Implementation of market research studies and marketing campaigns	Semi-annual reports; annual evaluations; IFM financial statements; market research results	Lessons, implications, and recommendations from sources of data are used to deliver the appropriate training and services so as to demand and maximize revenue
Inputs			
Contract consulting services to execute market research study; Set up and equip laboratories; Implement data base and "clearinghouse" system to link individual consultants and organizations providing technological services with small firms; Study tours, staff training, long term external assistance for IFM project staff to strengthen management, technical and service delivery capacity	Project Director identified and hired; Sistema Nacional de Laboratorios de Prueba (SINALP) and Centro Nacional de Metrología (CENAM) provide necessary training and information to officially certify laboratories; 100 man/days external assistance to IFM year 1 and 50 days years 2 and 3; alliances with international physical testing, chemical analysis and metrology laboratories	Project progress reports; IDB monitoring visits	Private sector counterpart funds and resources are provided at sufficient levels

ANNEX VII

EXAMPLES OF MEASURES TO MITIGATE POSSIBLE NEGATIVE ENVIRONMENTAL IMPACT IN THE MANUFACTURE OF METAL PRODUCTS

POSSIBLE NEGATIVE ENVIRONMENTAL IMPACT

MITIGATION MEASURES

Air contamination. For example through welding and antiquated foundry processes.

Industrial safety measures. Use of protective equipment for workers (masks, gloves, etc.). Installation of filters and fans.

Contamination of water, ground and sewer systems as a result of spills or waste of solvents, paints or metals.

Norms for tasks and order in the workshops.
Adequate management of materials.
Recycling of waste.

Noise resulting from cutting and polishing processes.

Use of ear-plugs by operators of machinery.
Reduce noise by periodically adjusting and greasing machinery.
Establish suitable work hours.

Risk of fire and explosions.

Exercise security measures. Establish contingency plans for fire, explosion and work accidents. Install basic fire hazard prevention equipment.

Energy consumption.

Review plant installation. Conserve energy.

Annex 8 - Project Budget According to Bank Category

CODE	ITEM	PROJECT TOTALS		
		MIF	LOCAL	TOTAL
2.2	Individual Consultants	83,370	0	83,370
2.5	Observation Trips	37,000	0	37,000
6.3	Equipment	413,700	492,900	906,600
8.2	Audit & Evaluation	60,000	8,000	68,000
96	Direct Costs	1,042,750	476,930	1,519,680
	IFM Personnel	573,000	8,000	581,000
	IFM Direct & Overhead Costs	469,750	468,930	938,680
98	Contingencies	130,733	0	130,733
	TOTAL	1,767,553	977,830	2,745,383

PROPOSED RESOLUTION

MEXICO. NONREIMBURSABLE TECHNICAL COOPERATION FOR
A PRODUCTIVITY CENTER IN JALISCO

The Donors Committee of the Multilateral Investment Fund

RESOLVES:

1. That the President of the Inter-American Development Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Multilateral Investment Fund, to enter into such agreements as may be necessary with the Instituto de Fundición y Maquinado de Jalisco, and to take such additional measures as may be pertinent for the execution of the project memorandum referred to in Document MIF/AT- with respect to a technical cooperation training project for a productivity center in Jalisco.

2. That up to the amount of US\$1,767,550, or its equivalent in other convertible currencies, is authorized for the purpose of this resolution, chargeable to the resources of the Small Enterprise Development Facility of the Multilateral Investment Fund.

3. That the above-mentioned sum is to be provided on a nonreimbursable basis.