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16263

**DIRECTORY OF  
RESEARCH AND DEVELOPMENT  
INSTITUTIONS:  
NON-FERROUS METALS INDUSTRY**

Prepared for  
the First Consultation on Non-ferrous Metals Industry  
by the Industrial and Technological Information Bank (INTIB)

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CONTENTS

	Page
INTRODUCTION	
English.....v	
French.....ix	
Spanish.....xiii	
INDEXES	
English.....vi	
French.. . . . .x	
Spanish.....xiv	
SAMPLE ENTRY	
English.....vi	
French.....x	
Spanish.....xiv	
SAMPLE FORMAT.....xvii	
COUNTRY CODE INDEX.....xix	
ACTIVITY INDEX.....xx - xxxiii	
ALUMINIUM.....xx - xxii	
COPPER.....xxiii - xxv	
LEAD.....xxvi - xxvii	
NICKEL.....xxviii - xxix	
TIN.....xxx - xxxi	
ZINC.....xxxii - xxxiii	
TECHNICAL CO-OPERATION INDEX.....xxxiv	
RESEARCH AND DEVELOPMENT INSTITUTIONS	1 - 465
(ARRANGED ALPHABETICALLY BY ENGLISH	
NAME OF COUNTRY)	
APPENDIX	466 - 473

## INTRODUCTION

Part of the work programme of the Industrial and Technological Information Bank (INTIB) and within the framework of the First Consultation Meeting on Non-ferrous metals is to compile a directory of R&D institutions concerning non-ferrous metals.

Among the facilities covered in this directory are research and development centers, institutes, laboratories, bureaus, data collection centers, and similar research facilities and programmes concerned with fundamental, applied, and developmental studies. Included also are foundations, councils, associations and other institutions that sponsor, administer or otherwise support research programmes in the field of the non-ferrous metals within a country.

Except for the international section, which appears at the beginning of the main body of this directory, the rest of the R&D institutions contained in this document are arranged by country. The countries are listed alphabetically in the order of their English names.

This directory provides, in particular, the following information:

- sphere of activity of the respective R&D institution with particular current and anticipated projects;
- essential extent and purpose of operation together with the corresponding research equipment (pilot scale);
- identification of possibilities and interest for technical co-operation and availability of organizing training programmes;
- number of staff and relation with other organization(s);
- budget and source of funds.

All the information in this directory has been elicited by questionnaire. The preparation of the questionnaire was part of the preliminary work for this directory. A major problem in the preliminary work was how to cover, as systematically and comprehensively as possible, the various possibilities of activities related to the six metals in question. These are: Aluminium, Copper, Lead, Nickel, Tin, Zirc. In view of these and some other difficulties a proper classification of the desired information was necessary. Therefore, a table with code - numbers referring to the particular combination of activity and metal was designed. By means of this system an abundance of information has been obtained from every replied questionnaire.

The production of this document has been partly assisted by computer stored information which aids the provision of cross references (see activity index and technical co-operation index). A number of questionnaires were replied in handwriting which might have resulted in spelling mistakes in names, etc., although every care has been taken in compiling the information obtained. Any corrections and/or additional information would be welcome.

It is hoped that the information elicited will contribute to develop co-operation among R&D institutions/centers etc., working and/or supporting work in similar fields, and strengthen substantially the technological capabilities of R&D facilities in developing countries.

We would like to take the opportunity of thanking all who have responded to the request for co-operation and made this project possible by completing the form sent to them.

The continuing development of research and development programmes means that any reference directory of this kind needs regular updating. Consequently, it is hoped to produce updated versions of this directory. We would appreciate hearing from users, who may have suggestions to make for the improvement of future editions, or who are able to point out any errors of omission or who recommend additional R&D institutions not having been considered in this present issue.

A copy of the questionnaire is attached at the end of the directory.

#### INDEXES

Three indexes provide full access to the descriptive listings in the main body of the document. In all three, listings are referred to by index entry rather than page number. These are:

- Country code index;
- Activity index to provide access to research units by specific field of activity;
- Technical co-operation index to provide access to R&D units carrying out training programmes or requesting training and/or assistance.

#### SAMPLE ENTRY

Each institution of research and development has been given a separate entry. Each entry is introduced with the full title of the institution.

Each numbered table and/or section in this sample entry designates an item of information. The tables and/or sections are explained in the descriptive paragraph below, and are followed by the sample.

- ① **Name:** The full name of the research and development institution.
- ② **Address:** Location and/or permanent mailing address of the institution.
- ③ **Telephone, telex and cable:** City and/or country codes are included, if provided.
- ④ **Director:** Name of the head or director of the institution.
- ⑤ **Contact person:** Name of the person to be contacted.
- ⑥ **Staff:** Includes professional personnel.
- ⑦ **Budget, year, source of funds:** Contains the budget, the budget year and the source of the funds respectively.
- ⑧ **Relationship with other organizations:** Includes information concerning relations of the institutions in question with particular governmental organization(s), private enterprise(s), etc.
- The following entries ⑨ to ⑪ refer to substantial activities and projects of the respective R&D institution.
- ⑨ **On-going projects:** The package of information to be obtained from this entry contains with respect to the metals listed, the fields of activities, project title(s) and classification of the respective activity, R for Research and T for Training.

The metal(s) and classification(s) in question are indicated by an "x" in the appropriate column(s).

Every field of activity, indicated metal(s), numbered project title(s) and indicated classification(s) constitute a closed loop of information.

- ⑩ **Anticipated projects:** See explanatory note of entry ⑨
- ⑪ **Availability of pilot installation/equipment:** This entry includes information about the availability of pilot installation/equipment with respect to the particular field of activity and according to the listed purposes of operation. The code-number(s) in the metal-column(s) deliver additional information concerning the operational extent of the equipment/installation in question. The description of these code-numbers is given in table 15 of every R&D institution (see also explanatory notes for entry ⑮).
- The following entries ⑫ and ⑬ refer to activities concerning technical co-operation.
- ⑫ **Technical co-operation given:** The right hand side of this entry contains general information with respect to the technical assistance which can be obtained from the R&D institution in question, e.g. a) consultants/experts, b) training program including duration and language requirements. Information about the fields of training program with respect to the particular metal(s) is to be attained from the left hand side of the entry in general.



- ⑬ Technical co-operation requested: This entry indicates the needs of the respective R&D institution concerning training, experts, equipment and desired field as well as language capabilities and possible duration. The metal(s) in question are indicated by an "x" in the appropriate column(s). This entry provides also information about technical assistance already obtained.
- ⑭ Documents: Indicates types of publications which can be disseminated by the unit.
- ⑮ Notes: Description of the abbreviations and the code numbers used and miscellaneous information not covered in other sections.
- ⑯ Country chapter: Each country chapter comprises R&D institutions arranged in alphabetical order.
- ⑰ Index entry: All index entries refer to the full entry by a three - letter country code and a number indicating the alphabetical order of the title of the organization in the respective country chapter. The number after the slash is used as pagination index. Normally four pages are devoted to every institution, e.g. BRA 4/1 to BRA 4/4. The three letter country codes are shown on the page with the country code index.

Any inquires or suggestions regarding this directory should be addressed to:

Industrial and Technological Information Section - INTIB  
UNIDO  
P.O. Box 300  
A-1400 Vienna  
Austria

## INTRODUCTION

Une tâche prévue dans le programme de travail de la Banque d'informations industrielles et techniques (INTIB) et qui s'inscrit dans le cadre de la première Consultation sur les métaux non ferreux est l'établissement d'un répertoire des institutions de R-D du secteur des métaux non ferreux.

Dans ce répertoire figureront des centres de recherche-développement, des instituts, des laboratoires et des bureaux d'études, des centres de rassemblement de données et des institutions et programmes similaires qui s'occupent de la recherche fondamentale et appliquée et de la recherche sur le développement. Y figureront également des fondations, conseils et associations et autres institutions qui patronnent, administrent ou apportent de quelque autre façon leur soutien à des programmes de recherche sur les métaux non ferreux dans tel ou tel pays.

Abstraction faite de la section internationale placée en tête du corps même du répertoire, les institutions de R-D sont classées par pays et les pays eux-mêmes sont classés dans leur ordre alphabétique anglais.

Ce répertoire contient en particulier les renseignements suivants :

- Sphère d'activité de chaque institution de R-D, avec indication de ses projets en cours et prévus;

- Objet et étendue des activités, avec indication du matériel de recherche correspondant (échelle pilote);
- Possibilités de coopération technique et intérêt manifesté à cet égard et moyens d'organisation de programmes de formation;
- Importance des effectifs et relation avec d'autres organisations;
- Budget et source de financement.

Tous les renseignements figurant dans le répertoire proviennent des réponses à un questionnaire qu'il a fallu d'abord mettre au point. Un des grands problèmes à résoudre préalablement était le choix d'une couverture aussi systématique et complète que possible des diverses perspectives d'activités en ce qui concerne les six métaux considérés, à savoir : aluminium, cuivre, étain, nickel, plomb et zinc. Compte tenu, entre autres, de ces difficultés, il a fallu définir une classification rationnelle des renseignements et donc élaborer un tableau de numéros de code renvoyant aux diverses combinaisons d'activités et de métaux. Le système adopté a permis de tirer beaucoup de renseignements de chaque réponse au questionnaire.

La mise au point de ce document a été en partie facilitée par les renseignements mis en mémoire dans un ordinateur, et grâce auxquels on peut plus facilement faire les recoupements (voir les index "Activités" et "Coopération technique"). Un certain nombre de réponses aux questionnaires ayant été données sous forme manuscrite, quelques noms ont pu être mal orthographiés malgré le soin apporté à la compilation des renseignements. Toutes corrections et/ou informations supplémentaires seront les bienvenues.

On espère que les renseignements ainsi présentés faciliteront la coopération entre institutions/centres de R-D, etc., les travaux et/ou activités de soutien dans des domaines similaires et qu'ils aideront à améliorer sensiblement la capacité technique des institutions de R-D dans les pays en développement.

Nous voudrions profiter de cette occasion pour remercier tous ceux qui nous ont apporté leur concours et qui ont permis de mener à bien l'oeuvre entreprise en répondant à notre questionnaire.

Comme les programmes de recherche-développement sont en évolution permanente, tout répertoire de ce type doit être mis à jour à intervalles réguliers et nous espérons pouvoir éditer de telles mises à jour. Nous souhaiterions que les utilisateurs qui ont des améliorations à suggérer, des erreurs ou omissions à signaler, ou qui recommandent d'ajouter des institutions de R-D qui n'ont pas retenu l'attention dans la présente édition, de bien vouloir se mettre en rapport avec nous.

On trouvera à la fin du répertoire un exemplaire du questionnaire.

## INDEX

Trois index permettent de retrouver les renseignements contenus dans les listes descriptives du corps du document. Dans les trois listes, les références renvoient aux entrées de l'index et non à un numéro de page. Ces index sont les suivants :

- Index par numéros de code des pays;
- Index par activités qui permet de trouver les unités de recherche dans tel ou tel domaine d'activité;
- Index par modalités de coopération technique, pour trouver des unités de R-D qui exécutent des programmes de formation ou qui demandent une formation et/ou une assistance.

## EXEMPLE D'ENTREE

Il y a une entrée distincte pour chaque institution de recherche-développement. Pour chaque entrée est indiqué en premier lieu le titre complet de l'institution.

Chaque table et/ou section numérotées de cet exemple d'entrée désignent une information. Les tables et/ou sections sont expliquées dans le paragraphe descriptif ci-dessous et sont suivies de l'exemple d'entrée.

- ① Nom : nom complet de l'institution de recherche-développement.
- ② Adresse : adresse réelle et/ou adresse postale permanente de l'institution.
- ③ Téléphone, télex et télégramme : quand ils ont été communiqués, les codes postaux de la ville et/ou du pays sont indiqués.
- ④ Directeur : nom du directeur de l'institution.
- ⑤ Contact : nom de la personne à contacter.
- ⑥ Personnel : cadres inclus.
- ⑦ Budget, exercice financier, provenance des fonds : renseignements concernant le budget, l'exercice financier et la source de financement.
- ⑧ Relations avec d'autres organisations : renseignements sur la relation de l'institution considérée avec tel(s) ou tel(s) organisme(s) public(s), entreprise(s) privée(s), etc.

Les entrées ⑨ à ⑪ qui suivent ont trait aux activités et projets de l'institution de R-D considérée.

- ⑨ Projets en cours : ensemble d'informations sur les métaux de la liste, les domaines d'activité, le titre du ou des projet(s) et le classement des activités, R pour Recherche et T pour Training (F formation).

Le métal et la classification ou les métaux et classifications en question sont signalés par un "X" dans la ou les colonne(s) appropriée(s).

Chaque domaine d'activité, tous les métaux indiqués, tous les titres de projet avec le numéro de code et les classifications indiquées constituent un tout informatif.

- ⑩ Projets prévus : voir la note explicative de l'entrée ⑨.
- ⑪ Installations pilotes/équipement disponibles : on trouvera ici des renseignements sur les installations pilotes et/ou équipement disponibles pour le domaine d'activité considéré et en fonction des objectifs d'activité indiqués. Le ou les numéro(s) de code porté(s) dans la ou les colonne(s) relative(s) aux métaux apportent des renseignements supplémentaires sur les capacités opérationnelles de l'équipement/installation. L'explication de ces numéros de code est donnée au tableau 15 de chaque institution de R-D (voir également les notes explicatives relatives à l'entrée ⑮).

Les entrées ⑫ et ⑬ ci-après ont trait aux activités de coopération technique.

- ⑫ Offre de coopération technique : la partie droite de cette entrée contient des renseignements généraux sur l'assistance technique qui peut être fournie par l'institution de R-D considérée, par exemple

a) services de consultants/experts,  
b) programme de formation avec indication de durée et des conditions linguistiques à remplir. Dans la partie gauche de l'entrée, d'une manière générale, on trouvera des renseignements sur les domaines de formation relative à tel métal ou tels métaux particulier(s).

⑬ Demande de coopération technique : cette entrée indique les besoins de l'institution de R-D considérée en ce qui concerne la formation, les experts, le matériel et le domaine d'intérêt ainsi que les capacités linguistiques et la durée possible, le métal ou les métaux en question étant indiqué(s) dans la ou les colonne(s) appropriée(s). Cette entrée contient aussi des renseignements sur l'assistance technique déjà obtenue.

⑭ Documents : sont indiqués les types de publications qui peuvent être diffusés par l'institution considérée.

⑮ Notes : description des abréviations et des numéros de code utilisés et informations diverses qui ne sont pas mentionnées dans d'autres sections.

⑯ Chapitre par pays : dans chaque chapitre par pays, les institutions de R-D sont indiquées dans l'ordre alphabétique.

⑰ Entrée dans les index : toutes les entrées dans les index renvoient à l'entrée complète, elles comportent un code de pays de trois lettres et un chiffre indiquant la place alphabétique du titre de l'organisation dans le chapitre par pays considéré. Le nombre qui suit la barre oblique est un indice de pagination. Normalement, quatre pages sont consacrées à chaque institution, exemple : BRA 4/1 à BRA 4/4. Les codes de pays à trois lettres sont indiqués sur la page en même temps que le numéro de code du pays.

Toutes demandes de renseignements ou suggestions concernant ce répertoire doivent être envoyées à l'adresse suivante :

Section de l'information industrielle et  
technologique - INTIB  
ONU DI  
B.P. 300  
A-1400 Vienne  
Autriche

## INTRODUCCION

Como parte del programa de trabajo del Banco de Información Industrial y Tecnológica (INTIB), y en el marco de la Primera Consulta sobre las Industrias de los Metales No Ferrosos, se prepara una guía de instituciones de investigación y desarrollo (I+D) dedicadas a los metales no ferrosos.

Entre los servicios incluidos en esta guía figuran centros de investigación y desarrollo, institutos, laboratorios, oficinas, centros de acopio de datos, y otros servicios y programas de investigación análogos que se dedican a estudios fundamentales, aplicados y de perfeccionamiento. También figuran fundaciones, consejos, asociaciones y otras entidades que patrocinan, administran o apoyan de algún otro modo programas de investigación en la esfera de los metales no ferrosos en un país dado.

Salvo en lo tocante a la sección internacional, que figura al comienzo del cuerpo principal de esta guía, el resto de las instituciones de I+D que figuran en el presente documento están ordenadas por países. Estos se han enumerado en el orden alfabético de sus nombres en inglés.

La presente guía facilita en concreto la siguiente información:

- esfera de actividad de la respectiva institución de I+D con proyectos concretos en curso y previstos;

- ámbito y finalidad esenciales de sus operaciones junto con el equipo de investigación correspondiente (a escala piloto);
- determinación de las posibilidades y del interés de la cooperación técnica y disponibilidad para organizar programas de capacitación;
- número de personal y relación con otras organizaciones;
- presupuesto y fuente de financiación.

Toda la información que figura en la presente guía se ha obtenido mediante un cuestionario. La preparación de éste formó parte de la labor preliminar de la presente guía. Un importante problema con el que se tropezó en la labor preliminar fue cómo abarcar, de la manera más sistemática y amplia, las diversas posibilidades de las actividades relacionadas con los seis metales objeto de estudio, a saber: el aluminio, el cinc, el cobre, el estaño, el níquel y el plomo. Habida cuenta de esta dificultad y de algunas otras, resultó necesaria una clasificación adecuada de la información deseada. Por lo tanto, se confeccionó un cuadro con números de código que se refieren a la combinación concreta de la actividad y el metal. Mediante este sistema, se ha obtenido abundante información de los cuestionarios a que se ha respondido.

Para producir el presente documento se ha contado en parte con la ayuda de información almacenada en computadora que contribuye a facilitar interreferencias (véase el índice de actividades y el índice de cooperación técnica). Las respuestas que figuraban en cierto número de cuestionarios fueron rellenas de puño y letra, lo que tal vez haya dado pie a errores ortográficos en los nombres, etc., aunque se han adoptado todas las precauciones al recopilar la información obtenida. Se agradecerían correcciones y/o información suplementaria.

Es de esperar que la información obtenida contribuya a fomentar la cooperación entre instituciones y centros de I+D, etc., que trabajen y/o apoyen trabajos en esferas análogas, y a fortalecer considerablemente las capacidades tecnológicas de los servicios de I+D de los países en desarrollo.

Deseáramos aprovechar esta oportunidad para expresar nuestra gratitud a todos aquellos que han respondido a la solicitud de cooperación y han hecho que este proyecto se materialice al rellenar el formulario que se les envió.

La constante evolución de los programas de investigación y desarrollo significa que es preciso actualizar periódicamente toda guía de consulta de este tipo. En consecuencia, se espera producir versiones actualizadas. Agradeceríamos a los usuarios que puedan tener sugerencias para mejorar ediciones futuras, o señalar errores u omisiones o recomendar otras instituciones de I+D que no hayan sido incluidas en esta edición, que así nos lo comuniquen.

Al final de la presente guía se adjunta un ejemplar del cuestionario.

#### INDICES

Existen tres índices que facilitan la consulta de todas las listas descriptivas del cuerpo principal del documento. En los tres, se hace referencia a las listas por el asiento del índice y no por el número de la página. Se trata de los siguientes:

- Índice de códigos de países;
- Índice de actividades que facilita localizar dependencias de investigación por su esfera concreta de actividad;
- Índice de cooperación técnica que facilita localizar dependencias de I+D que llevan a cabo programas de capacitación o solicitan capacitación y/o asistencia.

#### EJEMPLO DE ANOTACION

Se ha asignado una anotación por separado a cada institución de investigación y desarrollo. Cada una comienza con el título completo de la institución.

Cada cuadro y/o sección numerados de este ejemplo de anotación señala un elemento de información. En el párrafo descriptivo que viene a continuación se explican los cuadros y/o secciones y seguidamente se presenta el ejemplo.

- ① Nombre: El nombre completo de la institución de investigación y desarrollo.

- ② Dirección: La ubicación y/o dirección postal permanente de la institución.
- ③ Teléfono, télex y dirección telegráfica: Se incluyen los prefijos de la ciudad y/o el país, si se dispone de ellos.
- ④ Director: Nombre del jefe o director de la institución.
- ⑤ Enlace: Nombre de la persona a la que hay que dirigirse.
- ⑥ Personal: Comprende el personal profesional.
- ⑦ Presupuesto, año, fuente de financiación: Contiene el presupuesto, el año a que corresponde y la fuente de la financiación, respectivamente.
- ⑧ Relación con otras organizaciones: Brinda información relativa a las relaciones de las instituciones en cuestión con organizaciones gubernamentales, empresas privadas, etc.

Los apartados ⑨ a ⑪ siguientes se refieren a las actividades y proyectos sustanciales de la institución de I+D de que se trate.

- ⑨ Proyectos en curso: El conjunto de información que puede obtenerse en este apartado contiene, respecto de los metales enumerados, las esferas de actividad, los proyectos y una clasificación de la actividad respectiva. Una R significa investigación y una T capacitación.

Los metales y las clasificaciones correspondientes se indican mediante una "x" en la columna apropiada.

Cada una de las esferas de actividad, los metales indicados, los títulos de proyectos numerados y las clasificaciones indicadas constituye un conjunto independiente de información.

- ⑩ Proyectos previstos: Véase la nota explicativa del apartado ⑨.
- ⑪ Existencia de instalaciones/equipo pilotos: Este apartado incluye información sobre la existencia de instalaciones/equipo pilotos respecto de la esfera concreta de actividad y según las finalidades de operación enumeradas. Los números de código en las columnas de metales facilitan información suplementaria sobre la importancia operativa del equipo/instalación de que se trate. La descripción de estos números de códigos figura en el cuadro 15 de cada institución de I+D (véanse también las notas explicativas del apartado ⑮).

Los apartados ⑫ y ⑬ siguientes se refieren a actividades de cooperación técnica.

- ⑫ Cooperación técnica prestada: La columna derecha de este apartado contiene información general sobre la asistencia técnica que puede conseguirse de la institución de I+D de que se trate, v.g.: a) consultores/expertos, b) programa de capacitación con detalles de su duración e idiomas en que se imparte. La



información sobre las esferas del programa de capacitación respecto de cada uno de los metales puede obtenerse en la columna izquierda del apartado.

⑬ Cooperación técnica solicitada: Este apartado señala las necesidades de la respectiva institución de I+D en lo que se refiere a capacitación, expertos, equipo y esfera deseada, así como a los idiomas que utiliza y la posible duración de los programas. Los metales de que se trate se indican en la columna correspondiente mediante una "x". El apartado brinda también información sobre la asistencia técnica que ya se ha obtenido.

⑭ Documentos: Indica los tipos de publicaciones que puede divulgar la dependencia.

⑮ Notas: Descripción de las abreviaturas y los números de código empleados e información varia que no se ha incluido en otras secciones.

⑯ Capítulo de países: Cada capítulo de países comprende instituciones de I+D ordenadas alfabéticamente.

⑰ Apartado índice: Todos los índices hacen referencia a la anotación completa mediante un código nacional de tres letras y un número que indica el orden alfabético del título de la organización en el capítulo del país correspondiente. El número que sigue a la barra se utiliza como índice de paginación. Por regla general, se dedican cuatro páginas a cada institución, v.g.: BRA 4/1 a BRA 4/4. Los códigos nacionales de tres letras se indican en la misma página con el índice del código del país.

Sírvanse dirigir las solicitudes de información o sugerencias sobre esta guía a:

Sección de Información Industrial y  
Tecnológica - INTIB  
ONUDI  
Apartado de correos 300  
A-1400 Viena  
Austria

SAMPLE FORMAT

B  
R  
A  
Z  
I  
L

1. NAME : IPT - INSTITUTO DE PESQUISAS TECNOLOGICAS DO ESTADO DE SAO PAULO S/A

2. ADDRESS : Cidade Universitaria "Armando de Salles Oliveira",  
Caixa Postal 7141,  
01000 - SAO PAULO-SP,  
Brazil

3. TELEPHONE : (011) 268-2211  
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CABLE : TECHINST

4. DIRECTOR : Henrique Silveira de Almeida

5. CONTACT PERSON(S) : Amantino Ramos de Freitas

6. STAFF: 2600

7. BUDGET / : US\$60.000.- YEAR : 1986  
SOURCE : No information provided.  
OF FUNDS :

8. RELATIONSHIP : Several organizations private and  
WITH OTHER : governmental-domestic and foreign.  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	ELEMENTS						PROJECT TITLE	R	I
	Al	Cu	Pb	Ni	Sn	Zn			
Smelting		X						X	

Production of copper by the "Segregatio Process" applied to Brazilian complex oxidized copper ores.  
See note 1).

63 BRA 4 / 1

10. ANTICIPATED PROJECTS

FIELDS OF ACTIVITY	ELEMENTS						PROJECT TITLE	R	I
	Al	Cu	Pb	Ni	Sn	Zn			
Beneficiation of ores			X					X	
Recycling and recovery operations			X					X	
Refining			X					X	
						X		X	

1. Beneficiation of medium and low-grade oxidized lead ores, with medium concentrations of silver from the Ribeira de Iguape Valley District, S.E. State of Sao Paulo.

1. Pollution-free production of lead from battery-fabricating plants scrap.

1. Treatment of high-copper drosses, containing lead, silver and gold from lead refining operations.

1. Recovery of zinc from galvanizer's drosses and iron-rich crusts, by vacuum distillation.

10 BRA 4 / 2

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT

PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Beneficiation of ores									1									
Recycling and recovery operations			2												1			
Refining			1,2			2									2			
Smelting	1												1					

64 BRA 4 / 2

12

12. TECHNICAL CO-OPERATION - GIVEN						
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn
	Smelting		x			

  

STAFF AVAILABILITY AND TRAINING	
Availability of staff as consultants or experts :	No for UNIDO field assignments
Training programs available for own nationals :	Yes
Training programs available for other nationals :	Yes
Training languages :	Portuguese, Spanish, English
Duration :	Two months (Max.)

13

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Beneficiation of ores									x									

  

Languages	: Spanish, English	Duration :	Four months.
Assistance obtained in the past	: Japan International Co-operation Agency - JICA (On ore dressing and precious metal assays).		

BRA 4/3

17

xviii

14

1- DOCUMENTS : Availability of brochures.

15

15. NOTES	
CODE	DESCRIPTION
B	Research (Tables 9 and 10)
T	Training -
1	For Technical Co-operation (Table 11)
2	For Technical Assistance -
3	For Own Use -
9	ALL of above (1, 2, and 3) -
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper -
Pb	Lead -
Ni	Nickel -
Sn	Tin -
Zn	Zinc -
1)	Other projects related to other mineral raw materials and metals are being carried out too (Table 9).
2)	High-temperature crucible-type electric furnace; high-vacuum mechanical pumps; several miscellaneous items (Table 13).

66

BRA 4/4

17

COUNTRY CODE INDEX

International

INT

Argentina

ARG

Australia

AUL

Austria

AUS

Belgium

BEL

Brazil

BRA

Bulgaria

BUL

Canada

CAN

Chile

CHI

China

CPR

Colombia

COL

Costa Rica

COS

Ecuador

ECU

Egypt

EGY

Finland

FIN

France

FRA

Germany, Federal Republic

GFR

Greece

GRE

Hungary

HUN

India

IND

Indonesia

INS

Ireland

IRE

Israel

ISR

Jamaica

JAM

Japan

JPN

Kenya

KEN

Malaysia

MAL

Mexico

MEX

Morocco

MOR

New Zealand

NZE

Norway

NOR

Pakistan

PAK

Peru

PER

Philippines

PHI

Poland

POL

Portugal

POR

Republic of Korea

ROK

Senegal

SEN

Spain

SPA

Sweden

SWE

Switzerland

SWI

Thailand

THA

Trinidad and Tobago

TRI

Turkey

TUR

United Kingdom

UK

United Republic of Tanzania

URT

United States of America

USA

Yugoslavia

YUG

ACTIVITY INDEX

ALUMINIUM	Ongoing projects	Anticipated projects
Alloying	AUS 1, AUS 2, BEL 2, CPR 2, CPR 3, COL 2, COS 1, ECU 1, EGY 1, EGY 2, GFR 1, HUN 1, HUN 3, ISR 3, JPN 2, JPN 3, MEX 1, NOR 1, PAK 1, POL 4, POR 2, SFA 1, SWE 3, THA 1, TUR 1, USA 1, YUG 1	AUS 2, BEL 2, EGY 1, EGY 2, GFR 1, HUN 3, IND 1, NOR 1, POL 1, POL 4, THA 1, TUR 1, UK 3, USA 1
Alternative technologies	AUL 4, AUS 2, BEL 2, CHI 4, CPR 2, CPR 3, CPR 4, EGY 1, EGY 2, HUN 2, HUN 3, IND 2, ISR 1, JAM 1, JPN 3, MEX 1, NOR 1, SWE 1, SWI 1, UK 3, UK 4, UK 5	AUS 1, AUS 2, BEL 2, BEL 3, CPR 4, EGY 1, EGY 2, GRE 1, HUN 3, JAM 1, NZE 1, NOR 1, SWE 1, SWI 1
Auxiliary utilities for processing	CPR 2, CPR 3, CPR 4, EGY 1, GFR 4, KEN 1, MEX 1	EGY 1, KEN 1
Beneficiation of ores	CPR 2, CPR 4, COS 1, EGY 1, GFR 4, ISR 3, MEX 1	CPR 2, EGY 1, JPN 5
Economics	CHI 4, CPR 2, SWI 1, UK 1, UK 3, USA 3	SWI 1
Energy	AUS 2, CPR 2, IND 1, ISR 1, MEX 1, NOR 1, UK 3	AUS 2, CPR 1, HUN 3, IND 1, NOR 1, UK 1
Environmental control	AUL 1, AUS 2, CHI 4, CPR 2, MEX 1, NOR 1, POL 3	AUS 2, CPR 4, NOR 1, POL 3
Exploration of deposits	CHI 4, CPR 4, MEX 1	CPR 4, COS 1
Main utilities for processing	AUS 2, CPR 2, CPR 4, GFR 4, KEN 1, MEX 1, UK 3	AUS 2, KEN 1
Manpower and safety	MEX 1, USA 3	CPR 2

ACTIVITY INDEX

ALUMINIUM (Contd.)	Ongoing projects	Anticipated projects
Manufacture of products	AUS 1, CPR 2, CPR 3, EGY 1, EGY 3, FIN 2, FRA 1, FRA 3, GFR 4, IND 1, IND 2, INS 1, ISR 1, JPN 3, MEX 1, NOR 1, PHI 1, POL 1, SWE 1, SWI 1, TRI 1, TUR 1, UK 2, UK 3, UK 4, USA 1	CPR 1, EGY 1, FRA 3, ISR 1, NOR 1, SWI 1, THA 1, TRI 1, TUR 1, UK 3, USA 1
Mining of principal materials or alternative ores	CPR 4, MEX 1, UK 2	CPR 4, COS 1
Process control and automation	CPR 2, MEX 1, POL 3, SWE 3, UK 2, UK 5, USA 3	AUL 4, CPR 4, JAM 1, NOR 1, POL 3, UK 3
Recycling and recovery operations	AUS 1, AUS 2, CPR 2, CPR 2, COS 1, ECU 1, EGY 1, EGY 2, GFR 1, HUN 3, ISR 3, MEX 1, NZE 1, POR 2, SWE 1	AUS 1, AUS 2, BEL 3, EGY 1, GFR 1, HUN 3, INS 2
Refining	AUL 1, AUS 2, CPR 2, CPR 4, ECU 1, GFR 1, GFR 2, GFR 4, HUN 3, MEX 1, POL 1, SWE 1, SWI 1	AUS 2, GFR 1, HUN 3, SWI 1
Quality control and instrumentation	AUS 1, CPR 2, CPR 3, HUN 1, MEX 1, POL 3, POL 4, TRI 1, UK 3, UK 5, USA 3, USA 4	AUS 1, BEL 3, CHI 5, CPR 4, ISR 1, JAM 1, NOR 1, POL 3, POL 4, USA 4
Smelting	AUS 2, CPR 2, CPR 4, EGY 1, GFR 1, GFR 4, HUN 3, MEX 1, NOR 1, POL 1, SWE 1, UK 3, USA 1	AUS 2, CHI 5, COS 1, EGY 1, GFR 1, HUN 3, NZE 1, NOR 1, UK 3, USA 1
Standard technologies	AUS 1, AUS 2, BEL 3, CHI 5, CPR 2, CPR 4, EGY 1, GFR 4, HUN 2, HUN 3, ISR 1, KEN 1, MEX 1, NZE 1, PAK 1, POL 1, POL 4, POR 2, SWI 1, USA 1, USA 3	AUS 1, AUS 2, CHI 5, CPR 2, EGY 1, HUN 3, KEN 1, NZE 1, PAK 1, POL 1, SWI 1, TRI 1, USA 1
<u>Other activities</u>		
Applications, technology transfer Corrosion	INT 1 BEL 1, JPN 3, POR 2	INT 1 BEL 1, EGY 3

ACTIVITY INDEX

ALUMINIUM (Contd.)	Ongoing projects	Anticipated projects
Other fields of activities not explicitly mentioned (management related)	CPR 2	CPR 2
Cement production CAD	CPR 4	CPR 4
Al-cast irons	EGY 1	
Anodizing	EGY 3	
Technology (not explicitly mentioned)	FIN 2, SWI 1	ISR 1, SWI 1
Electroplating	GFR 2	
International markets	GFR 3	
Information service	GFR 5	
Liquid state	HUN 3	
Extraction		IRE 1
Law, negotiation		JAM 1
Structural materials, deformation	JPN 1	
Joining		JPN 1
Metallurgy	JPN 4	
Chemical processing for minerals	JPN 4	
Special projects	MEX 1	
Management	NZE 1	
Moulding	PAK 1	
IMP specifications	POL 3	POL 3
New developments	POL 4	POL 4
Strontium influence	POR 1	
Thermal analysis	POR 1	
Mechanical behaviour		POR 1
Welding	SPA 1	
Corrosion, offshore structures	UK 3	
Health	USA 1	USA 1
Aircraft components	USA 4	USA 4
Treatment		BUL 1

ACTIVITY INDEX

COPPER	Ongoing projects	Anticipated projects
Alloying	INT 1, AUS 2, BEL 2, CPR 2, GFR 3, COL 2, GFR 1, HUN 1, HUN 3, JPN 3, MEX 1, PAK 1, POL 1, POL 4, POR 2, SPA 1, THA 1, TUR 1, UK 3	AUS 2, BEL 2, CHI 4, EGY 2, GFR 1, HUN 3, IND 1, POL 4, THA 1, TUR 1
Alternative technologies	INT 1, AUL 4, AUS 2, BEL 3, BUL 1, CAN 1, CPR 2, CPR 3, EGY 1, EGY 2, GFR 4, HUN 2, HUN 3, MEX 1, POL 1, SWE 1, SWE 2, SWI 1, UK 3, UK 5	AUS 2, RUL 1, CAN 1, CHI 4, EGY 2, GRE 1, HUN 2, HUN 3, SWI 1
Auxiliary utilities for processing	CPR 2, GFR 4, KEN 1, MEX 1, UK 3	BRA 1, KEN 1
Beneficiation of ores	BRA 1, BRA 2, CHI 1, CHI 2, CPR 2, FIN 1, GFR 4, INS 1, JPN 5, MEX 1, PER 1, POL 2, POR 2, SPA 1, SWE 2	BRA 1, CHI 1, CHI 4, CPR 2, FIN 1, INS 2, JPN 5, POL 2
Economics	CHI 4, CPR 2, SWI 1, UK 4	SWI 1
Energy	AUS 2, CPR 2, IND 1, MEX 1, UK 3, UK 4	AUS 2
Environmental control	AUL 3, AUS 2, BRA 1, BRA 3, BUL 1, CHI 1, CPR 2, JPN 4, MEX 1, POL 3	AUL 3, AUS 2, BRA 3, POL 3
Exploration of deposits	AUL 2, AUL 3, GFR 4, GRE 1, JPN 5, ROK 1, MAL 1, MEX 1, MOR 2, PER 1, POL 2	AUL 3, CHI 4, COS 1, GRE 1, ROK 1, MAL 1, POL 2,
Main utilities for processing	AUS 2, BUL 1, CPR 2, GFR 4, KEN 1, MEX 1	AUS 2, BRA 1, BUL 1, KEN 1
Manpower and safety	AUL 3, MEX 1	AUL 3, CPR 2
Manufacture of products	INT 1, CPR 2, CPR 3, ECU 1, EGY 3, FIN 1, FIN 2, FRA 3, GFR 4, IND 2, JPN 3, MEX 1, PHI 1, POL 1, SWI 1, TRI 1, TUR 1, UK 4	INT 1, BUL 1, FIN 1, FRA 1, FRA 3, PHI 1, SWI 1, THA 1, TRI 1, TUR 1



ACTIVITY INDEX

COPPER (Contd.)	Ongoing projects	Anticipated projects
Mining of principal materials or alternative ores	CHI 1, GFR 4, MEX 1, PER 1	COS 1
Process control and automation	CHI 3, CPR 2, MEX 1, POL 3	BEL 3, BUL 1, POL 3
Recycling and recovery operations	AUS 2, BUL 1, CHI 1, CPR 2, COS 1, EGY 2, GFR 1, GFR 2, HUN 3, ISR 3, JPN 3, JPN 4, MEX 1, NZE 1, SWE 1	AUS 2, GFR 1, HUN 3, SWE 2
Refining	AUS 2, BEL 3, BRA 2, CAN 1, CPR 2, CPR 3, FIN 1, GFR 1, GFR 4, HUN 1, HUN 3, JPN 5, MEX 1, POL 1, SWE 1, SWI 1	AUS 2, BRA 1, CAN 1, EGY 2, FIN 1, GFR 1, HUN 3, INS 2, JPN 5, SWI 1
Quality control and instrumentation	AUL 1, BEL 1, CHI 3, CHI 5, CPR 2, HUN 1, MEX 1, POL 3, POL 4, TRI 1	BEL 1, BEL 3, BUL 1, CHI 5, POL 3, POL 4
Smelting	AUS 2, BEL 3, BRA 4, CAN 1, CPR 2, CPR 3, FIN 1, GFR 1, GFR 4, HUN 3, JPN 3, JPN 5, MEX 1, POL 1, SWE 1, SWE 2	AUS 2, BRA 1, CAN 1, CHI 1, CHI 5, FIN 1, GFR 1, HUN 3
Standard technologies	INT 1, AUS 2, BRA 2, BUL 1, CHI 5, CPR 2, ECU 1, GFR 4, HUN 2, HUN 3, INS 1, KEN 1, MEX 1, PAK 1, POL 1, POL 4, SWI 1	AUS 2, BUL 1, CHI 5, CPR 2, HUN 3, KEN 1, PAK 1, SWI 1, TRI 1
<u>Other activities</u>		
Corrosion	BEL 1, POR 2	
Metallurgy	BUL 1, JPN 4	BUL 1
Treatment	BUL 1	BUL 1
Equipment	BUL 1	BUL 1
Heap leaching		CHI 1
Transport systems	CHI 1	
Training		CHI 3
Other fields of activities not explicitly mentioned (management related)	CPR 2	CPR 2

ACTIVITY INDEX

COPPER (Contd.)	Ongoing projects	Anticipated projects
Technology (not explicitly mentioned)	FIN 2, SWI 1	SWI 1
Electroplating	GFR 2, PHI 1	PHI 1,
Plating		GFR 2
Hydrometallurgy		GFR 2
International markets	GFR 3	
Information service	GFR 5	
Mineralization	GRE 1	
Liquid state	HUN 3	
Leaching	IND 2	
Mineralogy	INS 1	
Structural materials, deformation	JPN 1	
Joining		JPN 1
High temperature chemistry	JPN 4	
Chemical processing for minerals	JPN 4	
Special projects	MEX 1	
Moulding	PAK 1	
IMP specifications	POL 3	POL 3
New developments	POL 4	POL 4
Welding	SPA 1	
Corrosion, offshore structures	UK 3	

ACTIVITY INDEX

LEAD	Ongoing projects	Anticipated projects
Alloying	AUS 2, CHI 4, GFR 1, HUN 3, IND 3, JPN 3, MEX 1, PAK 1, POL 4, SPA 1, THA 1	AUS 2, GFR 1, HUN 3, IND 3, POL 4, THA 1
Alternative technologies	AUS 2, BEL 3, BUL 1, CAN 1, CHI 4, EGY 2, HUN 3, JPN 3, MEX 1, SWE 1, SWI 1, UK 5	AUS 2, BUL 1, CAN 1, EGY 2, GFR 4, HUN 3, SWI 1
Auxiliary utilities for processing	GFR 4, IND 3, KEN 1, MEX 1, THA 2	KEN 1
Beneficiation of ores	BRA 2, CHI 4, CPR 2, FIN 1, GFR 4, GRE 1, INS 1, JPN 5, MEX 1, PER 1, POL 2, POR 2, SWE 2, THA 2	BRA 4, CPR 2, FIN 1, GRE 1, INS 1, INS 2, JPN 5, POL 2
Economics	CPR 2, SWI 1	SWI 1
Energy	AUS 2, CPR 2, MEX 1	AUS 2, GFR 4
Environmental control	AUS 2, BUL 1, CPR 2, IND 3, MEX 1, POL 3, THA 2	AUS 2, GFR 4, POL 3
Exploration of deposits	AUL 2, AUL 3, CHI 4, GFR 4, GRE 1, JPN 5, ROK 1, MAL 1, MEX 1, MOR 2, PER 1, THA 2	AUL 3, GRE 1, ROK 1, MAL 1
Main utilities for processing	AUS 2, BUL 1, GFR 4, KEN 1, MEX 1	AUS 2, KEN 1
Manpower and safety	MEX 1	CPR 2
Manufacture of products	EGY 2, GFR 4, IND 3, JPN 3, MEX 1, PAK 2, SWI 1, TRI 1	IND 3, SWI 1, THA 1, TRI 1
Mining of principal materials or alternative ores	GFR 4, MEX 1, PER 1	
Process control and automation	CPR 2, MEX 1, POL 3	BUL 1, GFR 4, POL 3
Recycling and recovery operations	AUS 2, BUL 1, CPR 2, COS 1, GFR 1, GFR 2, GFR 4, HUN 3, IND 3, JPN 4, MEX 1, NZE 1, SWE 1	AUS 2, BRA 4, EGY 2, GFR 1, GFR 4, HUN 3, INS 1

ACTIVITY INDEX

LEAD (Contd.)	Ongoing projects	Anticipated projects
Refining	AUS 2, CAN 1, FIN 1, GFR 1, GFR 4, HUN 3, IND 3, JPN 5, MEX 1, SWE 1, SWI 1, THA 2	AUS 2, BRA 4, CAN 1, FIN 1, GFR 1, HUN 3, SWI 1
Quality control and instrumentation	AUL 1, CPR 2, HUN 1, MEX 1, POL 3, POL 4, THA 2	BEL 3, BUL 1, CHI 5, GFR 4, POL 3, POL 4
Smelting	AUS 2, BEL 3, CAN 1, EGY 2, FIN 1, GFR 1, GFR 4, HUN 3, IND 3, JPN 5, MEX 1, SWE 1	AUS 2, CAN 1, FIN 1, GFR 1, GFR 4, HUN 3
Standard technologies	AUS 2, BUL 1, CHI 5, GFR 4, HUN 3, INS 1, KEN 1, MEX 1, POL 4, SWI 1	AUS 2, CHI 5, CPR 2, HUN 3, KEN 1, SWI 1
<u>Other activities</u>		
Metallurgy	BUL 1, JPN 4	BUL 1
Treatment	BUL 1	BUL 1
Equipment	BUL 1	BUL 1
Other fields of activities not explicitly mentioned (technology related)	CPR 2	CPR 2
Plating		GFR 2
International markets	GFR 3	
Information service	GFR 5	
Mineralization	GRE 1	
Hydrometallurgy	JPN 4	
IMP specifications	POL 3	POL 3
New developments	POL 4	POL 4
Technology (not explicitly mentioned)	SWI 1	SWI 1

ACTIVITY INDEX

NICKEL	Ongoing projects	Anticipated projects
Alloying	AUS 2, BEL 2, CPR 2, CPR 3, GFR 1, HUN 1, HUN 3, IND 1, IND 2, ISR 1, JPN 2, JPN 3, MEX 1, PAK 1, POL 4, SPA 1, THA 1, YUG 1	BEL 2, GFR 1, HUN 3, IND 1, JPN 2, POL 4, THA 1, YUG 1
Alternative technologies	AUL 4, AUS 2, BEL 2, BEL 3, CPR 2, CPR 3, EGY 2, HUN 3, JPN 3, MEX 1, SWE 1, SWI 1, UK 5	AUS 2, BEL 2, EGY 2, HUN 3, SWI 1
Auxiliary utilities for processing	CPR 3, MEX 1, THA 2	
Beneficiation of ores	ARG 1, CPR 2, FIN 1, JPN 5, MEX 1, THA 2	CPR 2, FIN 1, JPN 5
Economics	CPR 2, SWI 1	SWI 1
Energy	AUS 2, CPR 2, MEX 1, UK 3	AUS 2, COL 1
Environmental control	AUS 2, BRA 3, CPR 2, MEX 1, POL 3, THA 2	BRA 3, POL 3
Exploration of deposits	AUL 1, AUL 2, ROK 1, MAL 1, MEX 1, MOR 2, POL 2, THA 2	ROK 1, POL 2
Main utilities for processing	AUS 2, CPR 2, CPR 3, MEX 1	AUS 2
Manpower and safety	MEX 1	CPR 2
Manufacture of products	CPR 2, CPR 3, JPN 3, ROK 2, MEX 1, PHI 1, SWI 1, UK 4	IND 2, SWI 1, THA 1
Mining of principal materials or alternative ores	MEX 1	
Process control and automation	CPR 2, MEX 1, POL 3, UK 3	POL 3
Recycling and recovery operations	AUS 2, CPR 2, GFR 1, GFR 2, GFR 4, HUN 3, INS 2, MEX 1, NZE 1, SWE 1, UK 4	GFR 1, HUN 1, HUN 3

ACTIVITY INDEX

NICKEL (Contd.)	Ongoing projects	Anticipated projects
Refining	AUS 2, CPR 2, CPR 3, FIN 1, GFR 1, GFR 4, HUN 3, MEX 1, SWE 1, SWI 1, THA 2	FIN 1, GFR 1, HUN 3, IND 2, SWI 1
Quality control and instrumentation	CPR 2, CPR 3, MEX 1, POL 3, POL 4, THA 2, UK 3	BEL 3, POL 3, POL 4
Smelting	AUS 2, CPR 2, CPR 3, FIN 1, GFR 1, GFR 4, HUN 3, MEX 1, SWE 1	AUS 2, FIN 1, GFR 1, HUN 3
Standard technologies	AUS 2, BRA 2, CHI 5, CPR 2, ECU 1, GFR 4, HUN 3, MEX 1, POL 4, SWI 1	AUS 2, CHI 5, CPR 2, HUN 3, SWI 1
<u>Other activities</u>		
Other fields of activities not explicitly mentioned (management related)	CPR 2	CPR 2
International markets	GFR 3	
Information service	GFR 5	
Structural materials, deformation	JPN 1	
Corrosion, fatigue	JPN 3	
Metallurgy	JPN 1	
Nuclear fuel metallurgy	JPN 4	
IMP specification	POL 3	POL 3
New developments	POL 4	POL 4
Welding	SPA 1	
Corrosion, offshore structures	UK 3	
Technology (other technologies not explicitly mentioned)	SWI 1	SWI 1
Hydrometallurgy		GFR 2
Electroplating	PHI 1	

ACTIVITY INDEX

TIN	Ongoing projects	Anticipated projects
Alloying	INT 2, GFR 1, JPN 3, MEX 1, PAK 1, POL 4, SPA 1, THA 1	AUS 2, GFR 1, INS 2, POL 4, THA 1
Alternative technologies	INT 2, AUS 2, BEL 3, EGY 2, GFR 4, HUN 3, MEX 1, SWE 1, SWE 2, SWI 1, UK 5	AUS 2, EGY 2, GFR 4, HUN 3, SWI 1
Auxiliary utilities for processing	GFR 4, KEN 1, MEX 1, THA 2	KEN 1
Beneficiation of ores	BRA 2, CPR 2, EGY 2, GFR 4, JPN 5, MEX 1, POL 2, POR 2, THA 2	CPR 2, JPN 5, POL 2
Economics	CPR 2, GFR 4, SWE 2, SWI 1	SWI 1
Energy	AUS 2, CPR 2, MEX 1, UK 3	AUS 2
Environmental control	CPR 2, GFR 4, MEX 1, POL 3, THA 2	AUS 2, GFR 4, POL 3
Exploration of deposits	AUL 2, GFR 4, ROK 1, MAL 1, MEX 1, PER 1, POL 2, THA 2	ROK 1, MAL 1, POL 2, THA 2
Main utilities for processing	AUS 2, CPR 2, GFR 4, KEN 1, MEX 1	AUS 2, KEN 1
Manpower and safety	MEX 1	CPR 2
Manufacture of products	INT 2, GFR 4, JPN 3, MEX 1, SWI 1	SWI 1, THA 1
Mining of principal materials or alternative ores	GFR 4, INS 1, MEX 1	
Process control and automation	CPR 2, GFR 4, MEX 1, POL 3	GFR 4, POL 3
Recycling and recovery operations	CPR 2, EGY 2, GFR 1, GFR 2, GFR 4, HUN 3, MEX 1, NZE 1, SWE 1	AUS 2, GFR 1, GFR 4, HUN 3, JPN 5
Refining	GFR 1, GFR 2, GFR 4, HUN 3, MEX 1, SWE 1, SWI 1, THA 2	AUS 2, GFR 1, HUN 3, SWI 1

ACTIVITY INDEX

TIN (Contd.)	Ongoing projects	Anticipated projects
Quality control and instrumentation	AUL 1, CPR 2, MEX 1, POL 3, POL 4, THA 2	BEL 3, GFR 4, POL 3, POL 4
Smelting	AUS 2, GFR 1, GFR 4, HUN 3, MEX 1, SWE 1, SWE 2	AUS 2, GFR 1, GFR 4, HUN 3
Standard technologies	INT 2, AUS 2, GFR 4, HUN 3, KEN 1, MEX 1, POL 4, SWI 1	AUS 2, CPR 2, HUN 3, KEN 1, SWI 1
<u>Other activities</u>		
Other fields of activities not explicitly mentioned (management related)	CPR 2	CPR 2
International markets	GFR 3	
Information service	GFR 5	
Metallurgy	JPN 4	
IMP specifications	POL 3	POL 3
New developments	POL 4	POL 4
Technology (other technologies not explicitly mentioned)	SWI 1	SWI 1



ACTIVITY INDEX

ZINC	Ongoing projects	Anticipated projects
Alloying	AUS 2, BEL 2, BRA 1, GFR 1, HUN 3, JPN 2, MEX 1, PAK 1, POL 4, SPA 1, THA 1	AUS 2, BEL 2, CHI 4, GFR 1, HUN 3, IND 1, POL 4, THA 1
Alternative technologies	AUS 2, BEL 2, BEL 3, BUL 1, CAN 1, EGY 2, HUN 3, JPN 3, MEX 1, SWE 1, SWI 1, UK 5	AUS 2, BEL 2, BUL 1, CAN 1, CHI 4, EGY 2, GFR 4, HUN 3, SWI 1
Auxiliary utilities for processing	GFR 4, KEN 1, MEX 1, THA 2	KEN 1
Beneficiation of ores	BRA 2, CPR 2, FIN 1, GFR 4, GRE 1, INS 1, ISR 3, JPN 5, MEX 1, PER 1, POL 2, POR 2, SPA 1, THA 2	CPR 2, FIN 1, GRE 1, INS 2, JPN 5, POL 2
Economics	CPR 2, SWE 2, SWI 1	SWI 1
Energy	AUS 2, CPR 2, MEX 1, UK 3	AUS 2
Environmental control	AUS 2, CPR 2, JPN 4, MEX 1, POL 3, THA 2	AUS 2, GFR 4, POL 3
Exploration of deposits	AUL 2, AUL 3, GFR 4, GRE 1, JPN 5, ROK 1, MAL 1, MEX 1, PER 1, POL 2, THA 2	AUL 3, CHI 4, GRE 1, ROK 1, MAL 1, POL 2
Main utilities for processing	AUS 2, BUL 1, CPR 2, GFR 4, KEN 1, MEX 1	AUS 2, AUT 2, KEN 1
Manpower and safety	MEX 1	CPR 2
Manufacture of products	FRA 1, GFR 4, IND 2, JPN 3, MEX 1, PAK 2, PHI 1, SWI 1, TRI 1	SWI 1, THA 1, TRI 1
Mining of principal materials or alternative ores	GFR 4, MEX 1, PER 1	
Process control and automation	AUL 4, CPR 2, MEX 1, POL 3	AUL 4, BUL 1, GFR 4, POL 3
Recycling and recovery operations	AUS 2, BUL 1, CPR 2, COL 1, COS 1, ECU 1, GFR 1, GFR 2, GFR 4, HUN 3, JPN 3, JPN 4, MEX 1, NZE 1, SWE 1	AUS 2, GFR 1, GFR 4, HUN 3

ACTIVITY INDEX

ZINC (Contd.)	Ongoing projects	Anticipated projects
Refining	AUS 2, CAN 1, COS 1, FIN 1, GFR 1, GFR 4, HUN 3, JPN 5, MEX 1, SPA 1, SWE 1, SWI 1, THA 2	AUS 2, BRA 4, CAN 1, CHI 4, FIN 1, GFR 1, HUN 3, INS 2, JPN 5, SWI 1
Quality control and instrumentation	AUL 1, BEL 1, CPR 2, MEX 1, POL 3, POL 4, THA 2, TRI 1	BEL 3, BUL 1, GFR 4, POL 3, POL 4
Smelting	AUS 2, CAN 1, GFR 1, GFR 4, HUN 3, JPN 3, JPN 5, MEX 1, SWE 1	AUS 2, CAN 1, CHI 4, GFR 1, GFR 4, HUN 3
Standard technologies	AUS 2, BUL 1, GFR 4, HUN 3, INS 1, KEN 1, MEX 1, PAK 1, POL 4, SWI 1	AUS 2, CHI 5, CPR 2, HUN 3, KEN 1, PAK 1, SWI 1
<u>Other activities</u>		
Corrosion	POR 2	BEL 1
Metallurgy	BUL 1, JPN 4	BUL 1
Treatment	BUL 1	BUL 1
Equipment	BUL 1	BUL 1
Other fields of activities not explicitly mentioned (management related)	CPR 2	CPR 2
Plating		GFR 2
Hydrometallurgy	JPN 4	GFR 2
International markets	GFR 3	
Information service	GFR 5	
Mineralization	GRE 1	
High temperature chemistry	JPN 4	
IMP specifications	POL 3	POL 3
New developments	POL 4	POL 4
Technology (other technologies not explicitly mentioned)	SWI 1	SWI 1
Electroplating	PHI 1	

TECHNICAL CO-OPERATION INDEX\*

Technical Co-operation - Given					Technical Co-operation - Requested			
INT 1					INT 1			
INT 2								
ARG 1	COL 1	INS 1	PHI 1	USA 1	ARG 1	EGY 1	NZE 1	YUG 1
	COL 2			USA 3		EGY 2		
AUL 1		ISR 1	POL 1	USA 4	AUL 1	EGY 3	PAK 1	
AUL 2	COS 1	ISR 2	POL 2				PAK 2	
AUL 3		ISR 3	POL 3	YUG 1	BEL 1	HUN 1		
AUL 4	ECU 1		POL 4			HUN 3	PER 1	
		JAM 1			BRA 1			
AUS 1	EGY 1		POR 1		BRA 2	IND 1	PHI 1	
AUS 2	EGY 2	JPN 3	POR 2		BRA 4	IND 3		
	EGY 3	JPN 4					POL 1	
BEL 1		JPN 5	ROK 1		BUL 1	INS 1		
BEL 2	FIN 1					INS 2	POR 1	
BEL 3	FIN 2	KEN 1	SPA 1		CHI 1		POR 2	
					CHI 2	IRE 1		
BRA 1	FRA 1	MAL 1	SWE 1		CHI 3		ROK 2	
BRA 2	FRA 2		SWE 2		CHI 4	ISR 1		
BRA 3	FRA 3	MEX 1	SWE 3		CHI 5	ISR 3	SEN 1	
BRA 4								
	GFR 1	MOR 1	SWI 1		CPR 1	JAM 1	THA 1	
BUL 1	GFR 2	MOR 2			CPR 2		THA 2	
	GFR 4		THA 1		CPR 3	JPN 5		
CAN 1	GFR 5	NZE 1			CPR 4		TRI 1	
			TRI 1			KEN 1		
CHI 1	GRE 1	NOR 1			COL 1		TUR 1	
CHI 2			TUR 1		COL 2	MAL 1		
CHI 4	HUN 1	PAK 1					UK 1	
CHI 5	HUN 2	PAK 2	UK 2		COS 1	MEX 1		
	HUN 3		UK 3				URT 1	
CPR 1		PER 1	UK 4		ECU 1	MOR 1		
CPR 2	IND 1		UK 5			MOR 2	USA 1	
CPR 3	IND 2						USA 3	
CPR 4	IND 3							

\* For more detailed information see entries 12. and 13. of the respective R&D institutes.

1. NAME : INTERNATIONAL COPPER RESEARCH ASSOCIATION, INC.

2. ADDRESS : INCRA European Office, Brosnan House,  
 : Darkes Lane,  
 : POTTERS BAR. HERTS. EN6 1BW,  
 : United Kingdom

3. TELEPHONE : (0707) 44577  
 TELEX : 27711  
 CABLE : INCRA POTTERS BAR

4. DIRECTOR : Dr. W.H. Drescher  
 :

5. CONTACT : B.B. Moreton  
 PERSON(S) :

6. STAFF: 5

7. BUDGET / : US\$3 Million. YEAR : 1985  
 SOURCE :  
 OF FUNDS : No information provided.

8. RELATIONSHIP : INCRA members are both private and  
 WITH OTHER : government owned mining, smelting  
 ORGANIZATIONS : and refining companies representing  
 the copper mining industry worldwide.

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying		x					1. Corrosion resistant, rapidly solidified copper alloys.	x	
							2. Improved, electrical H. conductivity alloys.	x	
							3. Bactericidal properties of copper and copper alloys.	x	
Alternative technologies		x					1. Laser welding and thin walled copper tube.	x	
							2. Alternative manufacturing routes for brass fittings.	x	
Manufacture of products		x					1. Manufacture and design of copper brass automotive radiators.	x	
							2. Weld fabrication of copper alloys for desalination, ship hull and offshore industry equipment.	x	

9. (Contd.) ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Manufacture of products (Contd.)							3. Electrical insulation coatings for copper.	x	
							4. Cast-to-size copper alloy tools for plastic moulds.	x	
Standard technologies Applications	x	x					5. Agrochemicals - copper formulations.	x	
							1. Property and environmental data.	x	
							1. Exploratory research/applications intelligence.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Manufacture of products		x					1. Copper/brass automotive radiators. 2. Copper alloy sheathing systems in marine industries. 3. Cast-to-size copper alloy tooling for plastic bodied cars.	x	
Applications, technology transfer	x						4. New agro-chem/micro-nutrient formulations. 1. Technology transfer/appropriate technology for developing countries. 2. Exploratory research. 3. Applications intelligence.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 1)																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn

12. TECHNICAL CO-OPERATION - GIVEN

FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING	
							Availability of staff as consultants or experts for UNIDO field assignments	
							Availability of staff as consultants or experts for UNIDO field assignments	: Yes
							Training program available for own nationals	: No
							Training program available for other nationals	: No
							Training languages	: -
							Duration	: -

13. TECHNICAL CO-OPERATION - REQUESTED

FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Manufacture of products Application, technology transfer							x	x										
Languages : English												Duration : 12 months.						
Assistance obtained in the past : FAO, WHO, UNIDO.																		

## 14. DOCUMENTS

: Availability of brochures, annual report and documents.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	None; all INCRA R&D contracted out to industrial, governmental and university research laboratories (Table 11).



1. NAME : INTERNATIONAL TIN RESEARCH INSTITUTE

2. ADDRESS : Kingston Lane,  
: Uxbridge,  
: MIDDLESEX. UB8 3PJ,  
: United Kingdom

3. TELEPHONE : (0895) 72406  
  
TELEX : No information provided.  
CABLE : TINSEARCH UXBRIDGE

4. DIRECTOR : Dr. B.T.K. Barry  
:

5. CONTACT : Dr. B.T.K. Barry  
PERSON(S) :

6. STAFF: 60

7. BUDGET / : Not made public. YEAR : 1985  
SOURCE : Governments of Indonesia, Malaysia,  
OF FUNDS : Nigeria, Thailand and Zaire.

8. RELATIONSHIP : Research Unit linked to Association of  
WITH OTHER : Tin Producing Countries (an Inter-  
ORGANIZATIONS : governmental Organization).

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE 1)	R	T
Alloying					x			x	
Alternative technologies					x			x	
Manufacture of products					x			x	
Standard technologies					x			x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Please see note 1)									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 2)																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Standard technologies					x		Availability of staff as consultants or experts : No for UNIDO field assignments  Training program available for own nationals : See 3) Training program available for other nationals : See 4)  Training languages : English  Duration : 3 weeks.

13. TECHNICAL CO-OPERATION - REQUESTED 5)																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Languages : - Assistance obtained in the past : None.												Duration : -						

## 14. DOCUMENTS

: Availability of annual report.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	All projects are aimed at developing new applications for tin either in metallic materials or as chemical compounds. These projects are too numerous to list here (Tables 9 & 10).
2)	No availability of pilot installation/equipment (Table 11).
3)	No information provided (Table 12).
4)	From the funding countries only (Table 12).
5)	No technical co-operation requested (Table 13).

1. NAME : INTI - CENTRO DE INVESTIGACION PARA LAS INDUSTRIAS MINERALES

2. ADDRESS : Parque Tecnológico, Miguelete, Avda. Gral. Pazentre  
: Albarelos y Constituyentes, Casilla de Correo 157,  
: (1650) SAN MARTIN,  
: Argentina

3. TELEPHONE : 755-6161  
  
TELEX : 021859 INTIAR  
CABLE : No information provided.

4. DIRECTOR : Dr. Adolfo Longo  
:

5. CONTACT : Dr. Adolfo Longo  
PERSON(S) :

6. STAFF: 14

7. BUDGET / : US\$ 500,000.- YEAR : 1985  
SOURCE OF: No information provided.  
FUNDS :

8. RELATIONSHIP : Banco Nacional de Desarrollo,  
WITH OTHER : Direccion General Fabricaciones  
ORGANIZATIONS : Militares.

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Beneficiation of ores				x			1. Beneficiation studies of ultra basic nickel-cobalt bearing rocks.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Beneficiation of ores				9							9							

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Beneficiation of ores				x			Availability of staff as consultants or experts : No for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : No  Training languages : Spanish  Duration : 6 months.

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Beneficiation of ores				x						x						x		
Exploration of deposits				x						x						x		
Manufacture of products				x						x						x		
Main utilities for processing				x						x						x		
Mining of principal materials or alternative ores				x						x						x		
Recycling and recovery operations				x						x						x		
Refining				x						x						x		
Smelting				x						x						x		
Standard technologies				x						x						x		
Languages : Spanish, English Assistance obtained in the past : UNIDO.												Duration : 6 months.						

## 14. DOCUMENTS

: No information provided.

15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "



1. NAME : CSIRO, DIVISION OF MINERALS AND GEOCHEMISTRY

2. ADDRESS : Underwood Avenue, Floreat Park,  
: Private Bag PO,  
: WEMBLEY, WA 6014,  
: Australia

3. TELEPHONE : 09 387 4233  
  
TELEX : AA92178  
CABLE : No information provided.

4. DIRECTOR : Dr. D F A Koch, Chief of  
: Division.

5. CONTACT : Dr. D F A Koch  
PERSON(S) :

6. STAFF: 39

7. BUDGET / : US\$4.500.000.- YEAR : 1985  
SOURCE :  
CF FUNDS : No information provided.

8. RELATIONSHIP : Part of Institute of Energy and Earth  
WITH OTHER : Resources within the Commonwealth  
ORGANIZATIONS : Scientific and Industrial Research  
Organization (CSIRO).

9. ON-GOING PROJECTS 1)									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Exploration of deposits				x			1. Nickel deposits in the Agnew Wiluna Belt.	x	
Refining	x						1. Crystal modification in industrial process.	x	
							2. Caustic extraction and neutralisation of red mud in the alumina industry.	x	
Environmental control	x						1. Caustic extraction and neutralisation of red mud in the alumina industry.	x	
Quality control and instrumentation		x	x		x	x	1. Development of field instruments for highly sensitive chemical analysis.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 2)																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
							Beneficiation of ores
Exploration of deposits	x	x	x	x	x	x	
Refining	x	x	x	x	x	x	
Environmental control	x	x	x	x	x	x	Training program available for own nationals : See 3) Training program available for other nationals : Yes Training languages : English Duration : 1 - 3 years.

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Auxiliary utilities for processing							x	x	x	x	x	x						
Beneficiation of ores							x	x	x	x	x	x						
Exploration of deposits							x	x	x	x	x	x						
Main utilities for processing							x	x	x	x	x	x						
Refining							x	x	x	x	x	x						
Smelting							x	x	x	x	x	x						
Process control and automation							x	x	x	x	x	x						
Languages : English												Duration : Short- and long-						
Assistance obtained in the past : Visiting scientists from various countries (bilateral co-operation).												term up to two years.						

## 14. DOCUMENTS

: Availability of annual report.

15.

NOTES

CODE	DESCRIPTION	
R	Research	(Tables 9 and 10)
T	Training	"
1	For Technical Co-operation	(Table 11 )
2	For Technical Assistance	"
3	For Own Use	"
9	ALL of above (1, 2, and 3)	"
Al	Aluminium	(Tables 9, 10, 11, 12, and 13)
Cu	Copper	"
Pb	Lead	"
Ni	Nickel	"
Sn	Tin	"
Zn	Zinc	"
1)	Additional projects concerning other non-ferrous metals (Table 9):	

  

FIELD OF ACTIVITY	PROJECT TITLE	R	T
1.1) Exploration of deposits	a) Platinum metals in ultramafic rocks.	x	
	b) Paleogeographic and stratigraphic controls of detrital gold and platinum mineralization.	x	
	c) Development and application of laterite geochemistry for detecting mineral deposits in deeply weathered terrain.	x	
	d) Dispersion of gold platinoids and associated elements in weathering profiles of ore deposits in the Yilgarn Block, WA.	x	
	e) Application of remote sensing to mineral exploration in weathered terrain of the Yilgarn Block.	x	
1.2) Beneficiation of ores	a) Selective recovery of fine particles.	x	
	b) Gold extraction and recovery.	x	
1.3) Refining	a) Extraction and separation of rare earths.	x	
	b) Ceramic products.	x	

CODE	DESCRIPTION
2)	No availability of pilot installation/equipment (Table 11).
3)	Supervision of limited number projects for Doctory of Philosophy Degree in association with Universities in West Australia (Table 12).

1. NAME : CSIRO - DIVISION OF MINERAL PHYSICS AND MINERALOGY

2. ADDRESS : P.O. Box 136,  
: North Ryde 2113,  
: SYDNEY,  
: Australia

3. TELEPHONE : (02) 887 8666  
  
TELEX : 25817  
CABLE : Facsimile: (02) 887-8909

4. DIRECTOR : Dr. Brian Embleton  
:

5. CONTACT : Dr. Brian Embleton  
PERSON(S) :

6. STAFF: 70

7. BUDGET / : US\$2.8 Million. YEAR : 1985  
SOURCE : Australian Government and Mineral  
OF FUNDS : Industry.

8. RELATIONSHIP : Division of the Commonwealth  
WITH OTHER : Scientific and Industrial Research  
ORGANIZATIONS : Organization.

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE 1)	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Exploration of deposits		x	x	x	x	x	1. Exploration for concealed deposits.	x	
							2. Exploration in weathered terrain.	x	
							3. Exploration techniques developments.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 2)																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn

12. TECHNICAL CO-OPERATION - GIVEN							STAFF AVAILABILITY AND TRAINING	
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn		
Exploration of deposits		x	x	x	x	x	Availability of staff as consultants or experts : Yes for UNIDO field assignments	
							Training program available for own nationals : Yes	
							Training program available for other nationals : Limited	
							Training languages : English	
							Duration : Variable.	

13. TECHNICAL CO-OPERATION - REQUESTED 3)																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Languages	: -																	
Assistance obtained in the past	: Exchange of scientists with People's Republic of China (bilateral co-operation).																	
	Duration : -																	



14. DOCUMENTS : No information provided.

15.

NOTES

CODE DESCRIPTION

R	Research	(Tables 9 and 10)
T	Training	"
1	For Technical Co-operation	(Table 11 )
2	For Technical Assistance	"
3	For Own Use	"
9	ALL of above (1, 2, and 3)	"
Al	Aluminium	(Tables 9, 10, 11, 12, and 13)
Cu	Copper	"
Pb	Lead	"
Ni	Nickel	"
Sn	Tin	"
Zn	Zinc	"
1)	Programme title (Table 9).	
2)	No availability of pilot installation/equipment (Table 11).	
3)	No technical co-operation requested (Table 13).	

1. NAME : SOUTH AUSTRALIAN DEPARTMENT OF MINES AND ENERGY

2. ADDRESS : P.O. Box 151,  
: Eastwood,  
: SOUTH AUSTRALIA 5063,  
: Australia

3. TELEPHONE : (08) 274 7500  
  
TELEX : AA 88692  
CABLE : FAX. (08) 272 7597

4. DIRECTOR : R.K.Johns  
:

5. CONTACT : Dr. C.D. Branch  
PERSON(S) :

6. STAFF: 112

7. BUDGET / : US\$12.4 Million. YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : State Government Department.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Exploration of deposits		x	x			x	1. Geological and geophysical mineral exploration.	x	
Environmental control		x					1. Environmental controls in mining operations.	x	
Manpower and safety		x					1. Safety in mining operations.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Exploration of deposits		x	x			x	1. Geological and geophysical mineral exploration.	x	
			x			x	1. Indonesian Aid Programme in mineral exploration (1987).		x
Environmental control		x					1. Environmental controls in mining operations.	x	
Manpower and safety		x					1. Safety in mining operations.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 1)																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn

12. TECHNICAL CO-OPERATION - GIVEN 2)							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Exploration of deposits		x	x			x	Availability of staff as consultants or experts : Yes for UNIDO field assignments
Environmental control		x					Training program available for own nationals : Yes
Manpower and safety		x					Training program available for other nationals : Yes
							Training languages : English
							Duration : Up to several months.

13. TECHNICAL CO-OPERATION - REQUESTED 3)																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Languages	: -																	
Assistance obtained in the past	: None.																	
	Duration : -																	

## 14. DOCUMENTS

: Availability of annual report.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No availability of pilot installation/equipment (Table 11).
2)	Previous projects have involved the countries: Indonesia, Korea, Pakistan, Saudi Arabia, Sri Lanka, Burma, Bangladesh, Oman, Algeria, Tanzania, China (Table 12).
3)	No technical co-operation requested (Table 13).

1. NAME : UNIVERSITY OF SYDNEY, DEPARTMENT OF CHEMICAL ENGINEERING

2. ADDRESS : Department of Chemical Engineering,  
: University of Sydney,  
: SYDNEY NSW,  
: Australia 2006

3. TELEPHONE : (02) 692 2354  
  
TELEX : 26169 UNISYD  
CABLE : See item 2 (address).

4. DIRECTOR : Prof. R.G.H. Prince  
:

5. CONTACT : Prof. R.G.H. Prince  
PERSON(S) :

6. STAFF: 13

7. BUDGET / : US\$650,000.- YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alternative technologies	x	x		x			1. Alternate non-bauxite sources of aluminium. 1. Use of sulphur dioxide in processing of copper and nickel materials.	x x	
Process control and automation						x	1. Simulation and control of zinc electrowinning.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Process control and automation	x						1. Simulation and on-line model control in the Bayer process.	x	
						x	1. On-line modelling in the zinc electrowinning process.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																			
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION						
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Alternative technologies		1		1															

12. TECHNICAL CO-OPERATION - GIVEN									
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING		
Alternative technologies	x	x	x	x	x	x	Availability of staff as consultants or experts : Yes for UNIDO field assignments		
Standard technologies	x	x	x	x	x	x	Training program available for own nationals : Yes		
Process control and automation 1)	x		x			x	Training program available for other nationals : Yes		
Quality control and instrumentation 1)	x		x			x	Training languages : English		
							Duration : 40 hours.		

13. TECHNICAL CO-OPERATION - REQUESTED 2)																			
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Languages	: -																		
Assistance obtained in the past	: None.																		
	Duration : -																		



## 14. DOCUMENTS

: Availability of brochures.

## 15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	A course on simulation and control (Table 12).
2)	No technical co-operation requested (Table 13).

1. NAME : AUSTRIA METALL AKTIENGESELLSCHAFT

2. ADDRESS :  
:  
: A-5282 BRAUNAU-RANSHOFEN  
: Austria

3. TELEPHONE : 07722/2341-0

TELEX : 27 745 MWRA  
CABLE : AUSTRIA METALL BRAUNAU AM  
INN

4. DIRECTOR : DDr. Robert Ehrlich  
:

5. CONTACT : Dipl.-Ing. Dr. Techn. Guntram  
PERSON(S) : Feurstein

6. STAFF: 6400

7. BUDGET / : US\$680.000.000.- YEAR : 1985  
SOURCE :  
OF FUNDS : See note 1).

8. RELATIONSHIP : See note 1).  
WITH OTHER :  
ORGANIZATIONS :

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying	x						1. Development of high duty alloys.	x	
Manufacture of products	x						1. Manufacture of primary aluminium rolled and extruded aluminium products and aluminium system products.	x	
Recycling and recovery operations	x						1. Dross recuperation.	x	
Standard technologies	x						1. Mould casting, forging.	x	
Quality control and instrumentation	x						1. Material testing methods design and calculation methods for aluminium structure.		x

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alternative technologies	x						1. Development of composite materials.	x	
Recycling and recovery operations	x						2. Investigation of different casting procedures.	x	
Standard technologies	x						1. Disposal of waste chemicals, direct aluminium recycling.	x	
Quality control and instrumentation	x						1. Development of new testing methods (ultra sonic).	x	
							1. Quality control methods.		x

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																			
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION						
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Alloying	3																		
Manufacture of products	9																		
Recycling and recovery operations	9						9						9						
Smelting	1,2																		
Standard technologies	9																		
Process control and automation	3						9												
Quality control and instrumentation	9						9												

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Process control and automation	x						Availability of staff as consultants or experts : No for UNIDO field assignments
Quality control and instrumentation	x						Training program available for own nationals : Yes Training program available for other nationals : Yes Training languages : German, English Duration : 4 weeks (approx.)

13. TECHNICAL CO-OPERATION - REQUESTED 2)																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Languages : - Assistance obtained in the past : None.												Duration : -						

## 14. DOCUMENTS

: Availability of brochures, annual report.

## 15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	Most important representative of the holding company of the nationalized industry of Austria in the field of aluminium and non-ferrous metals (Tables 7 and 8).
2)	No technical co-operation requested (Table 13).

1. NAME : MONTANUNIVERSITAET LEOBEN, INSTITUT FUER TECHNOLOGIE UND HUETTENKUNDE DER NICHEISENMETALLE 1)

2. ADDRESS : Franz-Josef-Str.18,  
:  
: A-8700 LEOBEN,  
: Austria

3. TELEPHONE : 03842-42555/485  
  
TELEX : 33322  
CABLE : No information provided.

4. DIRECTOR : Prof. Dipl.-Ing. Dr. Mont.  
: Peter Paschen

5. CONTACT : Prof. Dr. P. Paschen  
PERSON(S) :

6. STAFF: 7

7. BUDGET / : University Institute. YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSH. : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE 2)	R	T
Alloying	x	x	x	x		x		x	
Alternative technologies	x	x	x	x	x	x		x	
Main utilities for processing	x	x	x	x	x	x		x	
Recycling and recovery operations	x	x	x	x		x		x	
Refining	x	x	x	x		x		x	
Smelting	x	x	x	x	x	x		x	
Standard technologies	x	x	x	x	x	x		x	
Energy	x	x	x	x	x	x		x	
Environmental control	x	x	x	x		x		x	

10. ANTICIPATED PROJECTS

FIELDS OF ACTIVITY							PROJECT TITLE 3)	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying	x	x	x		x	x		x	
Alternative technologies	x	x	x	x	x	x		x	
Main utilities for processing	x	x	x	x	x	x		x	
Recycling and recovery operations	x	x	x		x	x		x	
Refining	x	x	x		x	x		x	
Smelting	x	x	x	x	x	x		x	
Standard technologies	x	x	x	x	x	x		x	
Energy	x	x	x	x	x	x		x	
Environmental control	x	x	x		x	x		x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 4)

PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
FIELDS OF ACTIVITY																		

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Alloying	x	x	x		x	x	Availability of staff as consultants or experts : Yes for UNIDO field assignments
Alternative technologies	x	x	x	x	x	x	
Main utilities for processing	x	x	x	x	x	x	Training program available for own nationals : Yes
Recycling and recovery operations	x	x	x		x	x	
Refining	x	x	x		x	x	Training program available for other nationals : Yes
Smelting	x	x	x	x	x	x	
Standard technologies	x	x	x	x	x	x	Training languages : English, French, German
Energy	x	x	x	x	x	x	
Environmental control	x	x	x		x	x	Duration : One to five days.

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
No information provided.																		
Languages	: No information provided.																	
Assistance obtained in the past	: No information provided.																	
												Duration : No information provided.						



14. DOCUMENTS : No information provided.

15. NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	Institute for Technololgy and Metallurgy of the Non-ferrous Metals (Table 1).
2)	No information provided (Table 9).
3)	No information provided (Table 10).
4)	No availability of pilot installation/equipment; only laboratory scale (Table 11).

1. NAME : CENTRE BELGE D'ETUDE DE LA CORROSION, CEBELCOR

2. ADDRESS : Ave. Paul Héger,  
: Grille 2,  
: B-1050 BRUXELLES,  
: Belgium

3. TELEPHONE : 322 6496396  
  
TELEX : 23069 UNILIB B  
CABLE : No information provided.

4. DIRECTOR : Antoine Pourbaix  
:

5. CONTACT : Antoine Pourbaix  
PERSON(S) :

6. STAFF: 5

7. BUDGET / : US\$300.000.- YEAR : 1985  
SOURCE : (Private Scientific Agencies).  
OF FUNDS :

8. RELATIONSHIP : Philippines (NSTA), China (University  
WITH OTHER : of Shandong), Peru, Brazil.  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Corrosion	x						1. Atmospheric corrosion of high-strength aluminium alloys.	x	
		x					1. Development of new stainless steels with less chromium and with Cu addition.	x	
Quality control and instrumentation		x					1. Training of a Peruvian University Professor.		x
						x	1. Setting-up of a corrosion laboratory in the Philippines.		x

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Corrosion	x					x	1. Anticorrosive paint for Zn-Al coated steel.	x	
Quality control and instrumentation		x					1. Quality control of copper tubes for tap water.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Corrosion	2	2				2	2	2				2	2	2				2
Quality control and instrumentation	1	1				1	1	1				1	1	1				1

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	A1	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
	Corrosion	x	x				

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	A1	Cu	Pb	Ni	Sn	Zn	A1	Cu	Pb	Ni	Sn	Zn	A1	Cu	Pb	Ni	Sn	Zn
Corrosion				x														
Languages : French, English Assistance obtained in the past : None.												Duration : One to three months.						

## 14. DOCUMENTS

: Availability of annual report.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No information provided (Table 12).

1. NAME : CENTRE DE RECHERCHES METALLURGIQUES

2. ADDRESS : 11, rue Ernest Solvay,  
:  
: B-4000 LIEGE,  
: Belgium

3. TELEPHONE : 041/527 050  
  
TELEX : 41202  
CABLE : No information provided.

4. DIRECTOR : A. Decker  
:

5. CONTACT : D. Coutsouradis  
PERSON(S) :

6. STAFF: 280

7. BUDGET / : US\$14.500.000.- YEAR : 1985  
SOURCE : Please see note 1)  
OF FUNDS :

8. RELATIONSHIP : None.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying	x	x		x		x	1. Study of properties and microstructures of various Al, Cu, Ni and Zn alloys.	x	
Alternative technologies	x			x		x	1. Processing (casting, rolling etc.) of Al, Ni or Zn alloys.	x	
				x			1. Coating techniques for nickel-based alloys.	x	
						x	1. Study of zinc-based coatings and process.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying	x	x		x		x	1. Study of properties and microstructures of various Al, Cu, Ni and Zn alloys.	x	
Alternative technologies	x			x		x	1. Processing (casting, rolling etc.) of Al, Ni or Zn alloys.	x	
				x			1. Coating techniques for nickel-based alloys.	x	
						x	1. Study of zinc-based coatings and processes.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alternative technologies						3												

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
No information provided.							Availability of staff as consultants or experts : Limited for UNIDO field assignments Training program available for own nationals : Yes Training program available for other nationals : Limited Training languages : No information provided. Duration : No information provided.

13. TECHNICAL CO-OPERATION - REQUESTED 2)																			
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Languages : - Assistance obtained in the past : Commission of European Communities; European Steel and Coal Community.													Duration : -						



## 14. DOCUMENTS

: Availability of brochures.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	60% Industry; 28% Belgian Government Subsidies (IRSIA); 17% CECA Subsidies; (85% Steel and 15% Non-ferrous and New Materials), (Table 7).
2)	No technical co-operation requested (Table 13).

1. NAME : UNIVERSITE LIBRE DE BRUXELLES, CENTRE DE RECHERCHES INDUSTRIELLES (CRI)

2. ADDRESS : CP 165,  
: 50, Avenue Roosevelt,  
: B-1050 BRUSSELS,  
: Belgium

3. TELEPHONE : 02/642 3010  
  
TELEX : 23069 UNILIB-B  
CABLE : No information provided.

4. DIRECTOR : Prof. René Winand  
:

5. CONTACT : Prof. René Winand  
PERSON(S) :

6. STAFF: 20  
See also 1)

7. BUDGET / : US\$1.5 Million, see 1). YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : Please see note 2)  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alternative technologies		x		x			1. High current density copper electrorefining.	x	
						x	1. Bright nickel plating without organic additives	x	
Refining			x		x		1. High current density zinc plating.	x	
		x					1. Lead-tin plating (alloys).		x
Smelting			x				1. Influence of organic additives on the structure of cathodes of electrorefined copper.		x
		x	x				1. Electric furnaces computer modelization, including experimental determination of viscosity, conductivity and other properties of slags.	x	
Standard technologies	x						1. Anodization (aluminium and titanium).		x

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alternative technologies	x						1. New method to refine aluminium scraps.	x	
Recycling and recovery operations	x						1. New method to refine aluminium scraps.	x	
Process control and automation		x					1. Sensors for the control of organic additives in copper electrorefining.	x	
Quality control and instrumentation	x	x	x	x	x	x	1. Non-ferrous metals in corrosion protection.		x

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alternative technologies		1,2				1,2		1,2				1,2		1,2				1,2
Refining	3	3																
Standard technologies							2	2				2						

12. TECHNICAL CO-OPERATION - GIVEN

FIELDS OF TRAINING PROGRAM	TECHNICAL CO-OPERATION - GIVEN						STAFF AVAILABILITY AND TRAINING
	Al	Cu	Pb	Ni	Sn	Zn	
Alternative technologies		x				x	Availability of staff as consultants or experts : See 3) for UNIDO field assignments
Quality control and instrumentation	x	x					Training program available for own nationals : Yes Training program available for other nationals : Yes Training languages : French, English Duration : 6 weeks to 3 months.

13. TECHNICAL CO-OPERATION - REQUESTED 4)

FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Language : - Assistance gained in the past : None.																		
Duration : -																		

## 14. DOCUMENTS

: Availability of brochures.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	It concerns the non-ferrous metals only (Table 6 & 7).
2)	AGCD (Belgian Administration for Development Co-operation); IRSIA; FNRS; Metallurgie Hoboken-Overpelt Vieille Montagne; Cockerill; Gécamines (Zaire), (Table 8).
3)	Yes, but for limited periods of time (Table 12).
4)	No technical co-operation requested (Table 13).

1. NAME : CEPED - CENTRO DE PESQUISAS E DESENVOLVIMENTO (RESEARCH AND DEVELOPMENT)

2. ADDRESS : Km "0" DA BA-512 Camacari,  
: CEP: 42.800,  
: BAHIA,  
: Brazil

3. TELEPHONE : 55-071-832-1949

TELEX : 071-7146  
CABLE : No information provided

4. DIRECTOR : Francisco José Fontes Lima  
:

5. CONTACT : Ariosto Farias Jr.  
PERSON(S) :

6. STAFF: 160

7. BUDGET / : US\$13.000.000.- YEAR : 1986  
SOURCE : No information provided.  
OF FUNDS :

8. RELATIONSHIP : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying						x	1. Alloy study for coin fabrication.	x	
Beneficiation of ores		x					1. Beneficiation of Carajas copper ores.	x	
Environmental control		x					2. Biological leaching of copper ores. 1. Diagnose of environmental conditions in a copper mine and concentrator.	x	

10. ANTICIPATED PROJECTS

FIELDS OF ACTIVITY							PROJECT TITLE	R	T	
	Al	Cu	Pb	Ni	Sn	Zn				
Auxiliary utilities for processing		x					For project titles see notes 1) and 2).	x1)	x2)	
Beneficiation of ores		x							x2)	
Main utilities for processing		x							x1)	x2)
Refining		x							x1)	x2)
Smelting		x							x1)	x2)

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT

PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Beneficiation of ores		9												1,2				

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Beneficiation of ores Smelting		x x					Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : Portuguese, Spanish, English  Duration : 1 - 2 months

13. TECHNICAL CO-OPERATION - REQUESTED																			
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Beneficiation of ores (see note 3)		x						x						x					
Languages : Portuguese, Spanish, English Assistance obtained in the past : No information provided.												Duration : Two months.							



## 14. DOCUMENTS

: Availability of brochures, annual report.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	Prefeasibility and feasibility studies for a copper concentrator, a copper smelter, a tank house, a precious metals plant, sulfuric acid plant, oxygen plant, oxygen plant and wire bar plant (Table No.10).
2)	20,000 t/d of ore concentrator plant; converter aisle for 200,000 t/y of blister copper (CEPED/OUTOKUMPU/BIPROMET); tank house (CEPED/OUTOKUMPU/MECHIN); flash furnace utilities; effluent treatment; nickel sulfate plant; fire refining for copper anodes; precious metals plant (pyro- and hydrometallurgy) (Table No.10)
3)	Biological leaching (Table No.13).

1. NAME : CETEM - CENTRO DE TECNOLOGIA MINERAL

2. ADDRESS : Rua 4 - Quadra "D" - Ilha do Fundao,  
: CEP 21.910,  
: RIO DE JANEIRO,  
: Brazil

3. TELEPHONE : (021) 230.7256,  
260.7222  
TELEX : (021) 22761  
CABLE : No information provided.

4. DIRECTOR : Profa Hedda Vargas O. Figueira  
:

5. CONTACT : Celso de O. Santos  
PERSON(S) :

6. STAFF: 149

7. BUDGET / : US\$2.000.000.- YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : Ministério das Minas e Energia through  
WITH OTHER : Dep. Nac. da Prod. Mineral.  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Beneficiation of ores		x	x			x	1. Pilot plants studies of a copper, lead and zinc ore treatment.	x	
Refining		x			x		1. Briquetting of tin ore fines. 1. The use of pulsating currents on the electro-refining of copper.	x	x
Standard technologies		x		x			1. Pilot and lab scale studies of copper and nickel minerals bulk flotation.	x	

10. ANTICIPATED PROJECTS											
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE			R	T
No information provided.											

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alternative technologies		1,2	1,2			1,2		1	1			1		3				3
Beneficiation of ores	1,2	1,2	1,2	1,2		1,2	1	1	1	1		1		3	3	3	3	3
Recycling and recovery operations		1,2	1,2					1	1									
Refining		1,2	1,2			1,2		1	1			1		3				3
Standard technologies	1,2	1,2	1,2	1,2	1,2	1,2	1	1	1	1	1	1		3		3		3

12. TECHNICAL CO-OPERATION - GIVEN							STAFF AVAILABILITY AND TRAINING
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	
Beneficiation of ores	x	x	x	x	x	x	Availability of staff as consultants or experts : Yes for UNIDO field assignments
							Training program available for own nationals : Yes
							Training program available for other nationals : Yes
							Training languages : Portuguese, French, English
							Duration : 1 to 52 weeks.

13. TECHNICAL CO-OPERATION - REQUESTED																			
FIELDS OF TRAINING REQUIRED 1)	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Languages : English, Portuguese												Duration : No information provided.							
Assistance obtained in the past : Japan, Canada, Germany.																			

14. DOCUMENTS

: Availability of brochures.

15.

NOTES

CODE	DESCRIPTION			
R	Research	(Tables 9 and 10)		
T	Training	"		
1	For Technical Co-operation	(Table 11		)
2	For Technical Assistance	"		
3	For Own Use	"		
9	ALL of above (1, 2, and 3)	"		
Al	Aluminium	(Tables 9, 10, 11, 12, and 13)		
Cu	Copper	"		
Pb	Lead	"		
Ni	Nickel	"		
Sn	Tin	"		
Zn	Zinc	"		
1)	FIELDS	OVERSEAS TRAINING FOR STAFF	EXPERTS FROM OVERSEAS	EQUIPMENT FROM OVERSEAS
	Biotechnology for minerals	x	x	x
Above note 1) refers to Table 13.				

1. NAME : CTP - CENTRO DE TECNOLOGIA PROMON

2. ADDRESS : Praia do Flamengo 154,  
: CEP: 22210,  
: RIO DE JANEIRO-RJ,  
: Brazil

3. TELEPHONE : (021) 205-0393  
  
TELEX : (021) 23338 PROM BR  
CABLE : No information provided.

4. DIRECTOR : Carlos Costa Ribeiro  
:

5. CONTACT : Carlos Costa Ribeiro  
PERSON(S) :

6. STAFF: 10

7. BUDGET / : US\$500.000.- YEAR : 1985  
SOURCE : 20% from sponsor (Promon Tecnologia) and  
OF FUNDS : 80% from research contracts with  
industry private and state owned.

8. RELATIONSHIP : Owned by Promon Tecnologia, Private  
WITH OTHER : Enterprise.  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Environmental control		x		x			1. Environmental impact assessment and pollution control systems design for a nickel, cobalt and copper mining refining and smelting complex in Minas Gerais, Brazil. See note 1).	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Environmental control		x		x			1. Evaluation of the extent of bio-lixiviation effects on copper, nickel and cobalt present in tailing piles upon the quality of water bodies near a mining, refining and smelting installation.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Environmental control 2)	2	2	2	2	2	2							2	2	2	2	2	2

12. TECHNICAL CO-OPERATION - GIVEN									
FIELDS OF TRAINING PROGRAM	A1	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING		
								Availability of staff as consultants or experts for UNIDO field assignments	:
							Training program available for own nationals	:	No
							Training program available for other nationals	:	No
							Training languages	:	-
							Duration	:	-

13. TECHNICAL CO-OPERATION - REQUESTED 3)																							
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS										
	A1	Cu	Pb	Ni	Sn	Zn	A1	Cu	Pb	Ni	Sn	Zn	A1	Cu	Pb	Ni	Sn	Zn					
Languages												Duration :						-					
Assistance obtained in the past												:						Several private consultants or association with foreign engineering companies (bilateral co-operation).					



## 14. DOCUMENTS

: Availability of brochures, annual report, list of projects.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	Additional projects in mining and aluminium undertaken by CTP mother company (Promon Tecnologia). In some of these projects staff has had some participation, especially, in environmental control technology. More information available in the documents of the company (Table 9).
2)	Pilot installations for testing of biological lixivation of metals from ores and mining tailings, supporting equipment for environmental analytical chemistry (Table 11).
3)	No technical co-operation requested (Table 13).

1. NAME : IPT - INSTITUTO DE PESQUISAS TECNOLOGICAS DO ESTADO DE SAO PAULO S/A

2. ADDRESS : Cidade Universitaria "Armando de Salles Oliveira",  
: Caixa Postal 7141,  
: 01000 - SAO PAULO-SP,  
: Brazil

3. TELEPHONE : (011) 268-2211  
  
TELEX : 11-38119-INPT-BR  
CABLE : TECNINST

4. DIRECTOR : Henrique Silveira de Almeida  
:

5. CONTACT : Amantino Ramos de Freitas  
PERSON(S) :

6. STAFF: 2600

7. BUDGET / : US\$60.000.- YEAR : 1986  
SOURCE : No information provided.  
OF FUNDS :

8. RELATIONSHIP : Several organizations private and  
WITH OTHER : governmental-domestic and foreign.  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Smelting		x					1. Production of copper by the "Segregatio Process" applied to Brazilian complex oxidized copper ores. See note 1).	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Beneficiation of ores			x				1. Beneficiation of medium and low-grade oxidized lead ores, with medium concentrations of silver from the Ribeira de Iguape Valley District, S.E. State of Sao Paulo.		x
Recycling and recovery operations			x				1. Pollution-free production of lead from battery-fabricating plants scrap.	x	
Refining			x				1. Treatment of high-copper drosses, containing lead, silver and gold from lead refining operations.	x	
						x	1 Recovery of zinc from galvanizer's drosses and iron-rich crusts, by vacuum distillation.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Beneficiation of ores									1									
Recycling and recovery operations			2												1			
Refining			1,2			2									2			
Smelting		1												1				

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Smelting		x					Availability of staff as consultants or experts : No for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : Portuguese, Spanish, English  Duration : Two months (Max.)

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Beneficiation of ores									x						x2)			
Languages : Spanish, English Assistance obtained in the past : Japan International Co-operation Agency - JICA (On ore dressing and precious metal assays).												Duration : Four months.						

## 14. DOCUMENTS

: Availability of brochures.

## 15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	Other projects related to other mineral raw materials and metals are being carried out too (Table 9).
2)	High-temperature crucible-type electric furnace; high-vacuum mechanical pumps; several miscellaneous items (Table 13).

1. NAME : HIGHER INSTITUTE OF CHEMICAL TECHNOLOGY

2. ADDRESS : Darvenitza 56,  
: Str. Kl. Ochridski 8,  
: 1156 SOFIA,  
: Bulgaria

3. TELEPHONE : 624 141  
  
TELEX : No information provided.  
CABLE : Darvenitza 56, Str. Kl.  
Ochridski 8, 1156 Sofia.

4. DIRECTOR : Prof. Dr. S. Raicheva  
:

5. CONTACT : Dr. Ing. D. Tchavdarova  
PERSON(S) :

6. STAFF: 20

7. BUDGET / : No information provided. YEAR : 1985  
SOURCE :  
OF FUNDS :

8. RELATIONSHIP : Corporation "Non-ferrous Metallurgy",  
WITH OTHER : Str. Stoyan Lepoev, 85; 1156 Sofia.  
ORGANIZATIONS :

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alteranative technologies		x	x			x	1. Hydrometallurgical processing of complex sulphide raw materials.	x	
Main utilities for processing		x	x			x	1. Flash smelting furnace, blast furnace, roasting furnace.	x	
Recycling and recovery operations		x	x			x	1. Recovery of Cu, Zn, Pb, Cd, As from metallurgical semiproducts.	x	
Standard technologies		x					1. Flash smelting, converting and electrolytic refining of copper.	x	
			x				1. Sintering and smelting of lead.	x	
Metallurgy		x	x			x	1. Extraction and electrolytic refining of zinc.	x	
Treatment		x	x			x	1. Non-ferrous metallurgy.		x
Equipment		x	x			x	1. Treatment of non-ferrous metals.		x
							1. Metallurgical equipment.		x

9. (Contd.) ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Environmental control		x	x				1. Recovery of arsenic from waste water in non-ferrous metallurgy.	x	

10. ANTICIPATED PROJECTS

FIELDS OF ACTIVITY	ELEMENTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alternative technologies		x	x			x	1. Metallurgical processing.	x	
Manufacture of products		x					1. Flash smelting of copper concentrates; smelting of copper concentrates in liquid bath.	x	
Main utilities for processing		x					1. Flash smelting of copper concentrates; smelting of copper concentrates in liquid bath.	x	
Standard technologies		x					1. Flash smelting of copper concentrates; smelting of copper concentrates in liquid bath.	x	
Metallurgy		x	x			x	1. Non-ferrous metallurgy.		x
Treatment	x	x	x			x	1. Treatment of non-ferrous metals.		x
Equipment		x	x			x	1. Metallurgical equipment.		x
Process control and automation		x	x			x	1. Metallurgical processing.	x	
Quality control and instrumentation		x	x			x	1. Metallurgical processing.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 1)

PURPOSE OF OPERATION	RESEARCH						TRAINING						INDUSTRIAL APPLICATION					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
FIELDS OF ACTIVITY																		



12. TECHNICAL CO-OPERATION - GIVEN

FIELDS OF TRAINING PROGRAM	TECHNICAL CO-OPERATION - GIVEN						STAFF AVAILABILITY AND TRAINING
	Al	Cu	Pb	Ni	Sn	Zn	
Alloying		x	x			x	Availability of staff as consultants or experts : No for UNIDO field assignments
Alternative technologies		x	x			x	
Auxiliary utilities for processing		x	x			x	Training program available for own nationals : Yes
Beneficiation of ores		x	x			x	
Exploration of deposits		x	x			x	Training program available for other nationals : Yes
Manufacture of products		x	x			x	
Main utilities for processing		x	x			x	Training languages : Bulgarian
Mining of principal materials or alternative ores		x	x			x	
Recycling and recovery operations		x	x			x	Duration : 5 years.
Refining		x	x			x	
Smelting		x	x			x	
Standard technologies		x	x			x	
Economics		x	x			x	
Energy		x	x			x	
Environmental control		x	x			x	
Manpower and safety		x	x			x	
Process control and automation		x	x			x	
Quality control and instrumentation		x	x			x	

13. TECHNICAL CO-OPERATION - REQUESTED

FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying		x	x			x								x	x			x
Alternative technologies		x	x			x								x	x			x
Auxiliary utilities for processing		x	x			x								x	x			x
Beneficiation of ores		x	x			x								x	x			x
Exploration of deposits		x	x			x								x	x			x
Manufacture of products		x	x			x								x	x			x
Main utilities for processing		x	x			x								x	x			x
Mining of principal materials or alternative ores		x	x			x								x	x			x
Recycling and recovery operations		x	x			x								x	x			x
Refining		x	x			x								x	x			x
Smelting		x	x			x								x	x			x
Standard technologies		x	x			x								x	x			x
Economics		x	x			x								x	x			x
Energy		x	x			x								x	x			x
Environmental control		x	x			x								x	x			x
Manpower and safety		x	x			x								x	x			x
Process control and automation		x	x			x								x	x			x
Quality control and instrumentation		x	x			x								x	x			x

Languages : Bulgarian, Russian, English, German.  
 Assistance obtained in the past : None.

Duration : 2 - 5 years.

14. DOCUMENTS : No information provided.

15. NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	tin "
Zn	Zinc "
1)	No availability of pilot installation/equipment (Table 11).

1. NAME : RESEARCH AND PRODUCTIVITY COUNCIL

2. ADDRESS : P.O. Box 6000,  
: College Hill Road, Fredericton,  
: NEW BRUNSWICK E3B 5H1,  
: Canada

3. TELEPHONE : (506) 452 8994  
  
TELEX : 014-46115  
CABLE : REPRODCO-FREDERICTON

4. DIRECTOR : Dr. Roy S. Boorman  
:

5. CONTACT : Dr. Roy S. Boorman  
PERSON(S) :

6. STAFF: 75

7. BUDGET / : US\$5.4 Million. YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : Independent.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alternative technologies		x	x			x	1. Demonstration of the RPC Sulphation - Roast - Electrowinning process for the recovery of zinc, lead, copper and silver from refractory base metal ores.	x	
Refining		x	x			x	2. As under research training of local operation. 1. Demonstration of the RPC sulphation - roast - electrowinning process for the recovery of zinc, lead, copper and silver from refractory base metal ores.	x	x
Smelting		x	x			x	2. As under research training of local operation. 1. Demonstration of the RPC sulphation - roast - electrowinning process for the recovery of zinc, lead, copper and silver from refractory base metal ores.	x	x

9. (Contd.) ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Smelting (Contd.)		x	x			x	2. As under research training of local operation.		x

10. ANTICIPATED PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alternative technologies		x	x			x	1. Demonstration of the RPC sulphation - roast - electrowinning process for the recovery of zinc, lead, copper and silver from refractory base metal ores;	x	
Refining		x	x			x	2. As under research training of local operation. 1. Demonstration of the RPC sulphation - roast - electrowinning process for the recovery of zinc, lead, copper and silver from refractory base metal ores;	x	x
Smelting		x	x			x	2. As under research training of local operation. 1. Demonstration of the RPC sulphation - roast - electrowinning process for the recovery of zinc, lead, copper and silver from refractory base metals ores; 2. As under research training of local operation.	x	x

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT

PURPOSE OF OPERATION FIELDS OF ACTIVITY 1)	a. RESEARCH 2)						b. TRAINING 2)						c. INDUSTRIAL APPLICATION 2)					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Please see note 3)							Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : English  Duration : As long as required.

13. TECHNICAL CO-OPERATION - REQUESTED 4)																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Languages : - Assistance obtained in the past : CIDA, Indonesia Project - application of RPC process to Pb, Zn ores.													Duration : -					



## 14. DOCUMENTS

: Availability to brochures and annual report.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	All of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No specific information provided concerning the metals listed or fields of activity (Table 11).
2)	Extent of operation: 9 (Table 11).
3)	Fluidized bed technology, pyro- and hydrometallurgy (Table 12).
4)	No technical co-operation requested (Table 13).

1. NAME : CIMM - CENTRO DE INVESTIGACION MINERA Y METALURGICA

2. ADDRESS : Av. Parque Institucional 6500 - Las Condes,  
:  
: SANTIAGO,  
: Chile

3. TELEPHONE : 56-2-2289544  
  
TELEX : 240780 CIMM CL  
CABLE : No information provided.

4. DIRECTOR : Dr. Werner Schlein Sch.  
:

5. CONTACT : Nelson Barrios D.  
PERSON(S) :

6. STAFF: 300

7. BUDGET / : US\$2.000.000.- YEAR : 1985  
SOURCE : (Government 30%)  
OF FUNDS : (Own sells 70%).

8. RELATIONSHIP : Chilean Mining Ministry.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Beneficiation of ores		x					1. In column flotation system for Chilean mines.	x	
							2. Gold processing methods for Chilean "small mines".	x	
							3. Hydrometallurgical study for arsenic contaminated copper concentrates.	x	
							4. Hydrometallurgical recovery of copper and molybdenum from reverberatory slags.	x	
							5. Corroding and wear in milling balls.		x
							6. Arsenic separation from sulphurated ores by flotation.		x
							7. Mathematical simulator for comminution circuits.		x
Mining of principal materials or alternative ores		x					1. Blasting optimization for "ANDINA" mine.	x	

9. (Contd.) ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Recycling and recovery operations		x					1. Rutilium recovery from copper tails.	x	
Environmental control		x					1. The copper tails-to-sea effects.	x	
Transport systems		x					1. Hydraulic transportation systems for solid materials.		x

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Beneficiation or ores Smelting		x					1. New comminution technologies.	x	
		x					1. Simulation study of flash smelting for copper concentrates.	x	
Heap leaching							2. Mathematical simulation of a copper smelter.		x
		x					1. Heap leaching of gold and silver mined wastes.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Beneficiation of ores		2												2				
Mining of principal materials or alternative ores		2												2				
Refining		2												2				
Smelting		2												2				
Environmental control		2												2				
Process control and automation		2												2				

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	STAFF AVAILABILITY AND TRAINING						
	Al	Cu	Pb	Ni	Sn	Zn	
Beneficiation of ores		x					Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : Spanish, English  Duration : Six months.
Mining of principal materials or alternative ores		x					
Refining		x					
Smelting		x					
Environmental control		x					
Process control and automation		x					

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Beneficiation of ores		x						x						x				
Exploration of deposits		x						x						x				
Mining of principal materials or alternative ores		x						x						x				
Process control and automation		x						x						x				
Refining		x						x						x				
Smelting		x						x						x				
Economics		x						x						x				
Energy		x						x						x				
Environmental control		x						x						x				
Manpower and safety		x						x						x				
Quality control & instrumentation		x						x						x				
Languages : Spanish, English												Duration : Six months - One year						
Assistance obtained in the past : JICA - Japan International Co-operation Agency, PNUD.																		

## 14. DOCUMENTS

: Availability of brochures.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "

1. NAME : COMITÉ DE INVESTIGACIONES TECNOLOGICAS DE CORFO, INTEC-CHILE

2. ADDRESS : Avda. Santa Maria 06500,  
: Casilla 19002, Correo 19,  
: SANTIAGO,  
: Chile

3. TELEPHONE : 228 2083  
  
TELEX : No information provided  
CABLE : No information provided

4. DIRECTOR : Bartolome Dezerega S.  
:

5. CONTACT : M. Angelica Moreno A.  
PERSON(S) :

6. STAFF: 72

7. BUDGET / : US\$1.000.000.- YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : INTEC is property of the Chilean State  
WITH OTHER : through the Corporación de Fomento de  
ORGANIZATIONS : la Producción, CORFO.

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Beneficiation of ores		x					1. Heap leaching of copper oxides with high acid consumption using other leaching media (research at pilot plant scale).	x1)	
							2. Demonstrative small-scale plant of heap leaching of gold and silver with sodium cyanide.	x1)	
							3. Demonstrative small-scale plant of heap leaching of copper sulphides including bacterial leaching.	x1)	
							4. Demonstrative small-scale plant for the application of gravitational concentration of ore and tailing recovering (copper, gold, cobalt, tungsten and others).	x1)	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH 3)						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY 2)	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn



12. TECHNICAL CO-OPERATION - GIVEN								
FIELDS 5)	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING	
							Beneficiation of ores	x4)
Recycling and recovery operations	x4)						Training program available for own nationals : No	
Refining	x4)						Training program available for other nationals : No	
Smelting	x4)						Training languages : -	
Energy	x4)						Duration : -	
Environmental control	x4)							
Process control and automation	x4)							
Quality control and instrumentation	x4)							

13. TECHNICAL CO-OPERATION - REQUESTED																			
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Alloying		x						x						x					
Manufacture of products		x						x						x					
Process control and automation		x						x						x					
Quality control and instrumentation		x						x						x					
Languages : English, Spanish												Duration : One - Two months each.							
Assistance obtained in the past : UNDP (Bacterial Leaching Project).																			

## 14. DOCUMENTS

: Availability of annual report.

## 15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	Projects reported here are with the sponsorship of the state corporation CORFO and are of public awareness. INTEC was working in 48 projects on non-ferrous metals with the sponsorship of the private sector and state enterprises under confidential agreement during 1986 (Table 9).
2)	No specific information provided concerning the metals listed or fields of activity (Table 2).
3)	Extent of operation : 2 (For Technical Assistance to Enterprises, Table 11).
4)	Also the same for gold and silver (Table 12).
5)	Fields of consultancy (Table 12).

1. NAME : INACAP - INSTITUTO NACIONAL DE CAPACITACION PROFESIONAL

2. ADDRESS : Chesterton 7028, Las Condes, Casilla de Correo 27.005,  
: Correo 27,  
: SANTIAGO,  
: Chile

3. TELEPHONE : 229 9000  
  
TELEX : No information provided.  
CABLE : No information provided.

4. DIRECTOR : Patricio Escudero Troncoso  
:

5. CONTACT : Patricio Escudero Troncoso  
PERSON(S) :

6. STAFF: 121

7. BUDGET / : US\$8.500.000.- YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : ILO - CODELCO/CHILE - CAP  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Process control and automation		x					1. Training on process control and automation.		x
Quality control and instrumentation		x					1. Training on process control and automation.		x

10. ANTICIPATED PROJECTS											
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE			R	T
Training		x					1. Supervisors training				x

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 1)																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn

12. TECHNICAL CO-OPERATION - GIVEN

FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING	
							Availability of staff as consultants or experts for UNIDO field assignments	
No information provided.							Availability of staff as consultants or experts for UNIDO field assignments	: No
							Training program available for own nationals	: Yes
							Training program available for other nationals	: No
							Training languages	: No information provided.
							Duration	: No information provided.

13. TECHNICAL CO-OPERATION - REQUESTED

FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Process control and automation		x						x						x				
Quality control and instrumentation		x						x						x				
Languages	: No information provided.												Duration : No information provided.					
Assistance obtained in the past	: PNUD/OIT - BIRF - BID, Belgium, Denmark, France, Italy, Germany Federal Republic, Switzerland, United Kingdom.																	

14. DOCUMENTS

: No information provided.

15.

NOTES

CODE

DESCRIPTION

R	Research	(Tables 9 and 10)
T	Training	"
1	For Technical Co-operation	(Table 11 )
2	For Technical Assistance	"
3	For Own Use	"
9	ALL of above (1, 2, and 3)	"
Al	Aluminium	(Tables 9, 10, 11, 12, and 13)
Cu	Copper	"
Pb	Lead	"
Ni	Nickel	"
Sn	Tin	"
Zn	Zinc	"
1)	No availability of pilot installation/equipment (Table 11).	

1. NAME : SOCIEDAD MINERA PIZARRO LTDA.

2. ADDRESS : 160 Vicuna Mackenna Street,  
: Province of Limari, IV Region of Coquimbo,  
: OVALLE CITY,  
: Chile

3. TELEPHONE : 1193 (Private)  
  
TELEX : 240729 CENBC CL.  
CABLE : No information provided.

4. DIRECTOR : Miguel Pizarro Molina  
:

5. CONTACT : Cristian Sinclair, Secretaria  
PERSON(S) : Ejecutiva de Inversiones  
Extranjeras, Chile/Santiago.

6. STAFF: 6

7. BUDGET / : Please see note 1). YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : Overseas Private Investment Co. of USA,  
WITH OTHER : Secretaria de Inversiones Extranjeras  
ORGANIZATIONS : de Chile, Comin co/Canada/Chilean  
Lead Mining Co. XI/Region.

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying Alternative technologies	x		x				1. Pb-alloying.		x
							1. Alternative Al-technologies.	x	
Beneficiation of ores Exploration of deposits	x		x				1. Alternative Pb-technologies.		x
							1. Beneficiation of Pb-ores.		x
Economics	x		x				1. Las Galenas Deposits (IV Region).	x	
							1. Exploration of Pb-deposits.		x
Environmental control	x	x					1. Economics.	x	
							1. Management economics.		x
							1. Environmental control.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying		x					1. Cu-alloying.	x	
Alternative technologies		x				x	1. Zn-alloying.		x
Beneficiation of ores		x				x	1. Cu-alternative technologies.	x	
Exploration of deposits		x					1. Zn-alternative technologies.		x
Refining						x	1. Beneficiation of Cu-ores.	x	
Smelting						x	1. Exploration of deposits in-situ (Loca, Los Pingos Deposits, IV Region).	x	
						x	1. Exploration of Zn-deposits.		x
						x	1. Zn-refining.		x
						x	1. Zn-smelting.		x

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 2)																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn



12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Exploration of deposits		x	x			x	Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : No  Training languages : Spanish, English  Duration : One year.

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Beneficiation of ores	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Languages : Spanish, English Assistance obtained in the past : -												Duration : 3 months.						

## 14. DOCUMENTS

: Availability of brochures, annual report, project document.

## 15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	According to the information provided: US\$30 Million/US\$15 Million (Table 7).
2)	Availability of pilot installation/equipment: Yes. Purpose of operation: Research, Training, Industrial Application. Extent of operation: 9 (Table 11).

1. NAME : UNIVERSIDAD DE TARAPACA - FACULTY OF ENGINEERING

2. ADDRESS : P.O. Box 287,  
:  
: ARICA,  
: Chile

3. TELEPHONE : 31798  
  
TELEX : 221036 UNTAR CL  
CABLE : No information provided.

4. DIRECTOR : Roberto Gibson  
:

5. CONTACT : Roberto Gibson  
PERSON(S) :

6. STAFF: 52

7. BUDGET / : US\$650.000.- YEAR : 1985  
SOURCE : Chilean Government.  
OF FUNDS :

8. RELATIONSHIP : Ministerio de Education (Ministry of  
WITH OTHER : Education).  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Standard technologies Quality control and instrumentation	x	x	x	x			1. End (non-destructive testing).	x	
		x					1. Standarization and quality control of metal products (COBRE).	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Smelting	x	x					1. Smelting process for copper and aluminium.	x	
Quality control and instrumentation	x	x	x				1. Standardization and quality control of smelting process and subproducts.	x	
Standard technologies	x	x	x	x		x	1. N.D.T.		x

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																			
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION						
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Manufacture of products																			
Quality control and instrumentation	3	3					1,3	1,3	1,3	1,3	1,3	1,3							

12. TECHNICAL CO-OPERATION - GIVEN

FIELDS OF TRAINING PROGRAM							STAFF AVAILABILITY AND TRAINING
	Al	Cu	Pb	Ni	Sn	Zn	
Quality control and instrumentation	x	x	x				Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : Spanish  Duration : One week up to one month.

13. TECHNICAL CO-OPERATION - REQUESTED

FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alternative technologies		x						x						x				
Manufacture of products	x	x					x	x					x	x				
Standard technologies	x	x	x				x	x	x				x	x	x			
Quality control and instrumentation		x						x						x				
Languages : Spanish, English Assistance obtained in the past : Denmark, France, Germany Federal Republic.												Duration : No information provided.						

## 14. DOCUMENTS

: Availability of brochures.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "

1. NAME : CHINA INTERNATIONAL ECONOMIC INFORMATION CENTRE

2. ADDRESS : Jia 20,  
: Dong Hang Cheng Gen North St.,  
: BEIJING,  
: China

3. TELEPHONE : 44 6331  
  
TELEX : 22559 COMPT CN  
CABLE : No information provided.

4. DIRECTOR : Zhao Gongda  
:

5. CONTACT : Ma Lan  
PERSON(S) :

6. STAFF: 86

7. BUDGET / : No information provided. YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : Ministry of Foreign Economic Relations  
WITH OTHER : and Trade People's Republic of China.  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Manufacture of products	x						1. Energy conservation in aluminium industry.		x
Energy	x						1. Energy conservation in aluminium industry.		x

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Manufacture of products													1					
Energy													2					



12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Standard technologies	x						Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : English, Chinese  Duration : One month.

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Manufacture of products	x						x						x					
Energy	x						x						x					
Environmental control	x						x						x					
Process control and automation	x						x						x					
Quality control and instrumentation	x						x						x					
Languages : English, Chinese Assistance obtained in the past : UNIDO, UNDP.												Duration : It depends on the training.						

## 14. DOCUMENTS

: Availability of annual report, project documents.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "

1. NAME : GENERAL RESEARCH INSTITUTE FOR NON-FERROUS METALS

2. ADDRESS : 2 Xin Jie Kou Wai Dajie,  
:  
: BEIJING,  
: China

3. TELEPHONE : 201-4488  
  
TELEX : 222204 GRINM CN  
CABLE : 2589, BEIJING

4. DIRECTOR : Ma Fukang  
:

5. CONTACT : Fu Jihe  
PERSON(S) :

6. STAFF: 1200

7. BUDGET / : YEAR :  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : China National Non-ferrous metals  
WITH OTHER : Industry Corporation (CNNC).  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE 1)	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying	x	x		x				x	
Alternative technologies	x	x		x				x	x
Auxiliary utilities for processing	x	x						x	
Beneficiation of ores	x	x	x	x	x	x		x	
Manufacture of products	x	x		x				x	
Main utilities for processing	x	x		x	x	x		x	x
Recycling and recovery operations	x	x	x	x	x	x		x	
Refining	x	x		x				x	
Smelting	x	x		x				x	x

		9. (Contd.) ON-GOING PROJECTS							
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE 1)	R	T
Standard technologies	x	x		x				x	
	x	x							x
Economics	x	x	x	x	x	x		x	
Energy	x	x	x	x	x	x		x	
Environmental control	x	x	x	x	x	x		x	
Process control and automation	x	x	x	x	x	x		x	
Quality control and instrumentation	x	x	x	x	x	x		x	
Other fields of activities not explicitly mentioned (management related)	x	x	x	x	x	x		x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE 1)	R	T
Beneficiation of ores	x	x	x	x	x	x		x	
Standard technologies	x	x	x	x	x	x		x	
Manpower and safety	x	x	x	x	x	x		x	
Other fields of activities not explicitly mentioned (technology related)	x	x	x	x	x	x		x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying	1,2	1,2					1,2	1,2					1,2	1,2				
Manufacture of products	1,2	1					1,2	1,2					1,2	1,2				
Main utilities for processing	1	1					1,2	1,2					1	1				
Smelting	1,2	1					1,2	1,2					1,2	1,2				
Standard technologies							1,2											

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
							Alloying
Manufacture of products	x	x					Training program available for own nationals : Yes
Smelting	x	x					Training program available for other nationals : Yes
							Training languages : English, Japanese, German, French.
							Duration : 1987 - 1990.

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying	x	x					x	x					x	x				
Manufacture of products	x	x					x	x					x	x				
Smelting	x	x					x	x					x	x				
Languages : English, Japanese, German, French.												Duration : 1987 - 1990.						
Assistance obtained in the past : From bilateral co-operation (no further details available).																		

14. DOCUMENTS

: Availability of brochures.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No information provided (Table 9, 10).

1. NAME : INSTITUTE OF METAL RESEARCH, ACADEMIA CHINA

2. ADDRESS : 2-6 Wenhua Road,  
:  
: SHENYANG,  
: China

3. TELEPHONE : 483531-340  
  
TELEX : 80095 IMRAS CN  
CABLE : 4430 SHENYANG

4. DIRECTOR : Prof. Li Yiyi  
:

5. CONTACT : He Haicai, Wei Wenduo  
PERSON(S) :

6. STAFF: 1200

7. BUDGET / : US\$3.500.000.- YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : Academia Sinica.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying	x	x		x			1. Aluminium alloys.	x	
							1. See note 1).	x	
Alternative technologies	x	x		x			1. Nickel-based alloys.	x	
							1. See note 1).	x	
Auxiliary utilities for processing	x			x			1. See note 1).	x	
							1. Copper tube and wire.	x	
Manufacture of products	x			x			1. See note 1).	x	
							1. See note 1).	x	
Main utilities for processing				x			1. See note 1).	x	
							1. See note 1).	x	
Refining		x		x			1. See note 1).	x	
							1. See note 1).	x	
Smelting		x		x			1. See note 1).	x	
							1. See note 1).	x	
Quality control and instrumentation	x			x			1. See note 1).	x	



10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying Manufacture of products	1	1		1									1	1		1		

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
							Alloying
Alternative technologies	x	x		x			Training program available for own nationals : Yes
Manufacture of products	x	x		x			Training program available for other nationals : Yes
							Training languages : English
							Duration : 1987 - 1990.

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying	x	x		x			x	x		x			x	x		x		
Manpower and safety	x	x		x			x	x		x			x	x		x		
Languages : English												Duration : 1987 - 1990.						
Assistance obtained in the past : UNIDO, 1981 - 1985.																		

## 14. DOCUMENTS

: Availability of brochures and annual report.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No information provided (Table 9).

1. NAME : SHENYANG ALUMINIUM AND MAGNESIUM ENGINEERING AND RESEARCH INSTITUTE

2. ADDRESS : 50 Block 3,  
: Heping Street, Shenyang,  
: LIAONING,  
: China

3. TELEPHONE : 33041  
  
TELEX : 80037 SAMI CN  
CABLE : 3070

4. DIRECTOR : Luo Xueqiang  
:

5. CONTACT : Luo Xueqiang  
PERSON(S) :

6. STAFF: 900

7. BUDGET / : No information provided.  
SOURCE :  
OF FUNDS :

8. RELATIONSHIP : It is a subordinate institution of  
WITH OTHER : China Non-ferrous Metals Corporation  
ORGANIZATIONS : (CNNC).

9. ON-GOING PROJECTS 6)									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alternative technologies	x						1. See note 1).	x	
Auxiliary utilities for processing	x						1. Whole engineering of Al-industry including main and auxiliary utilities for processing.	x	
Beneficiation of ores	x						1. Beneficiation of diasporite bauxite.	x	
Exploration of deposits	x						1. Exploration of diasporite bauxite and limestone deposits.	x	
Main utilities for processing	x						1. Whole engineering of Al-industry including main and auxiliary utilities for processing.	x	
Mining of principal materials	x						1. Surface mining of diasporite bauxite, limestone and other metallic deposits.	x	
Refining	x						1. See note 1).	x	
Smelting	x						1. Technology of aluminium smelt.	x	

9. (Contd.) ON-GOING PROJECTS 6)

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Standard technologies	x						1. Technology of alumina production.	x	
							2. Standard technologies applicable to the alumina, aluminium, titanium and diaspore bauxite.	x	
Cement production	x						1. Whole engineering of cement production using limestone and red mud.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alternative technologies	x						1. For project titles see notes 2) & 3).		x
Exploration of deposits	x						1. For project titles see notes 2) & 3).		x
Mining of principal materials or alternative ores	x						1. For project titles see notes 2) & 3).		x
Environmental control	x						1. See note 1).	x	
Process control and automation	x						1. See note 1).	x	
Quality control and instrumentation	x						1. See note 1).	x	
CAD	x						1. Computer aided design.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Cement production using limestone and red mud	3																	

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Alternative technologies	x						Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : See 4)  Training languages : Chinese, English, Russian  Duration : Three months.
Exploration of deposits	x						
Mining of principal materials or alternative ores	x						
Refining	x						

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
CAD; see note 5)	x						x						x					
Languages : English Assistance obtained in the past : None.												Duration : Two years.						

## 14. DOCUMENTS

: Availability of brochures.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	Part of other projects listed (Table 9).
2)	Recovering of surface mine, environmental production of aluminium complex, process automation and control of aluminium complex, total quality control and aluminium complex (Table 10).
3)	Technology of aluminium production using diasporite bauxite, technology of aluminium smelt, geology and exploration of diasporite bauxite deposits, technology of diasporite bauxite mining, designing of utilities of aluminium complex (Table 10).
4)	No information provided (Table 12).
5)	Computer Aided Design in the fields of surface mining, aluminium refinery and aluminium smelter (technology and management related; Table 13).
6)	Additional project titles: Equipment of aluminium complex; technology of titanium production (Table 9).



1. NAME : CIDI - CENTRO DE INVESTIGACIONES PARA EL DESARROLLO INTEGRAL

2. ADDRESS : Apartado Aereo 1178,  
:  
: MEDELLIN,  
: Colombia

3. TELEPHONE : 248 6892

TELEX : 65047 UPB  
CABLE : No information provided.

4. DIRECTOR : Cesar Valencia Jaramillo  
:

5. CONTACT : Sara Catalina Cardenas,  
PERSON(S) : Patricia Restrepo

6. STAFF: 15

7. BUDGET / : US\$120.000.- YEAR : 1985  
SOURCE : National and international aids besides  
OF FUNDS : university funds.

8. RELATIONSHIP : Universidad Pontificia Bolivariana  
WITH OTHER : (Parent University).  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Recycling and recovery operations						x	1. Recovery of zinc in a siderurgical plant.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Energy				x			1. Energy management of a nickel plant (cerromatoso).	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 1)																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn

12. TECHNICAL CO-OPERATION - GIVEN									
FIELDS OF TRAINING PROGRAM	A1	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING		
	Recycling and recovery operations Energy				x		x	Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : Spanish  Duration : Short course according to specific programme.	

13. TECHNICAL CO-OPERATION - REQUESTED																			
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	A1	Cu	Pb	Ni	Sn	Zn	A1	Cu	Pb	Ni	Sn	Zn	A1	Cu	Pb	Ni	Sn	Zn	
Recycling and recovery operations Energy				x3)								x2)				x3)			x2)
Languages : Spanish, English Assistance obtained in the past : See note 4)												Duration : See notes 2)&3).							

## 14. DOCUMENTS

: Availability of brochures.

15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No availability of pilot installation/equipment (Table 11).
2)	Short visits by experts (Table 13).
3)	Any short courses (Table 13).
4)	Organization of American States, Interamerican Bank for Development, Instituto de Pesquisas Technologicas of Sao Paulo, Brazil (Table 13).

1. NAME : SERVICIO NACIONAL DE APRENDIZAJE SENA DE COLOMBIA

2. ADDRESS : Calle 57 No.8-69,  
:  
: BOGOTA,  
: Colombia

3. TELEPHONE : 211 8521  
  
TELEX : 044481 BOGOTA  
CABLE : SENA

4. DIRECTOR : Dr. Enrique Low Murtra  
:

5. CONTACT : Dra. Juanita Castano  
PERSON(S) :

6. STAFF: 8204

7. BUDGET / : US\$120 Milliones      YEAR : 1985  
SOURCE : Contribution of private and  
OF FUNDS : governmental enterprises.

8. RELATIONSHIP : Dependence of the Ministry of Labour  
WITH OTHER : and Social Security.  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying	x	x					1. Short courses on aluminium alloys. 1. Short courses on copper alloys		x x

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying							3	3										

12. - TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Alloying	x	x					Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : Spanish  Duration : 80 hours.

13. TECHNICAL CO-OPERATION - REQUESTED																			
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Alloying	x	x					x	x					x	x					
Languages : Spanish Assistance obtained in the past : From British Government (bilateral).												Duration : Three months.							

14. DOCUMENTS

: No information provided.

15.

NOTES

CODE

DESCRIPTION

R	Research	(Tables 9 and 10)
T	Training	"
1	For Technical Co-operation	(Table 11 )
2	For Technical Assistance	"
3	For Own Use	"
9	ALL of above (1, 2, and 3)	"
Al	Aluminium	(Tables 9, 10, 11, 12, and 13)
Cu	Copper	"
Pb	Lead	"
Ni	Nickel	"
Sn	Tin	"
Zn	Zinc	"



1. NAME : INSTITUTO TECNOLOGICO DE COSTA RICA

2. ADDRESS : P.O. Box 159,  
:  
: CARTAGO,  
: Costa Rica

3. TELEPHONE : 515 333

TELEX : 8013 ITCR-CR  
CABLE : No information provided.

4. DIRECTOR : Arq. Roberto Villalobos A.  
:

5. CONTACT : Eng. Jorge Muñoz  
PERSON(S) :

6. STAFF: 8

7. BUDGET / : US\$40.000.- YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : Instituto per la Cooperazione  
WITH OTHER : Universitaria di Roma - ICU, Italy;  
ORGANIZATIONS : France Embassy.

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying	x						1. Main aluminium alloys.	x	
Beneficiation of ores	x						1. Extraction of aluminium minerals.	x	
Recycling and recovery operations	x	x	x			x	1. Basic foundry processes. 2. Vacuum boiling processes.		x x
Refining						x	1. Basic foundry processes. 2. Vacuum boiling processes.		x x

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Exploration of deposits	x	x					1. Mineral quantification.	x	
Mining of principal materials or alternative ores	x	x					1. Aluminium and copper mining.	x	
Smelting	x						1. Degasifying alloys.		x

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH 2)						b. TRAINING 3)						c. INDUSTRIAL APPLICATION 4)					
FIELDS OF ACTIVITY 1)	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
							Smelting

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED 5)	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying	x	x				x	x	x				x	x	x				x
Alternative technologies	x	x				x	x	x				x	x	x				x
Auxiliary utilities for processing	x	x				x	x	x				x	x	x				x
Beneficiation of ores	x	x				x	x	x				x	x	x				x
Exporation of deposits	x	x				x	x	x				x	x	x				x
Manufacture of products	x	x				x	x	x				x	x	x				x
Main utilities for processing	x	x				x	x	x				x	x	x				x
Mining of principal materials or alternative or	x	x				x	x	x				x	x	x				x
Recycling and recovery operations	x	x				x	x	x				x	x	x				x
Refining	x	x				x	x	x				x	x	x				x
Smelting	x	x				x	x	x				x	x	x				x
Standard technologies	x	x				x	x	x				x	x	x				x
Other activities (technology)	x	x				x	x	x				x	x	x				x
Economics	x	x				x	x	x				x	x	x				x

13. (Contd.) TECHNICAL CO-OPERATION - REQUESTED

FIELDS OF TRAINING REQUIRED 5)	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Energy	x	x				x	x	x				x	x	x				x
Environmental control	x	x				x	x	x				x	x	x				x
Manpower and safety	x	x				x	x	x				x	x	x				x
Process control and automation	x	x				x	x	x				x	x	x				x
Quality control and instrumentation	x	x				x	x	x				x	x	x				x
Other activities (management)	x	x				x	x	x				x	x	x				x
Languages	: Spanish, English																	
Assistance obtained in the past	: Italy, France.																	
Duration : No restrictions.																		

14. DOCUMENTS

: No information provided.

15.

NOTES

CODE

DESCRIPTION

R	Research	(Tables 9 and 10)
T	Training	"
1	For Technical Co-operation	(Table 11 )
2	For Technical Assistance	"
3	For Own Use	"
9	ALL of above (1, 2, and 3)	"
Al	Aluminium	(Tables 9, 10, 11, 12, and 13)
Cu	Copper	"
Pb	Lead	"
Ni	Nickel	"
Sn	Tin	"
Zn	Zinc	"
1)	No information provided (Table 11).	
2)	Extent of operation : 3 (Table 11).	
3)	Extent of operation : 9 (Table 11).	
4)	Extent of operation : 1,3 (Table 11).	
5)	Mainly interested (Table 13).	

1. NAME : ESCUELA SUPERIOR POLITECNICA DEL LITORAL (LAB. METALURGIA)

2. ADDRESS : P.O. Box 5863,  
:  
: GUAYAQUIL,  
: Ecuador

3. TELEPHONE : 304 997  
  
TELEX : 04-3509 ESPOLG-ED  
CABLE : No information provided.

4. DIRECTOR : Victor Bastidas  
:

5. CONTACT : Homero Ortiz  
PERSON(S) :

6. STAFF: 7

7. BUDGET / : US\$60.000.- YEAR : 1985  
SOURCE : ESPOL-BNF-CONUEPO.  
OF FUNDS :

8. RELATIONSHIP : Supported by various international,  
WITH OTHER : foreign and national organizations  
ORGANIZATIONS : and associations.

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying	x						1. Al-Si alloys modification with metallic sodium.	x	
Manufacture of products		x					1. Hypereutectoide Bronze-Al alloys for metalforming tooling and dies.	x	
Recycling and recovery operations	x						2. 80-10-10 bearing bronze for high loads.	x	
Refining	x					x	1. Aluminium scrap recycling.	x	
Standard technologies		x					1. ILZRO alloys production from scrap.	x	
							1. Al-alloys degassing with nitrogen.	x	
							1. Heat-treatment hypereutectoide Bronze-Al alloys.	x	
				x			1. Pure nickel electroforming.	x	

10. ANTICIPATED PROJECTS											
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE			R	T
No information provided.											

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying	3																	
Manufacture of products														2				2
Recycling and recovery operations													2					
Refining																		
Standard technologies		3		3														

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
No information provided.							Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : English, Spanish  Duration : Short-term.

13. TECHNICAL CO-OPERATION - REQUESTED																			
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Manufacture of products	x	x				x	x	x				x	x	x					x
Recycling and recovery operations	x	x				x	x	x				x	x	x					x
Refining	x	x				x	x	x				x	x	x					x
Languages : English, Spanish, Portuguese Assistance obtained in the past : From UNIDO													Duration : Six months.						



14. DOCUMENTS

: Availability of brochures.

15.

NOTES

CODE

DESCRIPTION

R	Research	(Tables 9 and 10)
T	Training	"
1	For Technical Co-operation	(Table 11 )
2	For Technical Assistance	"
3	For Own Use	"
9	ALL of above (1, 2, and 3)	"
Al	Aluminium	(Tables 9, 10, 11, 12, and 13)
Cu	Copper	"
Pb	Lead	"
Ni	Nickel	"
Sn	Tin	"
Zn	Zinc	"

1. NAME : ASSIUT UNIVERSITY, DEPARTMENT OF MINING AND METALLURGY

2. ADDRESS : College of Engineering,  
: Assiut University,  
: 71516 ASSIUT,  
: Egypt

3. TELEPHONE : 02-088 322455  
: 02-088 322553  
TELEX : 92863 ASUNV  
CABLE : No information provided.

4. DIRECTOR : Prof. Dr. Ing. Mohammed Emad  
: Kassem

5. CONTACT : Prof. Dr. Ing. Mohamed Emad  
PERSON(S) : Kassem

6. STAFF: 28

7. BUDGET / : US\$150.000.- YEAR : 1985  
SOURCE : (Governmental, FRCU & EGYPTALUM).  
OF FUNDS :

8. RELATIONSHIP : FRCU - EGYPT,  
WITH OTHER : EGYPTALUM - EGYPT.  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying	x						1. Production of Al-Ti alloys by using Egyptian ilmenite.	x	
							2. Production of Al-Si alloys by using sodium fluosilicate.	x	
							3. See note 1).		x
Alternative technologies	x	x					1. Powder metallurgy saves energy, raw materials and costs in industry.	x	
							1. See note 1).		x
Auxiliary utilities for processing	x						1. See note 1.		x
							1. Beneficiation of nepheline cyanite.	x	
Beneficiation of ores	x						2. See note 1).		x
							1. See note 1).		x
Manufacture of products	x						1. Recycling of valuable materials in aluminium industry.	x	
Recycling and recovery operations	x								

9. (Contd.) ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Recycling and recovery operations (Contd.)	x						2. See note 1).		x
Smelting	x						1. See note 1).		x
Standard technologies	x						1. See note 1).		x
Al-cast irons	x						1. Production of Al-cast irons for application in Al-smelters.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying	x						1. Production of Al-Bronzes; 2. See note 2).	x	x
Alternative technologies	x						1. See note 2).		x
Auxiliary utilities for processing	x						1. See note 2).		x
Beneficiation of ores	x						1. Desulphurization of petroleum coke; 2. See note 2).	x	x
Manufacture of products	x						1. See note 2).		x
Recycling and recovery operations	x						1. Recovery of fluorine compounds from spent-cathode linings in Al-smelters. 2. Treatment of carbon foams of Al-reduction cells to reduce their carbon content. 3. Production of aluminium sulphates from Al-slugs and waste Alumina. 4. See note 2).	x	
Smelting	x						1. See note 2).		x
Standard technologies	x						2. See note 2).		x

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT

PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying	3	3																
Alternative technologies	2	2																
Beneficiation of ores	1	1	1			1	1	1	1			1						
Recycling and recovery operations	3	3																
Al-Cast irons	2																	

12. TECHNICAL CO-OPERATION - GIVEN										
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING			
	Alloying	x						Availability of staff as consultants or experts : Yes for UNIDO field assignments		
Alternative technologies	x						Training program available for own nationals : Yes			
Auxiliary utilities for processing	x						Training program available for other nationals : Yes			
Manufacture of products	x						Training languages : Arabic, English, French, German.			
Recycling and recovery operations	x						Duration : Two weeks for each programme.			
Standard technologies	x									
Beneficiation of ores	x									

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying	x						x						x					
Auxiliary utilities for processing	x						x						x					
Manufacture of products	x						x						x					
Main utilities for processing	x						x						x					
Environmental control	x						x						x					
Quality control and instrumentation	x						x						x					
Languages : English, French, German													Duration : Four weeks for each training programme.					
Assistance obtained in the past : FRCU-EGYPT (bilateral co-operation).																		

14. DOCUMENTS : Availability of brochures, annual report, project documents.

15. NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	The department is responsible for the continuing education of the engineers as well as the technicians of the Aluminium Co. of Egypt (EGYPTALUM). The continuing education programme is divided to four levels. Each level is subdivided into three intensive courses. Ongoing are the levels 1 & 2 (Table 9).
2)	The levels 3 and 4 of the continuing education programme as mentioned in the note 1) (Table 10).

1. NAME : CMRDI - CENTRAL METALLURGICAL RESEARCH AND DEVELOPMENT INSTITUTE

2. ADDRESS : El-Tebbin,  
: P.O. Box Iron and Steel,  
: CAIRO,  
: Egypt

3. TELEPHONE : 790003  
  
TELEX : 93069 ASRT UN ATTD. CMRDI  
CABLE : No information provided.

4. DIRECTOR : Prof. Dr. Ahmed Adel Abdul Azim  
:

5. CONTACT : Prof. Dr. A.A. Abdul Azim  
PERSON(S) :

6. STAFF: 40

7. BUDGET / : US\$ 1 Million. YEAR : 1985  
SOURCE : Governmental contracts and foreign  
OF FUNDS : assistance.

8. RELATIONSHIP : Ministry of Scientific Research,  
WITH OTHER : Academy of Science.  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying	x						1. Controlling the quality of Al-Bronze castings. 2. Aluminium-graphite composites.	x	
Alternative technologies	x	x	x	x	x	x	1. Heat treatment, metallography, coating of metals and selection of materials.		x
Beneficiation of ores					x		1. Tin from cassiterite.	x	
Manufacture of products			x				1. Lead from scrap batteries.	x	
Recycling and recovery operations	x						1. Activation of Egyptian Bentonites. 2. Regeneration of Cryolite from C-foams.	x	
		x					1. Copper from scrap.	x	
					x		1. Tin from tin plated materials.	x	
Smelting			x				1. Lead from scraps and oxides.	x	



10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying	x						1. Aluminium alloys.	x	
		x					1. Copper alloys.	x	
Alternative technologies	x	x	x	x	x	x	1. Alloying, recycling and recovery, heat treatment, corrosion and selection of materials.		x
Recycling and recovery operations			x				1. Recycling lead.	x	
Refining		x					1. Copper refining.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Alternative technologies	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Auxiliary utilities for processing	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Beneficiation of ores	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Manufacture of products	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Main utilities for processing	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Recycling and recovery operations	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Refining	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Smelting	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Standard technologies	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	A1	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
	Alloying Alternative technologies	x x	x	x	x	x	

13. TECHNICAL CO-OPERATION - REQUESTED																			
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	A1	Cu	Pb	Ni	Sn	Zn	A1	Cu	Pb	Ni	Sn	Zn	A1	Cu	Pb	Ni	Sn	Zn	
Alloying Beneficiation of ores Recycling and recovery operations Refining Smelting	x		x				x		x				x		x			x	
		x	x		x			x	x		x			x	x				
Languages : English Assistance obtained in the past : USA, Netherlands, Sweden, Japan, Germany Federal Republic; UNIDO.												Duration : 6 months.							

## 14. DOCUMENTS

: Availability of brochures and annual report.

15.

NOTES

CODE

DESCRIPTION

R	Research	(Tables 9 and 10)
T	Training	"
1	For Technical Co-operation	(Table 11 )
2	For Technical Assistance	"
3	For Own Use	"
9	ALL of above (1, 2, and 3)	"
Al	Aluminium	(Tables 9, 10, 11, 12, and 13)
Cu	Copper	"
Pb	Lead	"
Ni	Nickel	"
Sn	Tin	"
Zn	Zinc	"

1. NAME : TABBIN INSTITUTE FOR METALLURGICAL STUDIES

2. ADDRESS : El-Tabbin,  
: P.O. Box 362,  
: CAIRO,  
: Egypt

3. TELEPHONE : 790642  
  
TELEX : 23389-UN  
CABLE : TABDRASAT, CAIRO

4. DIRECTOR : Prof. Mahmoud Hamed Selim  
:

5. CONTACT : Dr. Ali Fahmy Abdel-Salam  
PERSON(S) :

6. STAFF: 50

7. BUDGET / : US\$1 Million. YEAR : 1985  
SOURCE : Governmental fund.  
OF FUNDS :

8. RELATIONSHIP : Governmental industrial organizations.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Manufacture of products		x					1. Heat treatment of brasses.	x	
Anodizing	x						1. Production of high quality aluminium castings.		x
	x						1. Anodizing of Al-alloys.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Corrosion	x						1. Study of effect of alloying and structure modification on the corrosion resistance of Al-alloys casting.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. NG						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Manufacture of products	9						9						9					
Refining	3						3						3					
Smelting													3					
Other technologies 1)	9						9						9					
Energy	9						9						9					
Process control and automation	1,2						1,2						1,2					

12. TECHNICAL CO-OPERATION - GIVEN

FIELDS OF TRAINING PROGRAM	TECHNICAL CO-OPERATION - GIVEN						STAFF AVAILABILITY AND TRAINING
	Al	Cu	Pb	Ni	Sn	Zn	
Alloying	x						Availability of staff as consultants or experts : Yes for UNIDO field assignments
Beneficiation of ores	x	x					
Manufacture of products	x						Training program available for own nationals : Yes
Mining of principal materials or alternative ores	x						
Recycling and recovery operations	x						Training program available for other nationals : Yes
Refining	x	x					
Smelting	x	x					Training languages : English
Standard technologies		x					
Other technologies 2)	x	x					Duration : One week to one year.
Economics	x						
Energy	x	x					
Process control and automation	x	x					
Quality control and instrumentation	x	x					
Other 2)	x	x					

13. TECHNICAL CO-OPERATION - REQUESTED

FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying	X						X						X					
Beneficiation of ores	X						X						X					
Manufacture of products	X						X						X					
Mining of principal materials or alternative ores	X						X						X					
Recycling and recovery operations	X						X						X					
Refining	X						X						X					
Smelting	X						X						X					
Energy	X						X						X					
Process control and automation	X						X						X					
Quality control and instrumentation	X						X						X					
<p>Languages : English</p> <p>Assistance obtained in the past : USSR, France, Poland (bilateral co-operation), UNDP.</p> <p>Duration : One year.</p>																		

## 14. DOCUMENTS

: Availability of brochures.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	Technologies not mentioned explicitly (Table 11).
2)	Technologies and/or activities not mentioned explicitly (Table 12).



1. NAME : OUTOKUMPU OY/ENGINEERING DIVISION

2. ADDRESS : P.O. Box 27,  
:  
: 02201 ESPOO,  
: FINLAND

3. TELEPHONE : 358-0-4211  
  
TELEX : 121053 OED SF  
CABLE : No information provided.  
TELEFAX : 358-0-4212674

4. DIRECTOR : Raimo Monni  
:

5. CONTACT : Juhani Mattila  
PERSON(S) :

6. STAFF: 200  
(approx.)

7. BUDGET / : US\$50 Million. YEAR : 1985  
SOURCE : No information provided.  
OF FUNDS :

8. RELATIONSHIP : Working with Outokumpu Oy Metallurgical  
WITH OTHER : Research Centre and in co-operation  
ORGANIZATIONS : with Universities and the State  
Research Centre.

9. ON-GOING PROJECTS 1) & 2)

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS 1) & 2)						PROJECT TITLE 1)	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Beneficiation of ores		x	x	x		x	1. Various concentrating tests.	x	
Manufacture of products		x					1. Metal working tests.	x	
Refining		x	x	x		x	1. Hydrometallurgical tests.	x	
Smelting		x	x	x			1. Flash smelting tests.	x	

10. ANTICIPATED PROJECTS 3)									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Beneficiation of ores		x	x	x		x	1. Various concentrating tests.	x	
Manufacture of products		x					1. Metal working tests.	x	
Refining		x	x	x		x	1. Hydrometallurgical tests.	x	
Smelting		x	x	x			1. Flash smelting tests.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 4)																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Smelting		2,3	2,3	2,3				2	2	2				3	3	3		

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Generally in connection with on-going projects of the engineering division.							Availability of staff as consultants or experts : Yes 5) for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : No information provided.  Duration : No information provided.

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
No information provided.																		
Languages : No information provided. Assistance obtained in the past : No information provided.												Duration : No information provided.						

## 14. DOCUMENTS

: Availability of brochures, annual report.

15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	Additional information concerning other projects can be obtained from the Outokumpu News (Table 9).
2)	Training given in connection with the on-going projects of the division (Table 9).
3)	Training given in connection with the anticipated projects of the division (Table 10).
4)	Further information can be obtained from the Outokumpu News (Table 11).
5)	In limited numbers (Table 12).

1. NAME : TECHNICAL RESEARCH CENTRE OF FINLAND (VTT), METALS LABORATORY

2. ADDRESS : Kemistintie 3,  
:  
: SF-02150 ESPOO,  
: Finland

3. TELEPHONE : 358-0-4561  
  
TELEX : 122972 VTTTH SF  
CABLE : No information provided.

4. DIRECTOR : Prof. J. Forestén  
:

5. CONTACT : P. Auerkar  
PERSON(S) :

6. STAFF: 115

7. BUDGET / : US\$5 Million. YEAR : 1985  
SOURCE : 55% Industrial, 40% Public and  
OF FUNDS : 5% Foreign Sources.

8. RELATIONSHIP : State-owned Public Non-profit  
WITH OTHER : Institute.  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Manufacture of products	x						1. High-strength Al-alloys.	x	
		x					1. Long-term integrity of copper capsules.	x	
Technology (not explicitly mentioned)	x						1. High-strength Al-alloys.	x	
		x					1. Long-term integrity of copper capsules.	x	

10. ANTICIPATED PROJECTS											
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE			R	T
No information provided.											

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 1)																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn



## 14. DOCUMENTS

: Availability of brochures, annual report.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No availability of pilot installation/equipment (Table 11).
2)	No technical co-operation requested (Table 13).



1. NAME : CENTRE TECHNIQUE DES INDUSTRIES DE LA FONDERIE

2. ADDRESS : 12, Avenue Raphaël,  
:  
: 75016 PARIS,  
: France

3. TELEPHONE : (1) 4504 7250  
  
TELEX : CTIFPA 611054F  
CABLE : CENTRE FONDERIE

4. DIRECTOR : Claude Mascré  
:

5. CONTACT : J-C. Margerie  
PERSON(S) :

6. STAFF: 200

7. BUDGET / : US\$7.8 Million. YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : All the French Foundries.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Manufacture of products 1)	x						1. Quality control of aluminium castings by ultrasonics;	x	
	x					x	2. Feasibility of squeeze casting. 1. C.A. calculations of gating systems for pressure die casting of Al and Zn alloys.	x	x

10. ANTICIPATED PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
	Manufacture of products see note 1)		x						1. Thermal modelling of sand or permanent molded brass castings. 2. Control of copper equivalent factor by thermal analysis in foundry plants.

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT

PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Manufacture of products see note 2)	9	9				9							9	9				9

12. TECHNICAL CO-OPERATION - GIVEN

FIELDS OF TRAINING PROGRAM	TECHNICAL CO-OPERATION - GIVEN						STAFF AVAILABILITY AND TRAINING
	Al	Cu	Pb	Ni	Sn	Zn	
Manufacture of products 1)	x	x				x	Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : French  Duration : Three days or more.

13. TECHNICAL CO-OPERATION - REQUESTED 3)

FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Languages : No information provided. Assistance obtained in the past : European Community Commission (DG XII - DG XIII).																		
												Duration : No information provided.						

## 14. DOCUMENTS

: Availability of brochures, annual report.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	Foundry (Table 10).
2)	Laboratories (foundry), (Table 11).
3)	No request for technical co-operation (Table 13).

1. NAME : LABORATOIRES POURQUERY

2. ADDRESS : 93 Bd Du Par d'Artillerie,  
: B.P. 7251,  
: 69354 LYON CEDEX 07,  
: France

3. TELEPHONE : 7861 2116  
  
TELEX : 900988  
CABLE : No information provided.

4. DIRECTOR : Pourquery Ivan  
:

5. CONTACT : Chanel Alain  
PERSON(S) :

6. STAFF: 48

7. BUDGET / : US\$2 Million. YEAR : 1985  
SOURCE : Private Laboratory.  
OF FUNDS :

8. RELATIONSHIP : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Exploration of deposits Standard technologies													1	1	1	1	1	1
													2	2	2	2	2	2



## 14. DOCUMENTS

: Availability of brochures.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No technical co-operation requested (Table 13).



1. NAME : UNIVERSITY OF VALENCIENNES

2. ADDRESS : Le Mont Houy,  
:  
: 59326 VALENCIENNES CEDEX,  
: France

3. TELEPHONE : 2742 4100  
  
TELEX : UNIVHC 810 270  
CABLE : No information provided.

4. DIRECTOR : Pierre Tison  
:

5. CONTACT : Yves Ravalard  
PERSON(S) :

6. STAFF: 250

7. BUDGET / : US\$10.000.000.- YEAR : 1985  
SOURCE : Minister of Education, Private Contracts.  
OF FUNDS :

8. RELATIONSHIP : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Manufacture of products	x						1. Development of new methods.	x	
		x					1. For computing plastic flows.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Manufacture of products	x	x					1. Application of the rotary forging processes to Al-alloy products.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Manufacture of products	1,3												1					

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
							Availability of staff as consultants or experts : Yes for UNIDO field assignments
Training program available for own nationals : No							
Training program available for other nationals : No							
Training languages : -							
Duration : -							

13. TECHNICAL CO-OPERATION - REQUESTED 1)																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Languages : -													Duration : -					
Assistance obtained in the past : University of Denmark.																		

## 14. DOCUMENTS

: No information provided.

## 15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No technical co-operation requested (Table 13).

1. NAME : AACHEN TECHNICAL UNIVERSITY, INSTITUTE OF NON-FERROUS AND ELECTROMETALLURGY

2. ADDRESS : Intzestrasse 3,  
:  
: D-51 AACHEN,  
: Germany FR

3. TELEPHONE : 0241-805 850  
  
TELEX : 0852704  
CABLE : No information provided.

4. DIRECTOR : Prof. Dr. Ing. Joachim Krueger  
:

5. CONTACT : No information provided.  
PERSON(S) :

6. STAFF: 40

7. BUDGET / : US\$1.000.000.- YEAR : 1985  
SOURCE : Approx. 50% State, other 50% Open  
OF FUNDS : Funding (State, EC, Industry, DFG).

8. RELATIONSHIP : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying Recycling and recovery operations	x	x	x	x	x	x	1. Applied material science.	x	
	x	x	x	x	x	x	1. Recycling of metals. 2. Vacuum metallurgy. 3. Environmental control. 4. Electrometallurgy.	x x x x	
Refining	x	x	x	x	x	x	1. Aluminium technology.	x	
	x	x	x	x	x	x	1. University courses (non-ferrous metallurgy and electrometallurgy). 2. Vacuum metallurgy. 3. Metal refining. 4. Applied electrochemistry. 5. Plasma technology. 5. Environmental control.	x x x x x	x

9. (Contd.) ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Refining (Contd.)	x						1. Alumirium technology.	x	
	x	x	x			x	1. University courses in non-ferrous metallurgy and electrometallurgy.		x
Smelting	x	x	x	x	x	x	1. Plasma technology.	x	
							2. Environmental control.	x	
							3. Electrometallurgy.	x	
	x	x	x			x	1. University courses.		x

10. ANTICIPATED PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying	x	x	x	x	x	x	1. Applied material science.	x	
Recycling and recovery operations	x	x	x	x	x	x	1. Recycling of metals.	x	
							2. Vacuum metallurgy.	x	
							3. Environmental control.	x	
							4. Electrometallurgy.	x	
	x						1. Aluminium technology.	x	
	x	x	x			x	1. University courses (non-ferrous metallurgy and electrometallurgy).		x
Refining	x	x	x	x	x	x	1. Vacuum metallurgy.	x	
							2. Metal refining.	x	
							3. Applied electrochemistry.	x	
							4. Plasma technology.	x	
							5. Environmental control.	x	
	x						1. Aluminium technology.	x	
	x	x	x			x	1. University courses in non-ferrous metallurgy and electrometallurgy.		x
Smelting	x	x	x	x	x	x	1. Plasma technology.	x	
							2. Environmental control.	x	
							3. Electrometallurgy.	x	
	x	x	x			x	1. University courses.		x

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT

PURPOSE OF OPERATION FIELDS OF ACTIVITY 1)	a. RESEARCH 2)						b. TRAINING 2)						c. INDUSTRIAL APPLICATION 2&3)					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn



12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Alloying	x	x	x	x	x	x	Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : German, English; if necessary also Spanish, Chinese  Duration : As desired, short courses, three to twenty days.
Recycling and recovery operations	x	x	x	x	x	x	
Refining	x	x	x	x	x	x	
Smelting	x	x	x	x	x	x	
Standard technologies	x	x	x	x	x	x	

13. TECHNICAL CO-OPERATION - REQUESTED 4)																			
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Languages : - Assistance obtained in the past : None.												Duration : -							

## 14. DOCUMENTS

: Availability of brochures.

## 15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No specific information provided concerning the metals listed and the fields of activity (Table 11).
2)	Extent of operation: 9 (Table 11).
3)	Pilot plant scale available; further information and details about the available facilities can be obtained from institute brochures and respective documents (Table 11).
4)	No technical co-operation requested (Table 13).

1. NAME : INSTITUT FUER METALLURGIE - METALLHUETTENKUNDE - BH 15

2. ADDRESS : Technische Universitaet Berlin,  
: Strasse des 17. Juni 135,  
: 1000 BERLIN 12,  
: Germany FR

3. TELEPHONE : 030.314 2249  
  
TELEX : 184262 TUELN-D  
CABLE : No information provided.

4. DIRECTOR : Prof. Dr. Ing. Dr. h.c. Roland  
: Kammel

5. CONTACT : No information provided.  
PERSON(S) :

6. STAFF: 25

7. BUDGET / : No information provided.  
SOURCE :  
OF FUNDS :

8. RELATIONSHIP : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Recycling and recovery operations		x					1. Copper scrap converter.	x	
							2. Copper scrap shaft furnace.	x	
			x				3. Copper recovery from effluents.	x	
Refining					x		1. Lead from copper scrap.	x	
						x	1. Tin from copper scrap.	x	
				x			1. Zinc from copper scrap.	x	
Electroplating	x						1. Nickel recovery from effluents.	x	
					x		1. Al-electrolysis crust formation.	x	
Electroplating	x						2. Al-electrolysis bottom sludge formation.	x	
		x					1. Tin electrorefinery.	x	
							1. Al-electroplating.	x	
							1. Cu-electroplating.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Plating		x					1. Alloy plating.	x	
			x				1. Lead electroplating.	x	
						x	1. Hot dip galvanizing.	x	
Hydrometallurgy		x					1. Hydrometallurgy of sulphide ores.	x	
				x		x	1. Hydrometallurgy of sulphide ores.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH 2)						b. TRAINING						c. INDUSTRIAL APPLICATION 2)					
FIELDS OF ACTIVITY 1)	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM 3)	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
							Availability of staff as consultants or experts : See 3) for UNIDO field assignments  Training program available for own nationals : See 3)  Training program available for other nationals : See 3)  Training languages : No information provided.  Duration : See note 3).

13. TECHNICAL CO-OPERATION - REQUESTED 4)																			
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Languages : - Assistance obtained in the past : Bilateral co-operation (no further information provided).												Duration : -							

## 14. DOCUMENTS

: Availability of annual report.

15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No information provided concerning the metals listed (Table 11).
2)	Extent of operation: 3 (Table 11).
3)	Depends on the time and efforts involved (Table 12).
4)	No technical co-operation requested (Table 13).

1. NAME : INSTITUT FUER WELTWIRTSCHAFT AN DER UNIVERSITAET KIEL

2. ADDRESS : Düsternbrooker Weg 120,  
:  
: D-2300 KIEL,  
: Germany FR

3. TELEPHONE : (0431) 884-1  
  
TELEX : 292 479 WELTW D  
CABLE : WELTWIRTSCHAFT KIEL

4. DIRECTOR : President Prof. Dr. Drs.  
: h.c. Herbet Giersch

5. CONTACT : Dr. Martin Hoffmeyer  
PERSON(S) :

6. STAFF: No  
information  
provided.

7. BUDGET / : No information provided.  
SOURCE :  
OF FUNDS :

8. RELATIONSHIP : Research Institute at the University  
WITH OTHER : of Kiel.  
ORGANIZATIONS :

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
International markets	x	x	x	x	x	x	1. Medium-term trends of international non-ferrous metals markets.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 1)																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn



12. TECHNICAL CO-OPERATION - GIVEN										
FIELDS OF TRAINING PROGRAM	A1	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING			
								Availability of staff as consultants or experts : See 2) for UNIDO field assignments  Training program available for own nationals : No  Training program available for other nationals : No  Training languages : -  Duration : -		

13. TECHNICAL CO-OPERATION - REQUESTED 3)																			
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	A1	Cu	Pb	Ni	Sn	Zn	A1	Cu	Pb	Ni	Sn	Zn	A1	Cu	Pb	Ni	Sn	Zn	
Languages : - Assistance obtained in the past : None.												Duration : -							

## 14. DOCUMENTS

: No information provided.

## 15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No availability of pilot installation/equipment (Table 11).
2)	No information provided (Table 12).
3)	No technical co-operation requested (Table 13).

1. NAME : KHD HUMBOLDT WEDAG AG CONSULTING - DEPARTMENT IT-Z

2. ADDRESS : Wiersbergstrasse,  
:  
: 5000 KÖLN 91,  
: Germany FR

3. TELEPHONE : 221/823-6404

TELEX : 8812-262/263  
CABLE : HUMBOLDTWEDAG KOELN  
FAX. : 221/823-7240

4. DIRECTOR : Dipl.-Ing. J. Mehlbeer  
:

5. CONTACT : Dipl.-Ing. L. Andresen  
PERSON(S) : Dr. Ing. C. Beinhoff

6. STAFF: 1)

7. BUDGET / : US\$100 Million (Approx.). YEAR : 1985  
SOURCE : Own R&D and contract basis.  
OF FUNDS :

8. RELATIONSHIP : Subsidiary of KHD AG, Cologne.  
WITH OTHER :  
ORGANIZATIONS :

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alternative technologies		x					1. Feasibility study for the development of a porphyry copper deposit in Hungary.	x	
Auxiliary utilities for processing	x				x		1. Survey of the national tin mines in Bolivia. 1. Prefeasibility study for the erection of aluminium works at the Arabic Gulf.	x x	
		x					1. Study for metallurgical processing of complex non-ferrous metal concentrates in Romania. 2. Feasibility study for a copper refinery in Uganda. 3. Study for the modernization and extension of a copper smelting plant in Chile.	x x x	

		9. (Contd.) ON-GOING PROJECTS									
FIELDS OF ACTIVITY		Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T	
Auxiliary utilities for processing (Contd.)			x					4. Investigation of the possibilities of metallurgical processing for Burmese lead-, zinc- and copper concentrates.	x		
								5. Feasibility study for the development of a porphyry copper deposit in Hungary.	x		
									6. Study for the erection of a copper smelting plant in Chile.	x	
									7. Study for the extension of a copper smelter in Yugoslavia.	x	
									8. Studies for the erection of copper smelting plants in Italy and Poland.	x	
					x				1. Project study of a preparation plant for lead-zinc ore in Algeria.	x	
									2. Project study for a dense medium plant and flotation for lead zinc-ores in Burma.	x	
									3. Technical and economical study for the rehabilitation of a lead-zinc-baryte-flour spar ore mine in Tunisia.	x	
									4. Investigation of the possibilities of metallurgical processing for Burmese lead-, zinc- and copper concentrates.	x	
									5. Study for metallurgical processing of complex non-ferrous metal concentrates in Romania.	x	
									6. Study for the erection of a lead-silver-smelting plant in Bolivia.	x	
									7. Study for the erection of a large-scale lead smeltery and refining plant in the GFR.	x	
							x		1. Survey of the national tin mines in Bolivia.	x	
									2. Feasibility study on the preparation of tin and tungsten ores from deposits in Burma.	x	
									3. Feasibility study for the erection of a tin smelter and its later extension in Bolivia.	x	
									4. Feasibility study for the erection of a tin smelter on the basis of low-grade tin concentrates.	x	

9. (Contd.)		ON-GOING PROJECTS							
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Auxiliary utilities for processing (Contd.)						x	1. Study for metallurgical processing of complex non-ferrous metal concentrates in Romania.	x	
							2. Feasibility study for the erection of a zinc smelter in Bolivia.	x	
							3. Investigation of the possibilities of metallurgical processing for Burmese lead-, zinc- and copper concentrates.	x	
							4. Technical and economical study for the rehabilitation of a lead-zinc-baryte-flour spar ore mine in Tunisia.	x	
							5. Project study for a dense medium plant and flotation for lead zinc-ores in Burma.	x	
							6. Project study of a preparation plant for lead-zinc ore in Algeria.	x	
Beneficiation of ores	x	x					1. Prefeasibility study for the erection of aluminium works at the Arabic Gulf.	x	
							1. Consulting the copper industry in Zambia and Zaire.	x	
							2. Evaluation of copper deposits in Iran.	x	
							3. Feasibility study for the development of a porphyry copper deposit in Hungary.	x	
							4. Study for the extension of a copper smelter in Yugoslavia.	x	
							5. Study for the erection of a copper smelting plant in Chile.	x	
							1. Evaluation of lead-zinc deposits in the Pyrenees.	x	
							2. Project study of a preparation plant for lead-zinc ore in Algeria.	x	
							3. Project study for a dense medium plant and flotation for lead zinc-ores in Burma.	x	
							4. Technical and economical study for the rehabilitation of a lead-zinc-baryte-flour spar ore mine in Tunisia.	x	

		9. (Contd.) ON-GOING PROJECTS							
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Beneficiation of ores (Contd.)					x		1. Survey of the national tin mines in Bolivia.	x	
							2. Feasibility study on the preparation of tin and tungsten ores from deposits in Burma.	x	
Exploration of deposits						x	1. Technical and economical study for the rehabilitation of a lead-zinc-baryte-flour spar ore mine in Tunisia.	x	
							2. Project study for a dense medium plant and flotation for lead zinc-ores in Burma.	x	
							3. Project study of a preparation plant for lead-zinc ore in Algeria.	x	
							4. Evaluation of lead-zinc deposits in the Pyrenees.	x	
		x					1. Prospecting for copper in Zambia.	x	
		x					2. Geochemical sampling programme for copper in Zambia.	x	
		x					3. Consulting the copper industry in Zambia and Zaire.	x	
		x					4. Evaluation of copper deposits in Iran.	x	
		x					5. Study for the extension of a copper smelter in Yugoslavia.	x	
		x					6. Feasibility study for the development of a porphyry copper deposit in Hungary.	x	
			x			1. Exploration of lead-zinc deposits in Afghanistan.	x		
						2. Evaluation of lead-zinc deposits in the Pyrenees.	x		
						3. Technical and and economical study for the rehabilitation of a lead-zinc-baryte-flour spar ore mine in Tunisia.	x		
					x		1. Proposals for sampling of an alluvial gold-tin deposit in Peru.	x	
							2. Survey of the national tin mines in Bolivia.	x	

		9. (Contd.) ON-GOING PROJECTS							
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Exploration of deposits (Contd.)						x	1. Exploration of lead-zinc deposits in Afghanistan. 2. Evaluation of lead-zinc deposits in the Pyrenees. 3. Technical and economical study for the rehabilitation of a lead-zinc-baryte-flour spar ore mine in Tunisia.	x	
Manufacture of products	x	x					1. Prefeasibility study for the erection of aluminium works at the Arabic Gulf. 1. Studies for the erection of copper smelting plants in Italy and Poland. 2. Study for the extension of a copper smelter in Yugoslavia. 3. Study for the erection of a copper smelting plant in Chile. 4. Feasibility study for the development of a porphyry copper deposit in Hungary. 5. Investigation of the possibilities of metallurgical processing for Burmese lead-, zinc- and copper concentrates. 6. Study for the modernization and extension of a copper smelting plant in Chile. 7. Feasibility study for a copper refinery in Uganda. 8. Study for metallurgical processing of complex non-ferrous metal concentrates in Romania.	x	
			x				1. Study for metallurgical processing of complex non-ferrous metal concentrates in Romania. 2. Study for the erection of a lead-silver-smelting plant in Bolivia. 3. Study for the erection of a large-scale lead smeltery and refining plant in the GFR.	x	

9. (Contd.) ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T	
Manufacture of products (Contd.)			x				4. Investigation of the possibilities of metallurgical processing for Burmese lead-, zinc- and copper concentrates.	x		
							5. Technical and economical study for the rehabilitation of a lead-zinc-baryte-flour spar ore mine in Tunisia.	x		
					x		1. Feasibility study for the erection of a tin smelter and its later extension in Bolivia.	x		
							2. Feasibility study for the erection of a tin smelter on the basis of low-grade tin concentrates.	x		
							3. Survey of the national tin mines in Bolivia.	x		
						x	1. Study for metallurgical processing of complex non-ferrous metal concentrates in Romania.	x		
							2. Investigation of the possibilities of metallurgical processing for Burmes lead-, zinc- and copper concentrates.	x		
							3. Technical and economical study for the rehabilitation of a lead-zinc-baryte-flour spar ore mine in Tunisia.	x		
							4. Feasibility study for the erection of a zinc smelter in Bolivia.	x		
	Main utilities for processing	x						1. Prefeasibility study for the erection of aluminium works at the Arabic Gulf.	x	
			x					1. Study for metallurgical processing of complex non-ferrous metal concentrates in Romania.	x	
								2. Feasibility study for a copper refinery in Uganda.	x	
								3. Study for the modernization and extension of a copper smelting plant in Chile.	x	
							4. Investigation of the possibilities of metallurgical processing for Burmese lead-, zinc- and copper concentrates.	x		



		9. (Contd.) ON-GOING PROJECTS								
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T	
Main utilities for processing (Contd.)		x					5. Study for the erection of a copper smelting plant in Chile.	x		
							6. Study for the extension of a copper smelter in Yugoslavia.	x		
							7. Studies for the erection of copper smelting plants in Italy and Poland.	x		
							8. Feasibility study for the development of a porphyry copper deposit in Hungary.	x		
				x			1. Investigation of the possibilities of metallurgical processing for Burmese lead-, zinc- and copper concentrates.	x		
						x	2. Study for metallurgical processing of complex non-ferrous metal concentrates in Romania.	x		
							1. Survey of the national tin mines in Bolivia.	x		
							2. Feasibility study for the erection of a tin smelter and its later extension in Bolivia.	x		
							3. Feasibility study for the erection of a tin smelter on the basis of low-grade tin concentrates.	x		
						x	1. Study for metallurgical processing of complex non-ferrous metal concentrates in Romania.	x		
							2. Feasibility study for the erection of zinc smelter in Bolivia.	x		
							3. Investigation of the possibilities of metallurgical processing for Burmese lead-, zinc- and copper concentrates.	x		
	Mining of principal materials or alternative ores		x					1. Consulting the copper industry in Zambia and Zaire.	x	
								2. Evaluation of copper deposits in Iran.	x	
							3. Feasibility study for the development of a porphyry copper deposit in Hungary.	x		

9. (Contd.) ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Mining of principal materials or alternative ores (Contd.)			x				1. Evaluation of lead-zinc deposits in the Pyrenees.	x	
							2. Reorganization of a lead-zinc mine in Iran.	x	
							3. Technical and economical study for the rehabilitation of a lead-zinc-baryte-flour spar ore mine in Tunisia.	x	
					x		1. Survey of the national tin mines in Bolivia.	x	
						x	1. Evaluation of lead-zinc deposits in the Pyrenees.	x	
							2. Reorganization of a lead-zinc mine in Iran. 3. Technical and economical study for the rehabilitation of a lead-zinc-baryte-flour spar ore mine in Tunisia.	x x	
Recycling and recovery operations			x				1. Proposals for the utilization of waste and slag dumps of lead-zinc mines and smelting plants by thermal enrichment.	x	
							2. Sampling and project study for the erection of a thermal enrichment plant for the utilization of leaching rejects and tailings of the Zambian lead-zinc industry.	x	
							3. Project studies for thermal enrichment of zinc on the basis of various rejects and tailings of the lead-zinc industries in Austria, Iran, Italy, Mexico and Turkey.	x	
							4. Feasibility study for primary lead smelting companies in the USA, Canada, Taiwan, Morocco, Tunisia and Bolivia about the utilization of the KIVCET-CS process for Pb- based concentrates and cyclone smelting Pb-Zn concentrates.	x	
					x		1. Study for a nickel recovery plant on the basis of lateritic ores.	x	
					x	1. Feasibility study of a thermal enrichment plant for stanniferous tailings.	x		

9. (Contd.)		ON-GOING PROJECTS							
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Recycling and recovery operations (Contd.)						x	1. Prefeasibility study for the erection of a zinc-electrolysis plant in Algeria.	x	
							2. Proposals for the utilization of waste and slag dumps of lead-zinc mines and smelting plants by thermal enrichment.	x	
							3. Sampling and project study for the erection of a thermal enrichment plant for the utilization of leaching rejects and tailings of the Zambian lead-zinc industry.	x	
							4. Project studies for thermal enrichment of zinc on the basis of various rejects and tailings of the lead-zinc industries in Austria, Iran, Italy, Mexico and Turkey.	x	
							5. Comparative study about three hydrometallurgical and combined pyro- and hydrometallurgical processes for the treatment of zinc neutral leach residues, based on pilot plant tests in Bolivia.	x	
							6. Feasibility study for primary lead smelting companies in the USA, Canada, Taiwan, Morocco, Tunisia and Bolivia about the utilization of the KIVCET-CS process for Pb- based concentrates and cyclone smelting Pb-Zn concentrates.	x	
Refining	x						1. Prefeasibility study for the erection of aluminium works at the Arabic Gulf.	x	
		x					1. Consulting the copper industry in Zambia and Zaire.	x	
							2. Feasibility study for the development of a porphyry copper deposit in Hungary.	x	
							3. Study for the erection of a copper smelting plant in Chile.	x	
						4. Study for the extension of a copper smelter in Yugoslavia.	x		

9. (Contd.)		ON-GOING PROJECTS							
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Refining (Contd.)		x					5. Studies for the erection of copper smelting plants in Italy and Poland.	x	
							6. Feasibility study for a copper refinery in Uganda.	x	
							7. Study for the modernization and extension of a copper smelting plant in Chile.	x	
							8. Investigation of the possibilities of metallurgical processing for Burmese lead-, zinc- and copper concentrates.	x	
				x			9. Study for metallurgical processing of complex non-ferrous metal concentrates in Romania.	x	
							1. Investigation of the possibilities of metallurgical processing for Burmese lead-, zinc- and copper concentrates.	x	
							2. Study for metallurgical processing of complex non-ferrous metal concentrates in Romania.	x	
							3. Study for the erection of a lead-silver-smelting plant in Bolivia.	x	
							4. Study for the erection of a large-scale lead smeltery and refining plant in the GFR.	x	
							5. Proposals for the utilization of waste and slag dumps of lead-sinc mines and smelting plants by thermal enrichment.	x	
							6. Sampling and project study for the erection of a thermal enrichment plant for the utilization of leaching rejects and tailings of the Zambian lead-zinc industry.	x	
							7. Project studies for thermal enrichment of zinc on the basis of various rejects and tailings of the lead-zinc industries in Austria, Iran, Italy, Mexico and Turkey.	x	

9. (Contd.)		ON-GOING PROJECTS							
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Refining (Contd.)			x				8. Feasibility study for primary lead smelting companies in the USA, Canada, Taiwan, Morocco, Tunisia and Bolivia about the utilization of the KIVCET-CS process for Pb-based concentrates and cyclone smelting Pb-Zn concentrates.	x	
				x			1. Study for a nickel recovery plant on the basis of lateritic ores.	x	
					x		1. Survey of the national tin mines in Bolivia.	x	
							2. Feasibility study of a thermal enrichment plant for stanniferous tailings.	x	
							3. Feasibility study for the erection of a tin smelter and its later extension in Bolivia.	x	
							4. Feasibility study for the erection of a tin smelter on the basis of low-grade tin concentrates.	x	
						x	1. Investigation of the possibilities of metallurgical processing for Burmese lead-, zinc- and copper concentrates.	x	
							2. Study for metallurgical processing of complex non-ferrous metal concentrates in Romania.	x	
							3. Feasibility study for the erection of a zinc smelter in Bolivia.	x	
							4. Prefeasibility study for the erection of a zinc-electrolysis plant in Algeria.	x	
							5. Proposals for the utilization of waste and slag dumps of lead-zinc mines and smelting plants by thermal enrichment.	x	
							6. Sampling and project study for the erection of a thermal enrichment plant for the utilization of leaching rejects and tailings of the Zambian lead-zinc industry.	x	

9. (Contd.) ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Refining (Contd.)						x	7. Project studies for thermal enrichment of zinc on the basis of various rejects and tailings of the lead-zinc industries in Austria, Iran, Italy, Mexico and Turkey. 8. Comparative study about three hydrometallurgical and combined pyro- and hydrometallurgical processes for the treatment of zinc neutral leach residues, based on pilot plant tests in Bolivia. 9. Feasibility study for primary lead smelting companies in the USA, Canada, Taiwan, Morocco, Tunisia, and Bolivia about the utilization of the KIVCET-CS process for Pb-based concentrates and cyclone smelting Pb-Zn concentrates.	x	
Smelting	x	x					1. Prefeasibility study for the erection of aluminium works at the Arabic Gulf. 1. Consulting the copper industry in Zambia and Zaire. 2. Feasibility study for the development of a porphyry copper deposit in Hungary. 3. Study for the erection of a copper smelting plant in Chile. 4. Study for the extension of a copper smelter in Yugoslavia. 5. Studies for the erection of copper smelting plants in Italy and Poland. 6. Feasibility study for a copper refinery in Uganda. 7. Study for the modernization and extension of a copper smelting plant in Chile. 8. Investigation of the possibilities of metallurgical processing for Burmese lead-, zinc- and copper concentrates.	x	

9. (Contd.)		ON-GOING PROJECTS							
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Smelting (Contd.)		x					9. Study for metallurgical processing of complex non-ferrous metal concentrates in Romania.	x	
			x				1. Investigation of the possibilities of metallurgical processing for Burmese lead-, zinc- and copper concentrates.	x	
							2. Study for metallurgical processing of complex non-ferrous metal concentrates in Romania.	x	
							3. Study for the erection of a large-scale lead smeltery and refining plant in the FRG.	x	
							4. Proposals for the utilization of waste and slag dumps of lead-zinc mines and smelting plants by thermal enrichment.	x	
							5. Sampling and project study for the erection of a thermal enrichment plant for the utilization of leaching rejects and tailings of the Zambian lead-zinc industry.	x	
							6. Project studies for thermal enrichment of zinc on the basis of various rejects and tailings of the lead-zinc industries in Austria, Iran, Italy, Mexico and Turkey.	x	
							7. Feasibility study for primary lead smelting companies in the USA, Canada, Taiwan, Morocco, Tunisia and Bolivia about the utilization of the KIVCET-CS process for Pb-based concentrates and cyclone smelting Pb-Zn concentrates.	x	
							8. Study for the erection of a lead-silver-smelting plant in Bolivia.	x	
					x		1. Study for a nickel recovery plant on the basis of lateritic ores.	x	
						x	1. Survey of the national tin mines in Bolivia.	x	
							2. Feasibility study of a thermal enrichment plant for stanniferous tailings.	x	

9. (Contd.) ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Smelting (Contd.)					x		3. Feasibility study for the erection of a tin smelter and its later extension in Bolivia.	x	
							4. Feasibility study for the erection of a tin smelter on the basis of low-grade tin concentrates.	x	
						x	1. Investigation of the possibilities of metallurgical processing for Burmese lead-, zinc- and copper concentrates.	x	
							2. Study for metallurgical processing of complex non-ferrous metal concentrates in Romania.	x	
							3. Feasibility study for the erection of a zinc smelter in Bolivia.	x	
							4. Prefeasibility study for the erection of a zinc-electrolysis plant in Algeria.	x	
							5. Proposals for the utilization of waste and slag dumps of lead-zinc mines and smelting plants by thermal enrichment.	x	
							6. Sampling and project study for the erection of a thermal enrichment plant for the utilization of leaching rejects and tailings of the Zambian lead-zinc industry.	x	
						7. Project studies for thermal enrichment of zinc on the basis of various rejects and tailings of the lead-zinc industries in Austria, Iran, Italy, Mexico and Turkey.	x		
						8. Comparative study about three hydrometallurgical and combined pyro- and hydrometallurgical processes for the treatment of zinc neutral leach residues, based on pilot plant tests in Bolivia.	x		



FIELDS OF ACTIVITY	9. (Contd.) ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Smelting (Contd.)						x	9. Feasibility study for primary lead smelting companies in the USA, Canada, Taiwan, Morocco, Tunisia and Bolivia about the utilization of the KIVCET-CS process for Pb-based concentrates and cyclone smelting Pb-Zn concentrates.	x	
Standard technologies	x						1. Prefeasibility study for the erection of aluminium works at the Arabic Gulf.	x	
		x					1. Consulting the copper industry in Zambia and Zaire.	x	
							2. Feasibility study for the development of a porphyry copper deposit in Hungary.	x	
							3. Study for the erection of a copper smelting plant in Chile.	x	
							4. Study for the extension of a copper smelter in Yugoslavia.	x	
							5. Studies for the erection of copper smelting Plants in Italy and Poland.	x	
							6. Feasibility study for a copper refinery in Uganda.	x	
							7. Study for the modernization and extension of a copper smelting plant in Chile.	x	
							8. Investigation of the possibilities of metallurgical processing for Burmese lead-, zinc- and copper concentrates.	x	
							9. Study for metallurgical processing of complex non-ferrous metal concentrates in Romania.	x	
			x				1. Feasibility study for primary lead smelting companies in the USA, Canada, Taiwan, Morocco, Tunisia and Bolivia about the utilization of the KIVCET-CS process for Pb-based concentrates and cyclone smelting Pb-Zn concentrates.	x	

9. (Contd.) ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T		
Standard technologies (Contd.)			x				2. Sampling and project study for the erection of a thermal enrichment plant for the utilization of leaching rejects and tailings of the Zambian lead-zinc industry.	x			
							3. Project studies for thermal enrichment of zinc on the basis of various rejects and tailings of the lead-zinc industries in Austria, Iran, Italy, Mexico and Turkey.	x			
							4. Study for metallurgical processing of complex non-ferrous metal concentrates in Romania.	x			
							5. Study for the erection of a lead-silver-smelting plant in Bolivia.	x			
							6. Study for the erection of a large-scale lead smeltery and refining plant in the GFR.	x			
							7. Proposals for the utilization of waste and slag dumps of lead-zinc mines and smelting plants by thermal enrichment.	x			
							8. Investigation of the possibilities of metallurgical processing for Burmese lead-, zinc- and copper concentrates.	x			
							9. Technical and economical study for the rehabilitation of a lead-zinc-baryte-flour spar ore mine in Tunisia.	x			
							x	1. Study for a nickel recovery plant on the basis of lateritic ores.	x		
								x	1. Feasibility study for the erection of a tin smelter and its later extension in Bolivia.	x	
									2. Feasibility study for the erection of a tin smelter on the basis of low-grade tin concentrates.	x	
							3. Feasibility study of a thermal enrichment plant for stanniferous tailings.	x			

9. (Contd.)		ON-GOING PROJECTS							
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Standard technologies (Contd.)						x	1. Technical and economical study for the rehabilitation of a lead-zinc-baryte-flour spar ore mine in Tunisia.	x	
							2. Investigation of the possibilities of metallurgical processing for Burmese lead-, zinc- and copper concentrates.	x	
							3. Study for metallurgical processing of complex non-ferrous metal concentrates in Romania.	x	
							4. Feasibility study for the erection of a zinc smelter in Bolivia.	x	
							5. Prefeasibility study for the erection of a zinc-electrolysis plant in Algeria.	x	
							6. Proposals for the utilization of waste and slag dumps of lead-zinc mines and smelting plants by thermal enrichment.	x	
							7. Sampling and project study for the erection of a thermal enrichment plant for the utilization of leaching rejects and tailings of the Zambian lead-zinc industry.	x	
							8. Project studies for thermal enrichment of zinc on the basis of various rejects and tailings of the lead-zinc industries in Austria, Iran, Italy, Mexico and Turkey.	x	
							9. Comparative study about three hydrometallurgical and combined pyro- and hydrometallurgical processes for the treatment of zinc neutral leach residues, based on pilot plant tests in Bolivia.	x	
							10. Feasibility study for primary lead smelting companies in the USA, Canada, Taiwan, Morocco, Tunisia and Bolivia about the utilization of the KIVCET-CS process for Pb- based concentrates and cyclone smelting Pb-Zn concentrates.	x	

9. (Contd.) ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Economics					x		1. Economic consultancy for an intended tin smelting plant in Burma.	x	
Environmental control					x		1. Economic consultancy for an intended tin smelting plant in Burma.	x	
Process control and automation					x		1. Economic consultancy for an intended tin smelting plant in Burma.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alternative technologies			x		x	x	1. Study on the improved recovery of tin and lead/zinc minerals from tailing ponds.	x	
							2. Study on the reduction of losses in the running of a tin and lead/zinc beneficiation plant.	x	
Recycling and recovery operations			x		x	x	1. Study on the improved recovery of tin and lead/zinc minerals from tailing ponds.	x	
Smelting			x		x	x	1. Study on the improved recovery of tin and lead/zinc minerals from tailing ponds.	x	
							2. Study on the reduction of losses in the running of a tin and lead/zinc beneficiation plant.	x	
			x		x	x	1. Study on the improved recovery of tin and lead/zinc minerals from tailing ponds.	x	
							2. Study on the reduction of losses in the running of a tin and lead/zinc beneficiation plant.	x	
Environmental control			x		x	x	1. Study on the improved recovery of tin and lead/zinc minerals from tailing ponds.	x	
							2. Study on the reduction of losses in the running of a tin and lead/zinc beneficiation plant.	x	
Process control and automation			x		x	x	1. Study on the improved recovery of tin and lead/zinc minerals from tailing ponds.	x	
							2. Study on the reduction of losses in the running of a tin and lead/zinc beneficiation plant.	x	
Quality control and instrumentation			x		x	x	1. Study on the improved recovery of tin and lead/zinc minerals from tailing ponds.	x	
							2. Study on the reduction of losses in the running of a tin and lead/zinc beneficiation plant.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 2)

PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
FIELDS OF ACTIVITY																		

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Generally in the fields of activities given in the Tables 9. and 10.							Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : No, see 3) Training program available for other nationals : Yes, see 3) Training languages : English, German, French (limited).  Duration : Depending on circumstances and to be agreed beforehand.

13. TECHNICAL CO-OPERATION - REQUESTED 4)																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Languages : - Assistance obtained in the past : None.													Duration : -					

## 14. DOCUMENTS

: Availability of brochures and annual report.

15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	100 in R & D Department.
2)	Extensive information regarding pilot equipment/installation can be basically obtained from the institute's R & D brochures. Examples of such equipment are: Roll-type press/roller mill for compacting and high-pressure comminution; Jones high-intensity wet magnetic separator; Rotary dryer; Vibratory reacting vessel applied for hydro-metallurgical processes etc.
3)	Depending on circumstances and by special agreement (Table 12).
4)	No technical co-operation requested (Table 13).



1. NAME : ONLINE GMBH, INFORMATION SERVICE

2. ADDRESS : Poststr. 42,  
:  
: D-6900 HEIDELBERG,  
: Germany FR

3. TELEPHONE : (6221) 22671

TELEX : 461 782  
CABLE : No information provided.

4. DIRECTOR : Dr. Schumacher  
:

5. CONTACT : Dr. Schumacher  
PERSON(S) :

6. STAFF: 15

7. BUDGET / : US\$0.5 Million. YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Information service	x	x	x	x	x	x	1. Retrieval of technical and commercial information from all leading international databases. 2. Database business for R&D, products and co-operation opportunities (offers and demands), worldwide.	x	x

10. ANTICIPATED PROJECTS											
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE			R	T
No information provided.											

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 1)																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
							Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : No  Training program available for other nationals : No  Training languages : -  Duration : -

13. TECHNICAL CO-OPERATION - REQUESTED 2)																	
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS				
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn
Languages : - Assistance obtained in the past : None.																	
												Duration : -					

## 14. DOCUMENTS

: Availability of brochures.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No availability of pilot installation/equipment (Table 11).
2)	No technical co-operation requested (Table 13).

1. NAME : INSTITUTE OF GEOLOGY AND MINERAL EXPLORATION

2. ADDRESS : 70 Messoghion Av.,  
:  
: 11527 ATHENS,  
: Greece

3. TELEPHONE : 779 8412  
  
TELEX : 21 6357 IGME GR  
CABLE : No information provided.

4. DIRECTOR : Dr. C. Papavassiliou  
:

5. CONTACT : A. Makris  
PERSON(S) :

6. STAFF: 1259  
see 1)

7. BUDGET / : US\$17 Million. YEAR : 1985  
SOURCE : Ministry of Industry, Energy and  
OF FUNDS : Technology.

8. RELATIONSHIP : Financed and controlled by the  
WITH OTHER : Ministry of Industry, Energy and  
ORGANIZATIONS : Technology.

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Beneficiation of ores			x			x	1. Exploration and beneficiation of Molai (SE Greece) polymetallic deposit.	x	
							2. Exploration and beneficiation of Polycastro (NW Greece) base metal deposit.	x	
Exploration of deposits			x			x	1. Exploration and beneficiation of Molai (SE Greece) polymetallic deposit.	x	
							2. Exploration and beneficiation of Polycastro (NW Greece) base metal deposit.	x	
							3. Exploration of Thermes (N. Greece) base metal mineralization.	x	
							4. Exploration of Lavrion base metal.	x	
		x	x			x	1. Exploration of Kirki (NE Greece) base metal mine.	x	

9. (Contd.) ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Exploration of deposits (Contd.)		x					1. Exploration and beneficiation of Limogardi copper mineralization.	x	
Mineralization		x	x			x	1. Prospecting (geological, geochemical, geophysical surveys) of base metal mineralization in Greece.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alternative technologies	x						1. Red mud processing.	x	
Beneficiation of ores		x					1. Microbial leaching of copper ores.	x	
Exploration of deposits		x	x			x	1. Pilot plant study (heavy media and flotation).	x	
							1. Exploration of porphyry copper mineralization in Pontokerasia-Gerakariou area.	x	
			x			x	1. Exploration of base metal mineralization in Velies-Floka (SE Greece) area.	x	
							2. Exploration of base metal ores in Metalliko-Mavros Vrachos area.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																			
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION						
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Benficiation of ores			9			9									3				3
Mineralization		9	9			9													

12. TECHNICAL CO-OPERATION - GIVEN

FIELDS OF TRAINING PROGRAM	TECHNICAL CO-OPERATION - GIVEN						STAFF AVAILABILITY AND TRAINING
	Al	Cu	Pb	Ni	Sn	Zn	
Exploration of deposits	x	x	x	x		x	Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : See 2)  Training languages : English  Duration : 1 - 6 months

13. TECHNICAL CO-OPERATION - REQUESTED 3)

FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Languages : - Assistance obtained in the past : UNDP; bilateral co-operation with Czechoslovakia, USSR, GFR, Italy, France, etc.													Duration : -					



14. DOCUMENTS : Availability of brochures.

15. NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	Number of scientists: 259 (Table 6).
2)	No information provided (Table 12).
3)	No technical co-operation requested (Table 13).

1. NAME : INNOVATION AND DEVELOPMENT BUREAU FOR METALLURGICAL INDUSTRY

2. ADDRESS : Ferinov Budapest V. Oktober 6.u. 7.,  
 : POB 683,  
 : H-1365 BUDAPEST,  
 : Hungary

3. TELEPHONE : 189-902 or  
 189-892  
 TELEX : 22-44-34 koho h  
 CABLE : No information provided.

4. DIRECTOR : Andor Mandoki  
 :

5. CONTACT : Péter Longa, Project Manager  
 PERSON(S) :

6. STAFF: 14,  
 note 1).

7. BUDGET / : US\$1 Million. YEAR : 1985  
 SOURCE :  
 OF FUNDS : No information provided.

8. RELATIONSHIP : State-owned enterprise.  
 WITH OTHER :  
 ORGANIZATIONS :

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying	x	x		x			1. Research and production of complex alloys for iron and steel, aluminium and copper industry.	x	
Refining		x					1. Process for high quality copper production from blister and scrap.	x	
Quality control and instrumentation	x	x	x				1. Universal automatic chemical analyser on thermometric principle for industrial application.	x	

10. ANTICIPATED PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
	Recycling and recovery operations				x				1. Nickel and cadmium recovery from scrap batteries.

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT

PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION						
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Alloying Refining Quality control and instrumentation													1	1					
													1	1					

12. TECHNICAL CO-OPERATION - GIVEN									
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING		
	Alloying Refining Quality control and instrumentation	x	x x x					Availability of staff as consultants or experts for UNIDO field assignments : Yes	
							Training program available for own nationals : Yes		
							Training program available for other nationals : Yes		
							Training languages : English		
							Duration : One month.		

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Recycling and recovery operations	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Languages : English												Duration : 1 - 2 months.						
Assistance obtained in the past : No information provided.																		

14. DOCUMENTS

: No information provided.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	Engineers and Economists (Table 6).

1. NAME : TECHNICAL UNIVERSITY OF BUDAPEST, DEPARTMENT OF MECHANICAL TECHNOLOGY

2. ADDRESS : Goldman Gy. Ter 3 V/2,  
:  
: H-1111 BUDAPEST,  
: Hungary

3. TELEPHONE : 452-194  
  
TELEX : No information provided.  
CABLE : No information provided.

4. DIRECTOR : Dr. Artinger Ijtván  
:

5. CONTACT : Dr. Prohászka  
PERSON(S) :

6. STAFF: 30

7. BUDGET / : US\$200.000.- YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : HUNGALU.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alternative technologies	x	x					1. Increasing the conductivity.	x	1)
Standard technologies	x	x					1. Rapid heat treatment.	x	

10.

## ANTICIPATED PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
	Alternative technologies		x						1. Application of special heat treatment to prepare wire-tool spark-erosion machines.

## 11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT

PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alternative technologies	9	9					9	9					9					

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Alloying	x						Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : Hungarian, English  Duration : 28 - 42 hours (within one semester)

13. TECHNICAL CO-OPERATION - REQUESTED 2)																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Languages : - Assistance obtained in the past : None.												Duration : -						



## 14. DOCUMENTS

: No information provided.

## 15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	Post-graduate courses on Materials' Science (Table 9).
2)	No technical co-operation requested (Table 13).

1. NAME : TECHNICAL UNIVERSITY FOR HEAVY INDUSTRY, DEPARTMENT OF NON-FERROUS METALS

2. ADDRESS :  
:  
: H-3515 MISKOLC-EGGETEMRRAROS,  
: Hungary

3. TELEPHONE : 65-111  
  
TELEX : 62223 UCMIS H  
CABLE : No information provided.

4. DIRECTOR : Dr. Gedeon Pásztor  
:

5. CONTACT : Dr. Gedeon Pásztor  
PERSON(S) :

6. STAFF: 9

7. BUDGET / : US\$8.000.- YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : Ministry of Education.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying	x	x	x	x		x	1. Recycling and recovery of these metals.	x	
Alternative technologies	x	x	x	x		x	1. Principles of metal production.	x	
	x	x	x	x	x	x	1. Metallurgy of these metals.		x
Recycling and recovery operations	x	x	x			x	1. Recycling and recovery of these metals.	x	
	x	x	x	x	x	x	1. Metallurgy of these metals.		x
Refining		x					1. Electrolytic refining of copper.	x	
	x	x	x	x	x	x	1. Metallurgy of these metals.		x
Smelting	x	x	x	x	x	x	1. Metallurgy of these metals.		x
Standard technologies	x	x	x	x	x	x	1. Principles of metals production.	x	
							2. Metallurgy of these metals.		x
Liquid state	x						1. Structure of Alumina solutions.	x	
		x					1. Viscosity of copper melts.	x	

10. ANTICIPATED PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying	x	x	x	x		x	1. Recycling and recovery and refining of these metals.	x	
Alternative technologies	x	x	x	x	x	x	1. Metallurgy of these metals.		x
Energy	x						1. Reduction of specific energy consumption of Al-electrolysis.	x	
Recycling and recovery operations	x	x	x			x	1. Recycling and recovery and refining of these metals.	x	
Refining	x	x	x	x	x	x	1. Metallurgy of these metals.		x
	x	x	x	x	x	x	1. Recycling and refining of these metals.	x	
Smelting	x	x	x	x	x	x	1. Metallurgy of these metals.		x
		x					1. Copper smelting, electrolytic refining of copper.	x	
Standard technologies	x	x	x	x	x	x	1. Copper smelting, electrolytic refining of copper.	x	
Standard technologies	x	x	x	x	x	x	1. Metallurgy of these metals.		x

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 1)

PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
FIELDS OF ACTIVITY																		

12. TECHNICAL CO-OPERATION - GIVEN

FIELDS OF TRAINING PROGRAM							STAFF AVAILABILITY AND TRAINING	
	Al	Cu	Pb	Ni	Sn	Zn		
Alternative technologies	x	x	x	x	x	x	Availability of staff as consultants or experts : Yes	
Recycling and recovery operations	x	x	x	x	x	x	for UNIDO field assignments	
Refining	x	x	x	x	x	x	Training program available for own nationals : Yes	
Smelting	x	x	x	x	x	x	Training program available for other nationals : See 2)	
Standard technologies	x	x	x	x	x	x	Training languages : Hungarian	
							Duration : Continuously.	

13. TECHNICAL CO-OPERATION - REQUESTED

FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Scanning photo sedimentograph	x												x					

Languages : English  
 Assistance obtained in the past : Bergakademie, Freiberg (GDR) (bilateral co-operation).

Duration : Max. 6 months.

14. DOCUMENTS : No information provided.

15. NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No availability of pilot installation/equipment (Table 11).
2)	No information provided (Table 12).

1. NAME : COLLEGE OF ENGINEERING, DEPARTMENT OF METALLURGY

2. ADDRESS :  
:  
: PUNE 411 005,  
: India

3. TELEPHONE : 59535  
  
TELEX : No information provided.  
CABLE : No information provided.

4. DIRECTOR : Dr. H.V. Adavi  
:

5. CONTACT : Prof. K.R. Satyanarayan  
PERSON(S) :

6. STAFF: 12

7. BUDGET / : US\$1.8 Million YEAR : 1985  
SOURCE : (for the College).  
OF FUNDS : No information provided.

8. RELATIONSHIP : Attached to Government of Maharashtra.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying				x			1. Study of Ni-Ti shape memory alloys.	x	
Manufacture of products	x						1. Liquid forging of aluminium-silicon and other aluminium alloys.	x	
Energy	x	x					1. Rollbonding process of Al/Al and Al/Cu and study of flat plate solar collectors.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying	x	x		x		x	1. Study of Cu-Zn-Al-Ni shape memory alloys.	x	
	x						1. Corrosion studies of Al-alloys.	x	
Energy	x						1. Development of parabolic solar concentrators.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH 2)						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY 1)	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn



12. TECHNICAL CO-OPERATION - GIVEN									
FIELDS OF TRAINING PROGRAM	A1	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING		
								Availability of staff as consultants or experts for UNIDO field assignments	:
							Training program available for own nationals	:	No
							Training program available for other nationals	:	No
							Training languages	:	-
							Duration	:	-

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	A1	Cu	Pb	Ni	Sn	Zn	A1	Cu	Pb	Ni	Sn	Zn	A1	Cu	Pb	Ni	Sn	Zn
Alloying Energy	x			x			x			x			x			x		
Languages : English												Duration : 4 - 6 months.						
Assistance obtained in the past : None.																		

## 14. DOCUMENTS

: No information provided.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No information provided (Table 11).
2)	Extent of operation: 2 & 3 (Table 11).

1. NAME : INDIAN INSTITUTE OF SCIENCE

2. ADDRESS :  
:  
: BANGALORE 560 012,  
: India

3. TELEPHONE : 364 411

TELEX : No information provided.  
CABLE : SCIENCE

4. DIRECTOR : Prof. C.N.R. Rao  
:

5. CONTACT : Prof. Soundranayagam  
PERSON(S) :

6. STAFF: 350

7. BUDGET / : US\$900.000.- YEAR : 1985  
SOURCE : From UGC and external research funding.  
OF FUNDS :

8. RELATIONSHIP : University Grants Commission.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying				x			1. Mechanical alloying of 80Ni-20Cr-2ThO <sub>2</sub> .	x	
Alternative technologies	x						1. Quasi crystals of Al-14Mn alloy.	x	
Manufacture of products	x						1. Technology for producing high strength aluminium alloys containing lithium.	x	
	x	x				x	1. Technology of aluminium, copper and zinc castings.	x	
Leaching		x					1. Bacterial leaching of lean sulphide ores.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Manufacture of products				x			1. Vacuum investment casting of nickel alloys.	x	
Refining				x			1. Vacuum arc remelting of nickel alloys.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying				1														
Manufacture of products	1	1		1														
Refining				1														
Leaching		1																

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Alloying				x			Availability of staff as consultants or experts : Yes for UNIDO field assignments
Manufacture of products	x	x		x			
Refining				x			
							Training program available for own nationals : Yes
							Training program available for other nationals : Yes
							Training languages : English
							Duration : 3 months (up to 3 years for individual research).

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
No information provided.																		
Languages	: No information provided.												Duration : No information provided.					
Assistance obtained in the past	: No information provided.																	

## 14. DOCUMENTS

: Availability of brochures.

15.

NOTES

CODE

DESCRIPTION

R	Research	(Tables 9 and 10)
T	Training	"
1	For Technical Co-operation	(Table 11 )
2	For Technical Assistance	"
3	For Own Use	"
9	ALL of above (1, 2, and 3)	"
Al	Aluminium	(Tables 9, 10, 11, 12, and 13)
Cu	Copper	"
Pb	Lead	"
Ni	Nickel	"
Sn	Tin	"
Zn	Zinc	"

1. NAME : INDIAN LEAD PVT. LTD.

2. ADDRESS : Bombay Agra Road,  
: Majiwada,  
: THANE 400 601, Maharashtra State,  
: India

3. TELEPHONE : 501 151, 501 089,  
501 353, 592 363  
TELEX : 011-71948  
CABLE : PLUMBUM

4. DIRECTOR : B.C. Thadhani  
:

5. CONTACT : P.S. Malik  
PERSON(S) :

6. STAFF: 15

7. BUDGET / : US\$12.600.- YEAR : 1985  
SOURCE :  
OF FUNDS : Internal.

8. RELATIONSHIP : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying			x				1. Manufacture of lead selenium alloy and calcium lead alloy.	x	
Auxiliary utilities for processing			x				See note 1).		
Manufacture of products			x				See note 1).		
Recycling and recovery operations			x				See note 1).		
Refining			x				1. Modification in refining process (cost reduction).	x	
Smelting			x				2. Desilverization of lead.	x	
Environmental control			x				See note 1).		
							See note 1).		

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying Manufacture of products			x x				1. Solder alloys. 1. Lead and solder wires.	x x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying Manufacture of products Refining Smelting															3 3 3 3			



12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Manufacture of products															x			
Languages : English Assistance obtained in the past : None.												Duration : No information provided.						

## 14. DOCUMENTS

: No information provided.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No details about project title provided (Table 9).

1. NAME : MINERAL TECHNOLOGY DEVELOPMENT CENTER, DEPARTMENT OF MINES AND ENERGY

2. ADDRESS : Jl. Jenderal Sudirman 623,  
:  
: BANDUNG, West Java,  
: Indonesia

3. TELEPHONE : 613 483  
  
TELEX : 28279 MINERAL BD  
CABLE : No information provided.

4. DIRECTOR : Ir. Bambang Sulasmoro  
:

5. CONTACT : Ir. R.A. Sunardi  
PERSON(S) :

6. STAFF: 106

7. BUDGET / : US\$2.000.000.- YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : Mining Company and Government  
WITH OTHER : Research Center.  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Beneficiation of ores		x	x			x	1. Beneficiation of Pb, Cu and Zn complex sulphide ores.	x	
Manufacture of products	x		x				1. Flotation of Galena of Tanjung Balet. 1. Production of Al <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub> .nH <sub>2</sub> O from Kijang bauxite.	x	x
Mining of principal materials alternative ores					x		1. Slope stability study on Pemali primary tin ore.	x	
Standard technologies		x	x			x	1. Mineral processing and metallurgy of fine sulphide complexes ore.	x	
Mineralogy		x					1. Mineralogy of Sangkaropi copper ore.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Beneficiation of ores			x				1. Study on the extracion of lead ore.	x	
Recycling and recovery operations	x						1. Production of poly-aluminium chloride from waste aluminium metals.	x	
			x				1. Nickel extraction from waste textile screen printing materials.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH 2)						b. TRAINING 2)						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY 1)	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn



## 14. DOCUMENTS

: Availability of brochures.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No information provided (Table 11).
2)	Extent of operation: 9 (Table 11).
3)	No information provided concerning the metals listed and the fields of training (Table 13).
4)	Request for immediate technical co-operation includes: training demand, experts demand, equipment demand (Table 13).

1. NAME : LIPI - RESEARCH AND DEVELOPMENT CENTRE FOR METALLURGY

2. ADDRESS : Jl. Cisitu (Kompleks LIPI),  
:  
: BANDUNG 40135,  
: Indonesia

3. TELEPHONE : (022) 81055 - 84371  
  
TELEX : No information provided.  
CABLE : No information provided.

4. DIRECTOR : Sukarana Djaja  
:

5. CONTACT : Sukarna Djaja  
PERSON(S) :

6. STAFF: 50

7. BUDGET / : US\$170.000 + US\$400.000.- YEAR : 1985  
SOURCE :  
OF FUNDS : (Routine + Development) Government.

8. RELATIONSHIP : Under Indonesian Institute of Sciences  
WITH OTHER : (LIPI).  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Recycling and recovery operations				x			1. Extraction of nickel (from laterite ore) by hydrometallurgy process.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying					x		1. The possibility of pewter production.	x	
Beneficiation of ores		x	x			x	1. Beneficiation of complex sulphide ores.	x	
Refining						x	1. Refining of Zn ores.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying					3													
Beneficiation of ores		3	3			3												
Recycling and recovery operations				3														
Refining						3												



12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
							Availability of staff as consultants or experts : No for UNIDO field assignments
							Training program available for own nationals : No
							Training program available for other nationals : No
							Training languages : -
							Duration : -

13. TECHNICAL CO-OPERATION - REQUESTED																			
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Li	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Alloying					x							x					x		
Recycling and recovery operations		x	x			x		x	x			x		x	x				x
Refining		x	x			x		x	x			x		x	x				x
Smelting		x	x			x		x	x			x		x	x				x
Languages : English												Duration : 3 - 6 months.							
Assistance obtained in the past : Japan (bilateral co-operation), see note 1).																			

## 14. DOCUMENTS

: No information provided.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	Classification of the assistance obtained: training. Fields: a) Beneficiation of ores for: copper - lead - zinc. b) Recycling and recovery operations for: nickel (Table 13).

1. NAME : UNIVERSITY COLLEGE DUBLIN, MECHANICAL ENGINEERING DEPARTMENT

2. ADDRESS : Upper Merrion Street,  
:  
: DUBLIN 2,  
: Ireland

3. TELEPHONE : 761 584 (Dublin)  
  
TELEX : 93704 UCD EI  
CABLE : No information provided.

4. DIRECTOR : Prof. Seamus G. Timoney  
:

5. CONTACT : Malcolm H. Farmer  
PERSON(S) :

6. STAFF: No  
information  
provided.

7. BUDGET / : No information provided.  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : College of National University of  
WITH OTHER : Ireland.  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

10. ANTICIPATED PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Extraction	x						1. Extraction of titanium dioxide from red mud effluent of Aughinish alumina plant.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 1)

PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn

12. TECHNICAL CO-OPERATION - GIVEN

FIELDS OF TRAINING PROGRAM	TECHNICAL CO-OPERATION - GIVEN						STAFF AVAILABILITY AND TRAINING					
	Al	Cu	Pb	Ni	Sn	Zn						
No information provided.							Availability of staff as consultants or experts : No for UNIDO field assignments  Training program available for own nationals : No  Training program available for other nationals : See 2)  Training languages : No information provided.  Duration : No information provided.					

13. TECHNICAL CO-OPERATION - REQUESTED

FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Extraction	x						x						x					
Languages : English Assistance obtained in the past : None.												Duration : 5 years.						

14. DOCUMENTS

: Availability of project document.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3; "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No availability of pilot installation/equipment (Table 11).
2)	No information provided (Table 12).

1. NAME : DEPARTMENT OF MATERIALS ENGINEERING, TECHNION, ISRAEL INSTITUTE OF TECHNOLOGY

2. ADDRESS : Technion City,  
:  
: HAIFA 32000,  
: Israel

3. TELEPHONE : (04) 292 111

TELEX : TECLI IL 46650  
CABLE : No information provided.

4. DIRECTOR : Prof. M. Ron  
:

5. CONTACT : Prof. I. Minkoff  
PERSON(S) :

6. STAFF: 60

7. BUDGET / : US\$2.000.000.- YEAR : 1985  
SOURCE : Government, Industry.  
OF FUNDS :

8. RELATIONSHIP : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying Alternative technologies	x			x			1. Segregation of nickel base alloys. 1. Laser alloying.	x	
Manufacture of products Standard technologies	x						2. Gold sintering of aluminium. 1. Laser metling of metal surfaces.	x	
Energy	x						1. Solidification of aluminium. 1. Hydrides and hydrogen energy.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Manufacture of products	x						1. Industrial processing.		x
Technology (not explicitly mentioned)	x						1. New technology.	x	
Quality control and instrumentation	x						1. Quality control.		x

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying	3						1						3					
Alternative technologies													2					
Manufacture of products	1																	
Standard technologies	2						2,3						1					



12. TECHNICAL CO-OPERATION - GIVEN

FIELDS OF TRAINING PROGRAM	TECHNICAL CO-OPERATION - GIVEN						STAFF AVAILABILITY AND TRAINING			
	Al	Cu	Pb	Ni	Sn	Zn				
Alternative technologies	x						Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : English  Duration : 1 month.			

13. TECHNICAL CO-OPERATION - REQUESTED

FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alternative technologies							x						x					
Languages : English Assistance obtained in the past : USOM (bilateral co-operation).												Duration : 3 months						

## 14. DOCUMENTS

: Availability of brochures and annual report.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "

1. NAME : ISRAEL INSTITUTE OF METALS, TECHNION, HAIFA, ISRAEL

2. ADDRESS : Technion City,  
:  
: HAIFA 32000,  
: Israel

3. TELEPHONE : (04) 235 101,  
(04) 231 216  
TELEX : TECON IL 46406  
CABLE : No information provided.

4. DIRECTOR : Dr. Joseph Zahavi  
:

5. CONTACT : Dr. Joseph Zahavi  
PERSON(S) :

6. STAFF: 30

7. BUDGET / : US\$1.470.000.- YEAR : 1985  
SOURCE : (US\$1.000.000.- R&D, US\$470.000.-  
OF FUNDS : Industrial sources and others).

8. RELATIONSHIP : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
General information obtained from the official brochure and annual report of the Israel Institute of Metals is given in Table 15, note 1).									

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
General information obtained from the official brochure and annual report of the Israel Institute of Metals is given in Table 15, note 1).									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
General information obtained from the official brochure and annual report of the Israel Institute of Metals is given in Table 15, note 2).																		

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Information separately provided (see note 3).							Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : See 4)  Training program available for other nationals : See 4)  Training languages : No information provided.  Duration : No information provided.

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
No information provided.																		
Languages : No information provided. Assistance obtained in the past : No information provided.													Duration : No information provided.					

## 14. DOCUMENTS

: Availability of brochures, annual report.

## 15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	Melting, alloying and casting equipment for ferrous and non-ferrous alloys (including protective atmosphere); mold manufacturing equipment and evaluation of mold materials; pressure die-casting unit for aluminium, magnesium and zinc alloys; powder characterisation, composition and sintering by conventional methods; laser induced plating and etching processes; laser surface material process; electropolishing of metals; bio-medical materials; corrosion in various media; computerized control and electrodeposition processes etc. (Tables 9 & 10).
2)	Power sources for d.c., a.c. and pulsed current with varying frequency; instrumentation for electrochemical measurements; potentiostats, galvanostats, A.C. bridge, oscilloscope; laser pulse and continuous systems operating from the far IR to deep UV; workshop service; measuring systems; data-logger system etc. (Table 11).
3)	High priority areas for co-operation A) composite materials; B) Castings; C) Ceramic Coating; D) CAD; E) Laser induced plating and etching; F) Laser surface treatment; G) Corrosion and plating (Table 12).
4)	No information provided (Table 12).

1. NAME : MINERAL ENGINEERING RESEARCH CENTER

2. ADDRESS : Technion,  
:  
: HAIFA 32000,  
: Israel

3. TELEPHONE : 4-293 577  
  
TELEX : TECON-IL 46406  
CABLE : No information provided.

4. DIRECTOR : Prof. I.J. Lin  
:

5. CONTACT : Prof. I.J. Lin  
PERSON(S) :

6. STAFF: 10

7. BUDGET / : US\$150.000.- YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : USBM - USA, Israel Council for R&D.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying	x						1. Mechanoalloying of Al-Li-Mg.	x	
Beneficiation of ores	x					x	1. Eddy current separation.	x	
Recycling and recovery operations	x	x					1. Recycling of industrial solid wastes.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 1)																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn





## 14. DOCUMENTS

: No information provided.

## 15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No availability of pilot installation/equipment (Table 11).
2)	Interest for overseas training and equipment from overseas; no special information provided regarding the metals (Table 13).

1. NAME : JAMAICA BAUXITE INSTITUTE

2. ADDRESS : P.O. Box 355,  
: Hope Gardens,  
: KINGSTON 6,  
: Jamaica, W.I.

3. TELEPHONE : 92-72073-9  
  
TELEX : 2309 JAMBAUX JA.  
CABLE : JAMBAUX

4. DIRECTOR : Dr. Carlton E. Davis  
:

5. CONTACT : Dennis Morrison  
PERSON(S) :

6. STAFF: 26

7. BUDGET / : US\$745 Million. YEAR : 1985  
SOURCE : Government of Jamaica - Capital  
OF FUNDS : Development Fund.

8. RELATIONSHIP : National Investment Bank of Jamaica,  
WITH OTHER : Parent Company.  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alternative technologies	x						1. Improving the processability of Jamaican Boehmitic Bauxite.	x	
							2. Improving the processability of Jamaican Goethitic Bauxite.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alternative technologies	x						1. Research into the commercial extraction of gallium from Jamaican bauxite.	x	
							2. Research into the production of bricks from bauxite waste and low grade bauxite in Jamaica.	x	
							3. Research into the commercial extraction of rare earths from Jamaican red mud.	x	
Process control and automation	x						1. Training of a staff member in process control technology.		x
Quality control and instrumentation	x						1. Training of a staff member in the management of maintenance of industrial equipment.		x
Law, negotiation	x						1. Training of a staff member in development law, contract negotiation.		x

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alternative technologies	9						2						9					
Beneficiation of ores	9						2						9					
Exploration of deposits	9						2											
Manufacture of products	2,3						2						2,3					
Recycling and recovery operations	9						2						9					
Refining													9					
Economics							1											
Energy							9						2					
Environmental control	2,3						9						9					
Manpower and safety							1,3											
Process control and automation	3						9						2,3					
Quality control and instrumentation	2,3						9						2,3					

12. TECHNICAL CO-OPERATION - GIVEN

FIELDS OF TRAINING PROGRAM	TECHNICAL CO-OPERATION - GIVEN						STAFF AVAILABILITY AND TRAINING	
	Al	Cu	Pb	Ni	Sn	Zn		
Alternative technologies	x						Availability of staff as consultants or experts for UNIDO field assignments	: Yes
Beneficiation of ores	x						Training program available for own nationals	: Yes
Exploration of deposits	x						Training program available for other nationals	: Yes
Recycling and recovery operations	x						Training languages	: English
Standard technologies	x						Duration	: 4 weeks.
Energy	x							
Process control and automation	x							

13. TECHNICAL CO-OPERATION - REQUESTED

FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Process control and automation	x						x						x					
Quality control and instrumentation	x						x						x					
Any other technology	x						x						x					

Languages : English  
 Assistance obtained in the past : UN, UNIDO, CIDA.

Duration : 4 weeks each.

14. DOCUMENTS

: Availability of brochures, annual report.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "

1. NAME : KYUSHU UNIVERSITY, DEPARTMENT OF MATERIALS SCIENCE AND TECHNOLOGY, GRADUATE SCHOOL OF ENGINEERING SCIENCES

2. ADDRESS : Fukuoka,  
: Kasuga-shi,  
: KASUGA PARK 6 - 1,  
: Japan

3. TELEPHONE : 092-573-9611

TELEX : No information provided.  
CABLE : No information provided.

4. DIRECTOR : Prof. Masanori Akazaki  
:

5. CONTACT : Prof. Hideo Yoshinaga  
PERSON(S) :

6. STAFF: 4

7. BUDGET / : US\$30.000.- YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Structural materials, deformation	x						1. High temperature deformation.	x	
		x					2. Science of structural materials.		x
				x			1. Science of structural materials.		x
							1. Mechanism and flow-stress prediction; (note 1).	x	
							2. Strength of metals and alloys.		x

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Joining	x	x					1. Joining of metals to metals and ceramics.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Structural materials, deformation	3	3		3			3	3		3								





14. DOCUMENTS

: No information provided.

15.

NOTES

CODE

DESCRIPTION

R	Research	(Tables 9 and 10)
T	Training	"
1	For Technical Co-operation	(Table 11 )
2	For Technical Assistance	"
3	For Own Use	"
9	ALL of above (1, 2, and 3)	"
Al	Aluminium	(Tables 9, 10, 11, 12, and 13)
Cu	Copper	"
Pb	Lead	"
Ni	Nickel	"
Sn	Tin	"
Zn	Zinc	"
1)	Including solution hardening, dispersion hardening and lamella composites (Table 9).	
2)	No technical co-operation requested (Table 13).	

1. NAME : KYUSHU UNIVERSITY, FACULTY OF ENGINEERING, DEPARTMENT OF METALLURGY

2. ADDRESS : Hakozaki 6-10-1,  
: Higashi-ku,  
: FUKUOKA 812,  
: Japan

3. TELEPHONE : 092-641-1101  
  
TELEX : No information provided.  
CABLE : No information provided.

4. DIRECTOR : Prof. Mineo Shimizu  
:

5. CONTACT : Prof. Minoru Nemoto  
PERSON(S) :

6. STAFF: 10

7. BUDGET / : US\$75,000.- YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying	x						1. High strength, high specific modulus Al-Li alloys.	x	
				x			1. Electrodeposition of Ni alloys.	x	
				x			1. Single crystal Ni base super alloys.	x	

10. ANTICIPATED PROJECTS

FIELDS OF ACTIVITY	10. ANTICIPATED PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying				x			1. Electroplating of amorphous alloys.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT

PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying Technology 1)	3			3														
	3			3														



## 14. DOCUMENTS

: No information provided.

## 15.

## NOTES

CODE	DESCRIPTION
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R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No further specification provided (Table 11).
2)	No technical co-operation requested (Table 13).

1. NAME : NATIONAL RESEARCH INSTITUTE FOR METALS

2. ADDRESS : 2-3-12, Nakameguro,  
: Meguro-ku,  
: TOKYO 153,  
: Japan

3. TELEPHONE : 03-719-2271  
  
TELEX : FAX. 03-792-3337  
CABLE : No information provided.

4. DIRECTOR : Dr. Ryuichi Nakagawa  
:

5. CONTACT : Dr. Ryuichi Nakagawa  
PERSON(S) :

6. STAFF: 330

7. BUDGET / : US\$18.6 Million. YEAR : 1985  
SOURCE : Mainly from Japanese Government (only a  
OF FUNDS : small part comes from contracts).

8. RELATIONSHIP : Science and Technology Agency of  
WITH OTHER : Japanese Government.  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying	x		x	x			1. Fabrication method and properties of monotectic alloys.	x	1)
		x					1. Workability of intermetallic compounds of Laves phase.	x	
		x		x	x		1. Developments of super conducting and cryogenic materials.	x	
	x						1. Development of heat-resistant, light materials composed of intermetallic compounds like Ti-Al.	x	
					x		2. Studies on FRM with oriented reinforcements. 3. Microstructures and properties of intermetallic compounds.	x x	
					x	1. Study on thermoelectric conversion materials.	x		

		9. (Contd.) ON-GOING PROJECTS							
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying (Contd.)	x			x			1. Advanced alloys with controlled crystalline structures.	x	
				x			1. Manganese base alloys.	x	
							2. Tungsten fiber reinforced super alloys by casting.	x	
Alternative technologies	x			x			3. Mechanical properties of structural materials for high temperature gas-cooled reactor.	x	
							1. Preparation of mixed ultrafine powders of metals and ceramics.	x	
							1. Castings for high temperature corrosion resistance.	x	
Manufacture of products	x		x			x	2. Sokeizai production technology from molten metals.	x	
								1. Powder making by centrifugal atomization process.	x
	x					x	1. Characteristics of ultrafine powders and their collected bodies.	x	
								1. Evaluation of performance of nickel based alloy weld metals and TMCP steel's HAZ.	x
	x						1. Development of heat-resistant light materials composed of intermetallic compounds like Ti-Al.	x	
								2. Studies on FRM with oriented reinforcements;	x
	x						3. Sokeizai production technology from molten metals.	x	
								1. Advanced alloys with controlled crystalline structures.	x
	x		x				2. Preparation of mixed ultrafine powders of metals and ceramics.	x	
								1. Developments of super conducting and cryogenic materials.	x
x		x	x				1. Fabrication method and properties of monotectic alloys.	x	
								1. Powder making by centrifugal atomization process.	x



		9. (Contd.) ON-GOING PROJECTS							
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zr	PROJECT TITLE	R	T
Manufacture of products (Contd.)		x			x		1. Study on thermoelectric conversion materials.	x	
				x			1. Workability of intermetallic compounds of Laves phase.	x	
							1. Manganese base alloys.	x	
Recycling and recovery operations							2. Tungsten fiber reinforced super alloys by casting.	x	
							3. Evaluation of performance of nickel based alloy weld metals and TMCP steel's HAZ.	x	
Refining Smelting		x				x	1. Continuous process for extraction of copper and zinc.	x	
							See note 2).		
Corrosion, fatigue							1. Continuous process for extraction of copper and zinc.	x	
	x						1. Corrosion behavior of metallic materials in hot brine.	x	
				x			1. Corrosion fatigue and stress corrosion of metallic materials for water-cooled reactors.	x	
							2. Creep-fatigue interaction under combined loading for heat resistant steels.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Please see notes 3), 4) and 5).									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	RESEARCH						TRAINING						INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Please see note 6)																		



## 14. DOCUMENTS

: Availability of brochures.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No specific training project exists; possibilities are given for on-job-training in the research projects (Table 9)
2)	Niobium and other rare metals: Study on refining of pig iron containing Niobium and some other elements (Table 9).
3)	No specific information provided regarding the fields of activities (Table 10).
4)	New materials composed of rare metals including the six metals listed (Research) (Table 10).
5)	Refining of the rare metals (Research) (Table 10).
6)	It depends on the particular case in question. For more information contact the person in-charge; (Table 11).
7)	Recently, international collaboration on various subjects such as the development of natural resources and the development of new energy systems, has become more and more important. NRI has contributed not only to the international exchange of information, but also to the mutual deputation of scientists with foreign countries.
	Nine international collaborative studies shown below were conducted in 1984 fiscal year:
a)	Study on technology of refining of pig iron containing niobium, manganese and some other elements. (Japan-China joint research).

CODE	DESCRIPTION
	<p>b) Study on atomospheric corrosion of metals and alloys. (Joint collaborative research project between NRIM and the National Metallurgical Laboratory, India).</p> <p>c) Creep and fatigue data sheets. (Japan-GFR information exchange program).</p> <p>d) Superconducting and cryogenic materials. (Japan-France collaboration program for exchange of scientists).</p> <p>e) Arctic Marine transportation research and development. (Japan/Canada researcher exchange).</p> <p>f) Personal exchange and workshop. (Japan-US fusion co-operation program).</p> <p>g) Advanced materials and standards. (Summit working group on technology, growth and employment).</p> <p>h) Development of superconducting and cryogenic structural materials with high performance. (Japan-Germany collaboration research program).</p> <p>i) Development of continous steel-making process. (Exchange of research information and scientists between Japan and Korea).</p> <p>Notes 7a) - 7i) refer to Table 12.</p>
8)	No technical co-operation requested (Table 13).

1. NAME : TOHOKU UNIVERSITY, RESEARCH INSTITUTE OF MINERAL DRESSING AND METALLURGY SENKEN (Please see note 1)

2. ADDRESS : Tohoku University 1-1, 2-chome,  
: Katahira,  
: SENDAI 980,  
: Japan

3. TELEPHONE : 0222 (27) 6200,  
0222 (27) 6227, 6231  
TELEX : 0852-233 SENKEN J  
CABLE : No information provided.

4. DIRECTOR : Dr. Akiva Yazawa  
:

5. CONTACT : No information provided.  
PERSON(S) :

6. STAFF: 96

7. BUDGET / : US\$2,651,447.- FISCAL YEAR : 1985  
SOURCE : Provided by the Ministry of Education.  
OF FUNDS :

8. RELATIONSHIP : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
High temperature chemistry		x				x	1. Phase equilibria of the systems Cu-Fe-S-O, Zn-Fe-Mn-O, Ca-Fe-Mn-O and Ba-Fe-Mn-O.	x	
						x	1. The study for the phase relation in the system Zn-Fe <sub>2</sub> O <sub>4</sub> -iron oxide in air.	x	
Metallurgy	x	x	x	x	x	x	1. Study of historical metallurgy.	x	
Hydrometallurgy						x	1. Acid leaching of zinc sulfide concentrates under pressure with formation of sulfur at temperatures above its melting point.	x	
							2. Behavior of impurities in electrolyte in electrowinning of zinc.	x	
							3. Hydrolysis of ferric sulphate solution containing sulphates of zinc and magnesium at elevated temperatures.	x	

9. (Contd.) ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Hydrometallurgy (Contd.)			(x)				1. Role of silver in various types of lead alloy anodes in sulfate electrolyte.	x	
Recycling and reovery operations Smelting		x	x			x	1. Solubility of Cu-, Zn- and Ba- arsenates. 1. Direct lead smelting process by use of oxygen and ferrite slag.	x	x
Chemical processing for minerals		x					1. Separation between chalcopyrite and galena using polymer xanthate.	x	
	x						1. Preparation and characterization of monodispersed metal oxide colloids.	x	
Environmental control		x				x	1. Treatment of waste water in mining and metallurgy.	x	
Nuclear fuel metallurgy For other activities and/or projects, see note 2)				x			1. Exploitation of Nitinol (TiNi) heat engine.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Please see note 3)																		





## 14. DOCUMENTS

: Availability of brochures.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	The information contained in the Tables 9 to 15 has been obtained from the official information brochure of the SENKEN institute, year 1985.
2)	Mineral processing: a) Fundamental investigation of single particle crushing. b) Theoretical and experimental analysis on the relation between single particle crushing and ordinary grinding. c) Magnetic properties and magnetic separations of fine mineral particles. d) Flotation of complex sulphide ore. Chemical processing for minerals: a) Reverse flotation of silicon from hematite. b) Electrokinetic studies of bubbles in aqueous media. c) Stability of o/w emulsion. d) Heterocoagulation. Pyrometallurgy: a) Physical chemistry of new slags. b) Fundamental studies on smelting processes. c) Physico-chemical investigation of metallurgical products. d) Solubilities of inorganic salts in aqueous-organic solvent. Synthetic minerals: a) Physico-chemical investigation of synthetic minerals at high temperature. b) structural characterization of local structure in synthetic minerals by a resonance (anomalous) X-ray scattering.

CODE	DESCRIPTION
	<p>Electrometallurgy/material science: a) Production of rare metals by chloride smelting process.  b) Production of new materials using ultra high temperature.  c) Syntheses of the composite materials by CVD and/or PVD methods.  d) Studies of the utilization of secondary resources.</p>
	<p>Nuclear fuel metallurgy: a) Extraction and separation of new metals from their resources using nonaqueous NO<sub>2</sub>-HF solution.  b) Metallurgical studies on ThC and U<sub>3</sub>Si.</p>
	<p>Metallurgy of Radio elements: a) Solvent extraction.  b) Liquid membrane.  c) Processing of wastes with zeolites.  d) Ceramic solidification.  e) Adsorption of nuclides on rocks.</p>
	<p>Metallurgical engineering: a) Kinetics of noncatalytic gas-solid reactions.  b) Heat transfer between fluid and solid beds etc.</p>
	<p>Metallurgical process engineering: a) Measurement of the emissivity and temperature of the porous materials as well as powders in a stationary and flowing rate.  b) Measurement of the temperature and pressure distribution in a jet formed by injection of a gas with or without particles into a liquid.  c) Kinetics of mass and heat transfer between particles and the surroundings including jets.  d) Energy analysis of the combined system of coal gasification, smelting reduction and chemical processes.</p>
	<p>Environmental chemistry: a) Environmental chemistry for extractive metallurgy.  b) Management of smelter intermediate products and radioactive waste.</p>
3)	<p>a) Laboratories for joint use: Electron Microscope and Electron Diffraction Laboratory, X-Ray Diffraction Laboratory, X-Ray Fluorescence Analysis Laboratory, Electron Probe Microanalyser Laboratory, Spectrographic Analysis Laboratory, Mössbauer Spectrometer Laboratory, Radioactive Isotope Laboratory, Instrumental Analysis Laboratory, Ion Microanalyser Laboratory, Knudsen Type Mass Spectrometry Laboratory, High Temperature Thermophysics Laboratory, Vacuum Arc and Electron Beam Furnaces Laboratory, Levitation Furnace Laboratory, Material Testing Laboratory, TSS Terminal Equipment Room.</p> <p>b) Semi-pilot plant: The semi-pilot plant is equipped with facilities for dense-media separation, magnetic separation, flotation hydrometallurgical treatment, roasting, pelletizing, smelting, refining etc., and supplied with the electric power of 610 kVA.</p>

CODE	DESCRIPTION
4)	<p>The institute accepts visitors from overseas with individual purpose for scientific works. The foreign visiting staffs or students sponsored by the fellowships of the Ministry of Education, the Japan Society for the Promotion of Science, the Japan International Co-operation Agency (JICA) etc. are enrolled for upgrading their technology and scientific basis or for working towards an advanced degree. There is also an increasing request for the systematic training of young engineers and researchers in the developing countries with respect to the field of Mining and Metallurgy. Therefore, the Group Training Course on Mineral Processing and Metallurgy is provided in our institute by the auspices of the JICA and the Government of Japan.</p>

1. NAME : WASEDA UNIVERSITY

2. ADDRESS : 1-6-1 Nishi-Waseda,  
: Shinjuku-ku,  
: TOKYO 160,  
: Japan

3. TELEPHONE : 03-203-4141  
  
TELEX : 2323280 WASEDA J  
CABLE : WASEDAUNIV

4. DIRECTOR : Haruo Nishihara, President  
:

5. CONTACT : No information provided.  
PERSON(S) :

6. STAFF: See  
note 1)

7. BUDGET / : US\$230.248.200.- YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : None.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Beneficiation of ores		x	x	x	x	x	1. Flotation fundamentals.	x	
		x	x		x	x	1. Flotation studies.		x
Exploration of deposits		x	x			x	1. Computer modelling of electro-magnetic prospecting.	x	
							2. Computer modelling in exploration.		x
Refining		x	x			x	1. Complex sulphide ore processing and recovery of respective metals.	x	
							2. Calculation of complex sulphide ore processing in term of potential diagramme and E-Ph diagramme.		x
Smelting		x					1. Electro-Refining of Copper Anodes.	x	
		x	x			x	1. Complex sulphide ore processing and recovery of respective metals.	x	
							2. Calculation of complex sulphide ore processing in term of potential diagramme and E-Ph diag.		x

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Beneficiation of ores	x	x	x	x	x	x	1. Grindability of minerals. 2. Grindability studies.	x	
Recycling and recovery operations					x		1. Recycling and recovery of rare metallic resources. 2. Recycling of metallic resources.	x	x
Refining		x				x	1. Separation of copper and zinc by solvent extraction technique.	x	
		x					1. Copper deposition analysis by chemical impedance analysis.		x

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Beneficiation of ores	9	9	9	9	9	9	9	9	9	9	9	9						
Exploration of deposits		9	9			9		9	9			9						
Recycling and recovery operations					9						9							
Refining		9	9		9	9		9	9		9	9						
Smelting		9	9		9	9		9	9		9	9						

12. TECHNICAL CO-OPERATION - GIVEN

FIELDS OF TRAINING PROGRAM	TECHNICAL CO-OPERATION - GIVEN						STAFF AVAILABILITY AND TRAINING	
	Al	Cu	Pb	Ni	Sn	Zn		
Beneficiation of ores	x	x	x	x	x	x	Availability of staff as consultants or experts : Yes	Yes
Exploration of deposits		x	x			x	for UNIDO field assignments	
Recycling and recovery operations					x		Training program available for own nationals : Yes	Yes
Refining		x	x		x	x	Training program available for other nationals : Yes	Yes
Smelting		x	x		x	x	Training languages : English	
							Duration : 6 - 24 months.	

13. TECHNICAL CO-OPERATION - REQUESTED

FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS 3)						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Please see notes 2), 3)																		
Languages	: No information provided.																	
Assistance obtained in the past	: STDA (Selenium-Tellurium Development Association) (Note 4)																	
													Duration : No information provided.					

## 14. DOCUMENTS

: No information provided.

## 15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	Full-time: Academic staff: 1126 (Table 6); Administration: 1177. Part-time: 1876.
2)	Interest for co-operation with experts from overseas (Table 13).
3)	Experts on technology, processing (Table 13).
4)	Technology and processing related assistance (Table 13).



1. NAME : KENYA INDUSTRIAL RESEARCH AND DEVELOPMENT INSTITUTE

2. ADDRESS : P.O. Box 30650,  
:  
: NAIROBI,  
: Kenya

3. TELEPHONE : 557 762/557 728-9

TELEX : No information provided.  
CABLE : REDEV

4. DIRECTOR : Dr. Robert O. Arunga  
:

5. CONTACT : Dr. R.O. Arunga  
PERSON(S) :

6. STAFF: 45

7. BUDGET / : US\$980.000.- YEAR : 1985  
SOURCE : Government Treasury.  
OF FUNDS :

8. RELATIONSHIP : National Council for Science and  
WITH OTHER : Technology/Research Institutes/  
ORGANIZATIONS : Industry/EEC/UNIDO/IDRC/DSE.

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Auxiliary utilities for processing	x	x	x		x	x	1. Analysis of metal contamination in canned fruit and vegetable products.	x	x
Main utilities for processing	x	x	x		x	x	1. Analysis of metal contamination in canned fruit and vegetable products. 2. Analysis of elemental impurities.	x	x
Standard technologies	x	x	x		x	x	1. Analysis of metal contamination in canned fruit and vegetable products. 2. Analysis of elemental impurities.	x	x

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Auxiliary utilities for processing	x	x	x		x	x	1. Analysis of elemental impurities.	x	x
Main utilities for processing	x	x	x		x	x	1. Analysis of elemental impurities.	x	x
Standard technologies	x	x	x		x	x	1. Analysis of elemental impurities.	x	x

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH 2)						b. TRAINING 2)						c. INDUSTRIAL APPLICATION 2)					
FIELDS OF ACTIVITY 1)	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Alloying 1)							Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : English  Duration : 1 - 2 years.
Alternative technologies 1)							
Auxiliary utilities 1)							
Beneficiation of ores 1)							
Exploration of deposits 1)							
Manufacture of products 1)							
Main utilities for processing 1)							
Mining of principal materials 1)							
Recycling and recovery 1)							
Refining 1)							
Smelting 1)							
Standard technologies 1)							

13. TECHNICAL CO-OPERATION - REQUESTED																			
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Equipment	x	x					x	x					x	x					
Training	x	x					x	x					x	x					
Languages : English Assistance obtained in the past : UNIDO/EEC/IDRC/DSE/USAID/FAO.												Duration : 1 - 2 years.							

## 14. DOCUMENTS

: Availability of brochures (latest 1986, annual report 1982-1983, project document 1983-1988).

15.

NOTES

CODE	DESCRIPTION
F	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No specific information provided concerning the metals listed and the fields of activity (Tables 11 & 12).
2)	Extent of operation: 9 (Table 11).

1. NAME : GEOLOGICAL SURVEY DEPARTMENT

2. ADDRESS : Tingkat 20, Bangunan Tabung Haji,  
: Jalan Tun Razak, Peti Surat 11110,  
: 50736 KUALA LUMPUR,  
: Malaysia

3. TELEPHONE : 261 1033  
  
TELEX : MA 30808  
CABLE : GEOLOGY KUALA LUMPUR

4. DIRECTOR : Yin Ee Heng  
:

5. CONTACT : Foo Khong Yee  
PERSON(S) :

6. STAFF: 127

7. BUDGET / : US\$5.39 Million. YEAR : 1985  
SOURCE : Government.  
OF FUNDS :

8. RELATIONSHIP : Under Ministry of Primary Industries.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Exploration of deposits		x					1. Mineral exploration in Kinabalu area.	x	
					x		1. Mineral assessment.	x	
		x	x		x	x	1. Regional mineral exploration.	x	
							2. Mineral clearance in development areas.	x	
							3. Mineral clearance.	x	
						4. Mineral exploration - Sarawak.	x		
	x	x	x			x	1. Base metal exploration.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Exploration of deposits					x		1. Mineral assessment - Sintok.	x	
		x	x		x	x	1. Mineral clearance - North Terengganu.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 1)																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Exploration of deposits	x	x	x	x	x	x	Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : English, Malay  Duration : Variable.

13. TECHNICAL CO-OPERATION - REQUESTED																			
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Exploration of deposits		x	x		x	x		x	x		x	x							
Languages : English and Malay Assistance obtained in the past : CIDA, CCOP, BGS, RMRDC, ESCAP, DTCT, BRGM, Swiss Govt., JICA, Germany FR, The Netherlands.												Duration : Less than 3 months.							

## 14. DOCUMENTS

: Availability of brochures and annual report.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No availability of pilot installation/equipment (Table 11).



1. NAME : INSTITUTO POLITECNICO NACIONAL, ESIQIE, LABORATORIOS PESADOS DE INGENIERIA METALURGICA

2. ADDRESS : Apartado Postal 75-874,  
:  
: D.F. 07300 MEXICO,  
: Mexico

3. TELEPHONE : 586-1055  
  
TELEX : No information provided.  
CABLE : No information provided.

4. DIRECTOR : Dr. Guillermo Marroquin Suarez  
:

5. CONTACT : Dr. Jose Gerardo Cabañas Moreno  
PERSON(S) :

6. STAFF: 50  
(approx.)

7. BUDGET / : US\$230.000.- YEAR : 1985  
SOURCE :  
OF FUNDS : Mostly supplied by Government Funds.

8. RELATIONSHIP : Please see note 1).  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying	x	x	x	x	x	x	1. Master's programme in metallurgical engineering.		x
				x			1. Technology development for the production of high quality stainless steels.	x	
Alternative technologies	x	x	x	x	x	x	1. Master's programme in extractive metallurgy.		x
Auxiliary utilities for processing	x	x	x	x	x	x	1. Master's programme in extractive metallurgy.		x
Beneficiation of ores	x	x	x	x	x	x	1. Master's programme in extractive metallurgy.		x
		x					1. Leaching of lead silver concentrates by means of ferric chloride.	x	
Exploration of deposits	x	x	x	x	x	x	1. Leaching of zinc concentrates at high pressure and temperature.	x	
						x	1. Master's programme in extractive metallurgy.		x

9. (Contd.) ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Manufacture of products	x	x	x	x	x	x	1. Master's programme in metallurgical engineering.		x
	x						1. Optimization of Flat Rolling sequences.	x	
Main utilities for processing	x	x	x	x	x	x	1. Master's programme in extractive metallurgy.		x
Mining of principal materials or alternative ores	x	x	x	x	x	x	1. Master's programme in extractive metallurgy.		x
Recycling and recovery operations	x	x	x	x	x	x	1. Master's programme in extractive metallurgy.		x
Refining	x	x	x	x	x	x	1. Master's programme in extractive metallurgy.		x
Smelting	x	x	x	x	x	x	1. Master's programme in extractive metallurgy.		x
Standard technologies	x	x	x	x	x	x	1. Master's programme in extractive metallurgy.		x
Special projects	x						1. Protection of steels by aluminizing for their use at high temperatures.	x	
		x					1. Relation between intergranular cavitation and type and mobility of the grain boundaries in pure copper.	x	
							2. A study of substructures produced in materials used at high temperatures.	x	
Energy	x	x	x	x	x	x	1. Master's programme in extractive metallurgy.		x
Environmental control	x	x	x	x	x	x	1. Master's programme in extractive metallurgy.		x
Manpower and safety	x	x	x	x	x	x	1. Master's programme in extractive metallurgy.		x
Process control and automation	x	x	x	x	x	x	1. Master's programme in metallurgical engineering.		x
Quality control and instrumentation	x	x	x	x	x	x	1. Master's programme in metallurgical engineering.		x

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Mining	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Alternative technologies	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Auxiliary utilities for processing	9	9	9	9	9	9												
Beneficiation of ores	9	9	9	9	9	9		9	9	9	9	9	9	9	9	9	9	9
Manufacture of products	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Main utilities for processing	9	9	9	9	9	9												
Mining of principal materials	9	9	9	9	9	9												
Recycling and recovery operations	9	9	9	9	9	9	9	9	9	9	9	9						
Refining	9	9	9	9	9	9	9			9	9	9	9		9			
Smelting	9	9	9	9	9	9	9			9	9	9	9	9	9	9	9	9
Standard technologies	9	9	9	9	9	9												
Economics	9	9	9	9	9	9												
Energy	9	9	9	9	9	9												

11. (Contd.) AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT

PURPOSE OF OPERATION FIELDS OF ACTIVITY	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Manpower and safety	9	9	9	9	9	9												
Process control and automation	9	9	9	9	9	9	9											
Quality control and instrumentation	9	9	9	9	9	9	9	9	9	9	9	9						

12. TECHNICAL CO-OPERATION - GIVEN								
FIELDS OF TRAINING PROGRAM							STAFF AVAILABILITY AND TRAINING	
	Al	Cu	Pb	Ni	Sn	Zn		
Beneficiation of ores		x	x			x	Availability of staff as consultants or experts : Yes	
Smelting		x	x			x	for UNIDO field assignments	
Standard technologies	x	x	x			x	Training program available for own nationals : Yes	
Process control and automation	x	x	x		x	x	Training program available for other nationals : Yes	
Quality control and instrumentation	x	x	x			x	Training languages : Spanish, English	
							Duration : Variable (Weeks).	

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Smelting							x	x					x	x				
Languages : Spanish, English												Duration : 6 to 12 months.						
Assistance obtained in the past : Graduate programme was started in 1968 in co-operation with UNESCO.																		

## 14. DOCUMENTS

: Availability of annual report.

15.

NOTES

## CODE

## DESCRIPTION

R	Research	(Tables 9 and 10)
T	Training	"
1	For Technical Co-operation	(Table 11 )
2	For Technical Assistance	"
3	For Own Use	"
9	ALL of above (1, 2, and 3)	"
Al	Aluminium	(Tables 9, 10, 11, 12, and 13)
Cu	Copper	"
Pb	Lead	"
Ni	Nickel	"
Sn	Tin	"
Zn	Zinc	"
1)	a) Governmental bodies: CONACYT, COSNET, IIE.	
	b) Private enterprises: FALMEX, HYLSA.	
	c) International organizations: OAE, UNESCO.	

1. NAME : CAFRAD - AFRICAN TRAINING AND RESEARCH CENTRE IN ADMINISTRATION FOR DEVELOPMENT

2. ADDRESS : P.O. Box 310,  
:  
: TANGIER,  
: Morocco

3. TELEPHONE : 364-30/32 or  
366-01  
TELEX : 33664M  
CABLE : CAFRAD, TANGIER, MOROCCO

4. DIRECTOR : Dr. Mostafa Rhomari  
:

5. CONTACT : Dr. Mostafa Rhomari  
PERSON(S) :

6. STAFF: 9

7. BUDGET / : No information provided. YEAR : 1985  
SOURCE : See note 1).  
OF FUNDS :

8. RELATIONSHIP : CAFRAD has 29 African member states  
WITH OTHER : and also maintains relationship with  
ORGANIZATIONS : international African and  
Non-African organizations.

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Public enterprises 2)							1. Criteria and strategy for the improvement of performance of African public enterprises.	x	
Public administration 2)							2. Management of public enterprises in Africa.		x
							1. Decentralized administration in Africa.		x
							2. Training of trainers.		x

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Public enterprises 2)							1. Public enterprises management in Africa.	x	
Public administration 2)							2. Anthology of cases.	x	
							1. Directory of schools and institutes of public administration.	x	
							2. Directory of African consultants in public administration.	x	
							3. Decentralized administration.		x
							4. Training senior administrators in administration.		x
							5. Case study.		x
							6. Management of human resources.		x
							7. Conference for directors of ENA/IPA/HIM.		x
							8. Concept of African public administration.		x

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 3)																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn



12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Public enterprises management							Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : English, French, Arabic  Duration : 10 days.

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Public administration and public management 4) & 5)																		
Languages : English, French Assistance obtained in the past : Please see note 6)													Duration : On a short-term basis.					

14. DOCUMENTS : Availability of brochures.

15. NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	Member States' annual contributions and assistance from international organizations and bilateral aid agencies (Table 7).
2)	Management (Table 9 and Table 10).
3)	No availability of pilot installation/equipment (Table 11).
4)	Experts from overseas (Table 13).
5)	Equipment from overseas (Table 13).
6)	Bilateral and international from Government of Quebec, International Development Research Centre (IDRC) - Ottawa, Commonwealth Secretariat, Friedrich Ebert-Stiftung, Government of France, UNESCO, United Nations, USAID (Table 13).

1. NAME : DIRECTION DE LA GEOLOGIE

2. ADDRESS : Ministere de l'Energie et des Mines,  
: Rabat Instituts,  
: PABAT,  
: Morocco

3. TELEPHONE : 779-53  
  
TELEX : TAQA 32761 or TAQA 32762  
CABLE : No information provided.

4. DIRECTOR : Mohamed Ben-Said  
:

5. CONTACT : Azza Addi  
PERSON(S) :

6. STAFF: 300

7. BUDGET / : US\$2.450.000.- YEAR : 1985  
SOURCE : No information provided.  
OF FUNDS :

8. RELATIONSHIP : OCP, BRPM, ONAREP, CDM, les Minieres  
WITH OTHER : du Morocco.  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Exploration of deposits		x	x	x			1. Project precious metals associated with copper and lead.	x	
							2. Hast country project (Pb Ag).	x	
							3. Douar Haffar Project (Pb Zn Ag).	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 1)																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Exploration of deposits		x	x				Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : Arabic, French  Duration : One month.

13. TECHNICAL CO-OPERATION - REQUESTED																			
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Exploration of deposits		x	x					x	x					x	x				
Languages : Arabic, French, English Assistance obtained in the past : Bilateral co-operation with France, Poland, Czechoslovakia Belgium; international co-operation with UN, AIEA.												Duration : No information provided.							

## 14. DOCUMENTS

: Availability of annual report, project document.

15.

NOTES

CODE

DESCRIPTION

R	Research	(Tables 9 and 10)
T	Training	"
1	For Technical Co-operation	(Table 11 )
2	For Technical Assistance	"
3	For Own Use	"
9	ALL of above (1, 2, and 3)	"
Al	Aluminium	(Tables 9, 10, 11, 12, and 13)
Cu	Copper	"
Pb	Lead	"
Ni	Nickel	"
Sn	Tin	"
Zn	Zinc	"
1)	No availability of pilot installation/equipment (Table 11).	

1. NAME : INDUSTRIAL PROCESSING DIVISION, DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH

2. ADDRESS : Private Bag,  
:  
: PETONE,  
: New Zealand

3. TELEPHONE : (04) 666 919  
  
TELEX : PHYSICS NZ 3814  
CABLE : No information provided.  
FAX : (04) 690.132

4. DIRECTOR : T. Marshall  
:

5. CONTACT : E. Beanland  
PERSON(S) :

6. STAFF: 100  
(approx.)

7. BUDGET / : US\$1.250.000.- YEAR : 1985  
SOURCE : From Government Science Vote;  
OF FUNDS : US\$750.000.- Raised from Revenue  
Earning Research and Development.

8. RELATIONSHIP : Government organization partly funded  
WITH OTHER : by contract research and development  
ORGANIZATIONS : for industry.

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Recycling and recovery operations	x						1. Recycling and recovery operations.	x	
Standard technologies	x	x	x	x	x	x	1. Recycling and recovery operations.	x	
Management	x						1. Corrosion/metallurgy (physical). 1. Management aspects as required. See note 1).	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alternative technologies	x						1. Alternative source of raw materials for carbon anodes.	x	
Smelting	x						1. Alternative source of raw materials for carbon anodes.	x	
Standard technologies	x						1. Alternative source of raw materials for carbon anodes.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH 3)						b. TRAINING 3)						c. INDUSTRIAL APPLICATION 3)					
FIELDS OF ACTIVITY 2)	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn



12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Please see note 4)							Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : See 4) Training program available for other nationals : See 4) Training languages : Please see note 4). Duration : Please see note 4).

13. TECHNICAL CO-OPERATION - REQUESTED																			
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Metallurgy	x					x	x					x	x						x
Corrosion	x					x	x					x	x						x
Languages : English Assistance obtained in the past : None.												Duration : No information provided.							

## 14. DOCUMENTS

: Availability of brochures, annual report.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	Other project: Titanium from ilmenite (Table 9).
2)	No information provided concerning the metals listed and the fields of activity (Table 11).
3)	Extent of operation: 9 (Table 11).
4)	Usually no, unless overlapping with current project work occurs; Field: General primary and secondary metallurgy; Duration: 6 - 12 months, Language: English (Table 12).

1. NAME : SINTEF - THE FOUNDATION FOR SCIENTIFIC AND INDUSTRIAL RESEARCH AT THE NORWEGIAN INSTITUTE OF TECHNOLOGY

2. ADDRESS : Strindveien 2,  
:  
: 7034 TRONDHEIM,  
: Norway

3. TELEPHONE : 07 593 000  
  
TELEX : 55620 SINTF N  
CABLE : No information provided.

4. DIRECTOR : Johannes Moe  
:

5. CONTACT PERSON(S) : Conrad Krohu

6. STAFF: 940

7. BUDGET / SOURCE OF FUNDS : US\$20 Million. YEAR : 1985  
: No information provided.

8. RELATIONSHIP WITH OTHER ORGANIZATIONS : The Norwegian Institute of Technology (G.O.). The Royal Norwegian Council for Scientific and Industrial Research (NTNF).

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying	x						1. Aluminium-material technology.	x	x1)
Alternative technologies	x						1. Aluminium-material technology.	x	x1)
Manufacture of products	x						1. Aluminium-material technology.	x	x1)
Smelting	x						1. Aluminium electrolysis.	x	x1)
Energy	x						1. Aluminium electrolysis.	x	x1)
Environmental control	x						1. Aluminium electrolysis.	x	x1)

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying	x						No information provided.	x	
Alternative technologies	x						No information provided.	x	
Manufacture of products	x						No information provided.	x	
Smelting	x						No information provided.	x	
Energy	x						No information provided.	x	
Environmental control	x						No information provided.	x	
Process control and automation	x						No information provided.	x	
Quality control and instrumentation	x						No information provided.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH 3)						b. TRAINING 4)						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY 2)	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn



14. DOCUMENTS : No information provided.

15. NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	Ph.D. students involved in these projects (Table 9).
2)	No information provided concerning the metals listed and the fields of activity (Table 11).
3)	Extent of operation: 1 & 3 (Table 11).
4)	Extent of operation: 3 (Table 11).
5)	No technical co-operation requested (Table 13).

1. NAME : METAL INDUSTRY RESEARCH AND DEVELOPMENT CENTRE

2. ADDRESS : 125-A, Industrial Area,  
: Kot Lakhpat,  
: LAHORE-40,  
: Pakistan

3. TELEPHONE : 801 460/801 342  
  
TELEX : None.  
CABLE : None.

4. DIRECTOR : Dr. G. Mohyud Din Zia  
:

5. CONTACT : Yasir Abu Bakr  
PERSON(S) :

6. STAFF: 7

7. BUDGET / - YEAR : 1985  
SOURCE : Federal Government Funds.  
OF FUNDS :

8. RELATIONSHIP : Providing consultancy services to  
WITH OTHER : private and governmental enterprises.  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying	x						1. Master alloys development.	x	
		x					1. Seam welding electrode alloy development.	x	
			x				1. Alloy development for lead storage batteries.	x	
				x			1. Monel alloys development.	x	
					x		1. Bearing alloys and white metal alloys.	x	
Standard technologies						x	1. Zinc alloys development for die casting.	x	
	x						1. Die Casting of pistons.	x	
		x					2. Melting and casting process.		x
							1. Al-Bonze casting development.	x	
Moulding							2. Melting and casting processes.		x
	x	x				x	1. Zn-Al alloy gravity die casting development.	x	
							1. Moulding sands and their control.		x

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Standard technologies	x						1. Study of the various forging and die casting parameters.	x	
							2. Die casting process.		x
		x					1. Study of the various forging and die casting parameters.	x	
							2. Forging process.		x
					x	1. Study of the various forging and die casting parameters.	x		
						2. Die casting process.		x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2						
Standard technologies	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2						



12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Alloying	x	x	x	x	x	x	Availability of staff as consultants or experts : Yes for UNIDO field assignments
Manufacture of products	x	x	x	x	x	x	
							Training program available for own nationals : Yes
							Training program available for other nationals : Yes
							Training languages : English
							Duration : 6 - 8 weeks.

13. TECHNICAL CO-OPERATION - REQUESTED 1)																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS 2)						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Manufacture of products (see 3)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Standard technologies (see 3)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Languages : English												Duration : 6 - 8 Weeks						
Assistance obtained in the past : Fulmer Research Institute Ltd., United Kingdom; Bouglie Baldo Inng Milano, Italy (international organizations).												training; see note 2).						

## 14. DOCUMENTS

: Availability of brochures and annual report.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	From developed countries (Table 13).
2)	Expert services: 12 weeks (Table 13).
3)	Pressure Die Casting and Forging (Table 13).

1. NAME : MINERALS AND METALLURGY DIVISION, PAKISTAN COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH (PCSIR)

2. ADDRESS : Shahrah-e-Jalal-ud-Din Roomi,  
:  
: LAHORE-16,  
: Pakistan

3. TELEPHONE : 870 324-7  
  
TELEX : No information provided.  
CABLE : CONSEARCH LAHORE

4. DIRECTOR : Dr. Asaf Ali Qureshi  
:

5. CONTACT : Dr. M. Khalid Masood  
PERSON(S) :

6. STAFF: 34

7. BUDGET / : - YEAR : 1985  
SOURCE :  
OF FUNDS : -

8. RELATIONSHIP : Being a government organization, PCSIR  
WITH OTHER : has established close collaboration  
ORGANIZATIONS : with public and private sector.

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Manufacture of products			x				1. Production of antimony and lead metals from antimonial lead ore of Chitral.	x	
							2. Separation of antimony and lead sulphides from antimonial lead ore of Chitral.	x	
							3. Production of antimony and lead salts from the antimonial lead ore of Chitral.	x	
						x	1. Substitution of imported minerals and mineral based products.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alternative technologies		1,2	1,2			1,2												
Beneficiation of ores		9	9			9												
Manufacture of products		9	9			9								9	9			9
Main utilities for processing		9	9			9												
Standard technologies														9	9			9
Manpower and safety								9	9			9						

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	STAFF AVAILABILITY AND TRAINING						
	Al	Cu	Pb	Ni	Sn	Zn	
Beneficiation of ores		x	x			x	Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : Urdu, English, German, French  Duration : One to three months.
Manufacture of products		x	x			x	
Refining		x	x			x	
Process control and automation		x	x			x	

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Manufacture of products	x	x	x			x	x	x	x			x	x	x	x			x
Main utilities for processing	x	x	x			x	x	x	x			x	x	x	x			x
Standard technologies	x	x	x			x	x	x	x			x	x	x	x			x
Languages : English Assistance obtained in the past : UNDP (international organization).												Duration : 3 - 6 months.						

## 14. DOCUMENTS

: Availability of brochures.

15.

NOTES

## CODE

## DESCRIPTION

R	Research	(Tables 9 and 10)
T	Training	"
1	For Technical Co-operation	(Table 11 )
2	For Technical Assistance	"
3	For Own Use	"
9	ALL of above (1, 2, and 3)	"
Al	Aluminium	(Tables 9, 10, 11, 12, and 13)
Cu	Copper	"
Pb	Lead	"
Ni	Nickel	"
Sn	Tin	"
Zn	Zinc	"

1. NAME : INSTITUTO GEOLOGICO MINERO Y METALURGICO (INGEMMET)

2. ADDRESS : Pablo Bermúdez No.211,  
:  
: LIMA 11,  
: Peru

3. TELEPHONE : 316 233  
  
TELEX : No information provided  
CABLE : No information provided

4. DIRECTOR : Ing. Juan Zegarra Wuest  
:

5. CONTACT : Ing. Juan Zegarra Wuest  
PERSON(S) :

6. STAFF: 75

7. BUDGET / : US\$1.708.000.- YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Beneficiation of ores		x	x			x	1. Design of concentrator plant of the project Iscay-Cruz.	x	
							2. Beneficiation of polymetallic minerals-flotation pilot plant.	x	
Exploration of deposits		x					1. Bacteriological leaching of copper minerals;	x	
							2. Beneficiation of copper minerals.	x	
		x				x	1. Exploration of the deposit La Granja (Cu-Mo).	x	
							1. Search for heavy metals in the south part of Peru (Sn-W-Au).	x	
	x	x				x	1. Exploration and evaluation of deposits in Tambogrande (Pb-Zn-Ag-Cu).	x	
							2. Exploration and evaluation of deposits in Iscay-Cruz (Cu,Pb,Zn-Ag).	x	

9. (Contd.) ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Mining of principal materials or alternative ores		x	x			x	1. Several works on underground mining of rocks and ventilation.	x	



10. ANTICIPATED PROJECTS											
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE			R	T
No information provided.											

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																			
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION						
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
beneficiation of ores		2,3	2,3			2,3													

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
							See note 2)

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Beneficiation of ores		x	x			x		x	x			x		x	x			x
Exploration of deposits		x	x		x	x		x	x		x	x		x	x		x	x
Languages : Spanish, English Assistance obtained in the past : Germany Federal Republic, Japan, Spain, United Kingdom.												Duration : Variable						

14. DOCUMENTS

: No information provided.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No information provided (Table 12).
2)	Geology, Mining, Metallurgy (Table 12).

1. NAME : METALS INDUSTRY RESEARCH AND DEVELOPMENT CENTER

2. ADDRESS : Gen. Santos Avenue,  
: Bicutan, Taguig,  
: METRO MANILA,  
: Philippines

3. TELEPHONE : 822-04-31 to 35,  
822-09-77  
TELEX : 45596 MIRDEC  
CABLE : MIDEDEC, MANILA

4. DIRECTOR : Constante V. Ventura  
:

5. CONTACT : Constante V. Ventura  
PERSON(S) :

6. STAFF: 118

7. BUDGET / : US\$1.2 Million. YEAR : 1985  
SOURCE : Corporate Income, National Governmental  
OF FUNDS : subsidy and others.

8. RELATIONSHIP : Attached Agency of the Ministry of  
WITH OTHER : Trade and Industry.  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Manufacture of products	x	x					1. Conventional castings.		x
		x					1. Investment castings.		x
Electroplating		x		x		x	1. Electroplating.		x
							1. Electroplating.		x

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Manufacture of products		x					1. Brassware making. 2. Investment casting.	x	x
Electroplating		x					1. Electroplating.	x	x

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Manufacture of products (see note 1)							2	2		2		2	2	2		2		2

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
							Manufacture of products Electroplating

13. TECHNICAL CO-OPERATION - REQUESTED																			
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Manufacture of products Electroplating		x						x						x					
Languages : English Assistance obtained in the past : Colombo Plan, UNDP/UNIDO, JICA, FRG, Netherlands, Yugoslavia, Austria.													Duration : Please see note 2).						

14. DOCUMENTS : Availability of brochures.

15. NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
A.	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	For copper: Investment castings (Table 11).
2)	For manufacture of products: 9 months (Table 13). For electroplating: 24 months (Table 13).

1. NAME : FOUNDRY RESEARCH INSTITUTE

2. ADDRESS : ul. Zakopianska 73,  
:  
: 30-418 KRAKOW,  
: Poland

3. TELEPHONE : 665 022  
  
TELEX : 322431 IO PL  
CABLE : No information provided.

4. DIRECTOR : Prof. Zbigniew Górny  
:

5. CONTACT : Prof. Zbigniew Lech  
PERSON(S) :

6. STAFF: 780

7. BUDGET / : US\$25 Million. YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying		x					1. Copper alloys resistant to friction and abrasion.	x	
Alternative technologies		x					1. Technology of making precision castings in copper and its alloys using the investment process.	x	
Manufacture of products	x	x					1. Technology of making special-purpose castings/ fan blades, blast furnace tuyers.	x	
Refining	x						1. Vacuum refining.	x	
		x					2. Technology of melting and refining of Al and Cu alloys.		x
		x					1. Fluxes for refining of waste materials.	x	
							2. Technology of melting and refining of Al and Cu alloys.		x



9. (Contd.) ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Smelting	x	x					1. Technology of melting and refining of Al and Cu alloys.		x
Standard technologies	x	x					1. Modern lubricants and parting agents for pressure die cast Al and Cu alloys.	x	
	x						1. Squeeze casting.	x	
							2. Pressure die casting -- squeeze casting.		x
							3. "Alfin" process-diffused junction of Al-Fe.		x
							4. Gravity die casting of large pistons.		x

10. ANTICIPATED PROJECTS

FIELDS OF ACTIVITY	10. ANTICIPATED PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying Standard technologies	x x						1. Cast Al composites high strength Al-alloys. 1. Pressure die casting in active gases. 2. Automatized stand for pressure die casting.	x x x	 x x

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT

PURPOSE OF OPERATION FIELDS OF ACTIVITY	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Manufacture of products Standard technologies		1					1						1					

12. TECHNICAL CO-OPERATION - GIVEN										
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING			
	Refining	x	x					Availability of staff as consultants or experts : Yes for UNIDO field assignments		
Smelting	x	x					Training program available for own nationals : Yes			
Standard technologies	x						Training program available for other nationals : Yes			
							Training languages : English, French			
							Duration : 2 - 8 weeks.			

13. TECHNICAL CO-OPERATION - REQUESTED																			
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Manufacture of products	x	x																	
Process control and automation	x	x																	
Languages : English, French												Duration : 1 - 2 weeks.							
Assistance obtained in the past : None.																			

14. DOCUMENTS : No information provided.

15. NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "

1. NAME : INSTITUTE OF GEOLOGY AND MINERAL DEPOSITS

2. ADDRESS : Av. Mickiewicza 30,  
:  
: 30-059 KRAKOW,  
: Poland

3. TELEPHONE : 330-081 , 330-091  
  
TELEX : No information provided.  
CABLE : No information provided.

4. DIRECTOR : Prof. Dr. W. Zabinski  
:

5. CONTACT : Prof. W. Zabinski  
PERSON(S) :

6. STAFF: 250

7. BUDGET / : No information provided. YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : Ministry of Higher Education and  
WITH OTHER : Technique.  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Beneficiation of ores		x					1. Exploration and recovery of metals accompanying copper in the Zechstein deposits.	x	
					x		1. Chemical and physical properties of Sn ores in chloritic shales.	x	
			x			x	1. Host-rock ore body relationships and their applicability to exploration and mineral processing.	x	
Exploration of deposits		x					1. Exploration and recovery of metals accompanying copper in the Zechstein deposits.	x	
					x		.. Chemical and physical properties of Sn ores in chloritic shales.	x	
				x		x	1. Host-rock ore body relationships and their applicability of exploration and mineral processing.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Beneficiation of ores		x					1. Exploration and recovery of metals accompanying copper in the Zechstein deposits.	x	
					x		1. Chemical and physical properties of Sn ores in chloritic shales.	x	
Exploration of deposits			x			x	1. Host-rock ore body relationships and their applicability to exploration and mineral processing.	x	
		x					1. Exploration and recovery of metals accompanying copper in the Zechstein deposits.	x	
					x		1. Chemical and physical properties of Sn ores in chloritic shales.	x	
				x		x	1. Host-rock ore body relationships and their applicability to exploration and mineral processing.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Beneficiation of ores		2	2		2	2		2	2		2	2						
Exploration of deposits		2	2		2	2		2	2		2	2						

12. TECHNICAL CO-OPERATION - GIVEN

FIELDS OF TRAINING PROGRAM	TECHNICAL CO-OPERATION - GIVEN						STAFF AVAILABILITY AND TRAINING	
	Al	Cu	Pb	Ni	Sn	Zn		
Beneficiation of ores		x	x		x	x	Availability of staff as consultants or experts : Yes 1)	
Exploration of deposits		x	x		x	x	for UNIDO field assignments	
							Training program available for own nationals : Yes	
							Training program available for other nationals : Yes	
							Training languages : English	
							Duration : 3 - 6 months.	

13. TECHNICAL CO-OPERATION - REQUESTED

FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
No information provided.																		
Languages	: No information provided.																	
Assistance obtained in the past	: No information provided.																	
													Duration : No information provided.					

14. DOCUMENTS

: No information provided.

15.

NOTES

CODE

DESCRIPTION

R	Research	(Tables 9 and 10)
T	Training	"
1	For Technical Co-operation	(Table 11 )
2	For Technical Assistance	"
3	For Own Use	"
9	ALL of above (1, 2, and 3)	"
Al	Aluminium	(Tables 9, 10, 11, 12, and 13)
Cu	Copper	"
Pb	Lead	"
Ni	Nickel	"
Sn	Tin	"
Zn	Zinc	"
1)	For the fields of activities: Beneficiation of ores, Exploration of deposits (Table 12). For the metals: Cu, Pb, Sn, Zn (Table 12).	



1. NAME : INSTITUTE OF PRECISION MECHANICS

2. ADDRESS : Powazki Duchnicka Street 3,  
:  
: 00-967 WARSAW 86,  
: Poland

3. TELEPHONE : 399 810 or /inner 1224  
399 910  
TELEX : 813 555 PL or 812 505 PL  
CABLE : WARSAW - IMPREC

4. DIRECTOR : Prof. Andrzej Kozlowski  
:

5. CONTACT : Zdislaw Kolanko  
PERSON(S) :

6. STAFF: 500  
(approx.)

7. BUDGET / : US\$8.400.000.- YEAR : 1985  
SOURCE : 35% from Central State Budget and  
OF FUNDS : 65% financial self-sufficient.

8. RELATIONSHIP : Ministry of Metallurgy and Machinery  
WITH OTHER : Industry, Warsaw and Governmental  
ORGANIZATIONS : Office for Research and Development,  
Warsaw.

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
IMP specializations (see note 1)	x	x	x	x	x	x	Details about the project titles are given in the notes 2 (for Research) and 3 (for Training).	x	x
Environmental control	x	x	x	x	x	x		x	x
Process control and automation	x	x	x	x	x	x		x	x
Quality control and instrumentation	x	x	x	x	x	x		x	x

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
IMP specializations (see note 1)	x	x	x	x	x	x	Details about the project titles are given in the notes 2 (for Research) and 3 (for Training).	x	x
Environmental control	x	x	x	x	x	x		x	
Process control and automation	x	x	x	x	x	x		x	
Quality control and instrumentation	x	x	x	x	x	x		x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH 5)						b. TRAINING 5)						c. INDUSTRIAL APPLICATION 5)					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
IMP specializations (see note 4)																		



14. DOCUMENTS : Availability of brochures.

15. NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	<u>IMP specializations</u> : Chemical and electrochemical treatment of ferrous- and non-ferrous metals, deposition of metal- and alloy-coatings on all kinds of substrates/metals, alloys, plastics/applied in the industry (Tables 9, 10, 12).
2)	Protective, decorative and functional coatings on metals, alloys and plastics/electroplating, electroless processes, testing of coatings, effluent treatment connected with plating processes (Tables 9, 10).
3)	Chemical and electrochemical treatment of ferrous- and non-ferrous metals, deposition of metal- and some alloy-coatings on all kinds of substrates/metals, alloys, plastics/applied in the industry (Tables 9, 10).
4)	Chemical and electrochemical treatment of ferrous- and non-ferrous metals, deposition of metal- and some alloy-coatings on all kinds of substrates/metals, alloys, plastics/applied in the industry. Training depending on necessities of customers (Table 11).
5)	Extent of operation: 9 (Table 11).
6)	No technical co-operation requested (Table 13).
7)	UNIDO 1975 and following years Environmental Protection by effluent treatment and material recovery in the metal finishing industry. D.G.S. Jackson Expert, UNIDO Project No.SI/POL/75/810/11-01 (Table 13).

1. NAME : MATERIAL SCIENCES AND METAL TECHNOLOGY INSTITUTE OF CRACOW UNIVERSITY

2. ADDRESS : Al. Planu 6-let. 19A,  
:  
: 31-864 KRAKOW,  
: Poland

3. TELEPHONE : 480-170 or  
480-555 in. 421  
TELEX : 032 2468  
CABLE : No information provided.

4. DIRECTOR : Prof. Dr. Stanislaw Rudnik  
:

5. CONTACT : Prof. Dr. Ryszard H. Kozlowski  
PERSON(S) :

6. STAFF: 70

7. BUDGET / : US\$500.000.- YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : Institute of Mechanical Engineering  
WITH OTHER : Faculty at Cracow Technical  
ORGANIZATIONS : University.

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying	x	x	x	x	x	x	Details about the project titles are given in the notes 1 (for Research) and 2 (for Training).	x	x
Standard technologies	x	x	x	x	x	x		x	x
New developments	x	x	x	x	x	x			
Quality control and instrumentation	x	x	x	x	x	x		x	x

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying	x	x	x	x	x	x	Details about the project titles are given in the notes 3 (for Research) and 4 (for Training).	x	x
New developments	x	x	x	x	x	x		x	
Quality control and instrumentation	x	x	x	x	x	x		x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Standard technologies	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
New developments	9	9	9	9	9	9	2,3	2,3	2,3	2,3	2,3	2,3	9	9	9	9	9	9



## 14. DOCUMENTS

: Availability of Directory of the Technical University of Grocow.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	Physical metallurgy; physical metallurgy laboratories/equipments, layout, service; manpower; development of new alloys and casts from the local raw materials; heat treatment (Table 9).
2)	Physical metallurgy; training the counterpart staff; training programme on analysis of metallurgical failures and defects; metallography, heat treatment; metal physics, mechanical tests (Table 9).
3)	Manufacture of new alloys towards a better quality and spare parts (Table 10).
4)	Manufacture of new alloys, towards a better quality and spare parts (Table 10).
5)	No technical co-operation requested (Table 13).



1. NAME : DEPARTAMENTO DE ENGENHARIA MECANICA - FACULDADE DE ENGENHARIA

2. ADDRESS : Rua Dos Bragas,  
:  
: 4099 PORTO CODEX,  
: Portugal

3. TELEPHONE : 27505  
  
TELEX : 27323 FEUP P  
CABLE : No information provided.

4. DIRECTOR : A. Barbedo de Magalhaes  
:

5. CONTACT : A. Barbedo de Magalhaes  
PERSON(S) :

6. STAFF: 100

7. BUDGET / : US\$1 Million. YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Strontium influence	x						1. Study on the influence of strontium in aluminium alloys type AS7G.	x	
Thermal analysis	x						1. Application of thermal analysis on the control of chemical composition of Al-Si-Mg alloys.	x	

10. ANTICIPATED PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
	Mechanical behaviour	x							1. Mechanical behaviour of Al-SiC-Al <sub>2</sub> O <sub>3</sub> .

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT

PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Strontium influence, thermal analysis, mechanical behaviour	9																	

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Strontium influence, thermal analysis, mechanical behaviour	x						Availability of staff as consultants or experts for UNIDO field assignments : Yes  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : Portuguese  Duration : 20 weeks. Engineering materials and production.

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Mechanical engineering	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Languages : French, English. Assistance obtained in the past : Pós - graduation in several European countries.												Duration : Up to one year.						

## 14. DOCUMENTS

: Availability of brochures.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "

1. NAME : INSTITUTO DE TECNOLOGIA INDUSTRIAL 1)

2. ADDRESS : Azinhaga dos Lameiros,  
: Estrada Paco do Lumiar 22,  
: 1699 LISBOA CODEX,  
: Portugal

3. TELEPHONE : 758 7211,  
758 9181  
TELEX : 42486 LNETI P  
CABLE : No information provided.

4. DIRECTOR : Dr. Armando Alvaro d'Oliveira  
: Sampaio

5. CONTACT : O. Sampaio  
PERSON(S) :

6. STAFF: 80  
See 2)

7. BUDGET / : US\$1 Million. YEAR : 1985  
SOURCE : From National Budget.  
OF FUNDS :

8. RELATIONSHIP : Depending from Ministry of Industry.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying	x	x					1. Technology of high strength cast alloys.	x	
Beneficiation of ores		x	x		x	x	1. Metals recovery from complex sulphides.	x	
Recycling and recovery operations	x						1. Technology of high strength cast alloys.	x	
Standard technologies	x						1. Technology of high strength cast alloys.	x	
Corrosion	x	x				x	1. Corrosion and protection.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying	2	2					2	2										
Beneficiation of ores		2	2			2												
Recycling and recovery operations	2																	
Standard technologies	2						2											

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Beneficiation of ores Standard technologies	x	x	x			x	Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes Training program available for other nationals : Yes Training languages : Portuguese, English Duration : One week to six months.

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Beneficiation of ores					x													
Languages : English, French Assistance obtained in the past : French - Portuguese co-operation, AID (USA), IAEA.												Duration : 3 months to 1 year.						

## 14. DOCUMENTS

: No information provided.

## 15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	From Laboratório Nacional de Engenharia e Tecnologia Industrial (Table 1).
2)	Metallurgy Department (Table 6).



1. NAME : KIER - KOREA INSTITUTE OF ENERGY AND RESOURCES

2. ADDRESS : 219-5, Garibong-dong, Guro-gu,  
: 152 Guro P.O. Box 98,  
: SEOUL  
: Korea (Republic of)

3. TELEPHONE : (02) 856-0041  
  
TELEX : No information provided.  
CABLE : KIERSK K24337

4. DIRECTOR : Park K.S., Ph.D.  
:

5. CONTACT : Choi K.S.,  
PERSON(S) : Park N.Y., Ph.D.

6. STAFF: 10

7. BUDGET / : US\$140.000.-/year. YEAR : 1985  
SOURCE : From Government.  
OF FUNDS :

8. RELATIONSHIP : Ministry of Sciences and Technologies.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Exploration of deposits		x	x			x	1. A study of the base metal deposit at Siheung area, Korea.	x	
				x	x		2. Exploration of deposit.		x
							1. The origin of the tin deposit at Soon Kyoung area, Korea.	x	
							2. Exploration of deposit.		x

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Exploration of deposits		x	x			x	1. A study of the volcanogenic base metal deposit in Korea.	x	
				x	x		2. Exploration of deposit. 1. The origin of the tin deposit at Soon Kyoung Area, Korea. 2. Exploration of deposit.	x	x

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Inclusion study See notes 1) and 2)																		



## 14. DOCUMENTS

: No information provided.

15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No specific information provided concerning the metals (Table 11).
2)	Purpose of operation: Research; Extent of operation: 1 (Table 11).
3)	No technical co-operation requested (Table 13).

1. NAME : KOREA INSTITUTE OF MACHINERY AND METALS

2. ADDRESS : 66, Sangnam-dong, Kyungsang-nando,  
:  
: CHANGWON,  
: Korea

3. TELEPHONE : Changwon 82-1621  
  
TELEX : K53835  
CABLE : ROKKIMSEL

4. DIRECTOR : Hae Lee, Ph.D.  
:

5. CONTACT : Fui-Jin Jun, Ph.D.  
PERSON(S) :

6. STAFF: 620

7. BUDGET / : US\$19 Million. YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Manufacture of products				x			1. Development of Ni-base super-alloy castings for gas turbine application.	x	

10. ANTICIPATED PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT

PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION						
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Manufacture of products				3															

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Manufacture of products				x							x							
Languages : English Assistance obtained in the past : None.												Duration : 3 months.						

## 14. DOCUMENTS

: Availability of brochures, annual report.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "



1. NAME : ECOLE POLYTECHNIQUE DE THIES

2. ADDRESS : B.P. 10,  
:  
: THIES,  
: Senegal

3. TELEPHONE : 511 632  
  
TELEX : 7758 EPHIES SG  
CABLE : No information provided.

4. DIRECTOR : Colonel Lamine Cisse  
:

5. CONTACT : Colonel Lamine Cisse  
PERSON(S) :

6. STAFF: 40

7. BUDGET / : US\$3 Million. YEAR : 1985  
SOURCE : Agence Canadienne Développement  
OF FUNDS : International.

8. RELATIONSHIP : Ecole Polytechnique de Montreal,  
WITH OTHER : Ministere du Plan et de la  
ORGANIZATIONS : Cooperation Senegal.

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Please see note 1)									

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Please see note 1)									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 2)																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn

12. TECHNICAL CO-OPERATION - GIVEN								
FIELDS OF TRAINING PROGRAM 3)	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING	
							Availability of staff as consultants or experts : No for UNIDO field assignments	
Training program available for own nationals : No								
Training program available for other nationals : No								
Training languages : -								
Duration : -								

13. TECHNICAL CO-OPERATION - REQUESTED																			
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Alloying	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Corrosion	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Languages : French												Duration : No information provided.							
Assistance obtained in the past : Agence Canadienne de Developpement International.																			

## 14. DOCUMENTS

: No information provided.

15.

NOTES

CODE

DESCRIPTION

R	Research	(Tables 9 and 10)
T	Training	"
1	For Technical Co-operation	(Table 11 )
2	For Technical Assistance	"
3	For Own Use	"
9	ALL of above (1, 2, and 3)	"
Al	Aluminium	(Tables 9, 10, 11, 12, and 13)
Cu	Copper	"
Pb	Lead	"
Ni	Nickel	"
Sn	Tin	"
Zn	Zinc	"
1)	No projects particularly related to non-ferrous metals technology, are carried out (Tables 9 & 10).	
2)	No availability of pilot installation/equipment (Table 11).	
3)	No availability of training programme (Table 12).	

1. NAME : CENTRO NACIONAL DE INVESTIGACIONES METALURGICAS

2. ADDRESS : Avda. Gregorio del Amo no.8,  
:  
: 28040 MADRID,  
: Spain

3. TELEPHONE : 253 8900  
  
TELEX : 42182 CSICE E  
CABLE : CENIMENTAL

4. DIRECTOR : Dr. A.J. Vázquez Vaamonde  
:

5. CONTACT : J. Fernández  
PERSON(S) :

6. STAFF: 80

7. BUDGET / : US\$6.35 Million. YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : Consejo Superior de Investigaciones  
WITH OTHER : Cientificas (Council of Scientific  
ORGANIZATIONS : Research).

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying				x			1. New alloys with controlled micro-structure.	x	
			x				1. Corrosion of lead alloys.	x	
	x						1. Fine grained aluminium alloys fabrication.	x	
						x	2. Plastic deformation of aluminium alloys.	x	
Beneficiation of ores	x	x	x	x	x	x	1. Steel galvanization.	x	
		x				x	1. Chemical analysis of metals.	x	
Welding	x	x					1. Hydrometallurgical treatment of complex sulphide ore deposits.	x	
Refining				x			1. Welding courses.		x
						x	1. Qualification of welders.		x
							1. Zinc die-castings gases analysis.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying	9	9	9	9	9	9												
Beneficiation of ores														1	1	1	1	1
Recycling and recovery operations																		
Refining	1		1			1												
Smelting							1	1	1	1	1	1	1	1	1	1	1	1
Quality control and instrumentation													2	2	2	2	2	2
Welding							1	1		1								

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Welding	x	x		x			Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : Spanish  Duration : 250 hours (3 months or 9 months).

13. TECHNICAL CO-OPERATION - REQUESTED 1)																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Languages : - Assistance obtained in the past : Research Centers and International Associations.												Duration : -						

## 14. DOCUMENTS

: Availability of annual report.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No technical co-operation requested (Table 13).



1. NAME : MEFOS - THE FOUNDATION FOR METALLURGICAL RESEARCH

2. ADDRESS : P.O. Box 812,  
:  
: S-951 28 LULEA,  
: Sweden

3. TELEPHONE : +46-(0)9205 5640

TELEX : 80482 MEFOS S  
CABLE : No information provided.

4. DIRECTOR : Bertil Berg  
:

5. CONTACT : Bertil Berg  
PERSON(S) :

6. STAFF: 80

7. BUDGET / : US\$8.4 Million. YEAR : 1985  
SOURCE :  
OF FUNDS : 80% private companies (approx.).

8. RELATIONSHIP : Please see note 1).  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alternative technologies		x					1. New method to produce matte and copper from sulphide ores.	x	
	x	x	x	x	x	x	1. Continuous follow up of literature of techniques plus contacts with experts within this field.		x
Manufacture of products	x						1. Cold rolling of aluminium.	x	
Recycling and recovery operations	x	x	x	x	x	x	1. Continuous follow up of literature of techniques in this field plus contacts with experts.		x
Refining		x					1. New method to produce matte and copper from sulphide ores.	x	
	x	x	x	x	x	x	1. Continuous follow up of literature of techniques in this field plus contacts with experts.		x

9. (Contd.) ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Smelting		x					1. New method to produce matte and copper from sulphide ores.	x	
	x	x	x	x	x	x	1. Continuous follow up of literature of techniques in this field plus contacts with experts.		x

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alternative technologies	x						1. A new method for production of Aluminium.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alternative technologies	9	9	9	9	9	9		2	2		2		2	2	2	2	2	2
Manufacture of products					9													
Mining of principal material or alternative ores					9													
Recycling and recovery operations	9	9	9	9	9	9		2	2		2		2	2	2	2	2	2
Refining	9	9	9	9	9	9		2	2		2		2	2	2	2	2	2
Smelting	9	9	9	9	9	9		2	2		2		2	2	2	2	2	2
Economics		9																
Energy		9																
Environmental control		9	9															
Process control and automation		9	9				9	9										
Quality control and instrumentation		9	9															
Manpower and safety		9																



## 14. DOCUMENTS

: Availability of brochures and annual report.

15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	MEFOS is an independent research foundation. Swedish, Norwegian and Finnish companies producing steel or metals and companies with interest in these industries are members of the foundation. Today MEFOS has 30 members from Sweden, Finland and Norway. The government through the National Swedish Board of Technological Development is financing some projects.
2)	No technical co-operation requested (Table 13).

1. NAME : ROYAL INSTITUTE OF TECHNOLOGY, DEPARTMENT OF PRODUCTION TECHNOLOGY, MINING AND STEEL INDUSTRY

2. ADDRESS :  
:  
: S-100 44 STOCKHOLM,  
: Sweden

3. TELEPHONE : 46-8 787 8930  
  
TELEX : 103 89 KTHB S  
CABLE : TECHNOLOGY

4. DIRECTOR : Professor John Olof Edström  
:

5. CONTACT : Professor John Olof Edström  
PERSON(S) :

6. STAFF: 16

7. BUDGET / : US\$450,000.- YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : Please see note 1).  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alternative technologies		x					1. The metallurgical treatment of copper and silver sulphid concentrates rich in impurities like antimony, bismuth, lead, arsenic, mercury.	x	
					x		1. The beneficiation of ilmenite ores and production of titanium rich slags and titanium powder production.	x	
Beneficiation of ores		x	x				1. The metallurgical treatment of copper and silver sulphid concentrates rich in impurities like antimony, bismuth, lead, arsenic, mercury.	x	

9. (Contd.) ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Smelting		x					1. The metallurgical treatment of copper and silver sulphid concentrates rich in impurities like antimony, bismuth, lead, arsenic, mercury.	x	
Economics					x		1. The beneficiation of ilmenite ores and production of titanium rich slags and titanium powder production.	x	
					x		1. The beneficiation of ilmenite ores and production of titanium rich slags and titanium powder production. See also note 2).	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Recycling and recovery operations		x					1. Recycling and recovery of precious metals from circuit boards, catalysts and telecom scrap. 2. See also note 2), part a).	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 3)																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn



12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM 4)	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
							Availability of staff as consultants or experts for UNIDO field assignments : Yes Training program available for own nationals : Yes Training program available for other nationals : Yes Training languages : English Duration : See note 5).

13. TECHNICAL CO-OPERATION - REQUESTED 6)																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Languages : - Assistance obtained in the past : SIDA, Mexico, China, UNIDO (Chinese dr).												Duration : -						

## 14. DOCUMENTS

: Availability of brochures, annual report, project document.

## 15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	National Swedish Board for Technical Development (STU), Swedish Agency for Research Co-operation with Developing Countries (SAREC), Swedish International Development Authority (SIDA).
2)	Activities with other non-ferrous metals (Tables 9, 10): a) Precious metals: Alternative technologies, beneficiation of ores, recycling and recovery, economics. b) Vanadium, titanium: Alternative technologies, beneficiation of ores, smelting, economics.
3)	Availability of pilot installation/equipment is given; purpose of operation: research (Table 11), extent of operation: 9 (Table 11).
4)	Metallurgy.
5)	1 - 2 years (individual studies and research work).
6)	No technical co-operation requested.

1. NAME : SWEDISH FOUNDRIES' ASSOCIATION (SVENSKA GJUTERIFÖRENINGEN)

2. ADDRESS : P.O. Box 2132,  
:  
: S-550 02 JÖNKÖPING,  
: Sweden

3. TELEPHONE : 036/11 83 40

TELEX : No information provided.  
CABLE : P.O. Box 2132, S-550 02  
JÖNKÖPING, SWEDEN

4. DIRECTOR : Hans Warrol  
:

5. CONTACT : Hans Warrol  
PERSON(S) :

6. STAFF: 25

7. BUDGET / : US\$1 Million. YEAR : 1985  
SOURCE : (Member companies' contributions,  
OF FUNDS : governmental research support, contract  
research fees etc.).

8. RELATIONSHIP : Please see note 1).  
WITH OTHER :  
ORGANIZATIONS :

FIELDS OF ACTIVITY 2)	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying	x						1. The influence of Cu- content and heat treatment on the resistance to corrosion for AlSi-alloys.	x	
							2. Non-ferrous metals metallurgy.		x
							3. Casting defects analyses.		x
Process control and automation	x						1. New methods for fettling of castings. Better casting quality and productivity at high pressure die casting by improved process control.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Manufacture of products	3																	
Standard technologies	3																	
Environmental control	3																	
Quality control and instrumentation	3																	

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
No information provided.							Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : No  Training languages : No information provided.  Duration : No information provided.

13. TECHNICAL CO-OPERATION - REQUESTED 3)																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Languages : - Assistance obtained in the past : None.													Duration : -					

## 14. DOCUMENTS

: No information provided.

15.

## NOTES

## CODE

## DESCRIPTION

R	Research	(Tables 9 and 10)
T	Training	"
1	For Technical Co-operation	(Table 11 )
2	For Technical Assistance	"
3	For Own Use	"
9	ALL of above (1, 2, and 3)	"
Al	Aluminium	(Tables 9, 10, 11, 12, and 13)
Cu	Copper	"
Pb	Lead	"
Ni	Nickel	"
Sn	Tin	"
Zn	Zinc	"
1)	As trade and research organization of the Swedish foundry industry, we have relations with all companies of this branch, as well as governmental boards for R&D, universities etc. (Table 8).	
2)	Being a foundry research centre, the priority is given to ferrous alloys as cast iron and steel. About 20% of the activities in the field of non-ferrous metals refer mainly to aluminium (Table 9).	
3)	No technical co-operation requested (Table 13).	

1. NAME : BATTELLE CENTRE DE RECHERCHE OF GENEVE

2. ADDRESS : 7, route de Drize,  
:  
: CH-1227 CAROUGE/GENEVE,  
: Switzerland

3. TELEPHONE : (022) 270 270  
  
TELEX : 423 472 (FAX: (022) 436732)  
CABLE : BATTELLE GENEVE

4. DIRECTOR : Dr. Frank Dawson  
:

5. CONTACT : Dr. G. Haour  
PERSON(S) :

6. STAFF: 380

7. BUDGET / : US\$23.000.000.- YEAR : 1985  
SOURCE : Private Industry and Government.  
OF FUNDS :

8. RELATIONSHIP : Battelle Institute eV Frankfurt,  
WITH OTHER : Battelle Memorial Institute,  
ORGANIZATIONS : Columbus, Ohio, USA.

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alternative technologies	x	x	x	x	x	x	See note 1).	x	
Manufacture of products	x	x	x	x	x	x		x	
Refining	x	x	x	x	x	x		x	
Standard technologies	x	x	x	x	x	x		x	
Economics	x	x	x	x	x	x		x	
Technology (other technologies not explicitly mentioned)	x	x	x	x	x	x			

10. ANTICIPATED PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alternative technologies	x	x	x	x	x	x	See note 1).	x	
Manufacture of products	x	x	x	x	x	x		x	
Refining	x	x	x	x	x	x		x	
Standard technologies	x	x	x	x	x	x		x	
Economics	x	x	x	x	x	x		x	
Technology (other technologies not explicitly mentioned)	x	x	x	x	x	x		x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT

PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Manufacture of products	9	9	9	9	9	9	9	9	9	9	9	9						



12. TECHNICAL CO-OPERATION - GIVEN										
FIELDS OF TRAINING PROGRAM 2)	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING			
								Availability of staff as consultants or experts for UNIDO field assignments : Yes Training program available for own nationals : Yes Training program available for other nationals : Yes Training languages : Flexible due to the multinational staff. Duration : No information provided.		

13. TECHNICAL CO-OPERATION - REQUESTED 3)																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Languages : - Assistance obtained in the past : None.												Duration : -						

## 14. DOCUMENTS

: Availability of brochures and annual report.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
	Confidential (Tables 9, 10).
	Depends on the particular needs (Table 12).
3)	No technical co-operation requested (Table 13).

1. NAME : THE METALWORKING AND MACHINERY INDUSTRIES DEVELOPMENT INSTITUTE

2. ADDRESS : Soi Trimit (Kluaynamthai),  
: Rama 4 Rd. Phrakhanong,  
: BANGKOK 10110,  
: Thailand

3. TELEPHONE : 391-2929  
  
TELEX : No information provided.  
CABLE : No information provided.

4. DIRECTOR : Dr. Damri Sukhotanang  
:

5. CONTACT : Sunthorn Runnarong  
PERSON(S) :

6. STAFF: 7

7. BUDGET / : - YEAR : 1985  
SOURCE :  
OF FUNDS : Government budget.

8. RELATIONSHIP : Department of Industrial Promotion,  
WITH OTHER : Ministry of Industry.  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying	x	x	x	x	x	x	1. Colours of jewelry and bronze. 2. Foundry technology, centrifugal casting technique.	x	x

10. ANTICIPATED PROJECTS

FIELDS OF ACTIVITY							PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying	x	x	x	x	x	x	1. Jewelry and bearings.		x
Manufacture of products	x	x	x	x	x	x	1. Jewelry and bronze. 2. Jewelry and bearings.	x	x

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT

PURPOSE OF OPERATION : FIELDS OF ACTIVITY 1)	a. RESEARCH 2)						b. TRAINING 2)						c. INDUSTRIAL APPLICATION 2)					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Alloying	x	x	x	x	x	x	Availability of staff as consultants or experts : No for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : See 3)  Training languages : Thai  Duration : 1 - 2 weeks.

13. TECHNICAL CO-OPERATION - REQUESTED																			
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Manufacture of products	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Standard technologies	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Languages : English Assistance obtained in the past : Japan International Co-operation Agency (bilateral co-operation).												Duration : One year.							

## 14. DOCUMENTS

: No information provided.

15.

## NOTES

## CODE

## DESCRIPTION

R	Research	(Tables 9 and 10)
T	Training	"
1	For Technical Co-operation	(Table 11 )
2	For Technical Assistance	"
3	For Own Use	"
9	ALL of above (1, 2, and 3)	"
Al	Aluminium	(Tables 9, 10, 11, 12, and 13)
Cu	Copper	"
Pb	Lead	"
Ni	Nickel	"
Sn	Tin	"
Zn	Zinc	"
1)	No information provided regarding the fields of activities and the metals listed (Table 11).	
2)	Extent of operation: 2 (Table 11).	
3)	No information provided (Table 12).	

1. NAME : REGIONAL CENTER OF MINERAL RESOURCES

2. ADDRESS : Chiangrai University,  
:  
: CHIANGMAI,  
: Thailand

3. TELEPHONE : 221 385  
  
TELEX : No information provided.  
CABLE : No information provided.

4. DIRECTOR : Sathian Snansieng  
:

5. CONTACT : Sathian Snansieng  
PERSON(S) :

6. STAFF: 9

7. BUDGET / : US\$27,550.- YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : Department of Mineral Resources,  
WITH OTHER : Ministry of Industry.  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Auxiliary utilities for processing			x	x	x	x	1. Routine, see note 1)	x	
Beneficiation of ores			x	x	x	x	1. Routine, see note 1)	x	
Exploration of deposits			x	x	x	x	1. Routine, see note 1)	x	
Refining			x	x	x	x	1. Routine, see note 1)	x	
Environmental control			x	x	x	x	1. Routine, see note 1)	x	
Quality control and instrumentation			x	x	x	x	1. Routine, see note 1)	x	

10. ANTICIPATED PROJECTS											
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE			R	T
Exploration of deposits					x		1. Tin deposits in Northern Thailand.			x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Auxiliary utilities for processing			1,2		1,2	1,2			1,2		1,2	1,2			1,2		1,2	1,2



12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
No information provided.							Availability of staff as consultants or experts : See 2) for UNIDO field assignments  Training program available for own nationals : See 2)  Training program available for other nationals : See 2)  Training languages : No information provided.  Duration : No information provided.

13. TECHNICAL CO-OPERATION - REQUESTED																			
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS						
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	
Exploration of deposits					x													x	
Languages : English Assistance obtained in the past : No information provided.												Duration : 3 months.							

## 14. DOCUMENTS

: No information provided.

## 15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No more information provided (Table 9).
2)	No information provided (Table 12).

1. NAME : CARIBBEAN INDUSTRIAL RESEARCH INSTITUTE

2. ADDRESS : c/o Tunapuna Post Office,  
 : UWI Campus,  
 : ST. AUGUSTINE,  
 : Trinidad and Tobago

3. TELEPHONE : 662-7161/4  
 TELEX : 24438 CARIRI WG  
 CABLE : CARIRI, TRINIDAD

4. DIRECTOR : Hollis Charles  
 :

5. CONTACT : Cecil Chin  
 PERSON(S) :

6. STAFF: 60

7. BUDGET / : US\$6 Million. YEAR : 1985  
 SOURCE :  
 OF FUNDS : No information provided.

8. RELATIONSHIP : No information provided.  
 WITH OTHER :  
 ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Manufacture of products	x	x	x			x	1. Experimental Casting Prototype development.	x	x
Quality control and instrumentation	x	x				x	1. Miscellaneous projects.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Manufacture of products	x	x	x			x	1. Casting techniques.		x
Standard technologies	x	x					1. Forging techniques for manufacture of small components.	x	
							2. Industrial attachments.		x

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Manufacture of products	2,3	2,3	2,3			2,3	2,3	2,3	2,3			2,3						

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Manufacture of products	x	x	x			x	Availability of staff as consultants or experts : Yes
Standard technologies	x	x					for UNIDO field assignments
Quality control and instrumentation	x	x				x	Training program available for own nationals : Yes
							Training program available for other nationals : Yes
							Training languages : English
							Duration : By arrangement.

13. TECHNICAL CO-OPERATION - REQUESTED																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alternative technologies	x	x		x			x	x		x			x	x		x		
Manufacture of products	x	x	x			x	x	x	x			x	x	x	x			x
Recycling and recovery operations	x			x			x		x				x					
Standard technologies	x	x					x	x					x	x				
Languages : English												Duration : By arrangement.						
Assistance obtained in the past : None.																		

## 14. DOCUMENTS

: Availability of annual report.

15.

NOTES

CODE

DESCRIPTION

R	Research	(Tables 9 and 10)
T	Training	"
1	For Technical Co-operation	(Table 11 )
2	For Technical Assistance	"
3	For Own Use	"
9	ALL of above (1, 2, and 3)	"
Al	Aluminium	(Tables 9, 10, 11, 12, and 13)
Cu	Copper	"
Pb	Lead	"
Ni	Nickel	"
Sn	Tin	"
Zn	Zinc	"

1. NAME : MARMARA RESEARCH INSTITUTE, THE SCIENTIFIC AND TECHNICAL RESEARCH COUNCIL OF TURKEY 1)

2. ADDRESS : Marmara Research Institute,  
: P.O. Box 74 Gebze,  
: KOCAELI,  
: Turkey

3. TELEPHONE : 2300-2308 (Gebze),  
520 7376 (Istanbul)  
TELEX : 34123 Mae tr  
CABLE : No information provided.

4. DIRECTOR : Prof. Dr. Yilmaz Tokad  
:

5. CONTACT : Resit Basgut  
PERSON(S) :

6. STAFF: 600

7. BUDGET / : US\$4.568.185.- YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : None.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying	x						1. UNIDO small-scale foundry.		x
Manufacture of products		x					1. Operations group training programme.		x
	x						1. UNIDO small-scale foundry.		x
		x					1. Operations group training programme.		x

FIELDS OF ACTIVITY	10. ANTICIPATED PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying	x						1. The development of Al Si Mg 0.5 aluminium alloy contact holder parts alloying and casting technology.	x	
							2. Small-scale foundry operations.		x
							1. The development of high conductivity copper contact holder parts alloying and casting technology.	x	
							2. The development of blast furnace tuyere parts manufacturing technology.	x	
							3. The development of Cu-Al alloy arc furnace parts manufacturing technology.	x	
Manufacture of products	x						4. The development of Cu-Zn alloy arc furnace parts manufacturing technology.	x	
							5. Group training programme.		x
							1. The development of Al Si Mg 0.5 aluminium alloy contact holder parts alloying and casting technology.	x	
							2. Small-scale foundry operations.		x
							1. The development of high conductivity copper contact holder parts alloying and casting technology.	x	
							2. The development of blast furnace tuyere parts manufacturing technology.	x	
							3. The development of Cu-Al alloy arc furnace parts manufacturing technology.	x	
							4. The development of Cu-Zn alloy arc furnace parts manufacturing technology.	x	
							5. Group training programme.		x



11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT

PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying	9	9					9	9					9	9				
Manufacture of products	9	9					9	9					9	9				

12. TECHNICAL CO-OPERATION - GIVEN

FIELDS OF TRAINING PROGRAM	TECHNICAL CO-OPERATION - GIVEN						STAFF AVAILABILITY AND TRAINING			
	Al	Cu	Pb	Ni	Sn	Zn				
Alloying	x	x					Availability of staff as consultants or experts : Yes for UNIDO field assignments			
Manufacture of products	x	x					Training program available for own nationals : Yes			
							Training program available for other nationals : Yes			
							Training languages : English			
							Duration : Up to three months.			

13. TECHNICAL CO-OPERATION - REQUESTED

FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloying	x												x					
Manufacture of products	x												x					
Languages : English												Duration : 3 months.						
Assistance obtained in the past : From UNIDO.																		

## 14. DOCUMENTS

: No information provided.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	Marmara Research Institute has different research departments. Non-ferrous research group is in the Material Research Department. Number of professional staff is 9 (Table 1).

1. NAME : ANTHONY BIRD ASSOCIATES

2. ADDRESS : 193 Richmond Rd.,  
: Kingston,  
: SURREY, KT2 5DD,  
: United Kingdom

3. TELEPHONE : 01-546 9045  
  
TELEX : 291 561  
CABLE : No information provided.

4. DIRECTOR : Tony Bird  
:

5. CONTACT : Tony Bird  
PERSON(S) :

6. STAFF: 1

7. BUDGET / : Not disclosed. YEAR : 1985  
SOURCE :  
OF FUNDS :

8. RELATIONSHIP : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Economics	x						1. Short medium-term forecasting of aluminium supply.	x	
							2. Analysis of aluminium production costs.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Energy	x						1. Pricing of energy to aluminium companies.	x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 1)																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn



## 14. DOCUMENTS

: Availability of brochures.

15.

NOTES

CODE

DESCRIPTION

R	Research	(Tables 9 and 10)
T	Training	"
1	For Technical Co-operation	(Table 11 )
2	For Technical Assistance	"
3	For Own Use	"
9	ALL of above (1, 2, and 3)	"
Al	Aluminium	(Tables 9, 10, 11, 12, and 13)
Cu	Copper	"
Pb	Lead	"
Ni	Nickel	"
Sn	Tin	"
Zn	Zinc	"
1)	No availability of pilot installation/equipment (Table 11).	

1. NAME : ASSOCIATION OF CONSULTING ENGINEERS

2. ADDRESS : Alliance House, 112 Caxton Street,  
 : Westminster,  
 : LONDON SW1H 0QL,  
 : United Kingdom

3. TELEPHONE : No information provided.  
 TELEX : No information provided.  
 CABLE : No information provided.

4. DIRECTOR : Major-General J.M. Pellereau  
 :

5. CONTACT : Major-General  
 PERSON(S) : P.J.M. Pellereau

6. STAFF: 2

7. BUDGET / : US\$0.6 Million. YEAR : 1985  
 SOURCE :  
 OF FUNDS : Members.

8. RELATIONSHIP : Member of FIDIC.  
 WITH OTHER :  
 ORGANIZATIONS :

9. ON-GOING PROJECTS 1)									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE 2)	R	T
Mining of principal materials or alternative ores	x						1. Industrial Complex for Bauxite Extracting Plant, India. 2. Industrial Complex for Bauxite Extracting Plant.		



10. ANTICIPATED PROJECTS											
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE			R	T
No information provided.											

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	RESEARCH						TRAINING						INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
No information provided.																		



## 14. DOCUMENTS

: Availability of Information Card, Overseas Work 1986.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	The following information has been obtained from the ACE Publication: Overseas work entrusted to members during 1985 (Table 9).
2)	Projects on the fields (Table 9).
3)	Technical advice and supervision of building and civil work (Table 9).
4)	By arrangement (Table 12).
5)	By members of ACE (Table 12).
6)	No technical co-operation requested (Table 13).

1. NAME : FULMER RESEARCH INSTITUTE

2. ADDRESS : Hollybush Hill,  
: Stoke Poges,  
: BUCKS. SL2 4QD,  
: United Kingdom

3. TELEPHONE : (02816) 2181  
  
TELEX : 849 374  
CABLE : No information provided.

4. DIRECTOR : Dr. W.E. Duckworth  
:

5. CONTACT : Dr. W.E. Duckworth  
PERSON(S) :

6. STAFF: 100

7. BUDGET / : US\$7 Million. YEAR : 1985  
SOURCE :  
OF FUNDS : Wholly from earnings.

8. RELATIONSHIP : Owned by the Institute of Physics.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying Alternative technologies	x	x					1. Corrosion of shape memory alloys.		x
							1. Manufacture of porous aluminium.	x	
Auxiliary utilities for processing Manufacture of products	x	x					2. Hot isostatic pressing of aluminium castings.	x	
							1. Production of fine grained coppe.		x
							2. Corrosion of shape memory alloys.		x
							1. Production of fine grained copper.		x
Main utilities for processing	x						1. Manufacture of porous aluminium.	x	
							2. Hot isostatic pressing of aluminium castings.	x	
							3. Semi-solid casting of aluminium alloys.	x	
							4. Study of light weight materials for offshore structures.		x
						1. Hot isostatic pressing of aluminium castings.	x		

9. (Contd.) ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Smelting Corrosion, offshore structures	x	x					1. Semi-solid casting of aluminium alloys.	x	
							1. Corrosion of shape memory alloys.	x	
							2. Evaluation of corrosion/erosion.	x	
	x						3. Resistance of monel. 1. Study of light weight materials for offshore structures.	x	
Economics	x			x			1. Evaluation of corrosion/erosion.	x	
							2. Resistance of monel.	x	
Energy Process control and automation	x	x		x	x	x	1. Study of light weight materials for offshore structures.		x
	x						1. Study of developments in metal forming.	x	
Quality control and instrumentation				x			1. Semi-solid casting of aluminium alloys.	x	
				x			1. Non-destructive testing of turbine blades.	x	
	x			x			1. Non-destructive testing of turbine blades.	x	
							1. Development of testing methods for non-ferrous armour.		x

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Alloying	x						1. Investment casting of aluminium alloys. 2. Pressure die cast sabots. 3. Semi-solid casting of Turbo Blower Wheels.	x x x	
Manufacture of products	x						1. Investment casting of aluminium alloys. 2. Pressure die cast sabots.	x x	
Smelting	x						1. Investment casting of aluminium alloys. 2. Pressure die cast sabots. 3. Semi-solid casting of Turbo Blower Wheels.	x x x	
Process control and automation	x						1. Investment casting of aluminium alloys. 2. Pressure die cast sabots. 3. Semi-solid casting of Turbo Blower Wheels.	x x x	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alloyings	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Alternative technologies	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Auxiliary utilities for processing	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Manufacture of products	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Main utilities for processing	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Smelting	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Standard technologies	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Process control and automation	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Quality control and instrumentation	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9

12. TECHNICAL CO-OPERATION - GIVEN

FIELDS OF TRAINING PROGRAM	TECHNICAL CO-OPERATION - GIVEN						STAFF AVAILABILITY AND TRAINING
	Al	Cu	Pb	Ni	Sn	Zn	
Alloying	x	x	x	x	x	x	Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : English  Duration : Typically 3 months; by arrangement 1 week to 1 year.
Alternative technologies	x	x	x	x	x	x	
Auxiliary utilities for processing	x	x	x	x	x	x	
Manufacture of products	x	x	x	x	x	x	
Main utilities for processing	x	x	x	x	x	x	
Recycling and recovery operations	x	x	x	x	x	x	
Refining	x	x	x	x	x	x	
Smelting	x	x	x	x	x	x	
Standard technologies	x	x	x	x	x	x	
Economics	x	x	x	x	x	x	
Energy	x	x	x	x	x	x	
Environmental control	x	x	x	x	x	x	
Manpower and safety	x	x	x	x	x	x	
Process control and automation	x	x	x	x	x	x	
Quality control and instrumentation	x	x	x	x	x	x	

13. TECHNICAL CO-OPERATION - REQUESTED 1)

FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn

Large : -  
 Assistance obtained in the past : UNIDO, ESA, EEC.

Duration : -



## 14. DOCUMENTS

: Availability of brochures, annual report.

15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No request for technical co-operation (Table 13).

1. NAME : UNIVERSITY OF BIRMINGHAM, DEPARTMENT OF METALLURGY AND MATERIALS

2. ADDRESS : P.O. Box 363,  
:  
: BIRMINGHAM B15 2TT,  
: United Kingdom

3. TELEPHONE : 021-472-1301  
  
TELEX : 338938 SPAPHYG  
CABLE : No information provided.

4. DIRECTOR : Prof. R.E. Smallman, FRJ  
:

5. CONTACT : Prof. R.E. Smallman, FRS  
PERSON(S) :

6. STAFF: 40

7. BUDGET / : US\$1 Million. YEAR : 1985  
SOURCE :  
OF FUNDS : UK Government, EEC and Industry.

8. RELATIONSHIP : University Sector of Higher Education.  
WITH OTHER :  
ORGANIZATIONS :

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alternative technologies	x						1. Forming of conventional and superplastic aluminium alloys.	x	
Manufacture of products	x						2. Improvement of wear-resistance of aluminium alloys by surface coating.	x	
							1. Investment casting of aluminium alloys.	x	
							2. Improving fracture and fatigue properties of aluminium and nickel alloys.	x	
							3. Forming of conventional and superplastic aluminium alloys.	x	
							4. Improvement of wear-resistance of aluminium alloys by surface coating.	x	
		x					1. Machinability of copper alloys.	x	

9. (Contd.) ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Manufacture of products (Contd.)				x			1. Improving fracture and fatigue properties of aluminium and nickel alloys.	x	
Recycling and recovery operations				x			1. Casting performance of re-cycled nickel base alloys.	x	
Economics		x					1. Stock control techniques that allow for market uncertainties.	x	

10. ANTICIPATED PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT

PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
No information provided.																		

12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Research (no other information provided)							Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : English  Duration : Any convenient length of time, eg. 3 - 6 months or more.

13. TECHNICAL CO-OPERATION - REQUESTED 1)																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
No information provided.																		
Languages : - Assistance obtained in the past : None.												Duration : -						

## 14. DOCUMENTS

: Availability of brochures and annual report.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No request for technical co-operation (Table 13).

1. NAME : UNIVERSITY OF HULL, DEPARTMENT OF ENGINEERING DESIGN AND MANUFACTURE (SURFACE ENGINEERING LABORATORY)

2. ADDRESS : Cottingham Rd.,  
:  
: HULL HU6 7RX,  
: United Kingdom

3. TELEPHONE : (0482) 465 073  
  
TELEX : 592 530  
CABLE : No information provided.

4. DIRECTOR : Dr. A. Matthews  
:

5. CONTACT : Dr. A. Matthews  
PERSON(S) :

6. STAFF: 10

7. BUDGET / : US\$250.000.- YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alternative technologies	x	x	x	x	x	x	1. Development of PVD coatings.	x	
Process control and automation	x						1. Process control in ionisation assisted process.	x	
Quality control and instrumentation	x						1. Coating adhesion testing.	x	

10. ANTICIPATED PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 1)

PURPOSE OF OPERATION	RESEARCH						TRAINING						INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn



12. TECHNICAL CO-OPERATION - GIVEN							
FIELDS OF TRAINING PROGRAM	Al	Cu	Pb	Ni	Sn	Zn	STAFF AVAILABILITY AND TRAINING
Alternative technologies	x	x	x	x	x	x	Availability of staff as consultants or experts : Yes for UNIDO field assignments  Training program available for own nationals : Yes  Training program available for other nationals : Yes  Training languages : English  Duration : 1 week (typically) - 6 months.
Manufacture of products	x	x	x	x	x	x	
Process control and automation	x	x	x	x	x	x	
Quality control and instrumentation	x	x	x	x	x	x	

13. TECHNICAL CO-OPERATION - REQUESTED 2)																		
FIELDS OF TRAINING REQUIRED	OVERSEAS TRAINING FOR STAFF						EXPERTS FROM OVERSEAS						EQUIPMENT FROM OVERSEAS					
	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
No information provided.																		
Languages	: -																	
Assistance obtained in the past	: None.																	
	Duration : -																	

14. DOCUMENTS

: No information provided.

15.

NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Sn	Tin "
Zn	Zinc "
1)	No availability of pilot installation/equipment (Table 11).
2)	No technical co-operation requested (Table 13).

1. NAME : TANZANIA INDUSTRIAL RESEARCH AND DEVELOPMENT ORGANIZATION

2. ADDRESS : Box 23235,  
: Oysterbay,  
: DAR ES SALAAM,  
: Tanzania

3. TELEPHONE : 68984  
  
TELEX : 41409  
CABLE : TIRDO

4. DIRECTOR : Prof. Gaspar Ndaalio  
:

5. CONTACT : Pascal Proby 1)  
PERSON(S) :

6. STAFF: Nil

7. BUDGET / : Nil YEAR : 1985  
SOURCE :  
OF FUNDS : Nil

8. RELATIONSHIP : R&D Under the Ministry of Industries  
WITH OTHER : and Trade; contacts with  
ORGANIZATIONS : enterprises.

9. ON-GOING PROJECTS See note 2)

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS See note 2)						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			

10. ANTICIPATED PROJECTS See note 3)									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 4)																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn



## 14. DOCUMENTS

: No information provided.

## 15.

## NOTES

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance "
3	For Own Use "
9	ALL of above (1, 2, and 3) "
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper "
Pb	Lead "
Ni	Nickel "
Su	Tin "
Zn	Zinc "
1)	Earmarked for training in non-ferrous material technology starting september 1987 after which non-ferrous R&D could be considered (Table 5).
2)	No information provided (Table 9).
3)	No information provided (Table 10).
4)	No information provided (Table 11).
5)	No information provided (Table 12).
6)	The institute is just conceiving the ideas of non-ferrous activities. There is a need for a) overseas training for staff; b) equipment from overseas in all fields of the respective technologies (Table 13).
7)	From UNIDO on infrastructural development and capability building of an industrial R&D; from EEC for equipment of metallurgy laboratory and training of one fellow in material technology (Table 13).

1. NAME : ALUMINIUM ASSOCIATION, INC.

2. ADDRESS : 900 19th Street, NW.  
:  
: WASHINGTON, DC 20006,  
: United States of America

3. TELEPHONE : (202) 862 5100  
  
TELEX : 710-822-1129  
CABLE : No information provided.

4. DIRECTOR : John C. Bard  
:

5. CONTACT : S. Donald Pitts  
PERSON(S) :

6. STAFF: 16

7. BUDGET / : US\$6.000.000.- YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying	x						1. Molten metal/water explosion research. 2. Energy Conservation Workshop. 3. Loss Prevention Workshop.	x	x
Manufacture of products	x						1. Temperature sensor research. 2. Molten metal/water explosion research. 3. Casting properties (internal). 4. Energy Conservation Workshop. 5. Loss Prevention Workshop. 6. Rolling Technology Workshop. 7. Extrusion Technology Workshop.	x x x	x x x
Smelting	x						8. Welding seminars. 1. Hall Cell Research - Carnegie Mellon Univ. 2. Pot Liner Recycling/Disposal.	x x	x

9. (Contd.) ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Smelting (Contd.) Standard technologies Health	X X X						3. Molten metal/water explosion research. 1. Casting properties (internal). 1. Aluminium and health.	X X X	



10.

ANTICIPATED PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	NI	Sn	Zn	PROJECT TITLES	R	T
Alloying	X						1. Molten metal/water explosion research. 2. Energy conservation.	X	X X
Manufacture of products	X						3. Loss Prevention Workshop. 1. Temperature sensor research. 2. Molten metal/water explosion research. 3. Casting properties (internal). 4. Energy Conservation Workshop. 5. Loss Prevention Workshop. 6. Rolling Technology Workshop. 7. Extrusion Technology Workshop. 8. Welding seminars.	X X X	X X X X X
Smelting	X						1. Hall Cell Research - Carnegie Mellon Univ. 2. Pot Liner Recycling/Disposal.	X X X X X	
Standard technologies Health	X X						3. Molten metal/water explosion research. 1. Casting properties (internal). 1. Aluminium and health.	X X X X X	

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 1)

PURPOSE OF OPERATION

FIELDS OF ACTIVITY

a.

RESEARCH

Al

Cu

Pb

Ni

Sn

Zn

b.

TRAINING

Al

Cu

Pb

Ni

Sn

Zn

c. INDUSTRIAL APPLICATION

Al

Cu

Pb

Ni

Sn

Zn



14. DOCUMENTS : Availability of brochures.

| 15. | NOTES |

DESCRIPTION

CODE

8	Research	(Tables 9 and 10)
7	Training	"
1	For Technical Co-operation	(Table 11 )
2	For Technical Assistance	"
3	For Own Use	"
9	ALL of above (1, 2, and 3)	"
A1	Aluminium	(Tables 9, 10, 11, 12, and 13)
Cu	Copper	"
Pb	Lead	"
Ni	Nickel	"
Sn	Tin	"
Zn	Zinc	"
1)	No availability of pilot installation/equipment (Table 11).	
2)	Seminars and workshops (Table 12).	
3)	Aluminium Development Council of Australia; European Aluminium Association; Aluminium Federation (U.K.); Japan Light Metal Association (Table 13).	

1. NAME : BATTELLE MEMORIAL INSTITUTE

2. ADDRESS : 505 King Avenue,  
:  
: COLINGUS, OH 43201,  
: United States of America

3. TELEPHONE : (614) 424-6424  
  
TELEX : 24-5454 BATTELLE COL  
CABLE : No information provided.

4. DIRECTOR : Dr. Ronald S. Paul  
:

5. CONTACT : Allan Clauer  
PERSON(S) :

6. STAFF: 3900

7. BUDGET / : US\$511.6 Million. YEAR : 1985  
SOURCE :  
OF FUNDS : From Government and Industrial Clients.

8. RELATIONSHIP : Wholly independent.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

10. ANTICIPATED PROJECTS

FIELDS OF ACTIVITY

No information provided.

PROJECT TITLE

Al Cu Pb Ni Sn Zn

R T

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT 1)

PURPOSE OF OPERATION

FIELDS OF ACTIVITY

a. RESEARCH

b. TRAINING

c. INDUSTRIAL APPLICATION

Al Cu Pb Ni Sn Zn

Al Cu Pb Ni Sn Zn

Al Cu Pb Ni Sn Zn



14. DOCUMENTS : Availability of brochures, annual report.

| 15. \_\_\_\_\_ NOTES |

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training " "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance " "
3	For Own Use " "
9	All of above (1, 2, and 3)
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper " "
Pb	Lead " "
Ni	Nickel " "
Sn	Tin " "
Zn	Zinc " "
1)	No availability of pilot installation/equipment (Table 11).
2)	No information provided (Table 12).
3)	No technical co-operation requested (Table 13).



1. NAME : INTERNATIONAL DEVELOPMENT FOUNDATION

2. ADDRESS : P.O. Box 70257,  
:  
: WASHINGTON, D.C. 20024-1534,  
: United States of America

3. TELEPHONE : (202) 723 7010  
  
TELEX : No information provided.  
CABLE : INDEFO

4. DIRECTOR : Nekki Mteva, Ph.D.  
:

5. CONTACT : Nekki Mteva, Ph.D.  
PERSON(S) :

6. STAFF: 25

7. BUDGET / : Unaudited Corporate. YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : Advisory.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
Standard technologies	x						1. Applied management.		x
Economics	x						1. Industrial safety.	x	
Manpower and safety	x						1. Industrial safety.	x	
Process control and automation	x						1. Industrial safety.	x	
Quality control and instrumentation	x						1. Industrial safety.	x	

10. ANTICIPATED PROJECTS									
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	PROJECT TITLE	R	T
No information provided.									

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	a. RESEARCH						b. TRAINING						c. INDUSTRIAL APPLICATION					
FIELDS OF ACTIVITY	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn	Al	Cu	Pb	Ni	Sn	Zn
Alternative technologies																		
Standard technologies		1												1				
Manpower and safety								2										
Quality control and instrumentation								1										

12. TECHNICAL CO-OPERATION - GIVEN

**FIELDS OF TRAINING PROGRAM**

Mining of principal materials or alternative ores

Al Cu Pb Ni Sn Zn

X

**STAFF AVAILABILITY AND TRAINING**

Availability of staff as consultants or experts : Yes  
for UNIDO field assignments

Training program available for own nationals : Yes

Training program available for other nationals : Yes

Training languages : English

Duration : 3 months.

13. TECHNICAL CO-OPERATION - REQUESTED 1)

**FIELDS OF TRAINING REQUIRED**

Al Cu Pb Ni Sn Zn

**EXPERTS FROM OVERSEAS**

Al Cu Pb Ni Sn Zn

**EQUIPMENT FROM OVERSEAS**

Al Cu Pb Ni Sn Zn

Languages : No information provided.  
Assistance obtained in the past : None.

Duration : No information provided.

14. DOCUMENTS

: No information provided.

| 15.

NOTES

COMS

	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training " "
1	For Technical Co-operation (Table 11 )
2	For Technical Assistance " "
3	For Com Use " "
9	ALL of above (1, 2, and 3) " "
Al	Aluminum (Tables 9, 10, 11, 12, and 13)
Cu	Copper " "
Pb	Lead " "
Ni	Nickel " "
Sn	Tin " "
Zn	Zinc " "
1)	Possibilities for extensive training for staff are requested. Field of training: No information provided (Table 13).

1. NAME : WELDER TRAINING AND TESTING INSTITUTE, INC.

2. ADDRESS : 1144 W. Graham Street,  
: P.O. Box 2363,  
: ALLENTOWN, PENNA. 18001,  
: United States of America

3. TELEPHONE : (215) 820 9551

TELEX : No information provided.  
CABLE : No information provided.

4. DIRECTOR : Robert Karl Wiswesser

5. CONTACT : R.K. Wiswesser  
PERSON(S) :

6. STAFF: 21

7. BUDGET / : No information provided. YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : American Welding Society.  
WITH OTHER :  
ORGANIZATIONS :

9. ON-GOING PROJECTS

FIELDS OF ACTIVITY	9.						PROJECT TITLE	R	T
	Al	Cu	Pb	NI	Sn	Zn			
Quality control and instrumentation	X						1. Welder testing for Mil. 1995, Mil. 248 C, Mil. 5021 C. 2. Welder training for F-15 aircraft components. 3. Welder training and testing for triton missile ground support components. Primarily skill upgrading.	X	X
Aircraft components	X						1. Welder testing for Mil. 1995, Mil. 248 C, Mil. 5021 C. 2. Welder training for F-15 aircraft components. 3. Welder training and testing for triton missile ground support components. Primarily skill upgrading.	X	X

10. ANTICIPATED PROJECTS						
FIELDS OF ACTIVITY	PROJECT TITLE					
	Al	Cu	Pb	NI	Sn	Zn
Quality control and instrumentation	X					
Aircraft components	X					

11. AVAILABILITY OF PILOT INSTALLATION / EQUIPMENT																		
PURPOSE OF OPERATION	RESEARCH						TRAINING 2)						INDUSTRIAL APPLICATION 3)					
	Al	Cu	Pb	NI	Sn	Zn	Al	Cu	Pb	NI	Sn	Zn	Al	Cu	Pb	NI	Sn	Zn
FIELDS OF ACTIVITY 1)																		

12. TECHNICAL CO-OPERATION - GIVEN

FIELDS OF TRAINING PROGRAM

See note 4)

A1	Cu	Pb	NI	Sn	Zn

STAFF AVAILABILITY AND TRAINING

Availability of staff as consultants or experts : Yes  
for UNIDO field assignments

Training program available for own nationals : Yes

Training program available for other nationals : Yes

Training languages : English

Duration : Open.

13. TECHNICAL CO-OPERATION - REQUESTED 5)

FIELDS OF TRAINING REQUIRED

A1	Cu	Pb	NI	Sn	Zn

EXPERTS FROM OVERSEAS

A1	Cu	Pb	NI	Sn	Zn

EQUIPMENT FROM OVERSEAS

A1	Cu	Pb	NI	Sn	Zn

Languages Assistance obtained in the past : None.

Duration : -

14. DOCUMENTS : Availability of brochures.

| 15. | NOTES |

CODE	DESCRIPTION
R	Research (Tables 9 and 10)
T	Training (Table 11 )
1	For Technical Co-operation
2	For Technical Assistance
3	For Own Use
9	ALL of above (1, 2, and 3)
Al	Aluminium (Tables 9, 10, 11, 12, and 13)
Cu	Copper
Pb	Lead
Ni	Nickel
Sn	Tin
Zn	Zinc
1)	No specific information provided concerning the metals listed (Table 11).
2)	Manual and semi-automatic welding processes; Extent of operation: 2 (Table 11).
3)	Skill upgrading and improvement of quality fabrication with aluminium welding; Extent of operation: 2 (Table 11).
4)	Training and quality assurance of aluminium welding processes (Table 12).
5)	No technical co-operation requested (Table 13).



1. NAME : INSTITUTE OF METALLURGY

2. ADDRESS : Lepi pot 11,  
: 61000 LJUBLJANA,  
: Yugoslavia

3. TELEPHONE : (061) 332-502  
TELEX : No information provided.  
CABLE : No information provided.

4. DIRECTOR : Dr. Jose Rodic

5. CONTACT : Dr. Jose Rodic  
PERSON(S) :

6. STAFF: 25

7. BUDGET / : US\$1.2 Million. YEAR : 1985  
SOURCE :  
OF FUNDS : No information provided.

8. RELATIONSHIP : No information provided.  
WITH OTHER :  
ORGANIZATIONS :

FIELDS OF ACTIVITY	9. ON-GOING PROJECTS						PROJECT TITLE	R	T
	Al	Cu	Pb	Ni	Sn	Zn			
Alloying	x			x			1. Development of Al-Fe alloys.	x	
							2. Copper clad Al sheet.	x	
							3. Development of Al foils for capacitors.	x	
							1. Development of Ni alloys for high temperature use.	x	
							2. Development of Ni alloys for electronics.	x	
							3. Vacuum heat treatment of metals.		x



12. TECHNICAL CO-OPERATION - GIVEN

FIELDS OF TRAINING PROGRAM

Alloying

Al Cu Pb Ni Sn Zn

X

STAFF AVAILABILITY AND TRAINING

Availability of staff as consultants or experts : Yes  
for UNIDO field assignments

Training program available for own nationals : Yes

Training program available for other nationals : Yes

Training languages : English, German, French.

Duration : On agreement.

13. TECHNICAL CO-OPERATION - REQUESTED

FIELDS OF TRAINING REQUIRED

Alloying

Al Cu Pb Ni Sn Zn

X

OVERSEAS TRAINING FOR STAFF

Al Cu Pb Ni Sn Zn

EXPERTS FROM OVERSEAS

Al Cu Pb Ni Sn Zn

EQUIPMENT FROM OVERSEAS

Al Cu Pb Ni Sn Zn

X

Languages : English, German, French.  
Assistance obtained in the past : None.

Duration : On agreement.

14. DOCUMENTS : Availability of brochures.

| 15. | NOTES |

CODE	DESCRIPTION
R	Research
T	Training
1	For Technical Co-operation
2	For Technical Assistance
3	For Own Use
9	ALL of above (1, 2, and 3)
Al	Aluminium
Cu	Copper
Pb	Lead
Ni	Nickel
Sn	Tin
Zn	Zinc
	(Tables 9 and 10)
	(Table 11 )
	(Tables 9, 10, 11, 12, and 13)

**A P P E N D I X**



# UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

VIENNA INTERNATIONAL CENTRE

P.O. BOX 328, A-1400 VIENNA, AUSTRIA

TELEPHONE: 26 310 TELEGRAPHIC ADDRESS: UNIDO VIENNA TELEX: 132612

5 November 1986

Dear Sir,

**Directory of Research and Development Institutions:  
Non-ferrous Metals**

The United Nations Industrial Development Organization is in the process of compiling a Directory of R and D institutions and advisory and information services concerning non-ferrous metals.

The information obtained from research and training together with its proper evaluation and dissemination are pivotal elements in the industrialisation process of developing countries, but a number of factors that contribute to the development of an appropriate technological infrastructure in industrialised countries are either insufficient or totally lacking in these countries.

Research and development co-operation is typically an area where a number of ideas, both old and new, still have to be fully tested. The promotion of twinning arrangements leads to direct channels of communication between R and D institutes and organisations in industrialised and developing countries. These arrangements also provide a framework for various types of training facilities and longer-term collaboration. Efforts might also be made to launch co-operative research programmes aimed at developing new technologies from which both industrialised and developing countries could benefit.

UNIDO's activities in this field are aimed at promoting the underlined objectives of technical assistance, co-operation and the exchange of industrial and technological information, and within

P.t.o.



- 2 -

the framework of the First Consultation Meeting on Non-ferrous Metals (to be held in November 1967), we plan to compile and disseminate the above mentioned directory throughout the Organisation's Member countries. This is part of the work programme of the Industrial and Technological Information Bank (ITIB) and it is hoped the technological capabilities of R and D institutions, professional organisations and advisory information services in developing countries will thereby be substantially strengthened.

..... By means of the attached questionnaire, UNIDO will be able to compile a list of your activities (or members of your organisation/association) and to identify priority areas of common interest for co-operative activities. I would, therefore, kindly ask you to submit the completed questionnaire to UNIDO by the end of December 1966 (and not later than early January 1967) in order that the first draft of the Directory will be available by February 1967.

I would greatly appreciate your co-operation in this matter.

Yours sincerely,

A handwritten signature in dark ink, appearing to read 'V. Podshlyakin'.

V. Podshlyakin  
Chief

Industrial and Technological  
Information Section



# UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

VIENNA INTERNATIONAL CENTRE, Industrial and Technological Information Section  
P.O. BOX 300, A-1000 VIENNA, AUSTRIA Attn.: Mr. V. Fedanlyukin  
TELEPHONE 26 310 TELEGRAPHIC ADDRESS UNIDO VIENNA TELEX 132612

## QUESTIONNAIRE

Co-operative arrangements among R and D institutions  
(Sector: Non-ferrous Metals)

Country: \_\_\_\_\_

### Part A: Items of general information

(i) Name of institute/organization: \_\_\_\_\_  
\_\_\_\_\_

(ii) Address of institute/organization: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Telephone: \_\_\_\_\_ Cable address: \_\_\_\_\_

Telex: \_\_\_\_\_

(iii) Relation with other organization(s) \_\_\_\_\_  
(Please indicate relations with  
particular governmental organization(s),  
private enterprise(s), etc. \_\_\_\_\_

(iv) Name of Director/Head \_\_\_\_\_

(v) Name of the person in charge to be contacted: \_\_\_\_\_

(vi) Total number of professional staff: \_\_\_\_\_

(vii) Approximate budget in 1985 and source  
of funds (give approximate equivalent  
in US\$) \_\_\_\_\_  
\_\_\_\_\_



**Part B: Table with the fields of activities <sup>a)</sup>**

<u>Technology</u>	<u>Aluminium</u>	<u>Copper</u>	<u>Lead</u>	<u>Nickel</u>	<u>Tin</u>	<u>Zinc</u>
- Alloying	A1	C1	L1	N1	T1	Z1
- Alternative technologies applicable to the metals listed	A2	C2	L2	N2	T2	Z2
- Auxiliary utilities for processing	A3	C3	L3	N3	T3	Z3
- Beneficiation of ores	A4	C4	L4	N4	T4	Z4
- Exploration of deposits	A5	C5	L5	N5	T5	Z5
- Manufacture of products	A6	C6	L6	N6	T6	Z6
- Main utilities for processing	A7	C7	L7	N7	T7	Z7
- Mining of principal materials or alternative ores	A8	C8	L8	N8	T8	Z8
- Recycling and recovery operations	A9	C9	L9	N9	T9	Z9
- Refining	A10	C10	L10	N10	T10	Z10
- Smelting	A11	C11	L11	N11	T11	Z11
- Standard technologies applicable to the metals listed	A12	C12	L12	N12	T12	Z12
- Other	A13	C13	L13	N13	T13	Z13
<b><u>Management</u></b>						
- Economics	A14	C14	L14	N14	T14	Z14
- Energy	A15	C15	L15	N15	T15	Z15
- Environmental control	A16	C16	L16	N16	T16	Z16
- Manpower and safety	A17	C17	L17	N17	T17	Z17
- Process control and automation	A18	C18	L18	N18	T18	Z18
- Quality control and instrumentation	A19	C19	L19	N19	T19	Z19
- Other	A20	C20	L20	N20	T20	Z20

<sup>a)</sup> Please use above-defined code numbers (A1 to Z20) to answer the following items (i) to (iv); fill in the respective spaces with the appropriate code-number.

(1) Please list your current projects (field of activity and project title) according to the following classification:

Research		Training	
Field (in code-number)	Project Title	Field (in code-number)	Project Title

(11) Please list your anticipated projects (field of activity and project title) according to the following classification:

Research		Training	
Field (in code-number)	Project Title	Field (in code-number)	Project Title

(iii) Availability of pilot installation or equipment: YES  NO

If YES, please fill in the following table with the suitable code-number:

<b>Purpose of operation</b>	<b>Research</b>	<b>Training</b>	<b>Industrial application</b>
<b>Intent of operation</b>			
<b>For technical co-operation</b>			
<b>For technical assistance</b>			
<b>For own use</b>			

(iv) Technical co-operation

(iv.1) Availability of your staff as consultants or experts for UNIDO field assignments: YES  NO

(iv.2) Availability of organizing training programs at your institute or organization:

for own nationals: YES  NO

for other nationals: YES  NO

If YES, please explain details of possible programs:

- Field (in code-number): \_\_\_\_\_

- Duration: \_\_\_\_\_

- Language(s): \_\_\_\_\_

**(iv.3) Immediate technical co-operation requested from international organisations or other countries**

**(A) Training**

**(Do you need your staff trained overseas?)**

**YES  NO**

**(B) Experts**

**(Do you need experts from overseas?)**

**YES  NO**

**(C) Equipment**

**(Do you need equipment from overseas?)**

**YES  NO**

**If YES, please specify:**

**- Field (in code-number):** \_\_\_\_\_

**- Duration:** \_\_\_\_\_

**- Language:** \_\_\_\_\_

**(iv.4) Any assistance obtained in the past from:**

**bilateral co-operation: YES  NO**

**international organisations: YES  NO**

**If YES, please specify (from whom):** \_\_\_\_\_

\_\_\_\_\_

**Part C: Documents**

**We enclose herewith our brochures**

**annual report**

**project document**