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Mission Report  
**JOINT UNEP/UNIDO MISSION TO BRAZIL**  
20-24 June 1994

by  
Dr. Miguel Rigola Lapeña, Consultant, UNIDO  
and  
Leo Heileman, UNEP

Evaluation of Escola Politecnica de Universidade de Sao Paulo, CODETEC  
and SENAI (Rio Grande do Sul) as candidates to be the National Cleaner  
Production Centre for Brazil.

VISIT TO THE "ESCOLA POLITECNICA DA UNIVERSIDADE DE SAO PAULO" (EP)  
20 June 1994

The programme of the visit and the persons met is indicated in Annex 1.

SUMMARY

1. Reception by the directorate of the school (EP) and introduction by Dr. Willibaldo Schmidell Netto to the human resources of the university and of the school.
2. Discussions were held on some aspects of the proposal for the Cleaner Production Centre (CPC). EP reinforces the potential interest of placing the CPC in the Sao Paulo area because it is the most industrialized zone in Brazil.
3. EP suggested the connection of the CPC based in the EP with several organizations:
  - Academic (Institute of Chemistry)
  - Research (Technological Research Institute-IPT)
  - Professional and Scientific (Brazilian Association of Chemical Engineers-ABEQ)
  - Managerial (Brazilian Service to Small and Medium Size Companies-SEBRAE)
  - Chemical Industry (Brazilian Association of Chemical Industries-ABIQUIM)
  - Federal and confederal organizations (Industrial Federation for the State of Sao Paulo-FIESP and the National Confederation of Industry-CNI)
  - Non-governmental Organizations (Institute for Environmental Studies-IEA, Risk management-GR and Quality Safety and Productivity-QSEP)

The Chamber of Commerce is not considered important because it only acts on export trade.

There is a similar experience to that of the CPC called FUNDACENTRO of the Ministry of Labour, related to health, and is specific for 119 companies in the metal finishing sector. There is no association of this sector and therefore the companies had to be identified on a company by company basis.

In general there are no sectorial associations except, for example in paper and ceramics. FIESP is the best sectorial connection through the Federal Syndicate of Owners. For example FIESP has members that are syndicates (Aluminium industry), various industries, consulting engineering companies and construction companies. There are approximately forty association of industries within FIESP eg. petrochemical, food, fertilizers, paints, leather, electronics etc.). This structure exists for all the State level industrial federations.

SEBRAE and ABEQ have an agreement for cooperation for the training of Small and Medium Enterprises (SME). This is a useful precedent for the diffusion of information to the SME.

4. The importance of the right selection of the manager of the CPC was stressed. The salary included in the EP budget could be low for the suggested candidates with long experience. A better provision would be US \$4500 to \$6000 gross per month, 13 times per year. A salary of US \$3000 will correspond to an engineer with a post graduate degree and five year experience (\$3000 also corresponds to the salary of a professor at the University). It is agreed that the salary figure could be supplemented from other parts of the budget, especially equipment that probably is not necessary. The budget for the vehicle was deleted because the school can share an existing vehicle with the Centre.

During lunch, Pedro Wongtchowski of ABEQ/ABIQUIM reinforced the idea to establish the CPC in the Sao Paulo area. In his opinion the four best engineering schools in the country can be acceptable candidates for the CPC including one in Rio de Janeiro, EP, University of Campinas and the University of San Carlos.

He considers that the Technological Research Institute (IPT) which is located within the campus of the University of Sao Paulo as is EP, is not a good candidate but a good potential partner. This opinion was supported by Maria Helena Orth of FIESP who considers IPT slow in responding to industry inquiries and not a convenient choice to assist small and medium size companies although technically competent. She stressed a real and urgent need of technical assistance to the small and medium size companies but not through IPT. She also indicated that for the national dissemination of the Cleaner Production concept, the National Confederation of Industry (CNI) should be involved of which FIESP is a member (see attachment).

The FIESP and ABIQ representatives confirmed that a gross salary of US\$4000 to \$5000 per month (13 times a year i.e. \$52000-\$65000 per year) is a correct one for the director of the Centre.

After lunch in the follow-up of the meeting it was remarked that the candidate must have the capability for financial management and develop and maintain contacts with government officials in particular in getting funds after the period of UNIDO and UNEP contribution is completed.

A final visit to the laboratories has shown the technical capacity of and space availability in EP. Please not the attached documents: brochure of EP; copies of introductory transparencies; proposed diagrams for the organization of cooperation; and CNI/COPEMA structure.

VISIT TO CODETEC (TECHNOLOGICAL DEVELOPMENT COMPANY)  
CAMPINAS, SAO PAULO, BRAZIL  
 21 June 1994

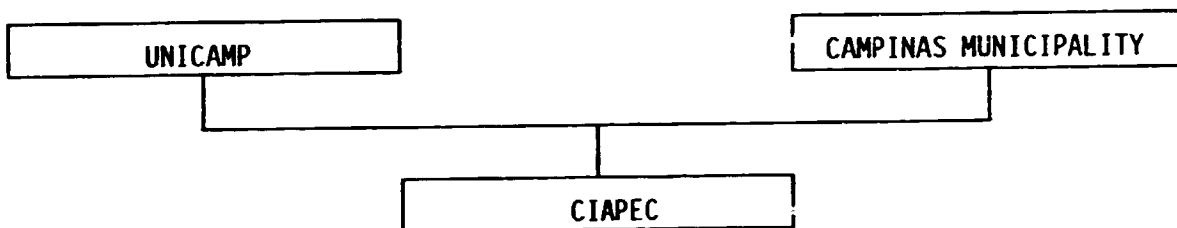
1. INTRODUCTION

Meetings were held with the persons indicated in Annex 1) and according to the attached schedule (Annex II).

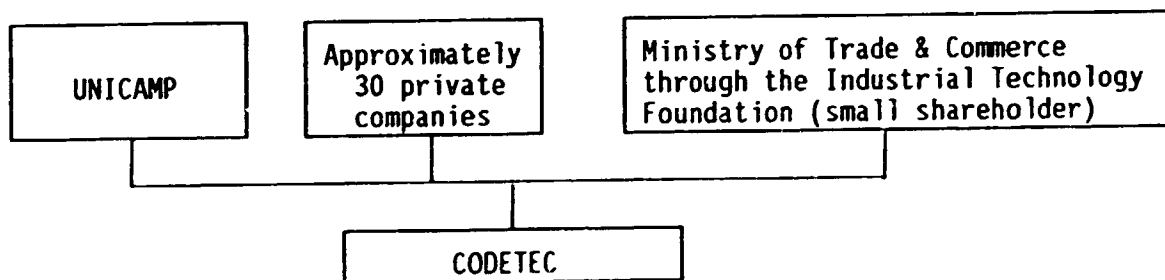
CODETEC is a private company founded in 1976 with the objective of providing the University (University of Campinas-UNICAMP) services to industry and other companies. Initially the services were concentrated in the field of energy and information systems but in 1984/85 specialization was development in fine chemicals (see attached brochures).

CODETEC provides services from technical assessment up to turn key plants and has experience in providing such to organizations in various parts of Brazil.

CIATEC (Company for Development of the Technological Park of Campinas) was founded in 1986 to manage two industrial parks reserved for technology based industries. It is a cooperation between the Municipality of Campinas and UNICAMP.



CODETEC is based in one of the industrial parks managed by CIATEC, and has shareholders according to the following structure:



2. Experience with small and medium size enterprises (SME). CODETEC explained its assistance to SEBRAE (Brazilian service for support to small and medium size companies) over the past year. SEBRAE uses a "balcony" approach of exhibition in the main locations as well as television "spots" with the twin objectives of updating inventories of enterprises and to better assist them. SEBRAE pays for

the first two hours of CODETEC services at a minimal rate of US \$25/hr but any time after this must be covered by the enterprises concerned. In this programme assistance has been given to the following types companies: laundries, soap and detergents, food processing, printing, plastic recycling and glass; at a rate of about 8 industries per week. CODETEC, however, does not have experience with some industries such as leather tanning and textile dying.

SEBRAE working capital is financed through a tax paid by industries, on the salaries of employees. The Government gives a portion of this revenue to SEBRAE for its operation.

3. CODETEC is one of the "Services Stations" of the Institute of Applied Information (IIA) ANTARES network for information to industry. This network which is still being developed is supported by the National Research Council and the Brazilian Institute of Information on Science and Technology (IBICT). It is envisaged that technical information can be disseminated through this network.

4. CIATEC has a joint venture with FIESP for the development of the "Trade point" (see brochure on Campinas) to develop trade by providing information on trade, markets, technologies etc. FIESP is the Federation of industries of the state of Sao Paulo. The venture was done in association with the technology Department of FIESP (Joasep Mindlin, Director and Joyce Jopper Leal, operations Manager). FIESP is defined as a complicated organization with different departments which do not always work together and have bad operative connections.

5. It was suggested by CODETEC that the salary of the director should be in the range of 3000-5000 per month (13 months/year). It must be noted that in the case of Brazil, over this gross salary, benefits are either 50% of base salary (for contract positions) or 100% of salary (for permanent positions). This additional "hidden" cost was not apparent in the budget supplied by CODETEC nor the one provided by the Polytechnic School of Sao Paulo.

Mr. Ceno Pietro Magnaghi who was suggest as a possible director, has a present salary of \$8000 US/month net.

CODETEC would be willing to supplement the salary of Mr. José Carlos Campana Gerez (the other suggested candidate) if chosen, by covering for e.g. the benefits of the post. Note, Mr. Campana Gerez was R&D Director of CODETEC (1983-1991) and CEO in 1992 and is still working at CODETEC.

In any case it is clear that some of the equipment in the budget may be necessary and this can be transferred to the directors salary. It was pointed out that critical factor in the success of the centre was the choice of the director.

6. A tour was made of CODETEC's facilities including laboratories, library and the multipurpose pilot plant. The laboratory facilities were very good, containing top of the line analytical apparatus (including Gas Chromatographs, GC-Mass Spec, NMR Spectrometer, IR Spec, etc.) which are necessary for chemical identification and synthesis work. The multipurpose pilot plant was also of a high quality which can be used for most types of process development/optimization work.

## ANNEX I

- Dr. Miguel Rigola Lapeña - UNIDO
- Mr. Leo Heileman - UNEP
- Prof. Rogério Cezar de Cerqueira Leite  
Presidente CIATEC Presidente do Conselho Administrativo CODETEC
- Dr. Ulysses C. Semeghini (only present during lunch).  
Secretário Municipal de Planejamento
- Prof. Marcos Zwanziger - CODETEC
- Prof. Jorge H. Nicola - UNICAMP (morning session)
- Dr. Victor Bozolin - CODETEC
- Eng. José Carlos Covizzi - CODETEC
- Eng. Dolcídio Pedrosa - CODETEC
- Embaixador Amaury Porto de Oliveira (Joined group at lunch time)
- Prof. Joama - University of Malasia (joined group at  
lunch time)

## ANNEX II

CODETEC

CIATEC

Campinas, State of Sao Paulo

NATIONAL CLEANER PRODUCTION CENTRE - BRAZIL (Site visit by UNIDO/UNEP mission)

## Schedule

- 9:30 Meeting at CIATEC (Introduction to CIATEC, CODETEC and UNICAMP)
- 13.00 Lunch
- 15.00 Tour of CODETEC R&D facilities
- 16.00 Final meeting at CODETEC
- 16.30 Departure to Guarulhos Airport



VISIT TO SENAI, RIO GRANDE DO SUL, BRAZIL, 22 June 1994

1. ANNEX I contains the itinerary of meetings and persons met. An introduction to SENAI was given by Carlos Alberto Vellinho, Deputy Director. Mr. Vellinho emphasized the close relationship that exist between SENAI and FIERGS (Industry Federation of the State of Rio Grande Do Sul). The budget for SENAI comes from a tax on the salaries in industry which gives it financial independence.

FIERGS has links with other state industrial federations through the National Confederation of Industry (CNI).

2. Mr. Gilberto Amato, Secretary for Science and Technology of the State of Rio Grande Do Sul expressed the full support of this Secretariat for SENAI to be the Centre for Cleaner Production Technology. He explained that this project is of particular interest to the government of Rio Grande Do Sul (RGS) and they are willing to provide financial support for investments over the next year for industries interested in cleaner production. This could be done through Financiario Nacional de Estudios y Proyectos (FINEP) as well as through the national council for scientific and technological development (CNPq) (see Annex II). Some state financial agencies can also be of assistance eg. FAPESP and FAPERGS (see attached brochures).

3. Mr. Carlos Nascimento and Mr. Hans Rahn of the Commission for the Defence of the Environment (CODEMA) of FIERGS also expressed the full support of FIERGS/CODEMA for SENAI.

SENAI has a national department and 27 regional departments of which SENAI-RS (SENAI-Rio Grande Do Sul) is one. There are 871 operational units all over Brazil with 70 units in Rio Grande Do Sul. The operation unit include Training Centres and Technological Centres. SENAI-RS has six Technological Centres (Mechanics & Electronics, Furniture, Shoes, Polymers, leather and Precision Mechanics) but there are other technological centres on various thematic areas in other parts of Brazil.

The national network of SENAI offers the advantage of an in-place system for the dissemination of information on cleaner production technology as well as some research capability in the various technological centres.

SENAI-RS is fully committed to sustainable development in correspondence with the environmental awareness and culture of the citizens of Rio Grande Do Sul. This state considers itself forward thinking in this regard in Brazil as evidenced in its laws and the readiness of industry to adopt systems which impact less on the environment.

4. Visit to the Centro Tecnológico de Curtiros (Leather Technology Centre): A meeting was held with chief personnel of the SENAI Leather Technology Centre in which a briefing on the NCPC concept was given and the operations of the Centre explained. This Centre is now a leading centre for training and some applied research in leather technology in Latin America. A visit was then undertaken to the waste treatment facility, laboratory and data management centre. This centre can serve as a resource for the NCPC in leather technology.

Mrs. Erica Lecke, Marina Moreira and Mr. Roberto Maia of SENAI/CT Leather, and MR. Luiz Ruppenthal, proposed Director of the CPC, as well as Eduardo Torres and Marco A. Dexheimer, proposed members of the committee of the CPC, were present in the meetings and the visit to the Leather Center, and during the lunch.

5. After lunch A meeting had been arranged with Dr. Dagoberto Lima Godoy, President of FIERGS, at the headquarters of FIERGS. Dr. Lima Godoy remarked the following points:

- the commitment of industries in RGS with the concept of sustainable development, what means a willingness on their part to adopt more environmentally friendly technologies;
- the connection of SENAI-RS to a nationwide network of State industrial federations through the National Confederation of Industries (CNI);
- the importance of MERCOSUL to Brazil (a free trade agreement between Argentina, Brazil, Paraguay and Uruguay) and the geographical and cultural advantages that RGS has in relation to these countries to project the concept of Cleaner Production (SENAI-RS receives many students from this countries for training in the specialized centers);
- the availability of Instituto Eubaldo Loge to articulate the relationship between University and Industry;
- the presence of the Regional Bank for the Development of the Extreme South (BRDE), which covers the states of Parana and Santa Caterina, in addition to RGS, complements the development finance activities of the National Bank for the financing of Development (BNDS).

As a conclusion an immediate meeting with the BRDE was arranged to get a better idea of its potential contribution to the success of the NCPC.

6. At the meeting in the BRDE with the President Jose Paulo Dornelles Cairoli and the Planning Manager Paulo Ricardo dos Santos, the mission was informed that the bank can supplement the 70% financing normally given by the BNDS with an additional 20% financing. The industry can obtain this financing at an interest rate of 9-12% above the rate of inflation. There are no grant subventions for investments at the present time.

7. On returning to SENAI the budget of the project was discussed. This was designed by SENAI using an incorrect premise (on the basis of spending 300.000 USD) although it was not clear were this figure came from. SENAI is ready to adjust the total figures to the UNIDO/UNEP budget.

The salary of the director is maintained on the basis of 40,000 gross USD (based on the salary of the Director of SENAI) although this could mean the need to search for a new candidate for the post. It should be noted that this salary figure includes all the legally required benefits.

## VISITS TO GOVERNMENT AGENCIES IN BRASILIA

Dr. Klaus Billand, UNIDO Country Director, arranged and participated with the mission in all the meetings with the government representatives in Brasilia.

### MEETING AT THE MINISTRY OF INDUSTRY, COMMERCE AND TOURISM, 23-6-94

A presentation was made on the NCPC to Mr. Luis Augusto Bittencourt and Ms. Maria Luiza Brun, Coordinator of the General Coordinator of International Affairs Office of the Ministry of Industry, Commerce and Tourism, as well as to numerous other individuals of this Ministry, the Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA) and CNI. The importance of such a Centre to Brazil and to MERCOSUR was stressed to us. The main objective of this meeting was to ensure the awareness of these personnel of the NCPC project as they would be directly involved in the development of related national policies.

### MEETING AT THE MINISTRY OF FOREIGN AFFAIRS (DEPARTMENT OF ENVIRONMENT), 23-6-94

The NCPC programme was discussed with "Ministro" Pedro Mota Pinto Coelho and Mr. Paulo Roberto Franca, First Secretary, Division for the Environment. They expressed the need for a national network to disseminate information on Cleaner Production Technologies country-wide. The importance of MERCOSUR to Brazil was also stressed and the possibility of using existing mechanisms within MERCOSUR to disseminate the CP concept would amplify the benefits of the Centre subregionally. UNIDO's Country Director indicated that, on behalf of Brazil, the choice of the NCPC was being handled by Ambassador Carlos Alberto De Azevedo Pimentel, Chief, Department of Scientific, Technical and Technological Cooperation. "Ministro" Pedro Mota Pinto Coelho replied that they will support the decisions taken by Ambassador Pimentel on this.

### MEETING AT THE MINISTRY OF ENVIRONMENT AND THE LEGAL AMAZON REGION, 24-6-94

A meeting was held with Minister Henrique Brandao Cavalcanti, Minister of the Environment and the Legal Amazon Region and Mr. Haroldo Mattos de Lemos, Secretary for Coordination of Environment Affairs. The NCPC project was discussed as well as the observations made during the mission to the three candidate institutions. The Minister indicated the importance of the Centre to Brazil and suggested the need to form linkages with organizations such as SEBRAE and the information network of IBAMA with the State Environmental Agencies.

### MEETING AT THE MINISTRY OF FOREIGN AFFAIRS, 24-6-94

This was the most important meeting for the mission in Brasilia. Discussions were held on the NCPC project and the impression of the mission as to the advantages and disadvantages of the three candidate institutions, with Ambassador Carlos Alberto De Azevedo Pimentel, Chief, Department of Scientific, Technical and Technological Cooperation and Mr. Julio Zelmer. Ambassador Pimentel inferred from the discussions that SENAI may be the preferred candidate as their national distribution (with offices in every State) and training and technological centres are very good. He also pointed out the political interest of having good relationships with CODETEC. He did however indicate the need to ensure a strong linkage between whichever Centre chosen and the University system

(possible through the Advisory Committee of the NCPC) to ensure adequate information exchange. He expressed the utility of having some mechanism whereby the strengths of other institutions, such as the candidates who have not been elected, can be harnessed to contribute to the effectiveness of the Centre.

#### MEETING WITH UNDP, BRAZIL, 24-6-94

Discussions were held with Mr. Cesar Augusto Miquel, UNDP Resident Representative for Brazil on the NCPC project and the objectives and results of the mission. Mr. Miquel expressed the need to ensure success and permanence to the Centre as well as to have some criteria to evaluate its success e.g. number of companies to adopt cleaner production technologies, etc.).

#### MEETING WITH UNIDO'S BRAZIL OFFICE

Dr. Klaus Billand, UNIDO's Country Director for Brazil has been intimately involved in the process for the NCPC at the country level. The advantages and disadvantages of each candidate institution was discussed with him and the opinion of the mission as to the best choice based on all the relevant factors expressed. Dr. Billand made reference to the good previous experience with SENAI and concurred with the conclusions of the mission.

It was clear to the mission that the UNIDO's country office in Brazil had a realistic appreciation of the Brazilian psyche, situation and operational modalities which served to assist the smooth operation of the mission. Appreciation is also expressed to the staff of UNIDO in Brazil who assisted the mission in the administrative and support aspects of the mission.

#### ADVANTAGES AND DISADVANTAGES OF THE CANDIDATE INSTITUTIONS Polytechnic School of the University of Sao Paulo, (EP)

EP has maximum general scientific and technological supporting capacity together with good connections with the Chemical Engineers Association (ABEQ), the Brazilian Association of Chemical Industries (ABIQUM) and the CNI branch in Sao Paulo (FIESP). EP has no sectoral specialized technological background, very little experience with SMEs nor connections with financial institutions. Being in Sao Paulo it can have easy communication with the 50% of Brazilian industry located in this area.

#### **Advantages:**

1. Excellent technical training and very good research capabilities;
2. Very well known and respected engineering school in Brazil;
3. Personnel of high academic stature with good academic links;
4. Technical support within the University and from the Technological Research Institute (IPT) which is on the same campus, is available;
5. Very good links with professional organizations such as the Brazilian Association of Chemical Engineers and the Association of Chemical Industries;
6. Located in the most industrialized city and area of Brazil;
7. Has the support of the Environment and Soil Use Department of FIESP;
8. Former students may have significant position in leading industries.

**Disadvantages:**

1. The links with small and medium size industries (SME) are very limited;
2. Has very little experience with SME;
3. The school is focussed on academics and the suggested committee is made up of principally academicians;
4. Influence will be mainly local as its ability to disseminate information and technology on a national basis is very limited;
5. Ability to disseminate information and technology on an international (MERCOSUR) basis is extremely limited;
6. There is no existing mechanism to attract or facilitate financial support from development banking institutions to industries to implement cleaner production technologies.

**CODETEC**

As a service branch of the University of Campinas, it has a unique position to assist and do research for organic chemical processes, together with general scientific and technological supporting capacity. They have no knowledge about other specific scientific sectors. CODETEC is also in the State of Sao Paulo and could easily diffuse the programme to the industries in that State but it would have much difficulty in doing the same to other States.

**Advantages:**

1. Very good research personnel and facilities in the areas of fine chemicals/chemical processes and physics and easy access to advanced research and development capabilities through UNICAMP and the only Synchrotron (can be used for computer chip development and other applications) in Brazil;
2. Located in the most industrialized State in Brazil, in the City of Campinas, 2 hours from the city of Sao Paulo;
3. Has the support of the municipality of Campinas;
4. A self supporting private company with experience working with some industries on a project basis (from process development to turnkey plant).

**Disadvantages:**

1. Very limited ability to disseminate information on cleaner production technologies on a national basis;
2. Does not have a network of operational units throughout the country;
3. Ability to disseminate information and technologies on an international (MERCOSUR) basis is extremely limited;
4. There is no existing mechanism to attract or facilitate support for development banking institutions, to industries to implement cleaner production technologies.

**SENAI-RS**

SENAI-RS has an unbeatable relationship with industry through its connections with FIERSP-CNI and good support from State institutions. It also has the most complete experience with small and medium size industries and ability to diffuse the cleaner production concept inside and outside of Brazil. Its capacity for organic synthesis is much lower than CODETEC's. The

sustainability of the Centre is another important asset of SENAI.

**Advantages:**

1. Very well known and respected national institution with departments in every state and 871 units country wide (many of which are training units). There are 70 units in Rio Grande Do Sul including six Technological Centres;
2. Has well developed Technological Centres in various parts of Brazil related to the important industries in those particular areas. These Technological Centres can be of tremendous impact nationally for the developing and/or dissemination of cleaner production technologies throughout Brazil;
3. Excellent linkage with and support from the State Industrial Federation (FIERGS) with good links to the National Confederation of Industries;
4. Has the support from the Government of the State of Rio Grande Do Sul;
5. Significant experience with training of personnel from the industrial sector (ongoing national programme), particularly in the small and medium size industries which make up about 90% of Brazil's industry;
6. Excellent support from the Regional Bank for the Development of the Extreme South (BRDE) covering the States of Rio Grande Do Sul, Santa Catalina and Parana, which would ensure funding on this subregional level for industries needing loans to invest in cleaner production technologies. At the national level there is some funding available through the National Bank for the Financing of Development (BNDS);
7. There is very good established linkages between Rio Grande Do Sul and the other countries of the MERCOSUR;
8. SENAI-RS trains personnel from various industries in MERCOSUR countries (particularly using their Technological Centres);
9. There already exists in Rio Grande Do Sul an environmental ethic and willingness on the part of industry to adopt less polluting technologies (many having done so). This enthusiasm can be harnessed to ensure a good start to the NCPC with significant impact at the State level and thus serving as an example for other States to follow.

**Disadvantages:**

1. The technology capacity is probably not the most sophisticated. Though the only Technological Centre visited by the mission (leather) was quite good and recognized internationally (MERCOSUR, Mexico).
2. The State of Rio Grande Do Sul is not the most industrialized State (it is the 4th).

**CONCLUSIONS**

While the three aspirant institutions have various strengths and weaknesses, based on all the factors involved, and keeping in mind the importance for national dissemination of the cleaner production information and technology, a mechanism for the provision of financing to industries desirous of investing in cleaner production technologies, support of the industrial federations and the importance of MERCOSUR and the possibility of the Centre being able to have an international impact, then SENAI-RS rates as the most valuable candidate and an appropriate choice for the NCPC in Brazil.

To obtain the maximum profit from the candidates the role of the Committee of the Centre must be reinforced in all cases to include members representing the Environmental and Industry, governmental authorities and members of the institutions that were not selected but can strongly contribute to the diffusion of the Cleaner Production mentality. This will increase their potential, especially including CODETEC's capability in fine chemicals when dealing with the chemical industry sector.

#### ACKNOWLEDGEMENT

The mission would like to acknowledge the tremendous support provided by all the staff members of UNIDO's Brazil Office.

NATIONAL CLEANER PRODUCTION CENTRES PROGRAMME - BRAZIL  
COMPARISON OF ESCOLA POLITECNICA, CODETEC AND SENAI-RS

ISSUE	ESCOLA POLITEC.	CODETEC	SENAI-RS
Connection with industrial associations (CNI, ABIQUIM)	3	2	5
Connection with non-industrial associations (SEBRAI, ABEQ)	4	2	1
Sector specific technical support	1	2	4
General scientific and technological support	5	5	2
Experience with small and medium-scale industries	1	3	5
Experience in similar projects	2	3	4
Sustainability	3	4	5
Diffusion inside Brazil	2	2	5
Diffusion outside Brazil	2	1	4
Connection with financial institutions	3	4	5
<b>TOTAL</b>	<b>26</b>	<b>28</b>	<b>40</b>

Scale: 0-5 (0 = poor; 5 = excellent)