P R O P O S A L

for a

S C I E N T I F I C A N D T E C H N I C A L I N F O R M A T I O N S E R V I C E

FOR

B O L I V I A

J. Chander
TECHNICAL INFORMATION SERVICE

C A N A D A

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1.0 ACKNOWLEDGEMENTS:

I wish to acknowledge with sincere thanks the full cooperation of Messrs. Donoso and Mattes of Ministerio de Industria y Comercio, Mr. Loayza of CNDCT and Messrs. Morales and Blanco of SIDERSA. They made my stay in Bolivia professionally effective and personally very pleasant.

Messrs. J. Cordua E. Fetzer and P.L. Diaz of OAS made my visit possible and consequently I am particularly grateful to them.

2.0 SUMMARY OF RECOMMENDATIONS:

Bolivians have a great deal of interest to develop the natural resources in their country. Information centers which have the necessary means (well-organized and well-equipped) to timely respond to inquiries can be of great assistance in achieving this goal.

The following recommendations are strongly emphasized:

1. All necessary steps and measures must be taken to develop a National Information Center. The main objectives of this center should include compilation of union catalogues of scientific and technical books and periodicals, development of standardized library procedures, cooperative acquisition policies with other libraries in the country, offering current awareness services, scheduling training courses and be a depository of one copy of each document published in the country.

2. With available funds from the World Bank of some financial help from O.A.S., a Mining and Metallurgy Information Center should be created which will encompass not only SIDERSA but also Empresa Nacional de Fundiciones, Corporacion Minera de Bolivia, Comision Boliviana de Energia Nuclear, Banco Minero de Bolivia, Servicio Geologico de Bolivia e Instituto de Investigaciones Minero-Metalurgicas. Material recommended in Appendix III should be obtained immediately to help SIDERSA plan the project.

3. A Technical Services Center in the Ministry of Industry and Commerce should be established as soon as possible. Its main function would be to provide secondary manufacturing industries assistance on the properties and the processing of materials, productivity and the efficient operation of manufacturing facilities.

4. Every effort should be made to improve the capabilities of the staff of both the Technical Services Centre of the Ministry of Industry & Commerce and Mining and Metallurgy Information Centre by sending them abroad to learn new methods and techniques.

5. Close cooperation should be established with other libraries in the country and other centers abroad.

6. Centro Nacional de Documentacion Cientifica y Tecnologica and the Central Library of the Universidad Mayor de San Andres have agreed to pool their resources. This verbal agreement should be formalized.

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3. REASON FOR THE VISIT:

The Bolivian Government, requested that a visit be made from March 23 to April 20, 1974 on behalf of the Organization of American States (OAS) to assist the Ministerio de Industria y Comercio and SIDERSA the National Enterprise for the Development of the Iron and Steel Industry (SIDERSA) to establish information centers. In consultation with the appropriate authorities the objectives of the visit were to:

1. Analyze the infrastructure in Bolivia
2. Assess the present and future needs of the country in the framework of the Ministerio de Industria y Comercio programs and SIDERSA.
3. Draw up a detailed plan for the organization of documentation and information services.
4. Advise on the procurement of suitable reproduction equipment and methods for storing information.
5. Include in the proposal, the fact that the Ministry of Mining and Metallurgy is planning to set up a documentation center of its own with the financial help from the World Bank (a sum of $50,000 being allocated for this purpose.)

4. SCOPE OF VISIT:

In order to understand and appreciate the problems related to the above objectives, a survey of different facilities in La Paz area and Oruro was carried out. All aspects of the projects were discussed with the directors and staff members of the bodies concerned with the providing of scientific information.

5. GENERAL COMMENTS ON INFORMATION:

Scientific and technical information constitutes an important and often ignored resource for economic and social development in any country. The aim of an information center is to organize rapidly increasing amounts of information, and to transfer effectively the parts of that information needed by industry or researchers in the shortest possible time. The center needs to review the extensive scientific and technical literature in the form of journals, textbooks, reports, papers and articles published in many languages by the industrialized nations of the world, and select those items having immediate and future applications.

Documentation involves all phases of the professional activities required to transfer information from the sources to the users. In this sense it overlaps and includes library activities.

The basic elements of an effective technical information service to assist industry are:

1. the preparation of information,
2. the acquisition, storage and retrieval of information
3. the selection and dissemination of information and,
4. the promotion of its use by the user.

Thus the service (in conjunction with libraries) should provide the following services:

1. bibliographic service
2. monthly abstracts service
3. individual inquiry and answer service dealing with specific requests or problems
4. product service (in order to help clients make major marketing, product and management planning reviews)
5. research service (to provide encouragement to industrial clients to go beyond the realms of available information and knowledge).

Many developments in information retrieval are taking place using electronic devices, but great care must be taken in any mechanization to suit both the needs of library work and documentation. The Ministry of Mining and Metallurgy documentation center (which will include SIDERSA), should acquire sufficient resource consider material before embarking on any sophisticated procedures for handling.

5.1 PROMOTION OF THE USE OF INFORMATION SERVICES:

Since information is an ingredient of research, development, production, and other human activities, it can be bought and sold. It has its own market. Gradually an information market can be created within the country. Ways and means should be devised and put into operation to increase the information consciousness of potential users of information at all levels. Opportunities for oral communications between the information specialists and potential users of information should be provided. These may take the form of group discussions, demonstrations, seminars, symposium and personal contacts with top scientists, technologists and managers.

6. THE ORGANIZATION OF AN INFORMATION SYSTEM:

The major components of an information system are:

1. Physical information resources such as libraries and documentation centers.
2. Trained library and information personnel.
3. Cooperation between economic, educational, and research & development sectors both internal and external.
4. Two-way communication channels with the users.
5. Working agreements which bring together the resources, personnel, and the contributing components, and
6. National policies designed to promote the progressive development of the system. (These components were

suggested by the Scientific and Technical Information for Developing Countries - National Academy of Sciences.)

Bolivia is just starting its information system and needs to identify its information needs, to acquire pertinent information, to adopt it to prevailing conditions, and requirements and to disseminate it to those who need it. A great effort is being made to get started and initial steps have been taken already.

7. LIBRARIES IN BOLIVIA:

Bolivia has municipal libraries, university libraries, faculty libraries, and institutional libraries. These can form the core or base of a documentation center and information transfer system. These libraries need to be organized and managed in accordance with current library practises and should offer information services on the basis of their resources. The material in their collections should not be limited to printed documents, but should include other useful media as well. These libraries should be provided with sufficient resources to satisfy users initial needs before being referred to other sources.

7.1 LIBRARY SYSTEM:

The Ministry of Education - Department of Culture, the Director of National Literature, Libraries and Archives and the respective ministries and municipalities are responsible for public and special libraries but there is no single government authority responsible for libraries in Bolivia. The existing libraries operate independently of each other and are not integrated as a system. The purchase of books and periodicals by the faculty libraries, the university libraries and institute or public libraries should be coordinated. This would conserve expenditures

because the duplication of books in these libraries could be avoided. Expansion of the book and periodical collections in the university libraries and the institute libraries should be undertaken to meet the needs of researchers, industry and institutes. What is most needed is coordination and cooperation on a nation-wide basis with an overall plan for the development of an integrated system of libraries. (UNESCO has been working in this area and their studies could be helpful.) Methods of modern information handling should be introduced in the libraries of the country as soon as feasible.

RECOMMENDATION: Coordinate all library sources into one single library system. (OAS or UN may be able to provide the funds for this purpose.)

7.2 UNION CATALOGUES:

To link the larger libraries into a service network, union catalogues will be very important instruments in giving shape and substance to the network concept. CNDCT (with the help of UNESCO) is already engaged in the compilation of a series of catalogues representing the holdings of some libraries in the country. This work should be extended to include other libraries. Probably the Universal Decimal Classification should be used in all libraries since it is considered to be adequate and provides flexibility in the codification of information.

7.3 STAFF STRUCTURE:

The effectiveness of any information center depends on the quality and the quantity of its staff. This is especially true in a new organization during its formative stages. The recruitment and training of staff members for information centers of the Ministry

of Commerce and Ministry of Mining and Metallurgy is a first priority. Those in-charge should be strongly motivated to obtain the highest calibre of personnel available.
The requirement of personnel for the Ministry of Industry and Commerce are specialists for their respective fields. The M.M.I.C. staff need advanced courses in classification, cataloguing and indexing, Universal Decimal Classification, abstracting mechanization of indexes, library automation, printing and reprography, library networks and systems, and magnetic tape services. Documentalists and information specialists need the opportunity of being kept informed about new techniques by sending them for short periods to other documentation centers both in Latin American and North American countries.

7.4 STAFF AND TRAINING:

In the Centro Nacional de Documentacion Cientifica y Tecnologica there is only one librarian in a staff of seven and her professional qualification are limited. The situation is about the same in other libraries. Like other similar countries, Bolivia is limited in human capabilities and human resources which can be devoted to the production of scientific and technical information. To be realistic in achieving effective results therefore, the best available training for librarians and information specialists is essential.

Elements of the training program needed should include:

1. workshops, seminars, short courses for in-service training.
2. academic program for information, documentation and library education within the country, keyed to national needs. (This can be achieved by offering graduates from all faculties courses in librarianship leading to a graduate diploma. The courses should stress practical training more than theory.

The National Council for Higher Education is setting up a course in librarianship at Universidad Mayor de San Andres but this is not at a level high enough to attract students of the calibre who could be the future librarians practicing librarianship and utilizing modern methods of information handling).

3. practical training to employed "librarians". (O.A.S. can contribute in this area by supplying financial support and arranging training of Bolivians in industrialized countries.)

8. BOLIVIAN TECHNICAL LIBRARY AND DOCUMENTATION CENTER (NATIONAL INFORMATION CENTER - N.I.S.)

Both documentation centers and active libraries for science and technology acquire and organize the publication and technical report literature. The documentation centers however obtain a higher level of intellectual sophistication when they become specialized, and acquire the added function of literature evaluation. This work requires staff having professional experience in the pertinent scientific and technical fields covered by the centers.

The "Bolivian Technical Library and Documentation Center" would provide documentation services to the institute laboratories, scientific institutions, universities and industrial firms. The special functions of this center would be to:

1. build up a modern scientific and technical library and guide the work of other libraries, which are able to meet the demand of scientifists and engineers.
2. receive and retain all scientific periodicals required in Bolivia.
3. inform scientists and engineers of articles which may be of value to them, by issuing monthly abstracts.
4. help by scheduling, preparing and participating in national and international meetings.
5. answer specific inquiries dealing with particular request.

6. supply photocopies or translations of articles required by laboratories, institutions or individual workers.
7. provide indexing services, bibliographies, national customers, Registry of scientific translations, services to foreign customers.
8. train the staff members needed for the Center and other libraries or centers.

The Centro Nacional de Documentacion Cientifica y Tecnica which is part of the Universidad Mayor de San Andres's provides services in preparation of bibliographies, photocopying, microfilm. Its' resources and manpower should be supplemented to provide the services normally associated with National documentation center.

8.1 SPECIAL DOCUMENTATION CENTERS:

Documentation facilities are provided in some special fields of science and technology in the information centers mentioned below. However, the organization of mutual services (rendering services to and receiving services from each other) need to be developed fully. Institutions or departments which are administratively part of the Ministry of Mining and Metallurgy, CNDCT and Ministerio de Industria y Comercio were surveyed superficially due to lack of time and merely mentioned here. The institutions which do not have any information center although they are engaged in special technology, are Empresa Nacional de Fundiciones; Empresa Siderurgica Boliviana S.A.; Corporacion Minera de Bolivia; Banco Minero de Bolivia y Comision Boliviana de Energia Nuclear.

It was not possible to determine if Ministries or departments other than those referred to above have information centers (see Appendix I) because this would have been beyond the terms of reference for this mission. (However, it is reasonable to suppose that the situation in these centers is somewhat similar to those referred to above.)

(a) Instituto de Investigaciones Minero-Metalurgicas:

This Institute has a small library to serve its own scientists. The library holds a small collection of books in extractive metallurgy and mineral dressing. It subscribes to some periodicals.

(b) Empresa Siderurgica Boliviana S.A.:

SIDERSA is still in a planning stage and the organization structure is not yet established. Therefore, it is difficult to forecast their information requirements. However, this unit should have in its possession references to plan operations such as: mining ore benefication, pelletizing iron ore, direct reduction, steel making, continuous casting and rolling. (See the list in Appendix II.) At the request of SIDERSA a list of specifications and standards of finished rolled products normally made from billets as well as the economics of transportation of 5,000 tons of ore per day (by railroad, road or water is also included in the Appendix. In addition, it is suggested that SIDERSA should obtain copies of reports and publications dealing with the installation and operation of steel works in India. India has undergone the pains of setting up a steel industry a decade or so ago and the economic, technical, and social conditions in that country were similar to those existing in Bolivia. A visit by Bolivian engineers to India in the near future to study the problems that country faced in installation of steel works could be most helpful. (The author's contacts in India may be helpful in organizing such a visit.) The references in Appendix II should be obtained immediately and kept in SIDERSA until such time M.M.I.C. is established. At that time, these documents can be transferred to M.M.I.

(c) Centro Nacional de Documentacion Cientifica y Tecnologica:

This Center was established with the financial help of UNESCO and is part of the Universidad Mayor de San Andres. It was created by the government by a "Decreto Supremo 08164" on December 6, 1967.

It provides information on scientific and technical subjects mainly to the Bolivian universities and with the help of UNESCO has recently compiled a list of libraries in Bolivia and is presently engaged in compilation of a union catalogue. The services of the Center include preparation of Bibliographies, photocopies, microfilm and the maintenance of a register of translators who are available on fee-basis for translation of technical and scientific literature. The Center receives the World Index of Scientific Translation, List of Russian Serial Being Translated into English and other languages, but has no staff to index or make use of such publications.

The Center is well organized and is ready to expand its client and services. The Center might well maintain a list of the titles of theses prepared in engineering faculties in Bolivia and submit a copy of the list to the M.M.I.C.

(d) GEOBOL - Documentation Center:

This Center has one self-educated librarian in a staff of five. It was a library until 1972. Its main function is to reproduce aerial photographs and make maps for GEOBOL. The library of the Center is very small, with some 7,000 books and periodicals. Most of the books are old and have not been indexed. The total budget of the center is around $5,000. The Librarian has been trying unsuccessfully to get more training abroad. The Center is acquiring microfilm and microfiche equipment.

(e) Associacion Nacional de Mineros Medianos:

A visit to this association was made to explore if it could cooperate with the proposed Mining and Metallurgical Information Center. The management agreed to cooperate in the establishment of a M.M.I.C. The association pointed out that it had some documents or reports which are confidential in nature which it alone could release.

It was agreed that a list of these reports would be satisfactory to M.M.I.C. The association agreed to send the Center Mining News, Reports and Bulletins as long as the Bulletins are kept confidential.

(f) National Council for Higher Education - Universidad Boliviana:

This body is responsible for the future planning of university education in the country. It has prepared bibliographies in geology and is compiling a directory of libraries and periodicals. The directory will contain statistics such as the number of personnel, the type of periodical being received. A considerable amount of work on computerized data banks for very advanced applications is also being planned. This organization is trying to obtain microfilm and microfiche equipment.

The work done here on information or documentation services is either an extension of or duplication of work being carried out in Centro Nacional de Documentacion Cientifica y Tecnologica, and is of an advanced nature without immediate applications. Therefore, it is recommended that the two organizations should combine their work.

(g) Universidad Mayor de San Andres:

CNDCT and Central Library are both parts of the University. CNDCT has reprographic facilities whereas Central Library has none. Central Library controls the Library facilities in the University including Faculty Libraries. Directors of both organizations report to the Rector and work independently of each other. To be effective a documentation center, both an adequate library base and reprographic services are needed. If both facilities are to operate efficiently and usefully, they need to combine their forces either by amalgamating or working cooperatively.

Both the Directors agreed to pool their resources and join efforts for the promotion of a university system of information. The union of these bodies could be the first step in the formation of a truly National Documentation Center.

(h) Ministerio de Industria, Comercio y Turismo:

This Ministry consists of a Sub-secretary of Industry and Integration and a Sub-secretary of Commerce and Turismo, plus five institutes and five enterprises. The first has three parts namely Direccion General de Desarrolo Industrial (Industrial Development) Direccion General de Normas Y Tecnologia (Standards and Technology) and Direccion General de Integracion (Integration).

Some of the above direcciones, institute and enterprises (General Direction of Standards & Technology) have libraries, although they are small. The General Direction of Standards and Technology is the one which requested assistance in the formation of technical services center, and therefore, this report deals with the establishment of this center only.

However, if and when the demands justify, the scope of the above center should be enlarged to include the other organizations.

8.2 TRANSLATION SERVICES:

Translation of publications in foreign languages including English is foreseen as an important function since many Bolivian technologists and scientists (who are non-English speaking) must provide information published in English and languages other than Spanish.

Besides the preparation of translations, the Center should also:

- keep records of available translations and give information on translations existing elsewhere.

- subscribe to periodicals such as World Index of Scientific Translations.

8.3 METHODS:

N.I.S. and M.M.I.C. should be organized to accommodate the traditional methods of handling information as well as modern information technology based upon highly developed reprographic equipment, telecommunications and computers. Parallel with the development of new techniques and their applications to information work, manual methods should be continued, utilizing and expanding, traditional skills. Information staff will have to be trained both in traditional and modern computer based methods.

Computer applications must be very carefully planned and should be based on the availability of computers in the country which have been installed for other purposes such as administration, science and mathematical applications. More magnetic tape services, such as Engineering Index and Chemical Abstracts, are becoming available and are more economical to use than originating new computer material. The preparation of various types of indexes becomes possible when a computer facility is available.

8.4 DEPOSITORY OF PUBLICATIONS:

Bolivia will need to acquire relevant published material such as periodicals, books, encyclopedias, dictionaries from outside the country. It should make provision, however for an official depository of all scientific and technological work in Bolivia To fulfill this responsibility (and until such time as a truly national depository is set up) each of the centers (M.M.I.C. Petroleum Institute, etc.) should undertake to:

- collect, process, retrieve and disseminate information on all reports and governmental publications in the country.
- collect copies of published and unpublished reports written

by experts, foreigners and consultants who have worked in Bolivia.

- collect copies of publications of Bolivian societies, universities, and associations.

8.5 MECHANIZATION OF INFORMATION HANDLING:

The purpose of mechanization in documentation centers is to have basic records and references in machine-readable form so that processing capabilities can be expedited. Well-developed computer-aided systems alert scientists and technologists to current information relevant to their interests.

It would be wise to start now to plan a national system which will progress logically, until an automatic and integrated system is achieved. Such a system can draw on the large pool of existing knowledge which is already on tapes.

The final stage in the development of a national system is to have a mechanized system for the storage and processing of bibliographic abstracts, reports, serials and books.

Many difficulties and problems are to be expected in the introduction of such a system. However, they are within the capabilities of Bolivians and success can be confidently anticipated.

8.6 DOCUMENT COPYING:

The services given by a documentation center include the provision of copies of books which the user needs. In addition, it is common practice in interlibrary loans to furnish copies of works requested instead of sending the originals.

The following forms and techniques of reproduction are normally used:

1. Photographic methods:

   This method makes use of optical means to get a picture of a document. These methods are not rapid or cheap but they form an essential part of the work of reprography.

2. Copying methods:

   This can be divided into dry method (such as Xerox machines) and wet methods (such as the electrostatic machine in which powder is carried in chemicals). The dry method is preferred because normal paper can be used and even though the machines are more expensive. Special zinc-oxide-coated paper is needed for the wet method.

3. Microfilms and Microfiches:

   The equipment to make microfilm and reader-printer are also useful, especially where storage is a problem. More and more libraries in the world are making use of this media since a large number of documents exist in microfilm or microfiche form.

4. Off-set printing equpment:

   This equipment is necessary to publish multiple copies of documents such as bibliographies, current awareness lists, or monthly abstracts, and new acquisition lists.

9. WORK PLAN:

The first concern of any information development assistance is to assure an adequate library base. Therefore the following work plan which emphasizes the formation of good technical libraries is submitted for M.M.I.C. and T.S.C. of M.I.C. Centers. At the same time work must be commenced to develop a plan for the other information centers as outlined in Appendix I. The importance of the M.M.I.C. and T.S.C. of M.I.C. Centers for Bolivia justify the development assistance required to make an integrated approach to the planning and management of a national information system. The time factor is an important element in the development of these centers. Much consideration should be given to each step. The success of these centers will depend on achieving each phase in turn.

The problems of lack of qualified professional staff and standardized procedures will require the assistance of O.A.S., U.N.E.S.C.O. or the World Bank to implement the work plan.

9.1 DETAILED ANALYSIS AND DESIGN TO SET UP "THE BOLIVIAN TECHNICAL LIBRARY AND DOCUMENTATION CENTER":

A detailed systems analysis and design information center and other centers (see Appendix I) should be prepared which should contain the following:

(a) an analysis of the actual and potential demand for information on various subjects, by various users, at various levels,

(b) the exact location of each of the centers given in Appendix I and the subject specification (profile) of these centers,

(c) the description of the service to,be provided by these centers with special consideration for badly needed new types of services like evaluated information, technical information, managerial information, and data retrieval,

(d) the procedures for interconnections of information services within these centers,

(e) the ways and means of and the machinery for setting up the coordination of national and branch centers, and the legal implications of coordination,

(f) the process of planning the major information services at a national level,

(g) the provision for the application of a reprographic, telecommunication and computer technology to information work in the national center and the other centers,

(h) the time schedule for the establishment of a coherent plan of action necessary to achieve the results desired,

(i) estimate of the costs and benefits of the system.

(j) organization

9.2 ESTABLISHMENT OF MINING AND METALLURGY INFORMATION CENTER (M.M.I.C.):

The author has discussed with personnel marked with an asterisk (see List of Persons Met) the formation of a "Mining and Metallurgy Information Center". They welcomed the idea and agreed to cooperate fully in the formation of the center.

This center should be installed as soon as possible (with available funds form the World Bank and the funds which O.A.S. is to allocate for SIDERSA) and should encompass the following:

1) Instituto de Investigaciones Minero-Metalurgicas. (IIMM)

2) Empresa Nacional de Fundiciones. (ENAF)

3) Empresa Siderurgica Boliviana S.A. (SIDERSA)

4) Corporacion Minera de Bolivia. (COMIBOL)

5) Banco Minero de Bolivia. (BAMIN)

6) Servicio Geologico de Bolivia. (GEOBOL)

7) Comision Boliviana de Energia Nuclear. (COBOEN)

8) Asociacion Nacional de Mineros Medianos. (ANMM)

The principal users of this center will be scientists and engineers who are engaged in research and development in industry. The center should be responsible for collecting, processing, indexing techno-economic and technical information in the fields of geology, mining, ore dressing, continuous casting, rolling, ferrous and non-ferrous metallurgy. In addition, it should establish relations for the exchange of publications and other information with technical information centers abroad and cooperate with the Inquiry Section of UNIDO and other foreign centers.

The center should build its own library. As an initial step towards this goal, a list of recommended books and periodicals is enclosed in Appendix II. The references contained in the list should be supplemented by obtaining annual indexes, abstracts, handbook-like publications, and these be obtained immediately for SIDERSA to have them plan their project effectively.

The center should be housed in La Paz in the Ministry of Mining and Metallurgy and its function should be to serve both the scientists and engineers of the Ministry as well as those in the mining and

metallurgy industry in-large. In addition to information on mining and metallurgy, the center should provide information in the specialized fields of the institutions it represents such as information in the fields of mining, palletizing, production, steel making, continuous casting and rolling for SIDERSA. c/c

A metallurgical engineer with experience will be required for this office. Initially, and until such time as a full-time staff is appointed, existing staff of the Ministry can be used on a part-time basis.

9.3 ESTABLISHMENT OF TECHNICAL SERVICE CENTER FOR MINISTRY OF INDUSTRY AND COMMERCE (T.S.C.):

The purpose of "The Technical Service Center for the Ministry of Industry and Commerce" should be to transfer industrial technology and provide service to enterprises by solving their day-to-day working problems. It should handle inquiries related to building practice and standards, chemical engineering, chemical products, construction material and methods, electrical engineering, electronics, food and food technology, material specifications and standards, mechanical engineering, and metallurgy. It should also give industrial engineering service or assistance including methods improvement, work measurement, value analysis, plant layout, materials handling, equipment utilization, organization, production planning, quality control, and cost control.

The center should have specialists in such areas as the following:

1. Metallurgy
2. Chemical Engineering (including leather, wood)
3. Mechanical Engineering

4. Food

5. Textiles

6. Electrical Engineering

The specialist should visit the enterprise periodically to discuss the problems of the enterprise.

The Center should have up-to-date handbooks, trade directories, and equipment suppliers catalogues in its own library. Books published by large companies such as Alcoa, Alcan, U.S. Steel, would be useful.

When confronted with problems which the specialist cannot solve he should refer them to UNIDO - Inquiry and Advisory Services or to the Technical Information Service of the National Research Council of Canada.

As an initial step towards acquiring useful information for this center, a list of Industrial Reference Guides (prepared by the staff of T.I.S. of the National Research Council of Canada) and a list of Industrial Profile Titles, (published by the U.S. Department of Commerce) have been supplied.

The former is available free of charge whereas the latter can be purchased at a nominal price. It is recommended that these publications be acquired as soon as possible.

Training of personnel should include plant visits in other countries. On return to Bolivia, specialists should visit industry of their own specialty. They should be encouraged to take specialized courses at the universities or by correspondence if available, for

example, Metals Engineering Institute of the American Society for Metals offers excellent correspondence courses in technologies such as foundry, heat-treatment, welding, electroplating.

10. DESCRIPTION OF O.A.S. AND NATIONAL INPUTS:

Request for assistance from O.A.S. or U.N. Agency or IDRC (CANADA)

The organization of a technical information system in Bolivia would be the first attempt in development country at an integrated approach to the planning and management of a national system. The importance of this system for Bolivia justify the development assistance required for this fact.

1. Bolivian Technical Library & Documentation Center (National Information System)

1.1 Consultant for 3 months: . . . . . $ 9,000.00

2. M.M.I.C. (SIDERSA requirements are included)

2.1 Equipment:

(a) Reprographic equipment (Xerox, microfilm and microfiche readers and reader printers, offset printing equipment, electrostatic coppier, stitcher, binder, etc. . . . . $ 50,000.00

(b) Keypunch machine $ 5,000.00

Computer Terminal for reading cards, punching cards and providing print-out plus data adaptor, etc. $ 125,000.00 (estimated)

(No immediate need but should be planned for when the Center starts functioning). N.R.C. offers S.D.I. packages through UNILIST on Chemical Abstract, etc.)

2.2 Experts:

1 expert for 6 months during 1974-1975	$ 15,000.00
1 expert for 6 months for period of 1975-76	$ 15,000.00
1 Technical Librarian for 1 year, starting when the acquisitions are available	$ 25,000.00

2.3 Fellowships:

(a) 1 fellowship during 1974-75 in Canada or U.S.A. 3 months each $ 1,800.00

(b) 1 the same for the period 1975-76 $ 1,800.00

(c) Computer technology:

1 Search Editor 1975-76	$ 8,000.00
2 Programmers 1975-76	$ 16,000.00

2.4 Bibliographies, Reference books, etc..
Subject bibliographies, reference books, etc. $ 75,000.00

2.5 Teaching Aids:

1 Tape recorder . . . . . $ 200.00

1 16 mm. projector . . . . . $ 600.00

1 Automatic slide projector . . . . . $ 250.00

3. Technical Services Center for Ministry of Industria y Comercio

3.1 6 fellowships during the period 1974-75, in each of specialized fields for a period of six months $ 18,000.00

3.2 Reference books, etc. . . . . $ 10,000.00

Trade directories, handbooks, etc.

3.3 Equipment: . . . . . $ 35,000.00

1 Microfilm reader printer

1 Microfilm reader printer

1 Printing Equipment with electrostatic copier, binder, etc.

(This is required to print announcements for technical bulletins etc. to the industry.)

4. Assignment of National Staff:

4.1 M.M.I.C.

(a) 1 full-time professional
(b) 1 technical librarian
(c) 1 secretary
(d) 1 reprographer
(e) 1 programmer

4.2 T.S.C. for M.I.C.:

(a) 1 part-time secretary
(b) 6 part-time specialists in fields of Metallurgy, Chemical Engineering, Mechanical Engineering, Electrical Engineering, Food Technology, Textiles.
(c) 1 librarian

11. LIST OF PERSONS MET

*	1.	Gonzalo Gutierrez	GENERAL DIRECTOR, MINISTRY OF MINING & METALLURGY
*	2.	Joaquin A. Orias A.	ADVISOR, MINISTRY OF MINING & METALLURGY
	3.	Fernando Kempff B.	INSTITUTO DE INVESTIGACIONES MINERO-METALURGICAS
*	4.	Dr. G. G. Blanco	SUB-DIRECTOR, INSTITUTO DE INVESTIGACIONES MINERO-METALURGICAS
*	5.	Dr. C. Valdez M.	JUDICIAL ADVISOR, EMPRESA NACIONAL DE FUNDICIONES
*	6.	Ing. J. Lema P.	TECHNICAL MANAGER, EMPRESA NACIONAL DE FUNDICIONES
*	7.	Dr. Munoz Reyes	SECRETARY GENERAL, CORPORACION MINERA DE BOLIVIA
*	8.	Mr. E. Pareja M.	CHIEF DOCUMENTATION CENTER, SERVICIO GEOLOGICO DE BOLIVIA
	9.	Mr. A. Fernandez C.	SERVICIO GEOLOGICO DE BOLIVIA
	10.	Dr. E. Natchman	O.A.S.
	11.	Mr. Piere Gonod	O.A.S.
	12.	Mr. G. Clement	I.D.R.C. (O.A.S.)
	13.	Cnl. M. Ayoroa	MINISTER, MINISTERIO DE INDUSTRIA Y COMERCIO

	14.	Dr. Pereyra F.	UNDERSECRE :Y INDUSTRY, MINISTERIO DE INDUSTRIA Y COMERCIO
	15.	Mr. O. Donoso	GENERAL DIRECTOR, MINISTERIO DE INDUSTRI Y COMERCIO
	16.	Mr. L. Mattes	MINISTERIO DE INDUSTRIA Y COMERCIO
	17.	Mr. Hugo Loayza	DIRECTOR, CNDCT
	18.	Elba Arzadum O.	SUB-DIRECTOR, CNDCT
*	19.	Mr. Carlos Morales	GENERAL MANAGER, EMPRESA SIDERIRGICA BOLIVIANA S.A.
*	20.	Mr. Carlos Blanco F.	TECHNICAL MANAGER, EMPRESA SIDERURGICA BOLIVIANA S.A.
	21.	Mr. Felix Miranda	MINISTERIO DE INDUSTRIA Y COMERCIO
	22.	Dr. Felipe Hartman	RECTOR DE LA UNIVERSIDAD MAYOR DE SAN ANDRES
	23.	Mr. C. Agruirre	CEPIC
	24.	Mr. J.S. Salinas	DIRECTOR DE LA BIBLIOTECA, UNIVERSIDAD MAYOR DE SAN ANDRES
	25.	Mr. R. Salgueiro	NATIONAL HIGHER EDUCATION COUNCIL
*	26.	Mr. A. Garcia O.	COBOEN