

**CONTROL DE LA CONTAMINACIÓN AMBIENTAL DE ORIGEN MINERO Y METALÚRGICO EN
EL VALLE DEL MANTARO**

(TC-94-01-11-8)

RESUMEN EJECUTIVO

SOLICITANTE: Gobierno del Perú

**ORGANISMO
EJECUTOR:** Ministerio de Energía y Minas del Perú

BENEFICIARIO: Gobierno del Perú

FINANCIAMIENTO:

CANTAP:	US\$ 350.000
Gobierno de Noruega:	US\$ 500.000
Contrapartida local:	US\$ 575.000
Total:	US\$1.425.000

CONDICIONES:

Período de ejecución:	1 año
Plazo para el desembolso:	1,5 año

**CLASIFICACIÓN
AMBIENTAL:** El Comité del Medio Ambiente, en la reunión del 28 de febrero de 1995, clasificó esta operación en la Categoría I.

OBJETIVOS: El objetivo principal de la asistencia técnica es brindar a las autoridades del gobierno opciones de inversión en medio ambiente a fin de reducir la contaminación provocada por las actividades mineras en el Valle del Mantaro.

DESCRIPCIÓN: Estas opciones de limpieza y sus costos respectivos servirán como instrumento para que el gobierno defina el alcance de su acción encaminada a remediar las condiciones sumamente peligrosas en esta región minera. El proyecto comprenderá una serie de actividades relacionadas con el cálculo de la inversión para reducir el daño ambiental causado por el sector minero y la posterior protección del medio ambiente en el Valle del Mantaro: 1) estudio de diagnóstico; 2) definición de un plan de acción; 3) preparación de perfiles de proyecto; 4) definición de una estrategia; 5/7) preparación de términos de referencia para las etapas posteriores de la preparación del proyecto.

Con esta información, tanto el Gobierno del Perú como las entidades privadas del sector minero decidirán una acción para reducir el daño ambiental causado por el sector minero en el Valle del Mantaro.

BENEFICIOS:

Los beneficios de la puesta en práctica de este programa ya se pusieron de manifiesto al convenir el Gobierno del Perú en ser el organismo de contrapartida y el ejecutor de este proyecto, en lugar de CENTROMIN. Las consultas con autoridades del gobierno han colocado en primer plano de la atención pública las cuestiones relacionadas con la salud y la seguridad públicas en La Oroya. El proyecto comenzará con consultas concernientes a los compromisos de costos para la reducción del daño ambiental causado por el sector minero en el Valle del Mantaro. Este ejercicio fomentará el debate entre los intereses del gobierno y ajenos a éste, concernientes a las cuestiones financieras relacionadas con la reducción del daño ambiental. Además, todas las actividades constituirán un esfuerzo conjunto de técnicos del gobierno y consultores locales e internacionales, que permitirá la transferencia de tecnología para un manejo moderno de los residuos peligrosos. El proyecto, en sí, brindará al Gobierno del Perú información valiosa para el desarrollo de un plan de acción para la limpieza del medio ambiente.

RIESGOS:

El principal riesgo para esta operación sería una falta de seguimiento. Este proyecto constituye un importante paso inicial, pero solo será valioso si la estrategia aquí elaborada se pone en práctica. El proyecto solamente proporciona perfiles de proyectos de nivel de diseño conceptual. Los recursos financieros para llegar a la etapa de diseño final de las obras de ingeniería que se recomienda aquí serán significativos, y requerirán un compromiso constante de las autoridades del gobierno. Además, con la privatización de CENTROMIN, la participación del sector privado en la mitigación de nuevos daños ambientales en La Oroya será decisiva para maximizar el impacto de las actividades aquí propuestas.

Finalmente, la ejecución efectiva de los proyectos de inversión propuestos aquí supondrá el fortalecimiento del marco institucional y jurídico a nivel nacional, que va más allá de los objetivos de esta cooperación técnica.

**ESTRATEGIA DEL
BANCO EN EL PAÍS:**

La estrategia del Banco, a mediano plazo, apoya las siguientes actividades del Gobierno del Perú: i) consolidación de la modernización económica y del Estado; ii) sectores sociales y reducción de la pobreza; iii) modernización de la infraestructura social y productiva, y iv) agricultura y desarrollo sustentable.

I. BACKGROUND

- 1.1 The Mantaro River and its surrounding basin are located in the central sierra region of Peru. The river starts in the surroundings of the Cerro de Parco Mine, passing through the metallurgical center of Oroya, irrigating the Mantaro Valley and eventually flowing into the Amazon River. The Mantaro River Valley is one of the principal agricultural valleys in the country, and is the primary food supplier for Lima.
- 1.2 The value of metallurgical activity in this area is estimated between US\$ 600 to US\$ 700 million annually, directly employing more than 20,000, making mining the principal economic activity of this region. Mining in this area is carried out by CENTROMIN-PERU, a public enterprise, and some 30 private enterprises. The river basin has suffered severe environmental damage since the beginning of the century, caused by the accumulation of solid and water wastes containing chemical and metallic contaminants 1/. These effluents are the by-product of mining activity, the operation of smelters and refineries, as well as urban and mining encampment wastes.
- 1.3 Recently, CENTROMIN technical experts have upgraded mining operations, resulting in a present reduction in contamination emissions. Nevertheless, environmental damages caused by the accumulation of mining wastes over time have yet to be addressed. Furthermore, there still exist mining practices which have serious repercussions for the Mantaro river basin. For example, the Cerro de Pasco mine, the largest mining operation in the region and property of CENTROMIN, emits acid water into the Mantaro River and is its greatest source of contamination. These waters are characterized by a high acidity and heavy metal content, always a by-product of the type of mining activity carried out in this area.
- 1.4 La Oroya, the mining center for this region currently operated by CENTROMIN, began its operations in 1920. This center, which employs 6,000 people, contains a complex of smelters and refineries primarily for copper, lead and zinc mining as well related industrial plants. Together with various sub-products, these metals result in annual sales of US\$ 400 million.
- 1.5 La Oroya is regarded as the primary source of environmental contamination in Peru. Operators estimate that 4,500 tons of solids are discharged every year from the various facilities either as liquid emissions or as stack gases. These solids include arsenic, zinc, cadmium, iron, and mercury. The bulk of noxious gases such as sulfur dioxide, by-products of metallurgical activity in La Oroya, are released into the atmosphere.

1/BID/PNUD. Nuestra Propia Agenda. Comisión de Desarrollo y Medio Ambiente de América Latina y El Caribe. p.37

- 1.6 The city of La Oroya, with a population of 50,000, borders the mine plant facilities. Two-thirds of its inhabitants have inadequate water and sewerage services as do the inhabitants of the worker camps. The Mantaro River crosses the city of La Oroya and the nearby metallurgical center. Lacking organic waste treatment facilities, all wastes are discharged directly into the Mantaro River, as are all liquid and solid effluents from the smelters and refineries. These highly toxic metallic elements in the river exceed all international limits, in some cases more than 600 times permissible levels.
- 1.7 It is the intention of the Government of Peru to privatize CENTROMIN during 1995. However, information concerning the cost and priorities for reduction of environmental damage in La Oroya is only partial and could stand as an impediment to the privatization process. The Government of Peru recognizes its responsibility to finance some of the reduction of environmental damage caused by mining activities and to share with potential investors in CENTROMIN reliable information regarding the cost and extent of actions to mitigate environmental damage in the future.
- 1.8 On December 22, 1994, the Government of Peru approved Law 26410, creating the National Environmental Council (CONAM), as a decentralized autonomous entity, under the Office of the Prime Minister. CONAM will be the national environmental authority; it will plan, promote, propose, coordinate and control environmental policies, and will dictate the norms for protecting and rationalize the use of natural resources. Particularly important is the coordinating function in order to harmonize sectoral, regional and local activities regarding environmental protection, now lacking such concurrence. CONAM also will establish sanctions for environmental norm incompliance.
- 1.9 CONAM will be formed by a Council of Directors (seven members representing central, regional and local governments and private sector), a Consulting Commission and an Executive Secretariat (whose chief is appointed by the Council). The Bank is now preparing a separate, US\$1.8 million technical cooperation to assist the Government of Peru in implementing and regulating this Law. Once CONAM is established, environmental control in all areas is expected to improve, including the mining related activities which are the components resulting from the proposed technical cooperation.
- 1.10 Given the preparation of the CONAM technical cooperation which will include strengthening of national environmental regulatory agencies as well as environmental legislation, it is proposed that institutional and legal components of this technical cooperation be limited to assisting the División de Medio Ambiente of the Ministerio de Energía y Minas in areas related to monitoring and control of mining activities which could affect the environment.

II. OBJECTIVES

- 2.1 The primary objective of the technical assistance is to provide Government authorities with environmental investment options for the reduction of contamination due to mining activities in the Mantaro Valley.

III. PROJECT DESCRIPTION

- 3.1 The following tasks will be undertaken by the consultants:

1. Diagnostic Study

- 3.2 Existing information concerning environmental damage in the Mantaro Valley will be reviewed. The extent of mining-related damage will be estimated and necessary actions for the reduction of environmental damage caused by mining activity will be specified. This will necessarily include identification of the sources of hazardous emissions, their volume and location, contamination indicators, analysis of technology used and its effect on the emission quality. Furthermore, the effects of such emissions and the population groups and productive sectors affected will be described in both quantitative and qualitative terms.

2. Definition of Action Plan

- 3.3 Based on the above referenced diagnostic, the following will be defined through discussions with pertinent government authorities and private sector representatives.

- a. Objectives. Criteria will be defined for developing general investment priorities and final goals of the investment program which will decrease environmental contamination of the productive sectors and affected population groups.
- b. Targets. Based on the identified objectives, benchmark indicators will be specified for verification of progress during execution of the Action Plan.

3. Preparation of Project Profiles

- 3.4 Project profiles will be developed for the introduction of needed investment to reach the strategic objectives outlined above, given the budget constraints which have been defined with the Government and the private sector. These profiles will be elaborated to the level of conceptual engineering design and financial and economic feasibility. Each profile will contain, as a minimum, the following information: (i) objectives; (ii) cost; (iii) environmental impact indicators; (iv) execution timetable; (v) economic analysis; (vi) financial analysis; (vii) social impact. The social impact analysis will focus on low income and indigenous

populations which could be affected by the particular investment and will estimate the cost of measures to mitigate identified negative impacts.

4. Strategy Definition

- 3.5 A strategy will be developed which addresses short, medium and long term objectives for treatment and mitigation of environmental damage in the Mantaro Valley caused by mining activities. A key point to be defined is the amount of resources the Government is willing to invest in the next five years toward the reduction of environmental damage in the Rio Mantaro Valley. Private sector financial participation for this environmental program will also be defined.

5. Terms of Reference.

- 3.6 Terms of Reference will be developed for the following aspects of subsequent project preparation:
- a. feasibility studies for each investment project profile;
 - b. complete environmental impact assessment, for each of the project profiles. This will necessarily include an estimation of the social impact of the particular investment;
 - c. institutional strengthening and organizational restructuring activities for the Oficina de Medio Ambiente in the Ministerio de Energia y Minas;
 - d. regulatory/legislative modification for control and monitoring of mining activity by the Oficina de Medio Ambiente in the Ministerio de Energia y Minas. These Terms of Reference will include recurrent cost estimates for these activities to be included in future operational budgets of the Ministry.
- 3.7 Consultant Requirements. The project will require an international consultant firm with experience and proven capability in: 1. engineering and technical aspects associated with projects for the reduction of metallurgical and mining contamination; 2. socio-economic evaluation of environmental projects related to mining centers in rural zones and indigenous communities.
- 3.8 Local consultants will provide technical support to the international consultant firm and will in turn receive hands-on experience in hazardous waste management using modern technologies.
- 3.9 The breakdown of person-months 2/ is as follows:

2/ This breakdown does not include counterpart human resources to be included in the project.

Position	Number Needed	Person-Months per Consultant	Consultant Type ^{3/}	Total Months
Project Leader	1	9	International	9
Metallurgical Expert	1	9	International	9
Mining Expert	1	9	International	9
Project Development Experts	5	12	Local	60
Economist	1	9	Local	9
Sociologist	1	4	Local	4
Short-Term Consultants	-	7	International	7
Total	10			107

3.10 The total estimated project cost is US\$ 1.425 million, to be financed with non-reimbursable resources from the Government of Norway (GON), the Canadian Technical Assistance Program (CANTAP), as well as counterpart resources from the Government of Peru, as outlined in the following table.

Environmental Control for Oroya Program Cost (in thousands)					
Investment Categories	CANTAP	CANTAP	GON	Peru	TOTAL
	(US\$)	(CNS)	(US\$)	(US\$)	(US\$)
1 International Consultant Firm	315	450	0	0	315
2 Individual Consultants	0	0	195	325	520
6 General Support	0	0	200	210	410
7 Publications	0	0	30	0	30
98 Contingencies	35	50	75	40	150
TOTAL	350	500	500	575	1425
Percentages	25.0		35.7	39.3	100.0

3.11 Counterpart resources will be provided by the Government of Peru through the Ministerio de Energia y Minas, which will be responsible for final consultant selection. The Terms of Reference for the consultant firm which appears as an Annex to this document have been reviewed and approved by the Ministerio de Energia y Minas.

^{3/} Based on preliminary discussions with Peruvian authorities.

IV. BENEFITS AND RISKS

- 4.1 The benefits of development of this program have already begun as the Government of Peru, rather than CENTROMIN itself, has agreed to be the counterpart and executing agency. Discussion with Government authorities have brought the health and public safety issues of La Oroya to the national forefront. The project will initiate with discussions regarding cost commitments to the reduction of environmental damage. This exercise will provoke debate among Government and non-government interests regarding financial issues related to the reduction of environmental damage by the mining sector. Furthermore, all activities will be a joint effort among Government technicians, local and international consultants which will permit technology transfer of modern hazardous waste management. The project itself will provide the Government of Peru with valuable information for developing an Action Plan for reducing environmental damage caused by mining activities.
- 4.2 The major risk of this operation would be a lack of follow-up. This project is an important first step, but will only be valuable if the strategy here developed is implemented. The project only provides project profiles to the level of conceptual design. Financial commitments to reach final design for the engineering works to be recommended here will be significant, implying a consistent commitment of Government authorities. Furthermore, upon privatization of CENTROMIN, private sector participation for the mitigation of further environmental degradation in La Oroya will be crucial toward maximizing the impact of the activities here proposed.
- 4.3 Finally, effective implementation of the investment projects proposed here will imply the strengthening of the legal, institutional and regulatory environmental framework at the national level, which goes beyond the objectives of this technical cooperation.

MANTARO VALLEY ENVIRONMENTAL CONTROL PROGRAM
TERMS OF REFERENCE FOR HIRING CONSULTANTS

I. OBJECTIVE

The objective of the consultancy is to provide support to the Government of Peru in identifying priorities for reducing mining and metallurgy pollution in the Mantaro Valley, and in developing the required works and investments to the level of conceptual design.

II. CONSULTING TASKS

In order to meet the stated objectives, the consultant will carry out the following activities:

A. Diagnostic study

In the first four weeks, a review of available information will be conducted in order to assess and quantify the environmental situation in the Mantaro Valley. To this end, the following information, *inter alia*, is to be presented: (i) sources of emissions; (ii) volume of emissions from those sources; (iii) pollution indicators; (iv) location of sources; (v) analysis of technology used and its impact on emission quality; (vi) quantitative and qualitative effects; (vii) agents and productive sectors affected.

B. Definition of an action plan

Once the above diagnostic study is complete, the firm, together with authorities from the Ministry of Energy and Mines, will establish the following:

- Objectives. Criteria will be defined for developing the general investment priorities and final goals of the investment program to reduce environmental damage in affected population groups and productive sectors. In particular, alternatives are to be proposed in terms of quality standards to be attained. The criteria are to include expected economic benefits.
- Targets. Based on the stated objectives, benchmark indicators will be established to verify progress during project execution.

C. Preparation of project profiles

The proposed projects will be developed to the level of conceptual engineering design, identifying and sizing their major components.

In each case at least three alternatives will be examined in terms of water, air and soil quality levels to be attained and the associated

costs and benefits, grouped by priority and by their effect in the short term (one to two years) and in the medium and long term (ten years or more).

These profiles are to contain at least the following information: (i) objectives, (ii) cost, (iii) environmental impact indicators; (iv) execution schedule; (v) economic analysis, including preliminary estimates of benefits; (vi) financial plans and impact on corporate cash flow; (vii) social impact. The social impact analysis is to focus on lower-income populations and indigenous groups affected by the proposed investment. The cost of measures to mitigate any adverse impact identified will be estimated.

D. Definition of a strategy

Based on the level of investment resources that the government would be prepared to commit, and the results of the analysis prepared, the projects are to be defined in such a way as to attain the goals set, in order of priority.

E. Preparation of terms of reference for subsequent work

Prepare terms of reference and estimate execution costs for the following aspects of the next stage of preparation of the action plan:

- Engineering, economic, and social feasibility studies for investment projects.
- Environmental impact assessments for individual projects and for the action plan overall.
- Activities for the institutional strengthening of the Environment Office of the Ministry of Energy and Mines, to assist it in efficiently exercising its control and supervision function.
- Modifications or adjustments to the legal and regulatory framework for the implementation stage of the action plan and subsequent control and monitoring of mining activity.
- Organization systems needed for effective implementation of the action plan, indicating the responsibilities of the various participating bodies in both the public and private sectors, and coordination needed for subsequent control and monitoring.

III. CONSULTANCY REQUIREMENTS

A. The consultant

The project calls for the services of a firm with experience and proven capability in the following areas:

- a. Technical and engineering: experience in developing projects to reduce mining and metallurgy pollution.
- b. Economic and social: experience in the evaluation and analysis of environmental projects. Experience in mining-related work.

The firm is to appoint a project leader to coordinate the work, being a professional with 10 years experience in projects to reduce mining and metallurgy pollution. The activities of this professional and those of experts and support staff are to take into account the extent of the impact of mining on economic and social development in the Mantaro Valley. The project leader will be responsible for ensuring compliance with these terms of reference, and will provide liaison between MEM and the firm.

In addition, the firm will furnish the services of at least the following professionals, who will work on a full-time basis according to the schedule:

- a. Two experts in environmental projects, one in mining and one in metallurgy (for 9 months each);
- b. Professionals with experience in project development (for a total of 60 person/months);
- c. One economist (for 9 months);
- d. One anthropologist or sociologist (for 4 months);
- e. Various experts for specific short-term tasks (for a total of 7 person/months).

It is considered advisable that the project development experts, economist, and anthropologist or sociologist be hired locally.

The experts on the project team will all have the following qualifications: professionals with more than 10 years experience in their fields; an equivalent to masters degree for technical areas; and an ability to communicate in English or Spanish.

B. National counterpart staff

Coordinating the consultant's work will be the responsibility of a project coordination committee composed of professionals from the Ministry of Energy and Mines, the Peruvian Association of Mining Engineers, Centromin Perú, the municipalities of Cerro de Pasco, Junin and La Oroya, and the National Mining and Petroleum Society.

MEM will appoint a general coordinator to work on a full-time basis, as well as the following national counterpart and support staff: four engineers (mining and metallurgy); four environmental experts, one of them specializing in agriculture and one in health; one economist; one lawyer; two secretaries; two drivers; and one messenger. MEM will also make available offices, computer facilities and transportation in Lima and in La Oroya.

IV. DURATION OF CONSULTANCY

The duration of the consultancy will be nine months. The work will be carried out in Lima and La Oroya, with travel to the interior of the valley as needed.

Tentative schedule

Experts	Month									e/m
	1	2	3	4	5	6	7	8	9	
One project leader	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	9
One mining expert	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	9
One metallurgy expert	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	9
Project experts (*)	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	60
One economist (*)	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	9
One sociologist (*)	xx							xxxx		4
Short-term advisers	x	x		x	x		x	x		7
Total expert/months										107

(*) Local expert

V. REPORTS AND DOCUMENTS

The consulting firm is to present, to the satisfaction of MEM and the Bank, the following principal reports and documents. In all cases, they are to be submitted in five printed copies and on two diskettes in WordPerfect 5.1 or a compatible program. The principal documents are to be submitted in both Spanish and English, while others may be in either language.

- Monthly progress report, with details on the progress of work, identifying any problems that require special attention.
- Mantaro Valley clean-up project, preliminary version, for discussion and comments, to be submitted at the end of the seventh month after activities begin. The Bank and MEM will forward their comments within a maximum of 30 calendar days.

The report is to consist of an executive summary with the main conclusions and recommendations, and the following main annexes: (i) project profiles; (ii) terms of reference for subsequent studies and work. Decision charts may be included as well (see attached).

- The final project report, reflecting comments made on the preliminary version, to be submitted at the end of the tenth month after activities begin. The Bank and MEM will forward their approval or comments within a maximum of 30 calendar days.

VI. PAYMENT TERMS

Payment for the consulting services will be effected as follows:

- 30 percent upon contract signing
- 30 percent upon submission of the preliminary report
- 30 percent upon submission of the final report
- 10 percent when changes requested by MEM and the Bank are made

CERTIFICATE

CT/FONDOS/CANADA (TC-94-01-11-8)
La Oroya Environmental Control Program

I hereby certify that the Canadian Technical Assistance Program contains sufficient funds to finance the sum of Cdn\$500,000, for use in the activities described in this Plan of Operations.

[signed version on file]
Timothy S. Fauquier, Chief
Technical Cooperation Unit, RE1/FSS

Date: March 16, 1995

PROPOSED RESOLUTION

PERU. NONREIMBURSABLE TECHNICAL COOPERATION FOR
THE PROJECT FOR METALLURGICAL AND MINING ENVIRONMENTAL
CONTROL OF THE MANTARO VALLEY

The Board of Executive Directors

RESOLVES:

1. That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, as Administrator of the grant funds made available by the Government of Canada to enter into such agreements as may be necessary and to adopt such other measures as may be pertinent for the execution of the plan of operations referred to in Document AT-_____ with respect to technical cooperation with the República del Perú for the Metallurgical and Mining Environmental Control of the Mantaro Valley.

2. That up to the sum of CAN\$500,000 is authorized for the purposes of this resolution, chargeable to the resources of the Canadian Technical Cooperation Program.

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