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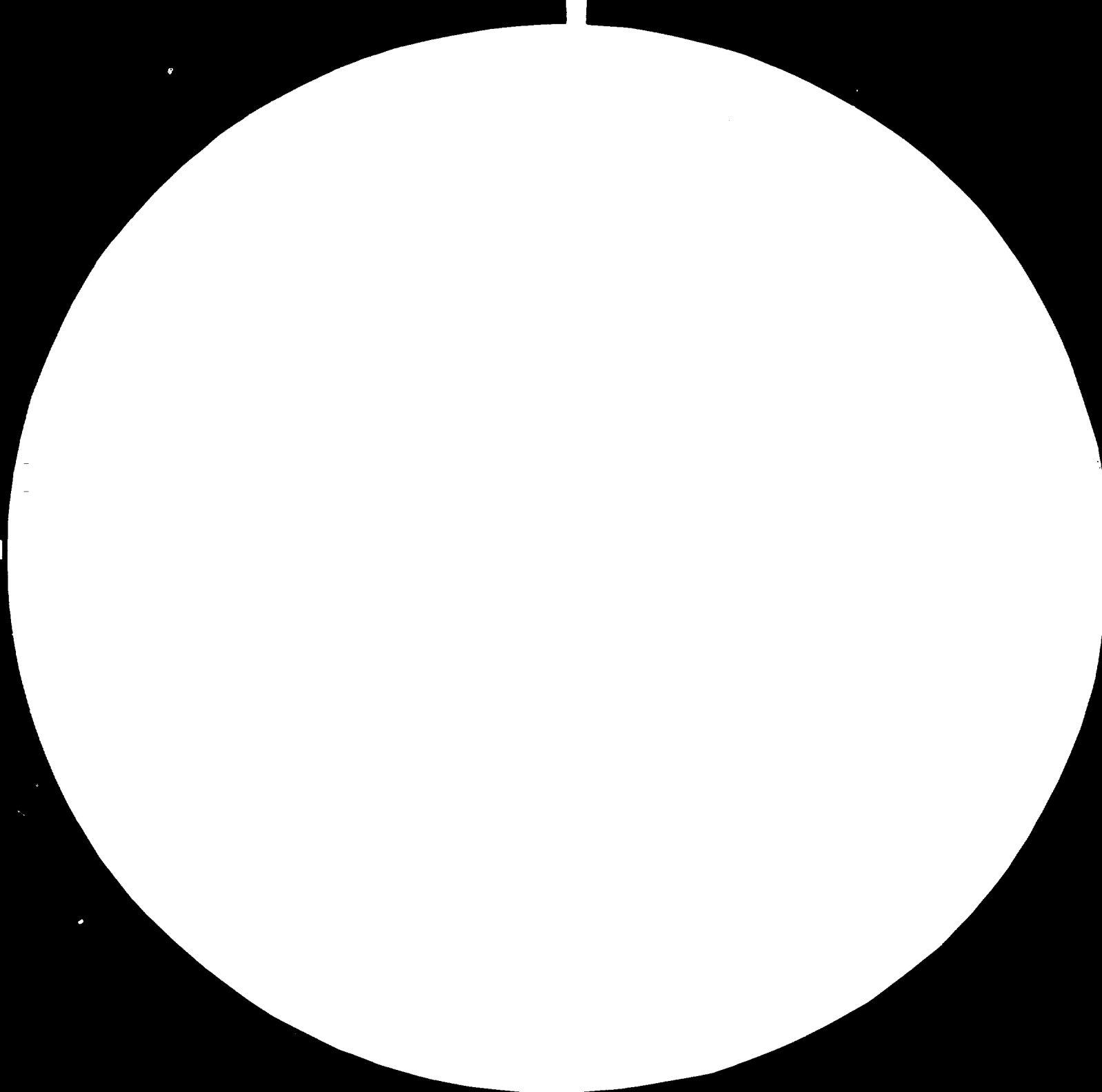

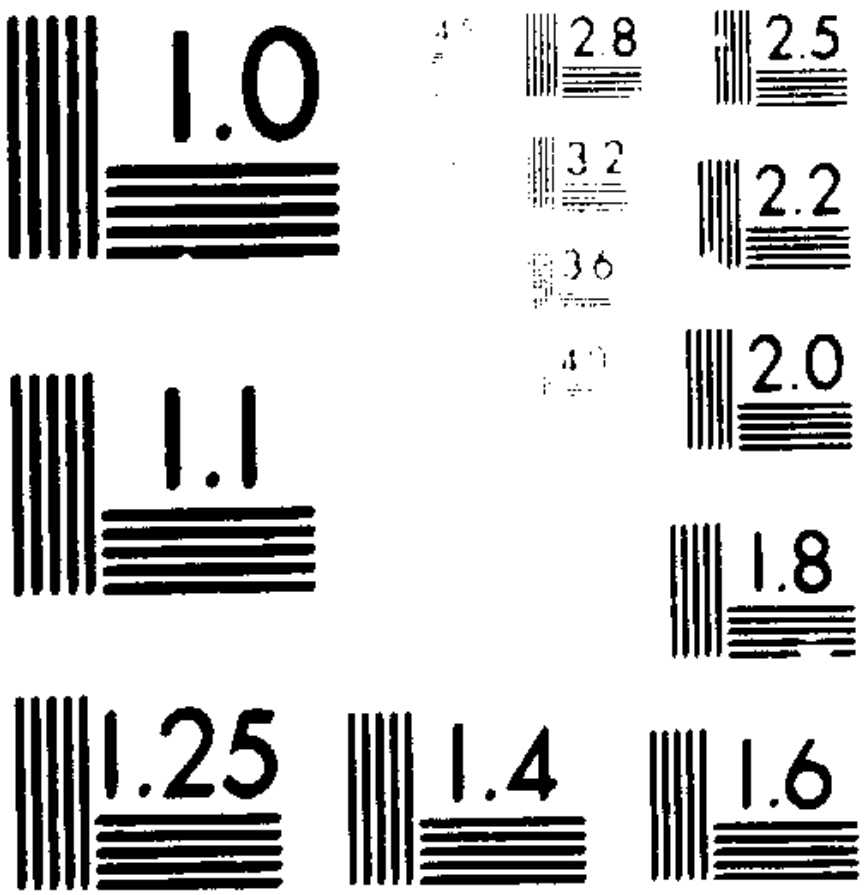

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27 Nov. 1979

Report on the Mission to Montevideo, Uruguay

From 8 to 12 October 1979

to

ASSESS THE STATUS OF AND THE NEED FOR TECHNICAL ASSISTANCE TO THE FOUNDRY INDUSTRY IN URUGUAY.

Project: SI/URU/79/803

carried out by:

L.F. Biritz
Acting Head
Factory Establishment and Management Section
Industrial Operations Division
UNIDO

and

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Project DP/ARG/78/004
Rosario, Argentina

Montevideo, 12 October 1979

C O N T E N T S

I. INTRODUCTION:

1. The relatively highly developed and diverse industrial base of Uruguay is recognized by the Government as one of the best economic assets of the country, with excellent potential for growth, particularly through the promotion of exportation of industrial products. At the same time, the country is importing considerable quantities of capital goods and other industrial products that, given the proper assistance, could be competitively manufactured within the country for its internal markets as well as for export. Since a healthy foundry sector is one of the critical, fundamental industries of any industrial economy. the time was considered opportune to assess the Uruguayan foundry sector as regards its capabilities, i.e. level of technology, existing capacities, its "state of the art", etc., in order to determine whether technical assistance to strengthen the sector would be advisable. It should be noted that very little information on the foundry sector of Uruguay was available.

2. Consequently, it was proposed to the Government through the Office of the Resident Representative in Uruguay in the letters of Mr. Koenz dated 23 October 1978, and of Mr. Szakal dated 24 January 1979, that a preparatory mission be carried out to assess that status of the foundry industry in Uruguay and the need for technical assistance - if any. The official Government request was transmitted by the cable 361 of the Resident Representative dated 28 March 1979, based on which Project SI/URU/79/80 was approved and consequently the preparatory mission was carried out from 8 to 12 October 1979 jointly by Mr. L.Biritz, Acting Head, Factory Establishment and Management Section, UNIDO and Mr. J.Shanz, Foundry Expert in Rosario, Argentina, under UNIDO Project DP/ARG/78/004.

3. A number of meetings were held during the mission with Government officials and two meetings with industry members of the foundry sector, of which the second, closing session on 11 October 1979 was most important in that the findings of the mission were discussed and the concept of the technical assistance jointly developed and agreed upon, as described later in the report. A total of 8 foundries were visited and information gathered

through discussions with the owners and management staff of the various enterprises. Appendix I lists the names and titles of Government and UNDP officials participating in the discussions and Appendix II lists the foundries visited and foundry people met. Mr. Shand has also transmitted a complete set of copies of the technical reports prepared in Rosario to be deposited at CNTPI and be accessible to foundry operators as these contain information of real practical interest to them. The findings and conclusions, recommendations and the concept of the proposed technical assistance is described in the following chapters. Special appreciation is due to Messrs. Crespi of the UNDP Office and to Mr. Perez Centurion of Industry and Energy, who arranged schedules, accompanied the members of the mission, and provided assistance during the numerous meetings and visits.

II. FINDINGS:

4. It was noted with interest that practically all foundries, with very few exceptions, had extensive machining operations, making and selling the finished parts (e.g. valves, cylinder sleeves, etc.). While they were their own customers of their foundries, nevertheless they all supplied castings to outside customers as well and wished to expand their business. In all cases the machining and fabricating operations appeared to be running excellently, with no problems reported. This performance of the enterprises was indeed impressive.

5. As regards the technological level of the foundry sector in Uruguay, the following was found:

a) pattern making is a well developed skill in the country, with most foundries having their own pattern shops. As the mission was told by foundry owners and technical staff, there are also excellent outside pattern shops supplying the industry with all its needs. (The mission did not have time to investigate if patterns are also made for export, but this potential deserves further attention in that it would be a very high value-added export item, worth Government support.)

b) As regards raw materials, ferrous scrap is in sufficient supply, thanks to the wise Government policy prohibiting the exportation of scrap iron and steel. The mission was also told by all foundry personnel contacted that there is excellent and plentiful foundry sand available in the country. The impression was gained, however, that practically all other raw materials (i.e. alloying materials, sand additives and binders, etc.) are being imported as these are not manufactured here. Even bentonite is brought in from Argentina, although this material might exist in within the country as there are a number of brick manufacturers using local clay.

c) By far the most commonly used metal melting unit is the cupola, using either imported coke or locally manufactured petroleum coke. The prices for coke are high, in the order of US$ 400 per ton. No foundry uses vegetable charcoal that might be considerably cheaper and would truly be an "appropriate technology" in view of the raw material potential of the country. Some foundries operate small size arc furnaces and several foundries plan the purchase of induction furnaces in the near future to make high quality (steel) castings for internal use (i.e. import substitution), and also for planned export.

d) While the melting technologies are properly used and controlled as regards its mechanical aspects in most foundries, the metallurgical control of the metal is mostly "by rule of thumb" and consequently products frequently do not meet international specifications (common in the industrialized countries) essential for export. Only one foundry of those visited has a very modern spectrophotometer, and only few others making special products maintain sufficient metal control. The reason for this lack of metallurgical know-how seems to be that there is no metallurgical curriculum in the university programme and there are simply no trained and experienced foundry metallurgists in the country. This is a serious handicap for the development of the industry and needs urgent attention and correction.

e) Mold and core making techniques used in most of the foundries visited are rather antiquitated, essentially relaying on green sand molding and oil sand cores. Some of the foundries, however, are using more modern technologies, such as shell molds and cores, silicate-CO_2 techniques, as well. Overall, there is far too little testing and control applied in mold and core making operations to get best results. The most missing element appears to be the lack of availability of information (i.e. books, journals, technical papers, suppliers information, etc.) on modern molding and core making technologies. In spite of this, however, the level of workmanship is quite high everywhere seen and tradition is compensating to a great degree for technological shortcomings.

f) All foundries visited practiced only floor molding and casting, a rather serious shortcoming as regards obtaining higher productivity, space utilization, etc. Consequently, all sand is handled by hand and there is no mechanization in this area, although at relatively low additional investments considerable improvements could be made. It seems that there is a general lack of modern foundry layout and industrial engineering know-how, resulting in inadequate foundry work organization practices.

g) Fettling and cleaning operations are rudimentary. Simple vibratory shake-out tables are not being used, nor was any shot blasting equipment noticed, although some plants use simple sand blasting quite effectively. (This is not allowed in most industrial countries because of worker silicosis danger.) Knowledge of moder techniques in the general area of fettling and cleaning is lacking.

h) Finally, and in the opinion of the mission, far too little process and quality control is being carried out, that is absolutely essential to make the industry internationally competitive.

6. As regards the internal castings market, the time for the mission was far too short to come up with a reasonable estimate. The individual foundry owners and operators gave widely varying estimates, between 3 and 10 thousand tons per year. This was considered far too low by the mission.

Based on the production data supplied by the foundries visited, a reasonable average figure would be 25 tons per month per foundry of ferrous production. Assuming that the quoted 42 foundries operating in the country is correct, this would amount to approximately 12,000 tons per year ferrous castings production. Based on international data and comparison, however, this seems to be still very low, considering the standard of living in Uruguay. It is the estimate of the mission that an internal casting market of 20,000 tons per year is a minimum. It would be very much worth while that the Government undertakes a detailed market analysis to determine not only the quantity of the castings market, but also the existing and potential product mix. The value of this market should be well over US$ 10 million per year, certainly justifying Government support to the industry at least in terms of technical assistance, establishment of continuous foundry training courses, etc.

7. The development of foundry technical personnel is totally lacking at the present time and there are no technical foundry training courses being offered either at the university or lower educational levels.

8. A number of foundry operators also requested assistance in foundry products export marketing (market identification, contacts, etc.). This was, however, considered outside the scope of the present mission and the proposed project. At the recommendation of the representative of the UNDP Office, it was agreed to forward this request to ITC for possible joint UNIDO/ITC cooperation and will be followed up separately.

III. CONCLUSIONS AND RECOMMENDATIONS

9. The overall conclusion of this preparatory mission is that the state of technology and level of know-how of the foundry industry in Uruguay is quite good, albeit mostly somewhat antiquitated. The level of operating personnel is excellent and foundry practices are carried out with care and artisanly expertise. But there are areas of serious deficiencies that should be rectified as soon as possible in order to have the industry perform to international standards and to improve its productivity.

This is not considered by the mission to be either too difficult a task nor too time consuming, assuming the required assistance is provided.

10. Specifically, the following is recommended:

a) the first, and most important need is for technical information, and the establishment of a Foundry Library and Information Centre is mandatory;

b) The knowledge level in foundry metallurgy has to be raised as quickly as possible, and the strengthening of the respective educational facilities at all levels (i.e. university, trade schools, etc.) is essential;

c) A Foundry Technical Laboratory should be established to be used for training, technical services support and quality control;

d) Modern foundry production technologies and practices should be introduced, commensurate with the size and nature of production of the individual enterprises. Particularly modern foundry industry engineering concepts, molding and core making techniques and melting practices need attention;

e) Process and quality control practices in general should be introduced on a more intensive and broader scope in all foundries.

11. It is further recommended that the Foundry Library and the Technical Laboratory are located on the same premises and not be separated. The actual location of this facility, however, should be a decision of the Industry and the Government, be it at the University, UTU(1), LATU(2), or any other place.

12. The organization and institutionalization of foundry and metallurgical training courses and educational opportunities should be determined during the implementation of the proposed technical assistance project, using the advice and inputs of the foreseen experts, who should be the initiators in this matter (and are expected to conduct such courses as part of their duty).

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(1) Workers University of Uruguay.

(2) Uruguayan Technological Laboratories.

13. The concept of TCDC should be explored and utilized to a maximum extent, such as starting with the training of foundry personnel at the laboratories of the Directorio Asesoramiento Tecnico in Rosario (Argentina) that was established and is being assisted under UNIDO Project DP/ARG/78/004. This would help to provide inputs immediately to the Uruguayan foundry industry, before the planned projects start. In order to start this programme going, it is recommended that an official of CNTPI together with one or more representative of the foundry industry visits these laboratories as soon as possible to gain first hand impression and to plan the actual training activities here. Naturally, any other TCDC support possibility from any country (e.g. Brazil) prior or during the implementation of the project should be explored.

14. Finally, it is recommended that when and if the proposed project is implemented, the Association of the Uruguayan Foundry Industry also bears at least some of the costs and that it provides the necessary counterparts to the experts and allows in-plant demonstrations conducted by the experts, if this does not impart on their productivity or internal security.

IV. THE PROPOSED PROJECT: CONCEPT AND INPUTS

15. In view of the findings and the recommendations presented in the previous chapters, the concept of the proposed technical assistance is rather straight forward: concentrate on the most critical and weakest technological areas of the foundry industry in order to improve these. Firstly, make available and easily acceptable technical information to the foundry sector. Simultaneously, improve foundry metallurgy know-how, followed by improving and helping the modernization of foundry production technologies and practices, including the introduction of production and quality control practices. Finally, initiate and help institutionalize foundry technology related training activities in the country.

16. The specific components input of the project, as discussed and agreed with the representatives of the foundry industry of Uruguay are proposed as follows:

a) Foundry Metallurgist — 12 m/m

- to provide advice to the industry;
- to conduct advanced level foundry metallurgy courses to industry staff and university students;
- to teach low to medium level practical foundry courses to industry personnel and trade school students;
- to advise on and demonstrate foundry metallurgy testing techniques.

b) Foundry Technologist — 12 m/m

- to provide advice to industry in all areas of foundry process technologies, i.e. melting, molding, core making, fettling, layout and industrial engineering, etc.
- to conduct specific courses, as needed in the above fields;
- to advise on and demonstrate foundry process control techniques.

c) Books and periodicals for Library — $ 15,000

d) Testing Equipment — $ 40,000

for sand testing; metallography; analytical chemistry.

16. The total cost of the project is estimated at US$ 185,000, having a duration of 18 months, with the foundry metallurgist as the first input and the foundry technologist arriving 6 months later for a 6 month overlap. This is thought advantageous in order to extend the duration of expert assistance and to allow more time for training of nationals through lectures by the experts.

APPENDIX I

OFFICIALS MET DURING FOUNDRY PREPARATORY MISSION

(8 to 12 October 1979)

1. Sr. Elías Pérez, Sub-Secretario, Ministerio de Industria y Energía

2. Ing. Remigio Gabín, Director de Industrias, Ministerio de Industria y Energía

3. Ing. Hector E. Ibarlucea, Director General, Centro Nacional de Tecnología y Productividad Industrial - Director del Proyecto: "Industrialización del Mineral de Hierro"

4. Ing. Angel Pérez Centurión, Ingeniero del Proyecto: "Industrialización del Mineral de Hierro", Ministerio de Industria y Energía

5. Ing. María Ema Villemur, Jefe del Proyecto de Industrialización del Mineral de Hierro, Ministerio de Industria y Energía

6. Sr. Pierre den Baas, Representante Residente, Programa de las Naciones Unidas para el Desarrollo

7. Sr. Juan Carlos Crespi, Jefe Unidad de Programación, Programa de las Naciones Unidas para el Desarrollo

8. Sr. Gregorio García García Peral, Coordinador del Proyecto URU/78/001 "Asistencia Técnica Integral a Empresas de Ramas Seleccionadas.

APPENDIX II

FOUNDRY ENTERPRISES VISITED AND PERSONS MET DURING PREPARATORY MISSION

(8 to 12 October 1979)

TSAKOS INDUSTRIAS NAVALES

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Ing. Luis García Filiberto
Ing. José L. Aguerre

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Sr. Roberto Peralta
Sr. Lázaro Dejhizian
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Sr. Omar J. Rosselli
Sr. Antonio José Terra

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Zapicán 2720

Sr. Luis Rodríguez

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Sra. Edda Benas de Nakle

FUNDICION DE LA U T E

Santa Fé esq. Mendoza

Ing. Ind. Alfonso Gaggero Orozco
Ing. Eduardo Lagos López

ATMA S.A.

Ing. José Serrato 3488

Sr. Alejandro Bergamali

FERROPAY

Instrucciones y S. Pereda
Paysandú

Sr. Américo Depauli Arin