

# チリ国 資源環境研修センター協力事業 プロジェクト運営指導チーム報告書

1998年7月  
(平成10年7月)

国際協力事業団

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## 序 文

チリ共和国では、近年の経済発展に伴い、環境保全が重要な課題となっているが、特に鉱業は同国の主要産業であるため、鉱山開発に伴う環境破壊に適切な措置を講ずることが社会的急務となっており、また、中小鉱山では、保守対策が不十分なため、鉱山災害が多発し、作業環境の安全性の確保も課題となっている。

かかる状況のもと、同国は鉱業省の傘下に、鉱山公害防止と鉱山保安に関する研修センターとして、資源環境研修センターの設立を計画し、我が国にプロジェクト方式技術協力を要請してきた。この要請を受けて、我が国政府は国際協力事業団（JICA）を通じ、1993年に事前調査団、長期調査員を派遣するとともに、1994年に実施協議調査団を派遣し、討議議事録（Record of Discussions）の署名・交換を行った。

以来、本プロジェクトは同討議議事録に基づき、1994年7月1日より5年間の協力を実施中であるが、1999年6月30日のプロジェクト協力期間終了を控え、1999年1月頃に終了時評価調査の実施を予定しているところ、本プロジェクトにおいては、これまでPDMが作成されてこなかったこともあり、JPCM手法に則った終了時評価調査を実施するため、PDMを作成するとともに、評価5項目をチリ国側に説明し、評価調査までの日本・チリ国双方の準備事項の確認を行うことを主な目的として、1998年5月30日から6月9日まで、プロジェクト運営指導チームが派遣された。

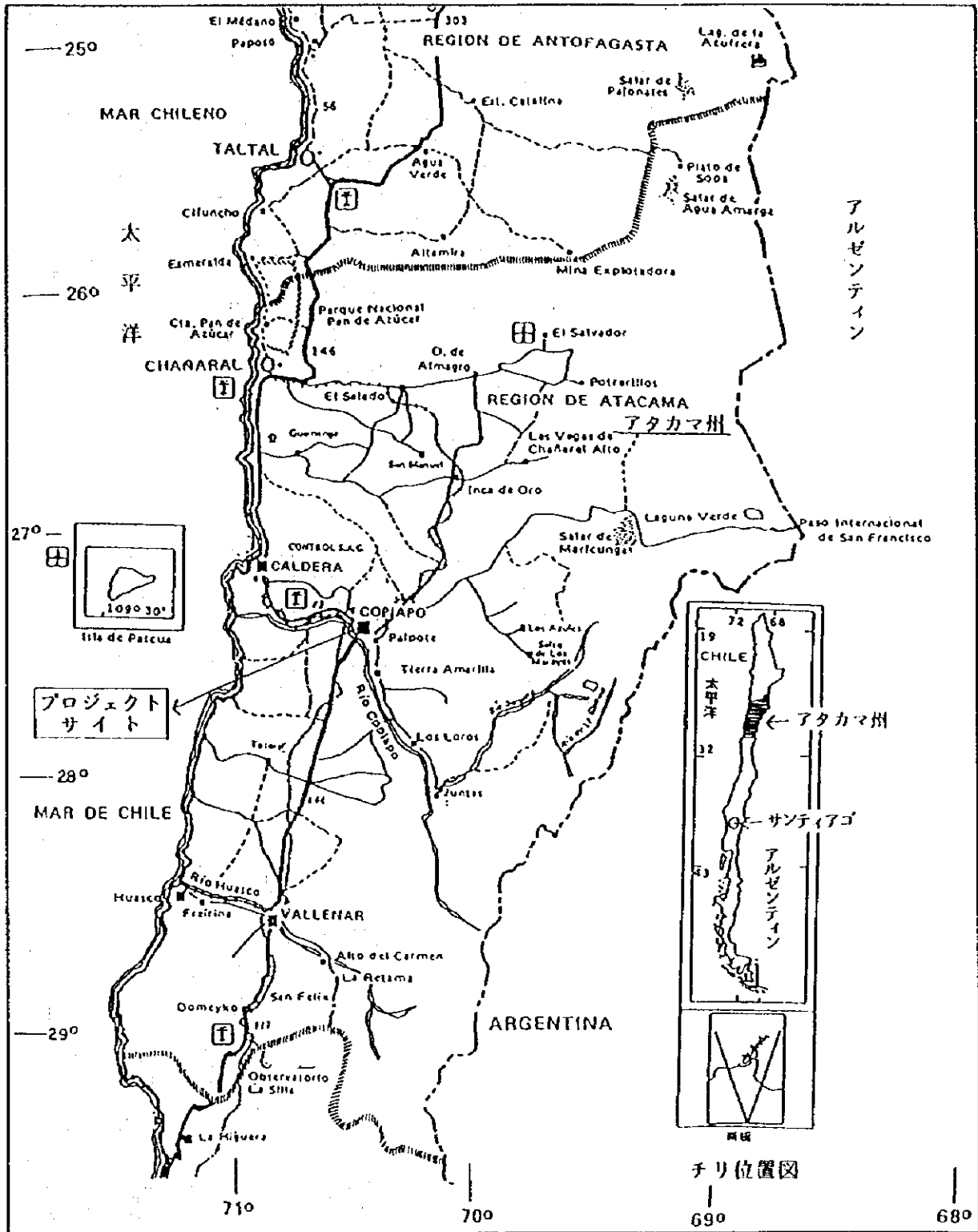
本報告書は、同運営指導チームの調査結果をまとめたものである。

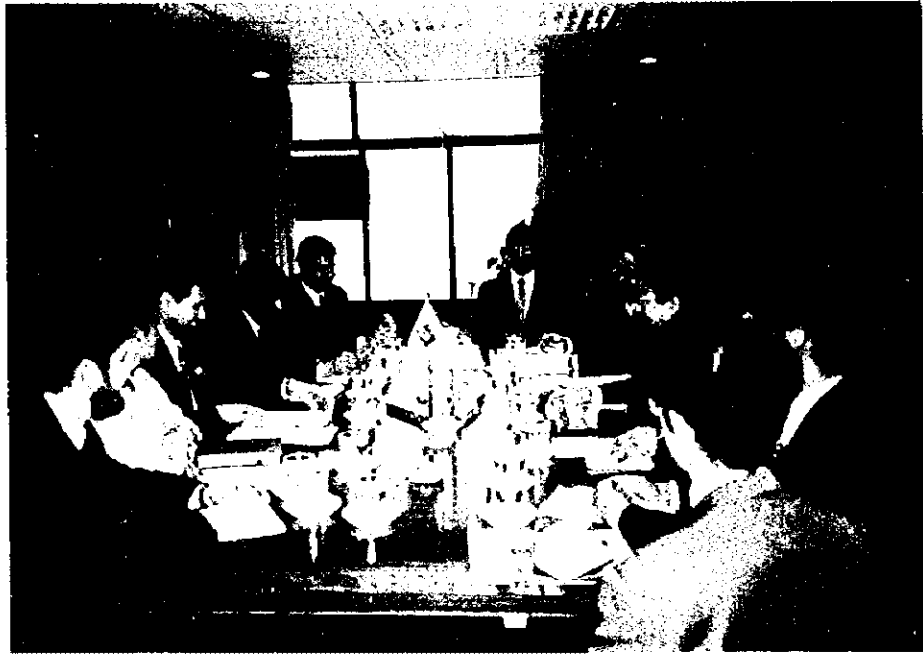
ここに本運営指導チームの派遣に関しご協力いただいた、日本・チリ両国の関係各位に対し、深甚の謝意を表するとともに、併せて今後のご支援をお願いする次第である。

1998年7月

国際協力事業団  
鉱工業開発協力部  
部長 谷川 和男

# プロジェクト位置図





協議風景



ミニッツ署名



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プロジェクト位置図

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## 第1章 運営指導チーム派遣の概要

### 1-1 運営指導チーム派遣の背景

1999年6月30日のプロジェクト協力期間終了を控え、1999年1月頃に終了時評価調査の実施を予定しているが、本プロジェクトにおいては、これまでPDMが作成されてこなかったこともあり、JPCM手法に則った終了時評価調査を実施するため、PDMを作成するとともに、評価5項目をチリ側に説明し、評価調査までの日本・チリ国双方の準備事項の確認を行う必要が生じていたことから、下記1-2の内容・項目を目的として、運営指導を実施した。

### 1-2 運営指導の内容・項目

#### (1) PDM

- 1) PDMの作成
- 2) 指標の設定

#### (2) 終了時評価

- 1) 評価5項目の説明
- 2) 評価調査までの日本・チリ国双方の準備事項の確認

#### (3) プロジェクト活動実績と計画

- 1) 投入実績、技術移転実績、研修実績の確認
- 2) プロジェクト終了までの活動計画の作成

#### (4) 広域技術協力推進事業についての検討

#### (5) プロジェクト運営上の課題についての意見交換

### 1-3 運営指導チームの構成

指導担当項目	氏名	所属
広域技術協力推進事業	宇佐美 毅	国際協力事業団 専門技術嘱託
プロジェクト活動実績と計画	松瀬 隆弘	通商産業省 環境立地局 鉱山保安課 監督係長
PDM、評価	和田 康彦	国際協力事業団 鉱工業開発協力部 鉱工業開発協力第二課 職員

1-4 運営指導日程

日順	月 日	行 程	
1	5月30日(土)	移動：成田→ロサンゼルス (JL-066) ロサンゼルス→ (AA-911)	
2	31日(日)	移動：→サンチャゴ	
3	6月1日(月)	JICA 事務所打合せ、日本大使館表敬、国際協力庁 (AGCI) 表敬 SERNAGEOMIN 局長表敬、プロジェクト専門家と打合せ	
4	2日(火)	SERNAGEOMIN と協議(プロジェクト活動進捗状況、終了までの活動計画)	
5	3日(水)	SERNAGEOMIN と協議 (PDM、評価、評価調査までの準備事項) 鉱業省次官表敬 (宇佐美団員のみ)	
6	4日(木)	SERNAGEOMIN 及び AGCI と協議 (PDM、広域技術協力推進事業) SERNAGEOMIN とミニッツ (案) 最終確認	
7	5日(金)	合同委員会開催 (JICA 事務所)、ミニッツ署名・交換 (鉱業省)	
8	6日(土)	資料整理	
9	7日(日)	ホテル発 移動：サンチャゴ→コピアポ (LA-112) 専門家と打合せ	
10	8日(月)	研修センター視察、カウンターパートと面談、周辺鉱山視察 移動：コピアポ→(夜行バス) *当初は航空機で移動する予定であったが、消防施設の関係により、 急きよコピアポ空港が閉鎖されたため、夜行バスで移動した。	
11	9日(火)	移動：→サンチャゴ JICA 事務所報告	
		(宇佐美、松渕) 移動：サンチャゴ→(AA-912)	(和田) 移動：サンチャゴ→ (AA-912)
12	10日(水)	移動：→ロサンゼルス ロサンゼルス→ (JL-061)	移動：→マイアミ マイアミ→ 멕시코・シティ (AA-2199) 멕시코・シティ→レオン・グアフアト (AM-134) → 멕시코石油精製安全研修センター (サラマンカ) (車両) 専門家と打合せ
13	11日(木)	移動：→成田	研修センター視察 センター長、カウンターパートと面談 製油所長と面談 専門家と面談 移動： Mexico石油精製安全研修センター (サラマンカ)→レオン・グアフアト(車両) レオン・グアフアト→ Mexico・シティ (AM-135) JICA 事務所打合せ
14	12日(金)		移動：メキシコ・シティ→ (JL-011)
15	13日(土)		移動：→成田

## 1-5 主要面談者リスト

### <チリ側>

#### (1) 鉱業省 (Ministry of Mining)

Mr.César Díaz-Muñoz Cormatches Undersecretary of Mining

Mr.Germán Contreras Advisor

#### (2) 鉱山地質局 (SERNAGEOMIN)

Mr.Ricardo Troncoso San Martín National Director

Mr.Manuel Bernal León National Vice Director of Mining

Ms.Cecilia Varderas Ch. Chief of Planning Office

Mr.José Bruna Uribe Chief of Administration and Finance Department

Mr.Daniel Alcayaga Esquivel Chief of Mine Safety Department

Mr.Gonzalo Astoroquiza Chief of Legal Department

Mr.Jaime de la Hoz Staff of Public Relations Office

Mr.Anton Hraste Carrasco Regional Director in III Region

Mr.Jorge Guerra Casanova Director of Mine Safety and Environmental Training Center

Mr.Nibaldo Gonzáles Instructor on Mine Safety,Mine Safety and Environmental Training Centre

Mr.Carlos Flores -ditto-

Mr.Eduardo Vega Donoso Instructor on Mine Pollution Control, Mine Safety and Environmental Training Center

Ms.Vinka Rakela Aranza Instructor on Chemical Analysis,Mine Safety and Environmental Training Center

Mr.Guido Montuschi Muga -ditto-

#### (3) チリ国際協力庁 (AGCI)

Mr.Bernardino Sanhueza Pino Fiscal

Mr.Pedro Ramírez Coordinator of Mining Sector

Ms.Adriana Lagos Coordinator of Japan Cooperation

<日本側>

(1) 在チリ日本国大使館

吉田 栄 一等書記官

(2) JICA チリ事務所

石井 和男 所長  
会田 孝一 次長  
大槻 清孝 所員  
山田 真美 所員(現地職員)

(3) チリ資源環境研修センタープロジェクト専門家

藤田 実 チーフアドバイザー  
原田 芳金 鉱山保安  
山口寿々男 鉱山公害防止  
安藤 通浩 化学分析  
斎藤 武 業務調整

(4) 個別派遣専門家(チリ国際協力庁)

大場 三穂 援助調整

## 第2章 調査結果

### 2-1 調査項目ごとの調査・協議結果

運営指導項目	現状及び問題点	対処方針	協議結果
第1 PDM	PDM が作成されていないので、プロジェクトの意見も踏まえつつ案を作成中。	<p>PDM の考え方についてチリ側に説明するとともに、我が方作成の PDM (案) についてチリ側と協議のうえ PDM を作成し、ミニッツに添付する。</p> <p>なお、PDM の「プロジェクトの概要部分」は、本来、R/D のマスタープランを利用するのが一般的であるが、本プロジェクトについては、R/D のマスタープランが PDM の導入を念頭に置いて作成されていないため、今回作成する PDM の「プロジェクトの概要部分」については、R/D のマスタープランとともに、それをより詳細化したものを「De-tailed Contents of Narrative Summary」として記入することとし、その旨チリ側に説明のうえ、同意を得、ミニッツに記載する。</p>	<p>対処方針に沿い PDM について説明を行ったところ、PDM の考え方及びその導入についてチリ側の理解が得られた。</p> <p>PDM (案) の作成に当たっては、指標、外部条件について、チリの現状に即した表現とするようチリ側から要望があり、協議のうえ、表現を若干変更した。チリ側からのさまざまなコメントから、我が方からプロジェクトを通じ提示していた PDM (案) について、チリ側が事前にかんがりの検討をいっていたことが伺えた。</p> <p>また、PDM (案) については、終了時評価に向けさらに検討を行ってほしいとのチリ側要望を踏まえ、その旨ミニッツに記載した。</p>
第2 終了時評価	R/D では、プロジェクト終了6か月前に、合同で評価を実施することとなっている。	<p>評価5項目について説明するとともに、本年12月頃に派遣を予定している終了時評価調査団がチリ側と合同で、評価5項目及び PDM に基づいて評価を実施する旨ミニッツに記載する。</p> <p>また、評価調査までに、プロジェクト及びチリ側が以下の点を準備する旨確認し、ミニッツに記載する。</p> <p>&lt;プロジェクト&gt;</p> <ol style="list-style-type: none"> <li>(1) PDM 指標データ入手手段に基づく指標データの入手。</li> <li>(2) 終了時評価報告書に添付する各種資料の作成。(各書類については、現時点のものを今次ミニッツに添付する。)</li> </ol> <p>&lt;チリ側&gt;</p> <ol style="list-style-type: none"> <li>(1) 1999年及びそれ以降継続的に実施される研修コース開催計画の作成。</li> <li>(2) 研修センターの組織的、人的、技術的、財政的自立発展の方策の検討。</li> <li>(3) 周辺国を対象とした研修実施についての検討。</li> <li>(4) チリ側評価調査メンバーの選出。</li> </ol>	<p>評価5項目及び終了時評価の実施について説明したところ、チリ側の理解が得られた。</p> <p>なお、終了時評価の実施時期については、チリの会計年度が12月で終了すること、及び1月中旬から休暇の時期に入ることから、1月上旬としてほしい旨、チリ側から要望があった。終了時評価に必要な調査日数等を考慮し協議した結果、おおよそ1月5日から20日頃の実施とすることとし、ミニッツには1月頃の実施と記載した。</p> <p>また、評価調査までの準備事項については、対処方針どおり確認し、ミニッツに記載した。</p>
第3 プロジェクト活動実績と計画	<p>終了時評価報告書の添付資料を想定し、過去の調査団派遣時やプロジェクトで独自に作成された資料をベースに、現在プロジェクトで以下の資料を作成中。</p> <p>&lt;投入実績及び計画&gt;</p> <ul style="list-style-type: none"> <li>・派遣専門家リスト</li> <li>・本邦研修実施カウンターパートリスト</li> <li>・供与機材リスト</li> </ul>	<p>各資料の内容をチリ側と確認し、ミニッツに添付する。</p> <p>特に、これまでの技術移転活動の進捗及びプロジェクト終了までの技術移転活動計画を確認するとともに、同計画に則り技術移転活動を実施していくことを確認し、ミニッツに記載する。</p>	<p>各資料についてチリ側から説明があり、互方で内容を確認し、ミニッツに添付した。</p> <p>なお、一部チリ側がスペイン語で作成していた資料についても、運営指導チーム滞在中にチリ側により英訳された。</p>

運営指導項目	現状及び問題点	対処方針	協議結果
<p>第3 プロジェクト活動実績と計画(続き)</p>	<ul style="list-style-type: none"> <li>・派遣調査団リスト</li> <li>・カウンターパート配置表</li> <li>・(チリ側) ローカルコスト負担実績・計画表</li> <li>・研修センターレイアウト図</li> <li>・チリ側関係機関組織図</li> <li>・TSI</li> <li>&lt;技術移転活動実績及び計画&gt;</li> <li>・TCP</li> <li>・詳細技術移転実績及び計画(機材操作・保守マニュアルリストを含む)</li> <li>・セミナー開催実績及び計画</li> <li>・現地調査実績及び計画</li> <li>・研修テキストリスト</li> <li>&lt;研修コース開催実績及び計画&gt;</li> <li>・研修コース開催実績及び受講実績(移動実験車を用いた研修開催実績を含む)</li> <li>・研修コース開催計画(同上)</li> </ul>		
<p>第4 広域技術協力推進事業</p>	<p>今年度、館側では本プロジェクトが実施候補案件となっている。</p> <p>また、チリ側からも実施要望が表明されている。</p>	<p>本件事業の実施手続き(A2 A3フォーム、A4フォーム等)、日本・チリ双方の責任分担、今後の実施手順等についてチリ側と確認し、ミニッツに記載する。</p>	<p>事業のスキームについて説明したところ、日本側が事業の実施主体であるという点に関し、現実問題として費用負担を含むチリ側の協力がなければ本事業の実施はありえないことから、チリ側も積極的に事業実施にかかわるということを明確にすべきである旨要望があった。我が方から、もちろん実際の事業の実施に関してはプロジェクト専門家及びチリ側の協力が不可欠である旨説明したが、チリ側要望が強く、協議、検討の結果、これまでの本プロジェクト活動の成果を踏まえ、日本・チリ双方がともに本事業を実施する旨ミニッツに記載した。</p> <p>また、対象国については南米諸国とすることを想定していたが、チリ側から、チリが推進している水平協力が中米諸国を含むラテンアメリカ諸国を対象としていることから、本事業についても南米諸国に限らずラテンアメリカ諸国としてほしい旨強い要望があったので、これを受け入れることとし、ミニッツ及びアネックス20の関連部分の表記を修正した。</p> <p>なお、チリ国際協力庁より、チリ側が旅費を負担すれば、日本人専門家と一緒にカウンターパートを派遣することが本事業の制度上可能か否かとの質問があり、もし可能ということであれば、チリの1999会計年度(1999年1月～12月)の、国際協力庁としての予算要求に同費用を計上したい旨発言があった。</p> <p>我が方からは、本事業については、チリ側が積極的に推進しようとしている水平協力を日本が支援するものではなく、あくまで日本が主体となる事業である旨繰り返し説明したが、チリ側はそれを理解したうえで、それでもなお水平協力の一環として本事業を活用したいとの強い意向を示した。</p> <p>本件に関しプロジェクト専門家と打合せたところ、もし本事業により専門家が周辺国へ出張するということを考えるのであれば、実際にやれること、及びその準備にかかる労力を最小にするということから、現在研修センターで行っていることをそのまま周辺国で行うということが現実的であり、そのためには専門家だけ出張するのでは意味がなく、カウ</p>



運営指導項目	現状及び問題点	対処方針	協議結果
<p>第4 広域技術協力推進事業 (続き)</p>			<p>ンターパートが同行し講師として講義を行ってもらう必要があるという意見にまとも、チリ側がカウンターパート派遣にかかる費用を負担すれば、日本人専門家にカウンターパートが同行することが標記事業の制度上可能ということであれば、実施時期は今年度第4四半期(1999年1月～3月)ということになるが、実施を検討してもよいのではないかとということになった。</p> <p>そこで、JICA 本部に照会したところ、チリ側が旅費を負担すれば、カウンターパートが専門家に同行することに特段の支障はない旨確認されたので、チリ側によるチリの1999会計年度にカウンターパートの旅費が確保された場合に限り、専門家の周辺国への出張を検討することとし、その旨アネックス20に記載した。</p> <p>なお、周辺国からの研修員の受入れの実施時期については、短期専門家によるセミナー開催、カウンターパート研修、APEC 環境協力ワークショップ開催等の各時期との調整を図り、早急にプロジェクトで検討することとした。</p>
<p>第5 プロジェクト運営上の課題</p>	<p>プロジェクトに照会したところ、今次運営指導からチリ側へ特に申し入れて欲しい事項はないということであった。</p> <p>なお、第3州支局と研修センターの最近の関係についても、特段問題は生じていないということである。</p>	<p>過去の累次の調査団派遣時に確認している以下の点について、チリ側取り組みに感謝するとともに、今後の継続を依頼し、ミニッツに記載する。</p> <p>(1) カウンターパートの永続的配属(及びカウンターパートの研修センターにおける身分の安定化-正規職員化-)</p> <p>(2) 第3州支局と研修センターの協力関係の緊密化</p> <p>また、最近の懸案事項として、公認分析ラボの資格取得のため化学分析のカウンターパートが忙しく、同分野の技術移転の時間が十分とれないことについて、プロジェクト終了までの技術移転活動計画に則り技術移転活動を実施していくために、カウンターパートが十分な時間をとれるようチリ側へ依頼のうえ、確認し、その旨ミニッツに記載する。</p>	<p>左記2点について、対処方針どおり確認し、ミニッツに記載した。なお、SERNAGEOMIN 局長より、左記2点に関し以下のとおり発言があった。</p> <p>(1) 研修センターは将来にわたり研修活動を継続していくものであるが、そのためにはカウンターパートの永続的な配属が必要であることから、センターの人員については将来的に全て正規職員としたいと考えており、これについての努力は本プロジェクトが終了した後も継続していく。</p> <p>(2) 第3州支局との関係については、現在も良好な関係を保っており、今後も継続していく。</p> <p>なお、(1)のカウンターパートの身分に関連し、在チリ日本大使館の担当書記官の説明によると、チリにおいては国家公務員の定員は、政権交代による変動を防ぐため憲法で規定されており、定員変更は極めて難しいことから、やむなく契約ベースの職員が多くなっているが、それはアルバイトといったものではなく、あくまで正規の職員と同じ働きをするものであるということであった。</p> <p>左記については対処方針どおり確認し、ミニッツに記載した。</p> <p>なお、チリ側より、研修センターの活動の継続のために、本プロジェクト終了後における、日本からの供与機材のメンテナンスについて支援してほしい旨要望があった。我が方からチリ側に確認したところ、供与</p>

運営指導項目	現状及び問題点	対処方針	協議結果
<p>第5 プロジェクト運営上の課題(続き)</p>			<p>機材は日本製であり、関連する部品や消耗品についてはチリ国内で入手が不可能であることから、チリ側が日本から調達するルートの確保について支援してほしいということであり、調達にかかる費用についてはチリ側が負担するということであった。</p> <p>本件は、研修センターの活動の継続には不可欠な重要な問題であることから、具体的にどのような支援が可能かわからないが、我が方として持ち帰り検討することとし、その旨チリ側要望を受入れ、ミニッツに記載した。</p> <p>これについては、プロジェクト専門家が、チリ国内で入手できる代替品の調査も行っているが、代替できるものは少ないということであり、また、プロジェクト専門家の意見としては、日本のメーカーの連絡先リストを作成しチリ側に残すことはできても、実際の調達に当たっては、現在専門家が果たしているような連絡調整の役割をプロジェクト終了後もしばらくの間は、日本側が担う必要があるということであった。</p> <p>いずれにしろ、プロジェクト終了まであと1年を残す時点で、チリ側からこのような要望があったことは、チリ側が将来の自立発展に向けて真剣に取り組もうとしていることの現れであり、我が方として、可能な限りの対応を行うことを前向きに検討する必要があると思われる。</p>
<p>第6 合同調整委員会</p>		<p>合同調整委員会を開催し、今次運営指導の内容について確認する。</p>	<p>合同調整委員会を開催し、今次運営指導の内容について確認した。</p> <p>なお、SERNAGEOMIN 局長より、本プロジェクトは、開始当初は双方の不理解によりさまざまな困難があったが、すべての関係者の努力によって、相互理解が進むとともにコミュニケーションも豊かになったことが、現在のプロジェクトの成功につながっており、これまでの関係者の努力に感謝する旨発言があった。</p> <p>また、チリ国際協力庁の日本担当者より、SERNAGEOMIN はチリ国内で日本との協力を実施している機関のなかでもしっかりした組織であるとして、本プロジェクトの成功を確信している旨発言があった。加えて、本プロジェクトの成果を広くラテンアメリカ諸国へ広めていく方策を、チリが推進している水平協力の一環として検討しているとして、日本のこれまでの協力に感謝するとともに、今後の水平協力への支援をお願いしたい旨発言があった。</p>

## 2-2 今後の留意点

今後の留意点としては、以下の点があげられる。

### (1) 終了時評価

1999年1月上旬の実施に向け、必要な準備を行っていく。

また、技術移転3分野のうちの化学分析(TCP上は Measurement and Analysis)について、R/Dのマスタープランでは研修コース開催対象とは読めないが、他では研修コース開催対象と読めるところがある。実際に化学分析のみの研修コースはニーズが少なく開催実績も少ないことから、評価を行う際、同分野をプロジェクト活動のなかでどのように位置づけるか、ラボの公認分析所資格取得のための活動とあわせ、整理する必要があると思われる。

なお、前回計画打合せ調査時のミニッツにおいては、研修コース開催実績及び計画関連のアネックスについて、各研修コースとTCPの項目との関連を示したが、今次運営指導のミニッツの関連アネックスにおいては、前回同様TCPの項目との関連を示すことでチリ側と合意したものの、時間の関係などから結果的に関連を示すことができなかつたので、終了時評価へ向け、プロジェクトで関連アネックスを修正していく必要がある。

### (2) 広域技術協力推進事業

#### 1) 周辺国からの研修員受入

実施時期について、短期専門家によるセミナー開催、カウンターパート研修、APEC環境協力ワークショップ開催などの各時期との調整を図り、プロジェクトで早急に検討のうえ、決定し、必要な手続き実施のタイミングを確認するとともに、プロジェクトから鉱開部へ申請書を提出する。

#### 2) 周辺国への専門家派遣

チリ側カウンターパートが専門家に同行する旅費について、チリ側によるチリの1999会計年度の予算確保状況を確認し、確保された場合、今年度第4四半期(1999年1～3月)の実施を検討する。

### (3) プロジェクト終了後の供与機材のメンテナンス

チリ側による関連部品や消耗品の日本からの調達に当たり、調達ルートの確保について、プロジェクト終了後に我が方としてどのような具体的支援を行うことができるか、終了時評価調査までに検討する。

## 2-3 中小鉱山等見学概要

### (1) ソニヤ鉱山（金）坑内掘り

巻き上げ機で立坑から鉱石を引き上げ、手選により鉱石とズリを選別した後、鉱石を手押し車により運搬トラックに詰め込み、周辺のプラントに運搬、選鉱され、その後 ENAMI（鉱業公社）の製錬所に搬入。

### (2) サンフランシスコ鉱山（金）坑内掘り

現在操業準備中。ENAMI（鉱業公社）の技術的支援を得て、鉱石を巻き上げ機で引き上げる際のバケット方式からトロッコ方式に変更中。トロッコ方式に改善することにより、バケット方式と比較して生産量が3倍に増加する見込み。操業開始後は6名体制で実施する予定。現在は操業準備中で収入がないため、鉱山従事者は、細々ながら、過去の堆積ズリの中から金含有量の比較的高いズリをピックアップし選鉱に回すことで、操業開始まで凌いでいる現状との説明があった。

### (3) プランタダイ（中規模プラント-25トン/日）

このような民間のプラントは、以前は70あったが、現在稼働中のものは15に減少。本プラントは現在稼働中のものの一つである。本プラントでは、銅の浮遊選鉱と水銀を使用したアマルガム法による金の抽出が行われていた。

なお、アマルガム法による金抽出方法は大きな危険を伴うことから、現在、チリは別の場所において、ベルギーと共同で、それに代わる比重（重力）による金の抽出方法を研究中とのことであった。

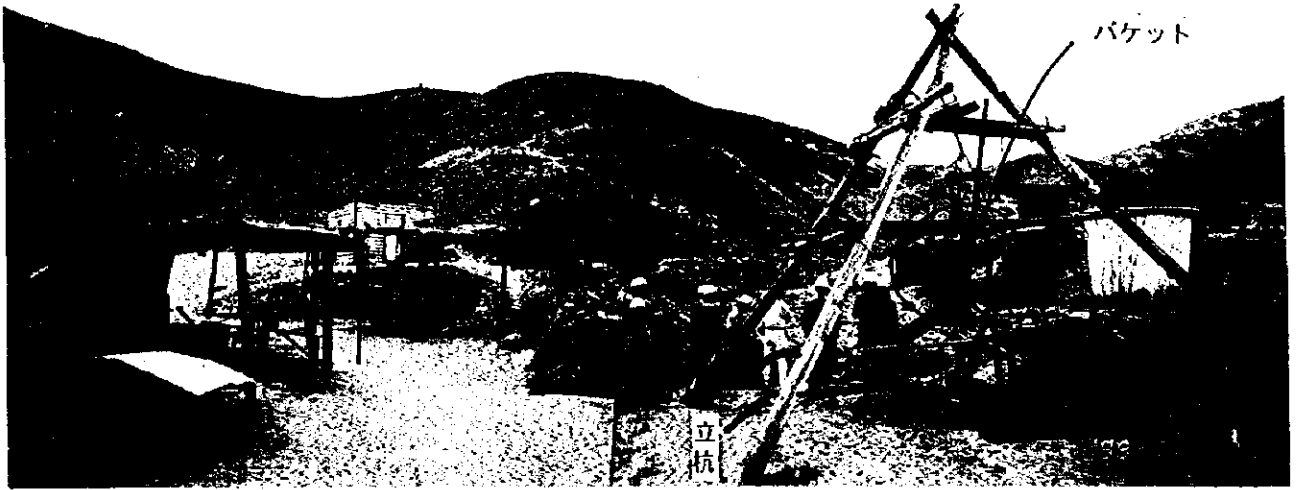
### (4) パイポテ（Paipote）製錬所（従業員520名）

チリにおいては、製錬所からの排煙による大気汚染（特にSO<sub>2</sub>）が深刻な問題になっている。しかしながら、今回、見学時、一般に言われているような、モクモクとした排煙の排出が見られなかったため、日本側専門家に聞いてみたところ、普段はあんなものじゃない。定期点検中か、大気環境のモニタリングポイントの測定値及び風向きなどに応じて操業度の調整を余儀なくされているかのどちらかであろうとのことであった。

現在、パイポテ製錬所においては、硫酸工場の設置等による一連の排煙対策（SO<sub>2</sub>対策）を実施中で、1998年末には完了する見込みであることから、この排煙対策の完了により、パイポテ製錬所から大気中へのS排出量がこれまでの4万トン/年から8千トン/年まで減少する見込みであるとのことであった。また、パイポテ製錬所におけるこれら環境対策への全投入金額は7,338万7,000ドルになるとのことであった。

なお、残念ながら、製錬所内部の転炉等の見学はできなかった。

サンフランシスコ鉱山（金）



サンフランシスコ鉱山全景



立杭内部



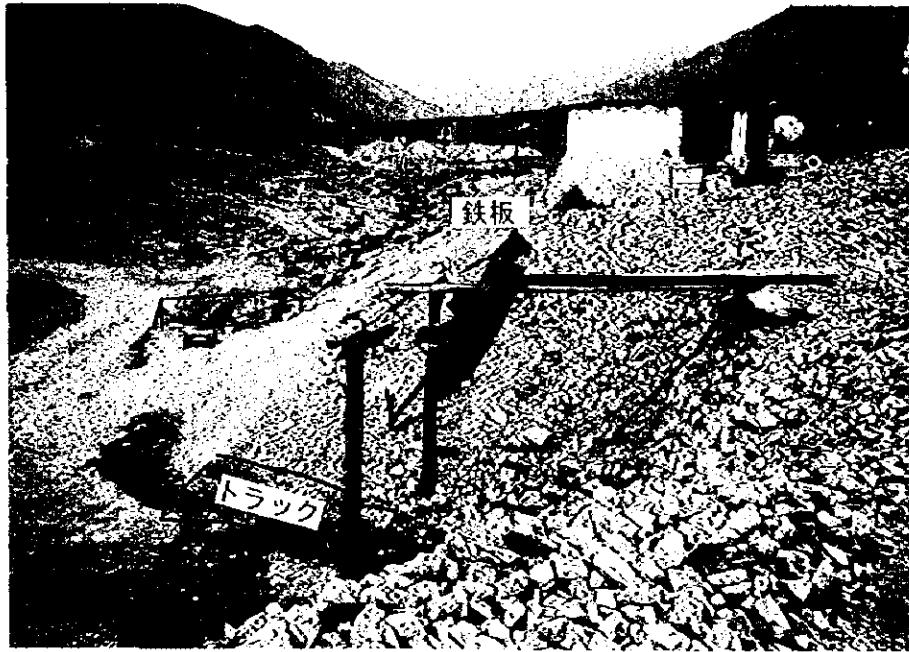
選鉱設備



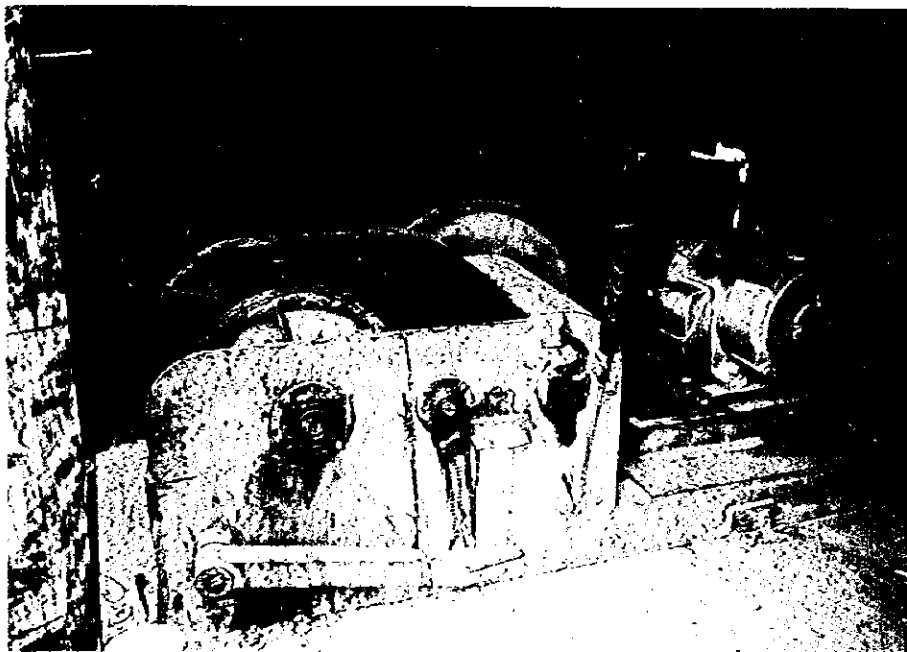
プラントダイ全景







手選された鉱石は手押し車に積み込まれ、さびた鉄板の上に投下され、横付けされていたトラックに積まれてプランタに運搬され、そこで選鉱される。



巻き上げ機



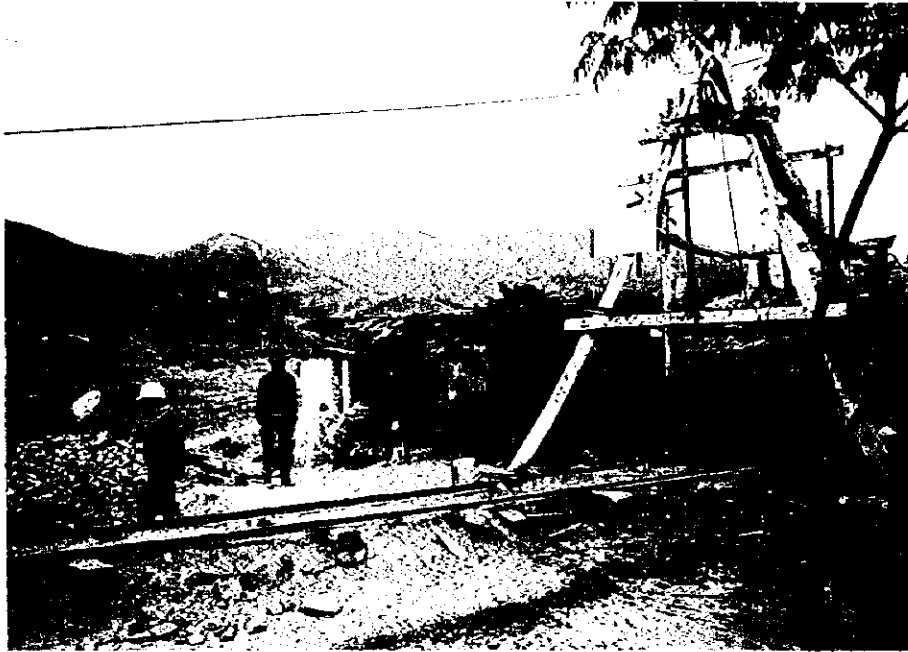


たぬき掘りの跡？  
(立杭位置から2～3mのところ)



ソニア鉱山（金）

立杭



立杭





### 第3章 運営指導チーム所見

チリ鉱業省鉱山地質局（SERNAGEOMIN）との協議を通じ、これまでのプロジェクトの活動実績ならびに1年後に迫ったプロジェクト終了までの活動計画を把握するとともに、終了時評価の内容、広域技術協力推進事業等について検討した。

また、協議終了後に合同調整委員会を開催し、全体の確認を行った。さらに、コピアポにあるプロジェクトサイトの視察、日本側専門家及びチリ側カウンターパートとの意見交換を行い、プロジェクトの視察、日本側専門家及びチリ側カウンターパートとの意見交換を行い、プロジェクト全体の状況を把握することができた。

主要な内容についての所見は以下のとおりである。

(1) 前回調査団派遣以降約1年半が経過したが、この間のプロジェクト活動は技術移転、研修及びセミナー開催等の面で顕著な成果がみられる。これは、センターの施設、機材等のハード面での環境整備が進んだことにもよるが、それ以外に以下の点があげられる。

- 1) センターの将来のビジョンに対するチリ側の方向づけがかなり明確になってきたこと。
- 2) チリ側と日本側の信頼関係が強まったこと。特に、プロジェクトサイトにおけるチリ側カウンターパートと日本側専門家とのコミュニケーションがより良好になり、相互に理解、協力する姿勢が生まれたこと。

このなかで、チリ側と日本側の信頼関係が築きあげられたことは大きな要因であり、これには、SERNAGEOMIN 局長自身が表明したとおり、カウンターパートなどチリ側関係者の本邦研修が大きく寄与したといっても過言ではない。

(2) 組織、運営面においては、これまで「カウンターパートの定着率の改善」、「第三州支局との関係」の2点が、特に大きな懸案事項となっていたが、これらについても著しい改善が見られた。

まず、カウンターパートに関しては、センター長も含め大半が半年から1年の契約の臨時職員であることも定着率を悪化させる一因となっているが、厳しい定員枠のなかで、この4月よりセンター長が正規職員として定員化されたことの意義は大きい。これについてはチリ側の努力に感謝するとともに、カウンターパートの定着化のために今後も引き続き努力するようチリ側に要請した。

次に、第三州支局との関係については、一時、当センターが第三州支局の傘下に組み入れられるのではという懸念もあったが、日本側より逆に同支局との協力関係を求めたことが功

を奏し、その後良好な関係が生まれている。これまで同支局長が物品、予算管理の責任者となっていたが、センター長の定員化により、組織、運営上の関係が明快なものとなり、今後トラブルは生じないものと予想される。

- (3) プロジェクト終了後の供与機材のメンテナンス、修理についてチリ側は大きな不安を抱いている。特に、チリ側での対応が不可能な日本製の機材については、メーカーへのコンタクト・ルート等、日本側が引き続き十分な支援をするよう強い要請があった。

これに対して運営指導チームより回答した内容は以下のとおりである。

- 1) プロジェクト終了後も供与機材が十分に活用されるよう、日本側はメーカーへのコンタクト等、適切な対応を検討する必要があること。
- 2) ただし、それらにかかる費用については日本側では負担できないこと。
- 3) 帰国後、他のプロジェクトの状況等を調査、検討し、次回の調査団派遣時には具体的な案を提示できるよう努力すること。

日本の供与機材が、修理、メンテナンスの煩雑さの理由で放置されることは、協力した日本にとっても大きなマイナスとなるものであり、チリ側が納得する方策を早急に検討する必要がある。

- (4) チリ国政府は、中南米カリブ地域を対象にした対外援助を「水平協力」と称して、近年特に力を入れ、予算及び内容を充実させている。昨年度より JICA に予算化された「広域技術協力推進事業」は、まさにチリ国政府の方針と合致しているため、積極的な姿勢がうかがわれた。しかし、事業の進め方については、次のような指摘があった。

- 1) 本事業をより効率的、効果的に推進できるのは、経験とネットワークを持つチリ側であること。
- 2) それにもかかわらず、パートナーとなるべきチリ側カウンターパートの派遣費用が確保されていないなど、チリ側に対する配慮が不十分であること。
- 3) 本事業の推進には、チリ側の協力が必要なことをミニッツ等に記載してほしいこと。

一方、日本側専門家の意見は次のとおりである。

- 1) プロジェクト終了直前の多忙な時期に、予想していなかった業務が加わることは大きな負担になること。
- 2) ただし、本事業の主旨は十分に理解できるので、可能な限り協力すること。
- 3) 相手国への専門家派遣については、日本側専門家とチリ側カウンターパートがペアとなって実施することが不可欠であること。



以上の意見を考慮し、実行面ではできる限り柔軟に対応することが必要である。

なお、本年度においては、相手国への専門家派遣の際に必要なチリ側カウンターパートの旅費を日本側が確保できないため、チリ側に来年度（1999年1～12月）の予算要求を依頼した。

(5) プロジェクト終了時の評価については、PDMの内容などを中心に詳しい説明を行ったため、チリ側の理解を得ることができたものと思われる。

しかし、PDMの細部については、チリ側の実状にあわない表現もあったため、一部削除、変更した。また、その他の内容についても引き続き検討することとした。

前述した供与機材のメンテナンス、修理の件については、評価5項目の一つである「自立発展性」に結びつくものであり、PDMのなかに日本側の支援を明記してほしい旨要望があったが、これについてはミニッツに記載することで合意が得られた。

(6) チリでは、現在、水質基準の見直しが進められており、1999年9月頃に新しい基準が適用される予定である。そのなかに、INN（チリの規格）を持った認証機関での検査が義務づけられている。このため、コピアポのセンターでは、この資格を得るために目下準備が進められている。

このような状況から、当センターに対する水質依頼分析は今後急増することが予想される。したがって、当センターは研修機能に加え、分析センターとしての機能も合わせ持った組織として発展していくものと思われる。もちろん、そのなかには水平協力の場としての中南米カリブ諸国を対象とした研修活動も視野に入っていることが予想され、プロジェクト終了後の自立発展は大いに期待できるものと考えられる。

(7) チリは、各種鉱物資源に恵まれ、特に銅の埋蔵量は世界の約24%、生産量、輸出量はいずれも世界一である。このように、チリにおける鉱業の役割は大きく、鉱業がチリ経済を支えているといっても過言ではない。

この鉱業行政を所管している鉱業省は、日本からの技術協力に引き続き大きな期待を寄せており、種々の面でこの国に協力していくことが、我が国の将来にとっても重要である。

本プロジェクトも1年後に終了するが、引き続き日本の協力を必要とする面もあるので、終了後もしばらく専門家を派遣するなどのフォローアップ、あるいはアフターケアを検討する必要もあるものと思われる。



# 資 料

資料1 ミニッツ (Minutes of Discussions)



MINUTES OF DISCUSSIONS  
BETWEEN THE JAPANESE MANAGEMENT CONSULTATION TEAM  
AND THE AUTHORITIES CONCERNED OF THE GOVERNMENT  
OF THE REPUBLIC OF CHILE  
ON THE JAPANESE TECHNICAL COOPERATION FOR THE PROJECT  
ON THE MINE SAFETY AND ENVIRONMENTAL TRAINING CENTER

The Japanese Management Consultation Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Dr. Takeshi Usami, visited the Republic of Chile for the purpose of reviewing the activities of the Project on the Mine Safety and Environmental Training Center (hereinafter referred to as "the Project") as well as holding discussions on the preparation of the final joint evaluation of the Project and on the Regional Technical Cooperation Promotion Program.

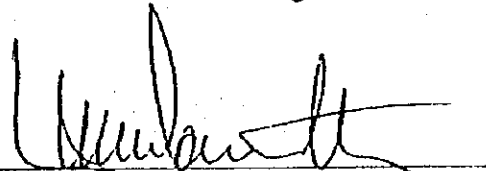
During its stay in the Republic of Chile, the Team had a series of discussions and exchanged views with the Chilean authorities concerned over the matters for the successful implementation of the Project.

As a result of the discussions, both sides agreed upon the matters referred to in the documents attached hereto.

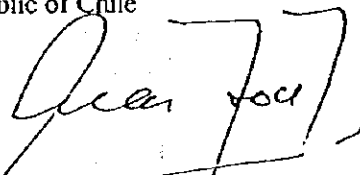
Santiago, June 5, 1998



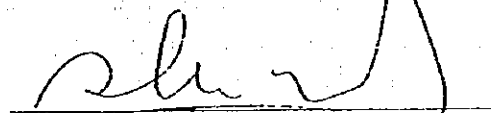
Takeshi Usami  
Leader  
Management Consultation Team  
Japan International Cooperation Agency (JICA)  
Japan



César Díaz-Muñoz Cormatches  
Undersecretary of Mining  
Ministry of Mining  
Republic of Chile



Ricardo Troncoso San Martín  
National Director  
National Service of Geology  
and Mining (SERNAGEOMIN)  
Republic of Chile



witnessed by : Bernardino Sanhueza Pizarro  
Fiscal  
International Cooperation Agency (AGCI)  
Republic of Chile

## THE ATTACHED DOCUMENT

### 1. Project Design Matrix

The Team proposed and the Chilean side agreed to jointly make the Project Design Matrix (hereinafter referred to as "PDM") for the Project in order to define the structure of the Project more logically and make the final evaluation of the Project more accurately.

In making the PDM, both the Japanese and the Chilean sides reviewed the Master Plan for the Project agreed upon in the Record of Discussions signed on April 5, 1994 (hereinafter referred to as "R/D"), and reached mutual understanding on the detailed contents of the Master Plan.

Then both sides jointly made the draft PDM as shown in ANNEX 1, based upon the detailed contents of the Master Plan and both sides confirmed that the draft PDM would be further discussed between the Japanese experts and the Chilean counterpart personnel.

### 2. Final Evaluation of the Project

The Team explained that the final evaluation of the Project would be conducted jointly by both the Japanese evaluation team organized by JICA and the Chilean evaluation team around January 1999, or six (6) months before the termination of the Project.

In this concern, the Team explained five (5) basic evaluation components as shown in ANNEX 2 and the Team also explained that the final evaluation would be conducted based on the PDM for the Project and in terms of five (5) basic evaluation components.

Then both the Japanese and the Chilean sides confirmed that the following preparation activities would be done beforehand.

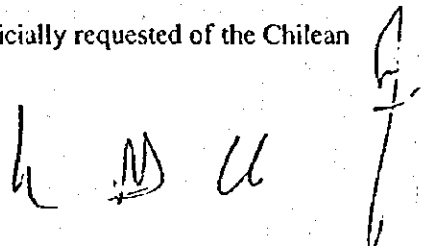
(1) The Japanese experts and the Chilean counterpart personnel carry out the following:

- a. Collect required data and information as shown in the objectively verifiable indicators of the PDM.
- b. Make documents related to the results of the inputs by both sides, technology transfer activities and training courses held.

(2) The Chilean side carries out the following:

- a. Make a plan for training courses to be held in 1999 and a plan for training courses to be continuously held in future.
- b. Make a self-reliant operation plan for the Mine Safety and Environmental Training Center after the termination of the Project in terms of institutional, technical and financial independency in order to continue and promote the activities of the center extensively throughout all the territory of the Republic of Chile.
- c. Make a plan for international training courses for neighboring countries in order to widely disseminate the activities of the center throughout South American countries.
- d. Select members of the Chilean evaluation team.

(Note: The Team stated that item No. (2) d. above would be officially requested of the Chilean side through the JICA Chile Office later.)

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### 3 Review and Plan of the Activities of the Project

Both the Japanese and the Chilean sides reviewed the results of and confirmed the plan of activities of the Project as follows:

#### (1) Inputs by both sides

- a. Dispatch of the Japanese experts is shown in ANNEX 3.
- b. Training of Chilean counterpart personnel in Japan is shown in ANNEX 4.
- c. Provision of machinery and equipment by the Japanese side is shown in ANNEX 5.
- d. Dispatch of the study teams by the Japanese side is shown in ANNEX 6.
- e. Assignment of Chilean counterpart personnel is shown in ANNEX 7-1 and ANNEX 7-2.
- f. Allocation of budget for the Project by the Chilean side is shown in ANNEX 8.
- g. Layout of the training center is shown in ANNEX 9.
- h. Organization chart of the National Service of Geology and Mining, Ministry of Mining (hereinafter referred to as "SERNAGEOMIN") is shown in ANNEX 10.
- i. Organization chart for the administration of the Project is shown in ANNEX 11.
- j. Tentative Schedule of Implementation (hereinafter referred to as "TSI") for the Project is shown in ANNEX 12.

#### (2) Technology transfer activities

- a. Technical Cooperation Program (hereinafter referred to as "TCP") for the Project is shown in ANNEX 13.
- b. Progress of technology transfer is shown in ANNEX 14.
- c. Seminars held in the Project is shown in ANNEX 15.
- d. Field surveys conducted in the Project is shown in ANNEX 16.
- e. Textbooks for the training courses is shown in ANNEX 17.

#### (3) Training courses at the training center

- a. Summary of operation of training courses is shown in ANNEX 18.
- b. Program of the training courses in 1998 and 1999 is shown in ANNEX 19.

In this connection, both sides confirmed that both the Japanese experts and the Chilean counterpart personnel would further concentrate on the technical transfer activities in line with the TCP and the progress of technology transfer shown in ANNEX 13 and 14 towards the termination of the Project.

### 4 The Regional Technical Cooperation Promotion Program

Based upon the confirmation on the progress of the Project referred to the item No. 3 above, under close cooperation of the Japanese experts and the Chilean counterpart personnel with the strong support of SERNAGEOMIN, AGCI and JICA, as well as common recognition on the existence of strong demand for similar training in the fields of mine safety and mine pollution control in the Latin American countries, the Team proposed the Regional Technical Cooperation Promotion Program (hereinafter referred to as "RTCPP") and the Chilean side agreed to conduct the RTCPP jointly.

Then both sides discussed the successful implementation of the RTCPP, and confirmed the purpose, contents and procedures of the RTCPP described in ANNEX 20 as well as confirmed that the detailed contents and schedule of the RTCPP would be further discussed among the Japanese experts, the Chilean counterpart personnel and the parties concerned.

## 5 Other Issues

### 5-1 Stability of the Chilean Counterpart Personnel

The Team stated and the Chilean side understood that the stability of the counterpart personnel is the most important key for the successful implementation of the Project and its sustainability.

In this concern, the Team appreciated and requested the continuation of the effort of the Chilean side to take possible measures for maintaining the stability of counterpart personnel in their corresponding fields to assure effective and smooth implementation of the technology transfer.

### 5-2 Close Relations with the Third Regional Office

Both the Japanese and the Chilean sides reaffirmed that the Third Regional Office in Copiapo plays an indispensable role in administrative matters in the spirit of support for the successful implementation of the Project.

### 5-3 Use of the Laboratory

The Chilean side explained to the Team that they have been implementing preparation activities to get the official authorization of Superintendencia de Servicios Sanitarios (hereinafter referred to as "SISS") for its laboratory in order to be able to do chemical analysis on commission in the future.

In this connection, the Team requested the Chilean side and the latter agreed to take necessary measures for the said preparation activities so that the technology transfer activities and the operation of the training courses in the field of chemical analysis are not affected.

### 5-4 Maintenance of the Equipment Provided by the Japanese Side after the Termination of the Project

The Chilean side requested the Team that the Japanese side would support for the procurement by the Chilean side of spare parts and consumables of the equipment provided by the Japanese side after the termination of the Project, stating that they would not need support for the cost of procurement but support for securing the route of procurement.

The Team agreed to convey the request to the JICA Head Office and to consider the possible measures among the parties concerned, stating that the Japanese side would not be able to support financially.

## 6 Joint Coordinating Committee for the Project

The Joint Coordinating Committee for the Project was held on June 5, 1998 and the contents of this Minutes of Discussions were reviewed.

## 7 Attendance of the Discussions

The attendance of the discussions are as shown in ANNEX 21.

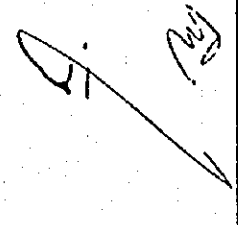
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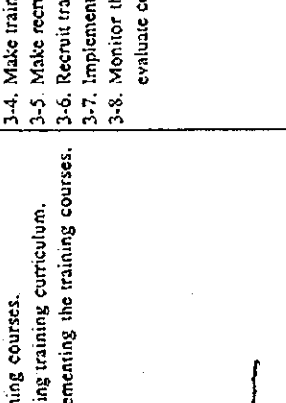
## LIST OF ANNEXES

- ANNEX 1 Draft Project Design Matrix (PDM)
- ANNEX 2 Five (5) Basic Evaluation Components
- ANNEX 3 List of Japanese Experts
- ANNEX 4 List of Chilean Counterpart Personnel Trained in Japan
- ANNEX 5 List of Machinery and Equipment Provided by the Japanese Side
- ANNEX 6 List of Study Teams Dispatched by the Japanese Side
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- ANNEX 20 The Regional Technical Cooperation Promotion Program
- ANNEX 21 The Attendance of the Discussions

ANNEX 1 Draft Project Design Matrix (PDM) for the Project on the Mine Safety and Environmental Training Center

Narrative Summary	Detailed Contents of Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
<p>&lt;Overall Goal&gt; The overall goal of the Project is to contribute to the improvement of the present situation on mine accident and mine pollution in metallic and non-metallic mining industry in the Republic of Chile.</p>	<p>&lt;Overall Goal&gt; The present situation on mine accident and mine pollution in metallic and non-metallic mining industry in the Republic of Chile will be improved.</p>	<p>1. Decrease of accidentability index in mining 2. Increase of number of mining companies that perform chemical analysis to the accompanish and control of their process and wastes</p>	<p>1. Annual report of mining industry (*) 2. Accumulated data in SERNAGEOMIN</p>	<p>a. Governmental policy on prevention of mine accident and mine pollution will not change. b. Governmental restriction on prevention of mine accident and mine pollution will be strengthened.</p>
<p>&lt;Project Purpose&gt; The purpose of the Project is to train instructors in the field of mine safety and mine pollution control and to implement the training at the Mine Safety and Environmental Training Center.</p>	<p>&lt;Project Purpose&gt; The Mine Safety and Environmental Training Center will be able to continuously implement appropriate training courses in the field of mine safety, mine pollution control and chemical analysis oriented to the present situation of mines in Chile for Chilean mine workers and related persons.</p>	<p>1. Level and contents of training courses. Level of training materials 2. Middle and long term implementation plan of training courses</p>	<p>1. Questionnaire to trainees 2. List of training courses to be continuously held</p>	<p>a. Trainees will apply the knowledge and technology earned from training courses to their actual work. b. The Government will take necessary measures for mining companies to introduce machinery and equipment for preventing mine accident and mine pollution.</p>
<p>&lt;Outputs&gt; 1. Training of Instructors for Mine safety technology and Mine pollution control technology 2. Training of technicians for Mine safety technology and Mine pollution control technology</p>	<p>&lt;Outputs&gt; 0. The management and operation system of the project will be established. 1. Various machinery and equipment for the implementation of the Project will be installed. 2. Technology necessary for instructors on mine safety, mine pollution control and chemical analysis will be acquired by the counterpart personnel. 3. Training courses on mine safety, mine pollution control and chemical analysis will be implemented.</p>	<p>0. Number of staffs, budget allocation and settlement of account 1. Number of installed machinery and equipment 2-1. Actual result on technology transfer activities 2-2. Number of counterpart personnel who can teach as instructors 2-3. Number of machinery and equipment that counterpart personnel can operate and maintain by themselves 2-4. Knowledge level of counterpart personnel 2-5. Ratio of training courses and curriculum that counterpart personnel can teach 3. Number of training courses and number of trainees</p>	<p>0. Personnel record, Accounting record 1. Machinery and equipment record 2-1. Project activities record, Technology transfer materials, Operation and maintenance manuals of machinery and equipment 2-2. List of instructors 2-3. Operation and maintenance record 2-4. Interview to Japanese experts, Questionnaire to trainees 2-5. Record of training courses 3. Record of training courses, List of trainees</p>	<p>a. Appropriate counterpart personnel will continuously work at the Mine Safety and Environmental Training Center. b. Trainees will be continuously collected from mining companies and governmental organizations.</p> 

(\*) The accidentability index are affected by other factors and actions developed by the mining companies and SERNAGEOMIN.

Narrative Summary	Detailed Contents of Narrative Summary	Inputs	Important Assumptions
<p>&lt;Activities&gt;                      1) Both Japanese and Chilean sides jointly carry out the following activities:                      -1 Fixing training schedule.                      -2 Giving lectures and guidance to instructors.                      -3 Giving guidance on how to prepare teaching materials.                      -4 Giving guidance on how to frame training curriculum.                      -5 Getting materials, machinery and equipment.                      2) The Chilean side carries out the following activities under the advice and guidance of the Japanese experts:                      -1 Keeping Chilean personnel to be instructor.                      -2 Fixing training course schedule.                      -3 Obtaining information from Chilean mining industry through questionnaires on the training courses.                      -4 Fixing plans for trainee recruitment                      -5 Recruiting trainees.                      -6 Preparing teaching materials for the training courses.                      -7 Framing training curriculum.                      -8 Implementing the training courses.</p>	<p>&lt;Activities&gt;                      0-1. Allocate staffs.                      0-2. Make operation plan of the training center.                      0-3. Make and implement budget plan properly.                      1-1. Make specification of the machinery and equipment.                      1-2. Make layout plans for the machinery and equipment as well as phased plans for installation.                      1-3. Provide and purchase the machinery and equipment.                      1-4. Transport, install and adjust the machinery and equipment.                      1-5. Procure supplementary materials and accessories.                      2-1. Make plan and curriculum of technology transfer from Japanese experts to Chilean counterpart personnel.                      2-2. Make materials for technology transfer.                      2-3. Implement technology transfer.                      2-4. Monitor the progress and achievement of technology transfer.                      3-1. Obtain information from Chilean mining industry through questionnaires on the training courses.                      3-2. Fix training courses and course schedule.                      3-3. Make training curriculum.                      3-4. Make training materials.                      3-5. Make recruitment plan of trainees.                      3-6. Recruit trainees.                      3-7. Implement training courses.                      3-8. Monitor the progress of training courses and evaluate courses.</p>	<p>&lt;Chilean side&gt;                      Allocation of necessary budget for operation of the Mine Safety and Environmental Training Center                      Assignment of counterpart personnel and administrative personnel                      Buildings and Facilities                      Equipment and Materials</p>	<p>&lt;Japanese side&gt;                      Long-term Experts                      Chief Advisor                      Coordinator                      Mine Safety                      Mine Pollution Control                      Chemical Analysts                      Short-term Experts                      Machinery and Equipment                      Counterpart Training in Japan</p>
			<p>a. Machinery and equipment provided by the Japanese side will obtain easy custom clearance.                      b. Appropriate counterpart personnel will continuously work at the Mine Safety and Environmental Training Center.</p> <p>&lt;Pre-conditions&gt;                      a. Strong demand on preventing mine accident and mine pollution exists in mining industry.                      b. Ministry of Mining has a strong intention to prevent mine accident and mine pollution.</p> 

## ANNEX 2 Five (5) Basic Evaluation Components

### 1. Five (5) Basic Evaluation Components

The five basic components defined by JICA as mentioned below are in line with those used for the evaluation works by DAC and other international assistance organization. Introduction of these components has enabled a consistent, well-balanced evaluation, which minimizes evaluator bias. Further, it allows us to share the results, knowledge and lessons with other aid organizations, since we are using common components and can discuss with them from the same viewpoints.

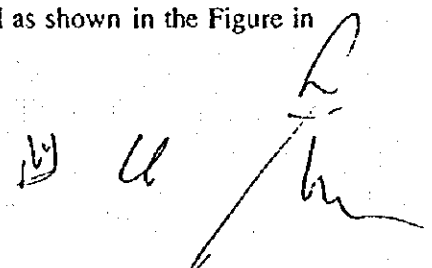
- (1) **Efficiency**  
Evaluate the method, procedure, term and cost of the project with a view to productivity.
- (2) **Effectiveness**  
Evaluate the results in comparison with the goals (or revised ones) defined at the initial or intermediate stage, and evaluate the attributes (factors and conditions) of the results.
- (3) **Impact**  
Evaluate the positive and negative effects of the project, extent of the effect and beneficiaries.
- (4) **Relevance**  
Preliminary evaluate whether the needs in the country have been correctly identified, and whether the design is consistent with the national and/or master plan.
- (5) **Sustainability**  
Evaluate the autonomy and sustainability of the project after the termination of cooperation, from the perspectives of operation, management, economy, finance and technology.

### 2. Relation between Five Basic Components and PDM

The following five components are used for the evaluation and a selection of a project.

- (1) **Efficiency**
- (2) **Effectiveness**
- (3) **Impact**
- (4) **Relevance**
- (5) **Sustainability**

These components are directly connected to the elements of PDM as shown in the Figure in the following page.

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The component "Efficiency" is a measure to qualitatively and quantitatively compare all resource (input) to the results (output) of the project in order to evaluate the economic efficiency or conversion from input to output.

The parameter "Effectiveness" is a measure to evaluate whether the purpose has been achieved or not, or to evaluate how much the outputs contributed to the achievement of the purpose, or to evaluate whether or not the characteristics of the outputs were as expected.

The parameter "Impact" is a foreseeable or unforeseeable, and a favorable or adverse effect of the project upon society. To evaluate impact, both the goal and project purpose should be referred to in the beginning of the evaluation. Evaluation with this components could lead to more than the confirmation as whether or not the goals have been obtained. Evaluation with this component requires comprehensive surveys in many cases.

The parameter "Relevance" is to comprehensively evaluate whether or not the project meets the overall goals, politics of both the donor and recipient, local needs and given priority levels, in order to decide whether the project should be continued, reformulated or terminated.

The component "Sustainability" is to comprehensively evaluate how long the favorable effect as a result of the project can continue after the project has been terminated. Evaluation with this component is required to decide how much the local resources should continue to be used for the project, and to evaluate how much the country receiving the assistance has been considering important. According to OECD (1989), "Sustainability" is a component to be used for the final test of the success of a development project.

All five components are essential for any of the projects or programs. The five components give necessary information to the decision maker so that he/she can decide how to approach the next step. Since each of the five components build on the intervention strategy, they also lay the foundation for standardization in monitoring and information handling within and among organizations and agencies.

In practice, each of the five parameters should also contain project-specific information.

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Evaluation components

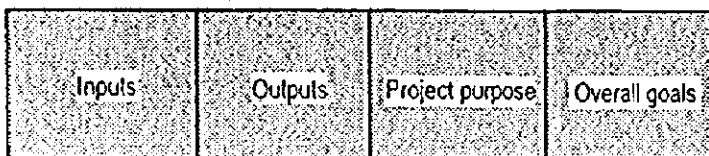
**Sustainability:**  
Evaluate the extent to which the positive effects as a result of the project will still continue after external assistance has been concluded.

**Relevance:**  
Evaluate the degree to which the project can still be justified in relation to the national and regional priority levels given to the theme.

**Impact:**  
Foreseeable or unforeseeable, and favorable or adverse effect of the project upon the target groups and persons possibly affected by the project.

**Effectiveness:**  
Evaluate the extent to which the purpose has been achieved or not, and whether the project purpose can be expected to happen on the basis of the outputs of the project.

**Efficiency:**  
Evaluate how the results stand in relation to the efforts and resources, how economically the resources were converted to the outputs, and whether the same results could have been achieved by other better methods.



Goal hierarchy

Five Components vs. Goal Hierarchy

### ANNEX 3 List of Japanese Experts

#### Long term

Name	Field	Term
Mr. Shozo Sawaya	Chief Adviser	94/8/08 - 97/9/07
Mr. Minoru Fujita	Chief Adviser	97/8/27 - 99/6/30
Ms. Futaba Ando	Coordinator	94/7/21 - 96/6/01
Mr. Takeshi Saito	Coordinator	96/5/25 - 99/6/30
Mr. Mitsuhiro Ota	Mine Safety	94/8/08 - 96/8/07
Mr. Yoshikane Harada	Mine Safety	96/7/17 - 99/6/30
Mr. Atsushi Kawada	Mine Pollution Control	94/8/08 - 96/8/07
Mr. Suzuo Yamaguchi	Mine Pollution Control	96/7/17 - 99/6/30
Mr. Eiichi Hoka	Chemical Analysis	94/8/08 - 97/8/07
Mr. Michihiro Ando	Chemical Analysis	97/6/28 - 99/6/30

#### Short term

Name	Field	Term
Mr. Hiroto Kidane	Mine Safety	95/5/16 - 5/30
Mr. Hiroshi Kashiwagi	Installation of Gas scrubber	95/11/14 - 11/23
Mr. Shigeo Yamano	Environmental Regulation of Japan	96/6/21 - 7/04
Mr. Tadao Inoue	Treatment of abandoned mine	96/6/21 - 7/04
Mr. Junichi Sato	Rock Pressure Measurement	96/11/22 - 12/03
Mr. Chuichi Nakata	Installation of Gas chromatograph	97/5/30 - 6/10
Mr. Eiji Kuboki	Policy of abandoned mine	97/6/21 - 7/03
Mr. Mitsuya Hirokawa	Treatment of abandoned mine	97/6/21 - 7/03
to be specified	Coal Mine Industry Policy	98 November
to be specified	Treatment of coal mine closure	98 November
to be specified	Utilization of ex coal mine	98 November
to be specified	Chemical Analysis Instrumentation	(if necessary)

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ANNEX 4 List of Chilean Counterpart Personnel Trained in Japan

Name	Title	Training field	Term
Mr. Ricardo Troncoso	National Director, SNGM	Mine Safety Policy	95/1/23 - 2/05
Mr. Jorge Guerra	Director, Training Center	Mine Safety & Pollution Control	95/1/23 - 2/18
Mr. Julio Morales	C/P, Mine Safety	Mine Safty	95/9/03 - 10/03
Mr. Hugo Aguirre	C/P, Mine Safety	Pollution Control	95/9/03 - 10/03
Dr. Andres Gomez-Lobo	C/P, Mine Safety	Chemical Analysis & Pollution Control	95/9/03 - 10/03
Mr. Anton Hraste	Regional Director, III Region, SNGM	Mine Safety Policy	97/3/02 - 3/15
Mrs. Vinka Rakela	C/P, Chemical Analysis	Chemical Analysis	97/7/046 - 8/01
Mr. Guido Montuschi	C/P, Chemical Analysis	Chemical Analysis	97/7/046 - 8/01
Mr. Juan-Mayra Bruna	Chief, Administration, III Region, SNGM	Mine Safety & Pollution Control	98/1/25 - 2/14
Mr. Manuel Bernal	National Vice Director for Mining, SNGM	Mine Safety & Pollution Control	98 July
Mr. Eduardo Vega	C/P, Mine Pollution Control	Mine Pollution Control	98 July

Note: C/P Counterpart personnel of the Project

Handwritten initials 'W' and 'U' followed by a large, stylized signature.



Code	Item	Description	Quantity
A-1	CO gas measurement unit	Carbon Monoxide Detector Alarm, Model:CAI-2B	10 units
A-2	Inflammable gas measurement unit	Combustible Gas Sampling Pump Kit, Model:XP-317	10 units
A-3	Gas detector tube	Gas Sampling Pump Kit, Model:NO-800	10 units
A-4	Portable digital gas detector	Portable Gas Sampling Pump Kit, Model:XP-302H	10 units
A-5	Hot wire type anemometer	Hot Wire Anemometer, Model:DP-70H	10 units
A-6	Windmill type anemometer	Windmill type anemometer, Model:No. 27	10 units
A-7	Barometer	Aneroid Barometer, Model:No. 3-1050 01	10 units
A-8	Smoke tube	Smoke Tester Kit, Model:NO.500	10 units
A-9	Digital Hygrometer	Digital Hygrometer, Model:SK-S01R11	3 units
A-10	Self-rescue unit	Escape Mask, Model:KINI-2/RM-102 Side Mounted Gas Mask, Model:HV-111 Self Contained Breathing Apparatus (S,C,B,A), Model:L2-815	3 units 3 units 4 units
A-11	Oxygen breathing unit	Oxygen Breathing Apparatus, Model:MARK10 Maintenance and Inspection Equipment, Model:Tester 3	10 units 1 unit
A-12	Safety helmet	Helmet	10 units
A-13	Safety goggles	Protective Goggle	10 units
A-14	Dusk mask	Dust Respirator	10 units
A-15	Safety shoes	Safety Shoes	10 pairs
A-16	Safety belt	Safety Belt	10 units
A-17	Helmet light	Miner's Cap Lamp, Model:YL2000 Flash Lamp	10 units 10 units
A-18	Charger for battery light & Dynamo	Recharger For Northern Light Miner's Lamp, Model:YL-5120-05 Generator Yanmar, Model:YDG300S-5E	2 units 1 unit
A-19	Earth & roof pressure gauge	Soil Pressure Transducer, Model:SMI-20A/BE-20KE	1 unit
A-20	Rope checker	Rope Measuring Gage, Model:TWT-550A	1 unit
A-21	Leg drill	Leg Rock Drill, Model:YS-77LDV Leg Rock Drill, Model:YS-77LD	2 units 1 unit
A-22	Stoper	Stoper, Model:BBD-46 WS6	3 units
A-23	Parts for rock drill	Air Hose 1" 150m, Air Hose 1/2" 150m, Hose Coupling 1" 10pcs.	...
A-24	Insert Bit	Integral Drill Steel, Chisel Bit .....	50 units
A-25	Rod polishing machine	Grinding Machine, Model:TEROC64	1 unit
A-26	ANFO charger	Loader Fixed Type, Model:B. C. Loader Portable Type, Model:S. C. B-20	1 unit 2 units
A-27	Blasting unit	Blasting Machine, Model:Nissan DX-100A	2 units
A-28	Blasting tester	Tester, Model:R-3-200	2 units
A-29	Photo-cell tester	Safety Circuit Tester, Model:SAFETY-C	2 units
A-30	Stray current measurement unit	Leakage Current Detector, Model:NISSAN	2 units
A-32	Blasting cap binder	Blasting Cap Binder	5 units
A-33	Dust sampler	Air Sampler, Model:L-15P	3 units
A-34	Digital dust-meter (portable type)	Digital Dust Indicator, Model:P-5112	2 units
A-35	Noise-meter	Noise Meter, Model:NA-24	2 unit
A-36	Air compressor	Portable Air Compressor, Model:EC75ZS-3	1 unit
B-1	pH meter	pH Meter, Model:D-14	3 units
B-2	Turbidimeter & thermometer	Water Quality Checker, Model:U-10 Water Quality Checker, Model:WQC-20A	1 unit 2 units
B-3	Ion meter	Ion Meter, Model:IM-7B Ion Meter, Model:290A	1 unit 2 units
B-4	Water quality meter (portable type)	Potable Water Analysis Laboratories, Model:HACH DR/2000	3 units
B-5	Conductivity meter	Electric Conductivity Meter, Model:CM-14	3 units
B-6	Electromagnetic flow meter	Portable Electromagnetic Current Meter, Model:LP-201 Electric Current Meter, Model:TK-105N	1 unit 1 unit
B-7	Digital stop watch	Digital Stop Watch, Model:SVAD 001	3 units
B-8	Thermometer	Thermometer, Model:SK-1250MC	3 units
B-9	Transparency meter	Transparency Meter, Model:8053-052	3 units
B-10	Cyanide measurement unit	Cyanide Measuring Apparatuses, Model:CN-S	1 set
B-11	Noise meter	Integrating Sound Level Meter, Model:NI-05A	1 unit
B-12	Vibration meter	Vibration Level Meter, Model:VM-50	1 unit
B-13	High volume sampler	High Volume Air Sampler, Model:HVC-1000N	1 unit
B-14	Low volume sampler	Low Volume Air Sampler, Model:SLT-20	1 unit

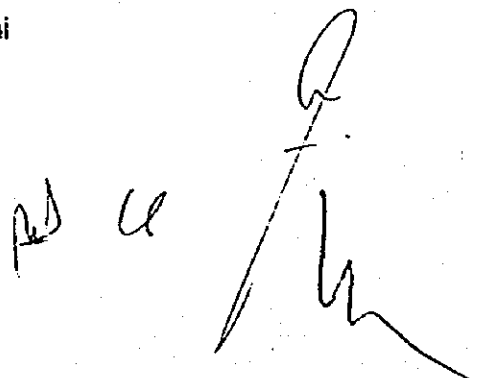
Code	Item	Description	Quantity
B-15	Desiccator	Desiccator, Model:DX-11	1 unit
B-16	Flow meter	Rotameter Kit with Needle Valve, Model:2833-01	1 unit
B-17	Digital dust meter	Digital Dust Indicator, Model:ICD-1	1 unit
B-18	Dust jar	Dust Jar, Model Code No. 8008-05	1 unit
B-19	Electronic balance	Electronic Balance, Model:EB-3200-SA Electronic Table Balance, Model:ET-1300SW	1 unit 1 unit
C-1	Atomic absorption spectrometer	Atomic Absorption Spectrophotometer, Model:Z-6100 Hydrogen Formation System, Model:HFS-3	1 unit 3 units
C-2	Spectrophotometer	Spectrophotometer, Model:U-2000	1 unit
C-3	Gas chromatograph	Gas Chromatograph, Model:G-6800 Suck In Pump, Model:NG-20A	1 unit 2 units
C-4	Laboratory pH Meter	Laboratory pH Meter, Model:F-22	1 unit
C-5	Ion meter	Ion Meter, Model:IM-40S	1 unit
C-6	Electro-conductivity meter	Electric-Conductivity Meter, Model:CM-40V	1 unit
C-7	Demineralizer	Water Softener, Model:TSF-25 Water Still's Barnstead Type, Model:SE-10 Deionizing Equipment, Model:MA-4	1 unit 1 unit 1 unit
C-8	Demineralizer for soft water	Deionizing Equipment for Water Softner, Model:IONPEI-5	1 unit
C-9	Thermostat dryer	Forced Convection Drying Oven, Model:FV-410 Drying Oven, Model:MOV-112	1 unit 1 unit
C-10	Vibrating mill	Vibration Mill, Model:T-100	1 unit
C-11	Thermostat dryer	Muffle Furnace, Model:KL-160 Muffle Furnace, Model:ELF-117/119te	1 unit 1 unit
C-12	Vacuum pump	Diaphragm Vacuum Pump, Model:DAT-50D Vacuum Pump, Model:OVD-50S	1 unit 1 unit
C-13	Centrifuge	Table-Top Centrifuge, Model:5100 Centrifuge, Model:11108M2	1 unit 1 unit
C-14	Shaker for separating funnel	Separatory Funnel Shaker, Model:MW-1 Shaker, Model:MW-J	1 unit 1 unit
C-15	Draft chamber	Draft Chamber, Model:SFA-180S Draft Chamber, Model:806E50NU	1 unit 1 unit
C-16	Gas scrubber	Exhaust Purifier, Model:JR-G-10	1 unit
C-17	Drainage treatment unit	Heavy Metal Waste Water Treatment Equipment, Model:LIP-20AIII	1 unit
C-18	Refrigerator	Refrigerator, Model:MPR-411F Medical Refrigerator, Model:MPR-511	1 unit 1 unit
C-19	Electronic balance	Analytical Balance, Model:AT-261	1 unit
C-20	Magnetic stirrer	Magnetic Stirrer, Model:MGM-66	2 units
C-21	Automatic mortar	Grinding Mixer, Model:Type#18	2 units
C-22	Sieve shaker	Sieve Shaker, Model:AS-200	1 unit
C-23	Sample splitter	Sample Divider, Model:Type#10	1 unit
C-24	Sieve	Sieve (29kinds/set)	1 set
C-25	Voltage stabilizer	Automatic AC Voltage Regulator, Model:VRS1001 Automatic Voltage Regulator, Model:SVC-10100A Voltage stabilizer, Model:ITS 4000h	1 unit 1 unit 1 unit
C-26	Consumables for chemical analysis	Beaker .....	---
C-27	Reagents for chemical analysis	Reagents for Chemical Analysis	279 items
C-28	Hot plate	Hot Plate, Model:ASP-650 Hot Plate, Model:TH-550	1 unit 1 unit
C-29	Microscope	*NIKON* Stereoscopic Microscope, Model:SMZ-1-3	1 unit
D-1	Video camera	III-8 Videl Camera Model:Sony, CCD-FR550	2 units
D-2	Video desk	VHS/SMM Video Cassette Recorder, Model:WV-F1	2 units
D-3	Video editor	Editing Control Unit, Model:RM-E1000	1 unit
D-4	TV	25-Inch Color TV Model:KV-K25M111	2 units
D-5	Slide projector	Slide Projector, Model: SOUND CABIN AIR	2 units
D-6	Screen	Screen, Model:WS-18DX	2 units
D-7	OHP	Over Head Projector, Model:Cu-650AF Transparency Film Maker, Model:4550	2 units 2 units
D-8	Recorder	Cassette Tape Recorder, Model:TCM-57	2 units
D-9	35 mm camera	Single Reflex Camera, Model:EOS KISS	2 units

Code	Item	Description	Quantity
D-10	Electronic white board	Electronic Board With Copy System, Model Kakitonkun Sansai 1800	1 unit
D-11	Microphone, amplifier, speaker, etc.	Microphone, Model DMI-703	1 unit
		Speaker, Model BS-102SA	1 unit
		Amplifiers, Model A31E	1 unit
		Power Megaphones	1 unit
E-1	Mobile training Unit	Mobil-Laboratory, (Model N1R)	1 unit
		Mobil-Haulage, (Model L14181/51)	1 unit
E-1	Technical literatures & reference	Slide (Mine Safety)	23 pcs
		Text (Japaneas)	126 vols
		Text (English or Spanish)	65 vols
		Chilean Norms	116 vols
E-2	Video tapes for training	Video (Analysis)	10 pcs
F-3	Photostat copy machine	Photostat Copy Machine, Model FF-4220	1 unit
F-4	Personal computer	Personal Computer, Model LC575	2 units
		Personal Computer, Model PB180C 4/160	1 unit
		Personal Computer, Model PC-9821Ne3-40W	1 unit
		Personal Computer, Model Power Book 520C	3 units
		Personal Computer, Model Performa 6310	1 unit
		Personal Computer, Model Power Book 190CS/66	1 unit
		Personal Computer, Model LCS800 8-800/14	4 units
		Laser Printer, Model LP-8500	2 units
		Printer, Model WRITEMOVE II	1 unit
		Printer, Model BJ-220JS	1 unit
		Printer, Model BJ-30V	1 unit
		Printer, Model Color Style Writer 2200	3 units
		Word Processor, Model 285III	1 unit
F-5	Micro-bus	Micro-bus, Model 96year, LO-812	1 unit
F-6	Station wagon	Toyota Land Cruiser 4WD 2-Door Hardtop, Model FZJ75L.V-MRU	1 unit
F-7	Fax	Fax, Model 240	1 unit
F-8	Wireless set	Transceiver, Model FF-80C with Long Wire Antenna Set	1 unit
		Transceiver, Model FF-80C with Auto Antenna Tube	2 units

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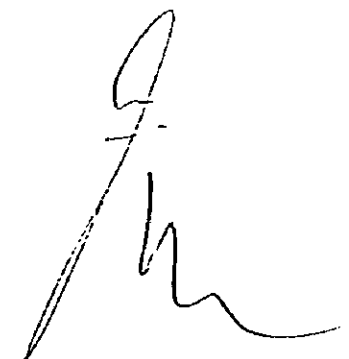
ANNEX 6 List of Study Teams Dispatched by the Japanese Side

Name of the Mission	Members	Terms
Implementation Study Team	Mr. Saburo Yamaguchi Mr. Kouetsu Fujii Dr. Kenji Tomita Mr. Yoshiaki Tsuboi Ms. Noriko Takasu	94.3.28 - 4.05
Consultation Team	Dr. Umetaro Yamaguchi Mr. Junichi Ozeki Mr. Takamitsu Morisada Mr. Sinya Tomonari	95.2.27 - 3.07
Advisory Team	Mr. Hiroshi Shiojiri Mr. Yoshio Sato Mr. Takamitsu Morisada Mr. Sinya Tomonari	96.1.10 - 1.12
Consultation Team	Dr. Takeshi Usami Mr. Makoto Takuwa Mr. Takamitsu Morisada Mr. Yuichi Endo	97.1.13 - 1.21
Management Consultation Team	Dr. Takeshi Usami Mr. Takahiro Matsubuchi Mr. Yasuhiko Wada	98.6.01 - 6.08



ANNEX 7-1 List of Chilean Counterpart Personnel

Job Description	Assigned Personnel	Remarks
<b>( Head Office in Santiago )</b>		
National Director of SERNAGEOMIN	Ricardo Troncoso San Martin	
National Vice Director of Mining	Manuel Bernal Leon	
Chief of Planification Office	Cecilia Valderas	
Chief of Administration & Finance Department	Jose Bruna Uribe	
Chief of Mine Safety Department	Daniel Alcayaga	
Chief of Environment Department	Silvia Defranchi Contreras	
<b>( III Region Office in Copiapo )</b>		
Regional Director of SERNAGEOMIN	Anton Hraste Carrasco	
<b>( Counter part )</b>		
Director of Mining Safety and Environmental Training Center	Jorge Guerra Casanova	
Instructor on Mine Safety	Nibaldo Gonzáles Nicolás	
ditto	Carlos Flores	
Instructor on Mine Pollution Control	Andrés Gómez-Lobo Rodríguez	
ditto	Eduardo Vega Donoso	
Instructor on Chemical Analysis	Vinka Rakela Aranza	
ditto	Guido Montuschi Muga	
<b>( Staff )</b>		
Chief of Administration Department	Juan Maya Bruna	not full time
Secretray	Magda Traslaviña Araya	
Secretray	Fresia Corles Vasquez	
Driver	Ricardo Araya Espinoza	

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## ANNEX 8

## Budget Allocation for the Project by the Chilean Side

	1991	1992	1993	1994	1995	1996	1997	1998	
	Result	Result	Result	Result	Result	Result	Result	Budget	Totals
<b>INCOME</b>	64,208	20,666	119,867	173,020	519,178	210,871	239,818	223,877	1,571,505
Operational Income									0
Buildings Selling									0
Other Incomes SNGM					22,125	8,014	27,837	* 8,140	57,976
Fiscal Budget SNGM	64,208	20,666	119,867	173,020	497,053	202,857	211,981	223,877	1,513,529
<b>CHARGES</b>	64,208	20,666	119,867	173,020	519,178	210,871	239,818	222,017	1,579,645
<b>PERSONEL</b>	0	0	0	0	146,151	168,507	194,925	173,721	683,304
Personal Salary							19,653		19,653
Honoriaes Fee					140,093	164,936	171,277	167,442	643,748
Travelling Expenses					6,058	3,571	3,993	6,279	19,903
Extra Time									0
<b>GOODS &amp; SERVICES</b>	0	0	0	0	75,975	35,052	36,599	47,830	195,456
Ordinary Material						4,731	6,579	6,977	18,287
General Service					61,270	18,214	18,309	26,288	124,081
Maintenance and Repairs					14,705	8,690	7,356	5,263	36,014
Other Goods and Services						2,758	3,181	4,651	10,570
Computational Expenses						679	1,174	4,651	6,504
<b>REAL INVESTMENT</b>	64,208	20,666	104,660	155,615	297,052	7,312	8,294	10,466	668,273
Office and Other Equipment						7,312	8,294	10,466	26,072
Studies for Investment			79,537	103,368					182,905
Computational Equipment									0
Buildings and Sites	64,208	20,666	25,123	52,247	297,052				459,296
Others			15,207	17,405					32,612

US\$1=5360 US\$1=5380 US\$1=5400 US\$1=5405 US\$1=5409 US\$1=5420 US\$1=5430 US\$1=5430

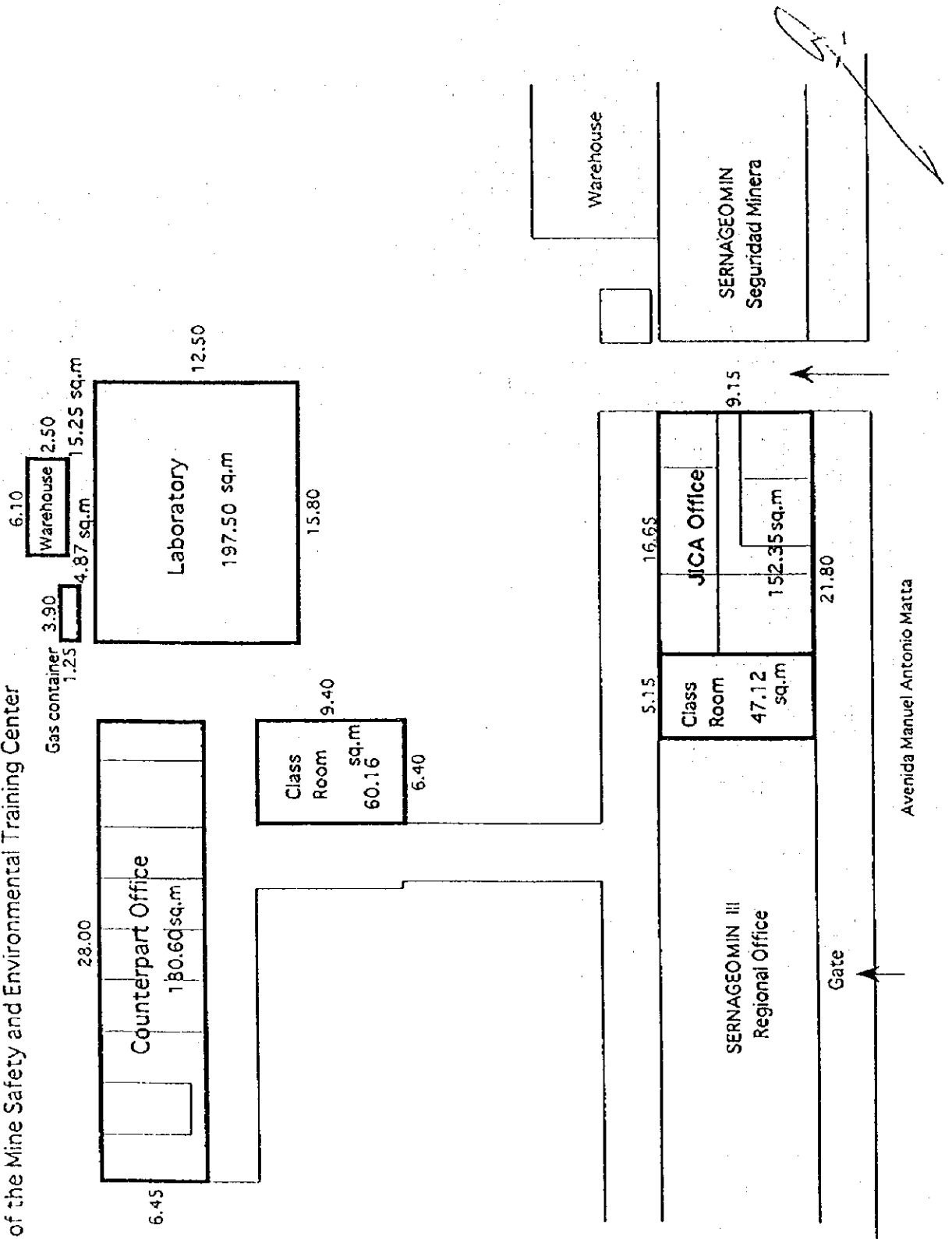
Unit: US\$ dollar

General Services include operational expenses

SNGM had included additional funds for salaries and investment

\* Include extra fund supply by SNGM, not considered in Budget in 1998

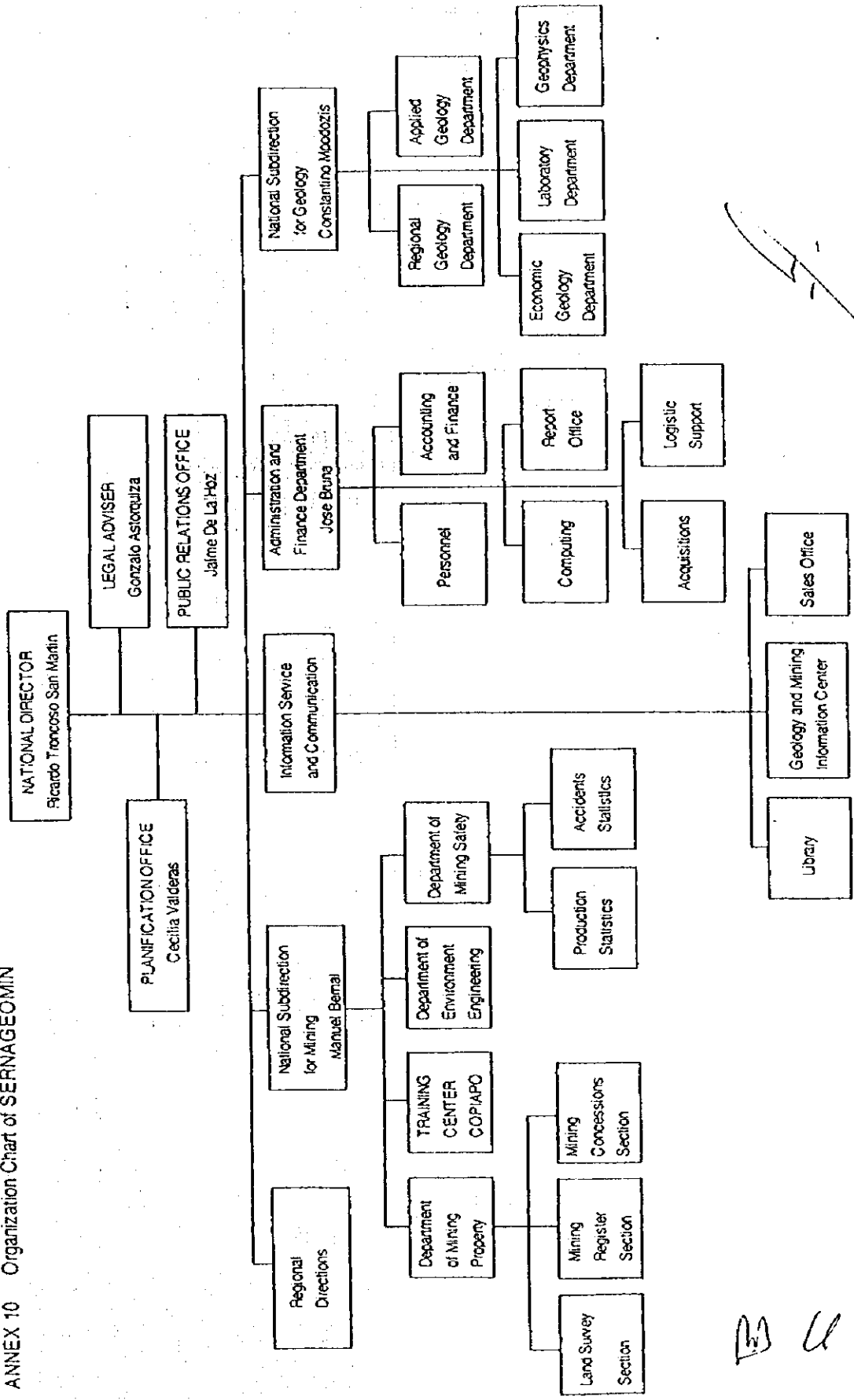
ANNEX 9  
Layout of the Mine Safety and Environmental Training Center



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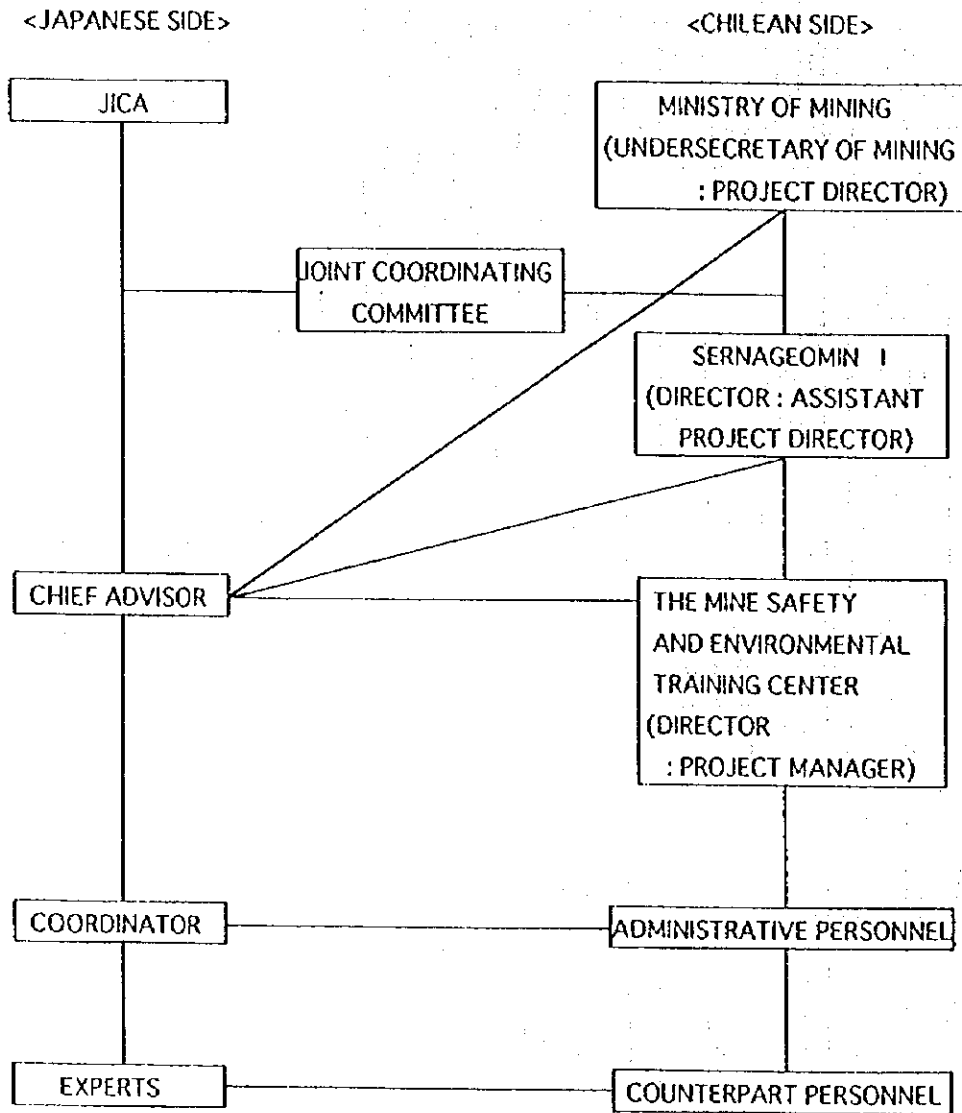


ANNEX 10 Organization Chart of SERNAGEOMIN



*B. C. h.*

ANNEX 11 ORGANIZATION CHART FOR THE ADMINISTRATION OF THE PROJECT




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ANNEX 12 TENTATIVE SCHEDULE OF IMPLEMENTATION (TSI)

Calendar Year	1994				1995				1996				1997				1998				1999		
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
I Term of the Project																							
II The Japanese Side																							
1 Dispatch of Expert																							
1) Long-term																							
2) Short-term																							
2 Provision of Machinery & Equipment From Japan In Chile																							
3 Training of Chilean Counterpart in Japan																							
4 Dispatch of Study Team	○				○				○												○		
III The Chilean Side																							
1 Construction of Center (Laboratory & etc.)																							
2 Allocation of C/P Personnel & Staff																							
3 Arrangement of Buildings & Facilities																							
4 Procurement of Machinery & Equipment																							
5 Allocation of Budget for Operation of Center																							
6 Operation of Training Courses																							
IV Joint Committee																							

Note: 1) This Schedule is subject to change in accordance with progress of the Project.

2) ○ Original, — Implementation

M. C. 

ANNEX 13 TECHNICAL COOPERATION PROGRAM (TCP)

Calendar Year	1994				1995				1996				1997				1998				1999			
	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		
Term of the Project																								
<b>A Mine Safety Technology</b>																								
A-1 Mining Operation																								
1) Safety Control at openpit mine																								
2) Safety Control at underground mine																								
3) Safety Control for working condition																								
4) Case study																								
A-2 Mill Operation																								
1) Safety control at mill																								
2) Safety control for working condition																								
3) Case study																								
A-3 Measures at Emergency																								
1) Life saving manual																								
2) Life preserver																								
3) System for Emergency																								
4) Case study																								
A-4 Equipment for Mine Safety																								
1) Description on equipment																								
2) Handling																								
A-5 Administration and Policy																								
1) Mine safety administration in Japan																								
2) Approval of equipment																								
3) Mine safety education																								
<b>B Mine Pollution Control Technology</b>																								
B-1 Water																								
1) Water pollution in general																								
2) Water pollutants & water control standard																								
3) Processing Facilities for mine drainage																								
4) Usage of recycled water																								
5) Treatment of sludge																								
6) Treatment of drainage from abandoned mine																								
7) Case study																								
B-2 Noise, Vibration and Dust																								
1) Noise pollution control																								
2) Vibration pollution control																								
3) Dust pollution control																								
4) Case study																								
B-3 Administration and Policy																								
1) Mine pollution control in Japan																								
2) Mine pollution education																								

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ANNEX 13 TECHNICAL COOPERATION PROGRAM (TCP)

Calendar Year	1994				1995				1996				1997				1998				1999			
	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		
Term of the Project																								
<b>C Technique on Analysis and Measurement:</b>																								
<b>C-1 Water Analysis</b>																								
1) Sampling method																								
2) Preparation of sample																								
3) Flow-rate measurement																								
4) Method for water analysis																								
5) Method of element analysis																								
6) Practice																								
<b>C-2 Gas Analysis</b>																								
1) Sampling method																								
2) Method for gas analysis																								
3) Practice																								
<b>C-3 Dust Measurement</b>																								
1) System of dust analysis																								
2) Measurements of dust characteristics																								
3) Apparatus for dust measurements																								
4) Practice																								
<b>C-4 Noise and Vibration Measurement</b>																								
1) Noise measurement																								
2) Vibration measurement																								
3) Practice																								
<b>C-5 Measurement of Physical Properties</b>																								
1) Measurement & examination																								
2) Practice																								

Note : \_\_\_\_\_ Original, \_\_\_\_\_ Implementation

\*E Short term expert on Gas chromatograph

*M. C. K.*

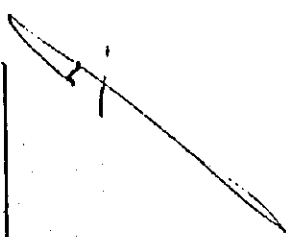
## ANNEX 14 Progress of Technology Transfer

Technical Fields	No. Item of the Equipment	Model	Technical Transfer		Manual		Remarks
			Theory	Op. & Maint.	Spanish	English	
A Mine Safety	A-1 Gas measurement unit & alarm	1	CO gas measurement unit	●	●	●	
		2	Inflamable gas measurement unit	●	●	●	
		3	Gas detector tube	●	●	●	
		4	Portable digital gas detector	●	●	●	
		5	Hot wire type anemometer	●	●	●	
		6	Windmill type anemometer	●	●	●	
		7	Barometer	●	●	●	
		8	Smoke tube	●	●	●	
		9	Digital hygrometer	●	●	●	
		10	Self-rescue unit	○	○ '98.7	○	
A-3 Relief aid equipment			Gaslec, CM-2B	●	●	●	
			NewCosmo, XP-317	●	●	●	
			Gaslec, NO-800	●	●	●	
			NewCosmo, XP-302-II	●	●	●	
			Sanko, DP-708	●	●	●	
			Ando, No.27	●	●	●	
			Isuzu, No.3-1050-01	●	●	●	
			Gaslec, No.500	●	●	●	
			Sato, SK-801RH	●	●	●	
			Shigematsu, MINI-2LRM-102	○	○ '98.7	○	
A-4 Protectors			Koken, HV-111	○	○ '98.7	○	
			Shigematsu, L2-815	○	○ '98.8	○	
			Shigematsu, MARK10	○	○ '98.9	○	
			SC-1N	-	-	-	
			110N/PEI-AF	-	-	-	
			102TR	-	-	-	
			SNH-24	-	-	-	
			NorthernLight, YL2000	●	●	●	
			NorthernLight, YL-512D-05	●	●	●	
			Yanmar, YDG300S-5E	●	●	●	
A-5 Physical measurement unit			Kyowa, SMD-20A/BE-20KE	●	●	●	
			Kyoto, YW-350A	●	●	●	
			Yamamoto, YS-77LDV	○	○ '98.6	○	
			Yamamoto, YS-77LD	○	○ '98.6	○	
			Atlas, BBD-46 WS6	○	○ '98.6	○	
			Air hose etc.	-	-	-	
			Chisel bit	-	-	-	
			Atlas, TEROC64	○	○ '98.6	○	
			Mitsubishi, B. C.	●	●	●	
			Mitsubishi, S. C. B-20	●	●	●	
A-6 Equipment for mining operation			Mitsubishi, DX-100A	●	●	●	
			Nichiyu, R-3-200	●	●	●	
			Nichiyu, SAFETY-C	●	●	●	
			Nichiyu, NISSAN	●	●	●	
				-	-	-	
				-	-	-	
				-	-	-	
				-	-	-	
				-	-	-	
				-	-	-	
A-7 Measurement unit for working environment			Sibata, L-15P	●	●	●	
			Sibata, P-5H2	●	●	●	
			Rion, NA-24	●	●	●	
			Komatsu, EC75ZS-3	●	●	●	
				-	-	-	
				-	-	-	

ANNEX 14 Progress of Technology Transfer

Technical Fields	No. Item of the Equipment	Model	Technical Transfer		Manual		Remarks	
			Theory	Op. & Maint.	Spanish	English		
B Mine pollution Control B-1 Water measurement quality unit	1	pH meter	●	●	●			
	2	turbidimeter & thermometer	●	●	●			
	3	ion meter	○	○ '98.8	○			
	4	Water quality meter (portable type)	○	○ '98.8	○			
	5	Conductivity meter	●	●	●			
	6	Electromagnetic flow meter	●	●	○ '98.9			
	7	Electromagnetic flow meter	●	●	●			
	8	Digital stop watch	●	●	●			
	9	Thermometer	●	●	●			
	10	Thermometer	○	○ '98.7	○ '98.9			
	11	Transparency meter	○	○ '98.8	○ '98.9			
	12	Cyanide measurement unit	○	○	○			
	B-2 Noise measurement unit	13	Noise meter	●	●	●		
		14	Vibration meter	○	○ '98.8	○		
		15	High volume sampler	○	○ '98.7	○		
		16	Low volume sampler	○	○ '98.6	○ '98.11		
		17	Desiccator	●	●	●		
		18	Flow-meter	○	○ '98.9	○ '98.11		
		19	Digital dust meter	○	○ '98.6	○ '98.10		
B-3 Vibration measurement unit	20	Dust jar	○	○ '98.7	○ '98.10			
	21	Electronic balance	○	○ '98.10	○			

Note ○ not yet completed (Scheduled period)  
 ● completed  
 △ under progress, less than 75%  
 ▲ under progress, more than 75%  
 - not available / not necessary



ANNEX 14 Progress of Technology Transfer

Technical Fields	No. Item of the Equipment	Model	Technical Transfer		Manual		Remarks
			Theory	Op. & Maint.	Spanish	English	
C Chemical Analysis Unit C-T Equipment for chemical analysis  Remarks; Instructor <input type="checkbox"/> Mr. Hoka <input checked="" type="checkbox"/> Mr. Ando CCh Chilean Counterpart E Short term Expert	1	Atomic absorption spectrometer		▲ '98.6-12			● <input type="checkbox"/> CCh
	2	Spectrophotometer		○ '98.6-12			● <input type="checkbox"/>
	3	Gas chromatograph		△ '98.6-12			● <input type="checkbox"/>
	4	pH meter		△ '98.6-12			● <input type="checkbox"/> CCh
	5	Ion meter		▲ '98.6			● <input type="checkbox"/> CCh
	6	Electro-conductivity meter		▲ '98.6-12			● <input type="checkbox"/> CCh
	7	Deminerlizer		●			● <input type="checkbox"/> CCh
	8	Water Still		●			● <input type="checkbox"/>
	9	Deminerlizer for soft water		●			● <input type="checkbox"/>
	10	Thermostat dryer		●			● <input type="checkbox"/>
	11	Vibrating mill		▲ '98.6			● <input type="checkbox"/> CCh
	12	Muffle furnace		▲ '98.6			● <input type="checkbox"/>
	13	Vacuum pump		●			● <input type="checkbox"/>
	14	Centrifuge		●			● <input type="checkbox"/>
	15	Shaker for separating funnel		●			● <input type="checkbox"/>
	16	Draft chamber		●			● <input type="checkbox"/>
	17	Gas scrubber		●			● <input type="checkbox"/> E
	18	Drainage treatment unit		●			● <input type="checkbox"/>
	19	Refrigerator		●			● <input type="checkbox"/> CCh
	20	Electric balance		▲ '98.6			● <input type="checkbox"/> CCh
	21	Magnetic stirrer		▲ '98.6			● <input type="checkbox"/>
	22	Automatic mortar		●			● <input type="checkbox"/>
	23	Sieve shaker		●			● <input type="checkbox"/> CCh
	24	Sample splitter		●			● <input type="checkbox"/>
	25	Sieve		-			-
	26	Voltage stabilizer		-			-
	27	Consumables for chemical analysis		-			-
	28	Reagents for chemical analysis		-			-
	29	Hot plate		●			● <input type="checkbox"/> CCh
30	Microscope		●			● <input type="checkbox"/> CCh	
31	Hydrogen Cyanide distiller		○	○ '98.8-9		● <input type="checkbox"/> CCh	



**Seminars Organized by Training Center or with Training Center Participatio.**

**Year : 1994**

**Date : November 21-24, 1994**

**Matter : "Mining Security and Environmental Training Center"**

**Seminar about Optimization of Operation and Management in**

**Planta:**

**Site : Hidalgo de Parral, Mexico**

**Number of Participant : 120**

**Year : 1995**

**Date : May 21-25, 1995**

**Matter : "Risk and Environmental Care"**

**Site : Copiapó**

**Number of Participants : 100**

**Date : November 14-15, 1995**

**Matter : "Environmental Matters in Small Mining"**  
**Seminar Mining and Environment**

**Site : Chañaral**

**Number of Participants : 60**

**Year : 1996**

**Date : June 26-27, 1996**

**Matter : Environmental Matters in Mining**

**Site : Copiapó**

**Number of Participants : 100**

Date : August 28-30, 1996  
 Matter : "Introduction to Environmental Concept  
 First Journey National Paritary of Health and Security Comit e  
 Site : Copiap o  
 Number of Participants : 200

Date : September 23 to october 11, 1996  
 Matter : "First Interamerican Course on Mining Security and Environment",  
 International Seminar  
 Site : Copiap o  
 Number of Participant : 25

Date : November 6-8, 1996  
 Matter : "Environment, Concept and Responsabilities"  
 "III National Convention of Risk Prevention Experts"  
 Site : Antofagasta  
 Number of Participants : 120

Date : November 20-22, 1996  
 Matter : "Mining and Environment"  
 Site : Algarrobo Mine, Vallenar  
 Number of Participant : 160

Year : 1997

Date : June 19-20, 1997  
 Matter : "Introduction of Environment Theme in Contratist Companies"  
 I Regional Meeting of Mining Enterprises and Contrations  
 Site : Copiap o  
 Number of Participants : 100

Date : June 25-26, 1997  
 Matter : "Environment: Applied Technology for left Mining Site"  
 Site : Copiap o  
 Number of Participants : 110

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Date : July 1th, 1997  
Matter : "Introduction to Environment"  
Site : Antofagasta  
Number of Participants : 120

Date : July 10-11, 1997  
Matter : "Studies and Declaration of Environmental  
Impact: Plans, Responsibility and Control"  
Seminar about "Applied Environmental Law to Mining",  
CORESEMIN, IV Región  
Site : La Serena  
Number of Participants : 80

Date : November 17-21, 1997  
Matter : "Risk and Environment Management"  
International Seminar  
Site : Copiapó  
Number of Participants : 20

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ANNEX 16 List of Field Surveys Conducted in the Project

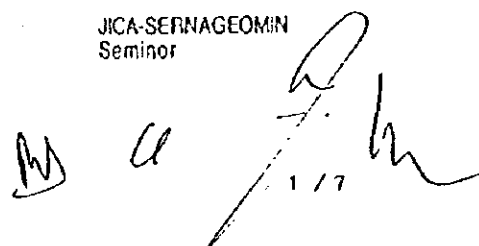
Date	Mine, Facility	Region	Surveyers
1996/10/1	Planta Salado	III	Hoka, Yamaguchi, Harada, Saito
1996/10/2	CMP Mina Argarobo	III	Hoka, Yamaguchi, Harada, Saito
1996/10/2	CMP Pellet Plant	III	Hoka, Yamaguchi, Harada, Saito
1996/10/3	Mina La Candelaria	III	Hoka, Yamaguchi, Harada, Saito
1997/1/21	Mina La Candelaria	III	Hoka, Yamaguchi, Harada, Nibaldo, Eduardo
1997/3/5	Mina Mantos de Cobre	III	Harada, Jurio, Nibaldo
1997/3/12	Mina San Marcos	III	Harada, Jurio, Nibaldo
1997/4/1	Area Inca de Oro	III	Yamaguchi, Edarudo
1997/4/2	Area Inca de Oro	III	Yamaguchi, Edarudo
1997/4/3	Area Inca de Oro	III	Yamaguchi, Edarudo
1997/4/4	Area Inca de Oro	III	Yamaguchi, Edarudo
1997/4/5	Area Inca de Oro	III	Yamaguchi, Edarudo
1997/4/6	Area Inca de Oro	III	Yamaguchi, Edarudo
1997/4/7	Area Inca de Oro	III	Yamaguchi, Edarudo
1997/4/8	Area Inca de Oro	III	Yamaguchi, Edarudo
1997/4/9	Area Inca de Oro	III	Yamaguchi, Harada, Edarudo, Guido
1997/4/16	Planta Union	III	Yamaguchi, Harada, Edarudo, Guido
1997/4/17	Planta Union	III	Yamaguchi, Edarudo
1997/5/12	Area Cerro Negro	III	Yamaguchi, Edarudo
1997/5/13	Area Cerro Negro	III	Yamaguchi, Edarudo
1997/6/5	Planta Dai	III	Yamaguchi, Harada, Jorge, Edarudo
1997/6/27	Mina La Candelaria	III	Hoka, Yamaguchi, Harada, Eduardo
1997/6/28	Area Jesus Maria	III	Yamaguchi, Edarudo
1997/7/2	CIMM	Santiago	Hoka, Ando
1997/7/2	Laboratorios, SNGM	Santiago	Hoka, Ando
1997/7/3	CENMA	c	Hoka, Ando
1997/7/17	Mina La Candelaria	III	Hoka, Ando
1997/7/9	Mina Escondida	II	Hoka, Yamaguchi, Harada
1997/7/10	Planta Cosoro, Escondida	II	Hoka, Yamaguchi, Harada
1997/7/11	Mina Chuquicamata	II	Hoka, Yamaguchi, Harada
1997/11/17	Mina Manto Verde	III	Yamaguchi, Harada, Carlos, Eduardo, Vinka, Guido
1998/3/25	CENMA	Santiago	Fujita, Yamaguchi, Harada, Ando, Saito
1998/5/18	Planta Salado, ENAMI	III	Fujita, Yamaguchi, Harada, Ando

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ANNEX 17 LIST OF TEXTBOOKS FOR TRAINING COURSES

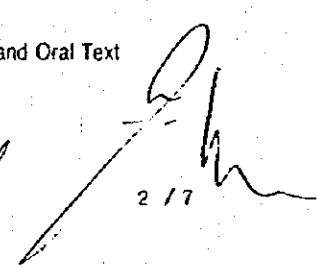
<u>Area</u>	<u>Title / Subtitle</u>	<u>Remarks</u>
Mine Safety	Control de Ambiente Minero	Formation of Expert
Mine Safety	Estadística de Accidentes	Formation of Expert
Mine Safety	Medio Ambiente(Módulo 4) Problemas Ambientales Asociados a la Minería	Formation of Expert
Mine Safety	Primeros Auxilios	Formation of Expert
Mine Safety	Riesgos en Minería a Rajo Abierto	Formation of Expert in Mine Safety - 1995
Mine Safety	Control de Riesgos en la Gestión de Empresas (EI)	I Inter-American Seminar on Integrated Control of Risk in Mine Operation
Medio Ambiente	Sumarios de la Política y las Leyes Relacionadas con el Medio Ambiente en Caso del Japón (Los)	JICA-SERNAGEOMIN Seminar
Mine Pollution Control	Ejemplos de Medidas Tomadas para Evitar la Contaminación por Minas Cerrada (Los)	JICA-SERNAGEOMIN Seminar
Mine Pollution Control	Experiencia de Planes abandono en Faenas Mineras de Japón	JICA-SERNAGEOMIN Seminar
Mine Pollution Control	Gestión Ambiental en las Empresas Mineras Practicas de Plan de Abandono	JICA-SERNAGEOMIN Seminar
Mine Pollution Control	Introducción a Los Sistemas de Gestión Ambiental	JICA-SERNAGEOMIN Seminar
Mine Pollution Control	Marco Legal Actual en Chile, Política Ministerial Referente a Planes de Abandono	JICA-SERNAGEOMIN Seminar
Mine Pollution Control	Premisos Ambientales y Planes de Abandono	JICA-SERNAGEOMIN Seminar

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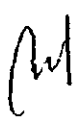

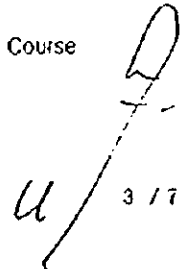
ANNEX 17 LIST OF TEXTBOOKS FOR TRAINING COURSES

<u>Area</u>	<u>Title / Subtitle</u>	<u>Remarks</u>
Mine Pollution Control	Técnicas de Construcción para el Cierre Abandono de Faenas Mineras	JICA-SERNAGEOMIN Seminar
Mine Safety	Entrenamiento para Prevención de Riesgos	JICA-SERNAGEOMIN Seminar
Listo de equipment	Desarrollo de Manuales Donación Japonesa	List of equipment
Mine Pollution Control	Antecedentes Historicos del Control Ambiental en Japón Sector Minero no-ferroso	Seminar
Mine Safety	Control de Seguridad Minera en Japón	Seminar
Mine Safety	Entrenamiento para Prevención de Accidentes en Minas (KYT)	Slide and Oral Text
Mine Safety	Equipo de Seguridad de la Mina para La Protección de su Vida	Slide and Oral Text
Mine Safety	Forma Correcta de Usar la Mascara para Polvo	Slide and Oral Text
Mine Safety	Los días que vivió en la Mina - Para la Seguridad de la Demolición Eléctrica	Slide and Oral Text
Mine Safety	Mantener la Seguridad para el Mañana -Conservación y el control de los cables metálicos (La)-	Slide and Oral Text
Mine Safety	Nosotros Mismos Vamos a Protegernos de los Accidentes -Seguridad para el trabajo solitario-	Slide and Oral Text
Mine Safety	Prevención de Accidentes Causados por Desprendimientos -Mina a Cielo Abierto-	Slide and Oral Text
Mine Safety	Procedimientos para Usar Explosivos en Minas de Carbón	Slide and Oral Text

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ANNEX 17 LIST OF TEXTBOOKS FOR TRAINING COURSES

<u>Area</u>	<u>Title / Subtitle</u>	<u>Remarks</u>
Mine Safety	Responsable eres Tú (El) -Prevención contra Accidentes de Maquinarias de Rodaje para	Slide and Oral Text
Mine Safety	Vamos a prevenir Accidentes Causados por la Electricidad Estática	Slide and Oral Text
Mine Pollution Control	Curso Básico de Evaluación Ambiental para Trabajadores Mineros Sector Pequeña Minería Localidade de Inca de Oro	SNGMPRAPEM
Mine Pollution Control	Curso Básico de Evaluación Ambiental para Trabajadores Mineros Sector Pequeña Minería Sierra Ojancos Viejo, Mina Union, Comuna de Copiapó	SNGMPRAPEM
General, Región Atacama	Diagnosticos Minas - Region de Atacama	Study
Administración	Gestión Integral de Empresas	Training Course
Analysis	Mejoramiento de la Calidad en la Preparación de Muestras de Minerales	Training Course
Analysis	Muestreo, Analisis de Aguas y de Residuos Líquidos Industriales y Uso de Equipos de Medición	Training Course
Mine Pollution Control	Curso Educación Ambiental básica para Trabajadores Mineros	Training Course
Mine Pollution Control	Educación Ambiental básica para Trabajadores Mineros	Training Course
Mine Pollution Control	Evaluación de Impacto Ambiental	Training Course
Mine Pollution Control	Instrumentos de Política Ambiental Macro Legal	Training Course
Mine Pollution Control	Introducción a Los Sistemas de Gestión Ambiental	Training Course




  
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ANNEX 17 LIST OF TEXTBOOKS FOR TRAINING COURSES

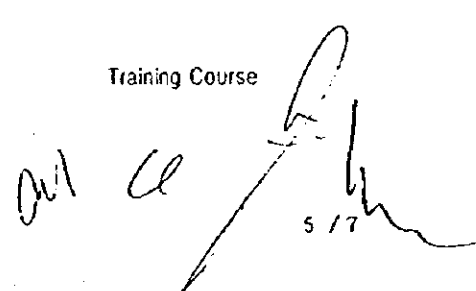
<u>Area</u>	<u>Title / Subtitle</u>	<u>Remarks</u>
Mine Pollution Control	Law of the General Bases for the Environment (English Text)	Training Course
Mine Pollution Control	Ley de Bases del Medio Ambiente y la Minería (La)	Training Course
Mine Pollution Control	Ley de Bases Generales del Medio Ambiente y la Minería Marco Conceptual y Conceptos Básicos (La)	Training Course
Mine Pollution Control	Ley del Medio Ambiente y la Minería	Training Course
Mine Pollution Control	Manejo de Basura y Residuos	Training Course
Mine Pollution Control	Metodología para Realizar Prevención de Contaminación	Training Course
Mine Pollution Control	Normativa Ambiental Basica para la Actividad Minera	Training Course
Mine Pollution Control	Permisos Ambientales y Planes de Abandono	Training Course
Mine Pollution Control	Problemas Ambientales asociados a la Minería y Posibilidades de Solución	Training Course
Mine Pollution Control	Riesgos del Mercurio en Procesos de Amalgamación	Training Course
Mine Pollution Control	Sistema de Gestión Ambiental según las nuevas NORMAS ISO 14000	Training Course
Mine Pollution Control	Sistemas de Gestión Ambiental, según las normas ISO 14000	Training Course
Mine Pollution Control	Gestión de Riesgos y Medio Ambiente	Training Course

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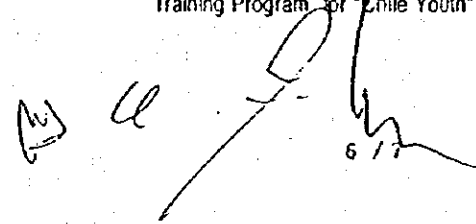
ANNEX 17 LIST OF TEXTBOOKS FOR TRAINING COURSES

<u>Area</u>	<u>Title / Subtitle</u>	<u>Remarks</u>
Mine Safety	Administración Básica de Empresas Mineras	Training Course
Mine Safety	Beneficio de Minerales	Training Course
Mine Safety	Control de Riesgos para el Trabajador Líder, Volumen 1	Training Course
Mine Safety	Control de Riesgos para el Trabajador Líder, Volumen 2	Training Course
Mine Safety	Equipos Mineros	Training Course
Mine Safety	Fundamentos de Higiene Industrial y Caracterización del Riesgo Ambiental Minero	Training Course
Mine Safety	Instructivo sobre la Investigación de Accidentes	Training Course
Mine Safety	Introducción al Reglamento de Seguridad Minera, DS 72, y La Ley de bases del Medio Ambiente y la Minería Introducción al Reglamento de Seguridad Minera, DS 72	Training Course
Mine Safety	Introducción al Reglamento de Seguridad Minera, DS 72, y La Ley de bases del Medio Ambiente y la Minería Ley de Bases del Medio Ambiente y la Minería(La)	Training Course
Mine Safety	Prevención de Riesgos en el Uso de Explosivos	Training Course
Mine Safety	Prevención de Riesgos por Caída de Distinto Nivel	Training Course
Mine Safety	Prevención de Riesgos por Caída de Rocas	Training Course
Mine Safety	Prevención de Riesgos por Movimiento de Rocas	Training Course


  
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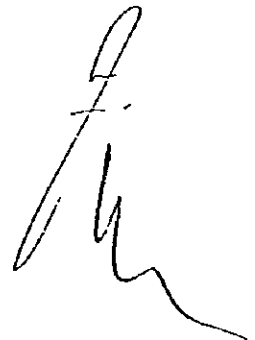
ANNEX 17 LIST OF TEXTBOOKS FOR TRAINING COURSES

<u>Area</u>	<u>Title / Subtitle</u>	<u>Remarks</u>
Mine Safety	Reglamento de Seguridad Minera, Decreto Supremo No.72 Explotación Minería a Tajo Abierto	Training Course
Mine Safety	Reglamento de Seguridad Minera, Decreto Supremo No.72	Training Course
Mine Safety	Riesgos Generales a la Explotación de Minas	Training Course
Mine Safety	Seguridad Minera para el Trabajador Líder	Training Course
Mine Safety	Sistema de Explotación de Minas	Training Course
Production Technology	Curso de Inducción Cia. Minera Cerro Colorado	Training Course
Production Technology	Generalidades sobre la Explotación de Minas	Training Course
Mine Safety	Mantenimiento Eléctrico de Plantas Mineras, Volumen 2 -Electricidad Básica Primera Parte: Nivelación Matemática	Training Program for "Chile Youth"
Mine Safety	Mantenimiento Eléctrico de Plantas Mineras, Volumen 2 -Beneficio de Minerales	Training Program for "Chile Youth"
Mine Safety	Mantenimiento Eléctrico de Plantas Mineras, Volumen 2 -Capacitación en Instrumentos de Medidas Eléctricas	Training Program for "Chile Youth"
Mine Safety	Mantenimiento Eléctrico de Plantas Mineras, Volumen 1 -Capacitación en Interpretación de Planos e Introducción a PLC	Training Program for "Chile Youth"
Mine Safety	Mantenimiento Eléctrico de Plantas Mineras, Volumen 1 -Capacitación en Ley de Ohms Potencia, Leyes de Kirchhoff	Training Program for "Chile Youth"
Mine Safety	Mantenimiento Eléctrico de Plantas Mineras, Volumen 2 -Conceptos Básicos	Training Program for "Chile Youth"


  
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ANNEX 17 LIST OF TEXTBOOKS FOR TRAINING COURSES

<u>Area</u>	<u>Title / Subtitle</u>	<u>Remarks</u>
Mine Safety	Mantencción Electrica de Plantas Mineras, Volumen 2 -Electricidad Basica	Training Program for "Chile Youth"
Mine Safety	Mantencción Electrica de Plantas Mineras, Volumen 2 -Instalaciones de Alumbrado Circuitos Electricos	Training Program for "Chile Youth"
Mine Safety	Mantencción Electrica de Plantas Mineras, Volumen 1 -Motores Electricos	Training Program for "Chile Youth"
Mine Safety	Mantencción Electrica de Plantas Mineras, Volumen 2 -Seguridad Basica Minera	Training Program for "Chile Youth"
Mine Safety	Métod del ANSI para Registrar y Medir la Experiencia en Lesiones de Trabajo	Workshop on Formulation of Monthly Statistics of Accident

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**SUMMARY ACTIVITY OF TRAINING YEAR 1996**

TOTAL COURSES	:	15
TOTAL SEMINARS	:	02
TOTAL LECTURES	:	05
TOTAL ACTIVITIES OF TRAINING	:	22
TOTAL HOURS OF TRAINING	:	916
TOTAL BENEFICIARY	:	862

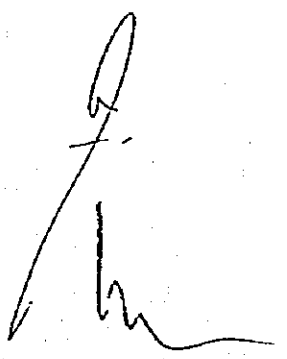
**RELATION ACTIVITIES OF TRAINING/EDUCATIONAL LEVEL**

- PROFESSIONALS	:	10
- WORKERS OF BIG AND MEDIUM MINING	:	10
- WORKERS OF SMALL AND ARTIFICIER MINING	:	02

**TOTAL BENEFICIARY ACTIVITY OF TRAINING 1996**

LEVEL	BENEFICIARY	HOURS	HOURS PENDENT 1997
PROFESSIONALS :	428	524	
WORKERS OF BIG AND MEDIUM MINING :	364	220	18
WORKERS OF SMALL AND ARTIFICIER MINING :	70	172	300
TOTAL :	862	916	318

*M. C. F.*



**SUMARY OF OPERATION OF TRAINING COURSES AT  
THE CENTER 1996**

NAME OF COURSE	Date/Month Duration (Hours)	-Enterprises - Region - N° Participants	Name of Instructor	Place of Realization
BASIC ENVIRONMENT LAW	13-14/03 8	- GOVERNMENT OFFICIALS OF CHILE - III - 20	Andrés Gómez-Lobo	TRAINING CENTER
INTRODUCTION TO RULER AND REGULATIONS OF SAFETY I.E. MINING D.S. 72 AND BASIC ENVIRONMENT LAW	18-20/04 20	- SUPERVISORS OF ENAMI AND OTHERS COMPANIES - III - 30	Nibaldo González N. Julio Morales Andrés Gómez-Lobo Dantel Alcayaga	TRAINING CENTER
CREATING OF MONITORS FOR MINING SAFETY	07-10/05 40	- WORKERS OF MINING COMPANIES AND INDIVIDUALS - III - 30	Nibaldo González N. Julio Morales Andrés Gómez-Lobo Vinka María Rakela	TRAINING CENTER
BASIC ENVIRONMENT LAW AND MINING	30-31/05 12	- MINING COMPANIES AND INDIVIDUALS - III - 30	Andrés Gómez-Lobo	TRAINING CENTER
PREVENTION OF RISK FOR MOVEMENT OF ROCKS	30-31/07 12	- WORKERS OF MINING - III - 30	Nibaldo González N.	TRAINING CENTER
SEMINAR: ENVIRONMENTAL TOPIC IN MINING	26/06 8	- MANAGERS AND SUPERVISORS - NATION-WIDE - 100	Andrés Gómez-Lobo	HOSTEL (INN) LASPIRCAS
SEMINAR: TECHNOLOGY OF DISPOSITIONS FOR ABANDONED MINE	27/06 8	- SUPERVISORS - NATION-WIDE - 70	Andrés Gómez-Lobo	HOSTEL (INN) LASPIRCAS
CREATING OF MONITORS FOR MINING SAFETY	05-09/08 19-23/08 40	- WORKERS OF MINING COMPANIES - I - 50	Nibaldo González N.	QUIQUE (*)
CREATING OF MONITORS FOR MINING SAFETY	30/09 - 04/10 40	- WORKERS OF EL SALVADOR, CODELCO - III - 29	Nibaldo González N. Julio Morales	EL SALVADOR
CREATING OF EXPERTS FOR PREVENTION OF RISK IN MINING INDUSTRY	14/10 - 29/11 300	- PROFESSIONALS OF MINING - III - 33	Nibaldo González N. Julio Morales Andrés Gómez-Lobo	TRAINING CENTER
INTERNATIONAL COURSE IN MINING SAFETY AND ENVIRONMENT	23/09 - 11/10 144	- PROFESSIONALS FROM OVERSEAS COUNTRIES AND CHILE - III - 60	Nibaldo González N. Julio Morales Andrés Gómez-Lobo	TRAINING CENTER
PREPARATION OF SAMPLES FOR CHEMICALS ANALYSIS	12-13/12 16	- LABORATORY PERSONNEL OF MINING COMPANIES - III - 10	Vinka María Rakela Gudi Montuschi M.	LABORATORY OF TRAINING CENTER

(\*) REALIZED TWO COURSE FOR 25 PEOPLE EACH COURSE.

## SUMMARY OF SPECIAL LECTURE AND COURSE AT THE CENTER 1996

TITLE OF LECTURE	Date/Month Duration (Hours)	-Enterprises -Region -N° Participants	Name of instructor	Place of Realization
LEGAL EXPLANATION OF ENVIRONMENT IN MINING	27/11 4	- MANAGERS AND SUPERVISORS - III - 40	Nibaldo González N. Julio Morales	EL SALVADOR
INTRODUCTION TO ENVIRONMENT	25/11 4	- STUDENTS OF UNIVERSITY OF ATACAMA - III - 20	Andrés Gómez-Lobo	UNIVERSITY OF ATACAMA
ENVIRONMENTAL LEGISLATION FOR MINING	06/12 4	- STUDENTS OF UNIVERSITY OF ATACAMA - III - 20	Andrés Gómez-Lobo	UNIVERSITY OF ATACAMA
HUMAN CONFIDENCE AND ERRONEOUS BEHAVIOUR	25/07 4	- MANAGERS AND SUPERVISORS - III - 35		TRAINING CENTER
PREPARATION OF INSTRUCTOR'S GUIDE	18-20/12 20	- INSTRUCTORS OF EL SALVADOR, CODELCO - III - 5	Nibaldo González N.	EL SALVADOR

## SUMMARY OF SPECIAL PROGRAM FOR SMALL SCALE MINES AND ARTIFICER AT THE CENTER 1996

TITLE OF LECTURE	Date/Month Duration (Hours)	-Enterprises -Region -N° Participants	Name of instructor	Place of Realization
BASIC MINING SAFETY AND ENVIRONMENT	20-21/11 16	- WORKERS OF PACIFIC MINING COMPANY - III - 180	Andrés Gómez Lobo	VALLENAR
BASIC MANAGEMENT FOR MINES	02-07/12 36	- WORKERS OF THE SMALL AND MEDIUM MINING SECTOR - III - 20	Nibaldo González N. Julio Morales	CERRO NEGRO AND CHAÑARAL
ELECTRICAL MAINTENANCE OF MINING PLANTS	4-31/12 120 (to 30/11/97)	- ARTIFICER OF MINING - III - 20	Nibaldo González N. Julio Morales Eduardo Vega	CHAÑARAL EL SALVADOR AND TRAINING CENTER
APPLICATION OF ENVIRONMENTAL LEGISLATION FOR MINING	18-20/11 16	- WORKERS OF THE SMALL AND MEDIUM MINING SECTOR - III - 30	Andrés Gómez-Lobo	IOUIQUE

**SUMMARY ACTIVITY OF TRAINING YEAR 1997**

TOTAL COURSES	:	41
TOTAL SEMINARS	:	03
TOTAL ACTIVITIES OF TRAINING	:	44
TOTAL HOURS OF TRAINING	:	2897
TOTAL BENEFICIARY	:	1200

**RELATION ACTIVITIES OF TRAINING/EDUCATIONAL LEVEL**

- PROFESSIONALS	:	22
- WORKERS OF BIG AND MEDIUM MINING	:	14
- WORKERS OF SMALL AND ARTIFICIER MINING	:	08

**TOTAL BENEFICIARY ACTIVITY OF TRAINING 1997**

LEVEL		BENEFICIARY	HOURS
PROFESSIONALS	:	690	692
WORKERS OF BIG AND MEDIUM MINING	:	335	173
WORKERS OF SMALL AND ARTIFICIER MINING	:	175	2032
<b>TOTAL</b>	:	<b>1200</b>	<b>2897</b>

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SERVICIO NACIONAL DE GEOLOGIA Y MINERIA  
SERNAMEGOMIN - JICA

## SUMMARY OF OPERATION OF TRAINING COURSES AT THE CENTER 1997

NAME OF COURSE	N° COURSE HOURS BY COURSE	PARTICIPANTS		ENTERPRISE	NAME OF INSTRUCTOR	OATE
		SUPERVISORS	TOTAL			
ENVIRONMENTAL LAW AND MINING	10 16	SUPERVISORS 200		CANDELARIA	ENVIRONMENTAL AREA - ANDRES GOMEZ LOBO R. - EDUARDO VEGA DONOSO.	09, 16/06 18, 25/07 29/08, 05/09 24/10, 31/10 21/11, 28/11 06, 13/06 01, 8/06 26/09, 03/10 04/11, 09/11 05/12, 12/12
ENVIRONMENTAL MANAGEMENT SYSTEM - LAW ISO 14000	5 16	SUPERVISORS 100		CHUQUICAMATA (3) MANTOS BLANCOS (2)	ENVIRONMENTAL AREA - ANDRES GOMEZ LOBO R. - LEONEL CATALDO MUNOZ	16, 17/06 17, 18/06 09, 10/12 10, 11/06 20, 21/10
ENVIRONMENTAL MANAGEMENT SYSTEM - LAW ISO 14000 WORKSHOP	9 3	SUPERVISORS AND WORKERS MINING OF CIA, MANTOS VERDES (CHANARRAL)	210	MANTOS VERDES (8)	ENVIRONMENTAL AREA - ANDRES GOMEZ LOBO R. - LEONEL CATALDO M.	04 - 08/08 13/12 29/07 14/12
ENVIRONMENTAL LAW AND MINING	1 16	SUPERVISORS	20	ENAMI IV REGION	ENVIRONMENTAL AREA - ANDRES GOMEZ LOBO R.	27, 28/11
ENVIRONMENTAL AND RISK INTERNATIONAL COURSE	1 30	PROFESSIONALS OF PERU, ARGENTINA BOLIVIA, CHILE	10	MINING MINISTRY	ENVIRONMENTAL AREA - ANDRES GOMEZ LOBO R. - MINING SAFETY - NIBALDO GONZALES	17, 21/11
CREATING OF MONITORS FOR MINING SAFETY	2 30	WORKERS MINING	60	CODELCO CHILE - ANQUINA	MINING SAFETY - NIBALDO GONZALES - JULIO MORALES B.	05 - 09/05 12 - 16/05
MINING SAFETY FOR LEADER WORKER	2 30	WORKERS MINING	60	HOMESTAKE	MINING SAFETY - NIBALDO GONZALES N. - DICK SAA P.	11 - 13/08 06 - 08/09
ELECTRICAL MAINTENANCE IN MINING PLANTS	1 420 (YEAR 97 300)	YOUNG MAN OF MINING FAMILY	20	EL SALVADOR	MINING SAFETY - NIBALDO GONZALES - JULIO MORALES B. - EXTERNAL SPEAKERS	02/12/96 - 28/1/97



Summary of Operation of Training Courses

COURSES	N° Nº COURSE HOURS BY COURSE	PARTICIPANTS		ENTERPRISES	NAME OF INSTRUCTOR	DATE
		TOTAL				
GUIDE TEACHER FORMATION	1 - 8	WORKERS MINING	5	CODELCO ELSALVADOR	MINING SAFETY - NIBALDO GONZALES	10. 11/07
BASIC MANAGEMENT IN SMALL MINING ENTERPRISE	1 - 36	WORKERS OF SMALL MINING	20	SENCE	MINING SAFETY - NIBALDO GONZALES	05/04 26, 27/04 19.20/04 04.05/05
BASIC LAW ENVIRONMENTAL FOR SMALL MINING ENTERPRISE	3 - 16	WORKERS OF ARTIFICER MINING	80	PRAPEM	MINING SAFETY - EDUARDO VEGA O. MINING SAFETY LABORATORIO MOVIL - GUIDO MONTUSCHI - YINKA RAKELA	03. 04/07 10/10 03/10
RISK ON MERCURY DURING AMALGAMATION PROCESS	1 - 16	WORKERS OF ARTIFICER MINING	10	PRAPEM	MEDIO AMBIENTE - EDUARDO VEGA O. ANALISIS QUIMICO LABORATORIO MOVIL - GUIDO MONTUSCHI - YINKA RAKELA	03 - 05/06
WAST HANDLING	1 - 16	WORKERS OF ARTIFICER MINING	25	PRAPEM	MEDIO AMBIENTE - EDUARDO VEGA O. ANALISIS QUIMICO LABORATORIO MOVIL - GUIDO MONTUSCHI - YINKA RAKELA	12. 13/05
SEMINAR ENVIRONMENTAL LAW AND MINING	1 - 16	SUPERVISORS	100	CORSEMIN IV REGION	ENVIRONMENTAL ARE - ANDRES GOMEZ-LOBO R.	10. 11/07
SEMINAR TECHNOLOGY FOR ABANDONED MINE	1 - 16	SUPERVISORS	100	ALL THE COUNTRY	ENVIRONMENTAL ARE - SILVIA DEFRANCHI C. - ANDRES GOMEZ-LOBO R. EXETRNAL SPEAKERS	25. 26/06
SEMINAR INTRODUCTION ENVIRONMENTAL LAW AND MINING	1 - 4	SUPERVISORS	100	ENAEX	ENVIRONMENTAL ARE - ANDRES GOMEZ-LOBO R.	30/06 - 01/07

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COURSES	N° COURSE HOURS BY COURSE	PARTICIPANTS		ENTERPRISES	NAME OF INSTRUCTOR	DATE
		TOTAL				
INTEGRAL MANAGEMENT OF ENTERPRISES	1 30	SMALL ENTERPRISES MINING 20		SENCE	MINING SAFETY - CARLOS FLORES LICUIME	27/11 28/11 30/11 08/12 22/11 29/11 05/12
ENVIRONMENTAL AUDITORS	1 40	PROFESSIONALS 20		II, III, IV REGION AND SANTIAGO	AMBAR S.A.	15 - 19/12
ENVIRONMENTAL MANAGEMENT CERTIFICATE IN MINING	1 320	PROFESSIONALS 40		II, III Y IV REGION A	• 7 EXTERNAL SPEAKERS - ANDRES GOMEZ LOBO R.	02/08/96 - 28/06/97

## SUMMARY OF TRAINING COURSES IN 1998

## ACTIVITIES PERFORMED AND IN EXECUTION JANUARY - JUNE YEAR 1998

COURSE	SPEAKERS AREA	MONTH	ENTERPRISES PARTICIPANTS	N° PARTICIPANTS BY COURSE	HOURS BY COURSE	N° COURSE	TOTAL PARTICIPANTS
ENVIRONMENTAL LAW AND MINING	ANDRES GOMEZ-LOBO ENVIRONMENTAL AREA	JANUARY	CANDELARIA SUPERVISORS	15	08	1	15
PERMANENT DEVELOPMENT INDEX	EXTERNAL SPEAKERS AND ANDRES GOMEZ-LOBO ENVIRONMENTAL AREA	JANUARY	ENTERPRISES AND GUBERNAMENTAL SERVICES III REGION	20	16	1	20
ENVIRONMENTAL TOPIC IN THE MINING	ANDRES GOMEZ-LOBO ENVIRONMENTAL AREA	MARCH	CONTRALORY GRAL. OF THE REPUBLIC SUPERVISORS I, II, III, IV y SANTIAGO	25	16	1	25
BASIC ENVIRONMENT EDUCATION FOR MINING ACTIVITY	EDUARDO VEGA D. ENVIRONMENTAL AREA	MAY	CHANAÑARAL SMALL MINING	20	16	1	20
BASIC ENVIRONMENT EDUCATION FOR MINING ACTIVITY	EDUARDO VEGA D. ENVIRONMENTAL AREA	MAY	INCA DE ORO SMALL MINING	20	16	1	20
WAST HANDLING	EDUARDO VEGA D. ENVIRONMENTAL AREA	JUNE	TIERRA AMARILLA SMALL MINING	20	16	1	20
USE OF MERCURY DURING AMALGAMATION PROCESS	EDUARDO VEGA D. ENVIRONMENTAL AREA	JUNE	TIERRA AMARILLA SMALL MINING	20	16	1	20

COURSE	SPEAKERS AREA	MONTH	ENTERPRISES/PARTICIPANTS	N° PARTICIPANTS BY COURSE	HOURS BY COURSE	N° COURSE	T. O. T. A PARTICIPANTS
ENVIRONMENTAL AUDITORS	EXTERNAL SPEAKERS ENVIRONMENTAL AREA	MAY	EMPRESAS DE I, II, III, IV, VIII REGIONES Y SANTIAGO SUPERVISORES	16	40	1	16
INTEGRAL MANAGEMENT OF ENTERPRISES	CARLOS FLORES L. MINING SAFETY	JANUARY (ACTIVIDAD DE SEGURIMENTO)	SMALL MINING CHAÑARAL	20	40	1	20
INTEGRAL MANAGEMENT OF ENTERPRISES	CARLOS FLORES L. MINING SAFETY	FEBRUARY	SMALL MINING COPIAPO	20	40	1	20
MINING AND ENVIRONMENTAL (ENVIRONMENTAL ANIVERSARY DAY)	ANDRES GOMEZ-LOBO ENVIRONMENTAL AREA	JUNE	OPEN SEMINARS (PROFESSIONALS AND STUDENTS)	100	08	1	100
ENVIRONMENTAL MANAGEMENT CERTIFICATE IN MINING	EXTERNAL SPEAKERS (COORDINATION AND CONTROL OF THE ACTIVITIES)	MAY 98 A MAY 99	ENTERPRISES I Y II REGIONES PROFESSIONALS	22	365	1	22
CREATING OF EXPERTS FOR PREVENTION OF RISK IN MINING INDUSTRY	NIBALDO GONZALEZ N. ANDRES GOMEZ-LOBO EXTERNAL SPEAKERS MINING SAFETY	26 JUNE A 31 JULY	PROFESSIONALS ALL THE COUNTRY	30	350	1	30
CRITICAL RISK INVENTORY	NIBALDO GONZALEZ N. MINING SAFETY	JUNE	CIA. MINERA HUASCO WORKERS	20	16	2	40
CRITICAL RISK INVENTORY	NIBALDO GONZALEZ N. MINING SAFETY	JUNE	CIA. MINERA HUASCO WORKERS	40	08	1	40

COURSE	SPEAKERS AREA	MONTH	ENTERPRISES- PARTICIPANTS	N° PARTICIPANTS BY COURSE	HOURS BY COURSE	N° COURSE	TOTAL PARTICIPANTS
WORK PROCEDURE DEVELOPMENT	NIBALDO GONZALEZ N. MINING SAFETY	JUNE	CIA. MINERA HUASCO WORKERS	20	16	2	40
WORK PROCEDURE DEVELOPMENT	NIBALDO GONZALEZ N. MINING SAFETY	JUNE	CIA. MINERA HUASCO WORKERS	40	08	1	40
TECHNOLOGY IMPLEMENTATION TO SMALL MINING	EDUARDO VEGA D. ENVIRONMENTAL AREA	MAY - JUNE	SMALL MINING	10	15	3	45
TOTAL JANUARY - JUNE 1998							553

**SUMMARY OF OPERATION OF TRAINING COURSES  
BY REGION YEAR 1995-1997**

Region YEAR	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	STGO.	Other country	Nº Hours	Nº Course	total participants by year
	1995		5	20	5											40	1
1996	93	22	619	22	10	10	7	8	9	7	7	5	28	15	916	22	862
1997	4	161	780	120	60	4	6	6	3	4	3	3	40	6	1317	44	1200
Total	97	188	1419	147	70	14	13	14	12	11	10	8	68	21	2273	67	2092

**SUMMARY OF OPERATION OF TRAINING COURSES  
BY REGION FIRST SEMESTER 1998**

Region year	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	STGO.	Other country	Nº Hours	Nº Course	total participants by year
	1 <sup>st</sup> -Semester 1998	4	25	485	8	4	2	3	2	2	1	2	1	10		1072	22

**MINING SECURITY AND ENVIRONMENTAL  
TRAINING CENTER**

**ASSISTANCE ACTIVITIES FOR TRAINING PERFORMED WITH MOBIL  
LABORATORY**

N°	ACTIVIDAD/LUGAR	MES	EMPRESA	PROFESIONAL
1	Quality Improvement in Minerals Samples	Diciembre/96	PROFESIONALES EMPRESAS MINERAS III REGION	Vinka Rakela Guido Montuschi
2	Basic Environmental Regulations for Mining Activities.	Abril/97	MICROEMPRESARIOS MINEROS	Eduardo Vega
3	Waste Handling.	Mayo/97	MICROEMPRESARIOS MINEROS	Eduardo Vega
4	Mercury's Risk in Amalgamation Process.	Junio/97	MICROEMPRESARIOS MINEROS	Eduardo Vega
5	Environmental Variable Inclusion in Mining Projects.	Octubre 03/97	COLEGIO TECNICO MINERO	Eduardo Vega
6	Environmental Variable Inclusion in Mining Projects.	Octubre 13/97	COLEGIO TECNICO MINERO	Eduardo Vega
7	Environmental Variable Inclusion in Mining Projects.	Octubre 14/97	COLEGIO TECNICO MINERO	Eduardo Vega
8	Gubernamental Services Modernization Exhibition.	Marzo/97	EXPOSICION	Guido Montuschi Vinka Rakela
9	International Cooperation Meeting.	Julio/97	EXPOSICION	Guido Montuschi Eduardo Vega
10	First Meeting of Chile-Argentina Border Comitee.	Noviembre/97	EXPOSICION	Eduardo Vega Carlos Flores
11	Technological Innovation Training for Small Mining Sector.	Abril-Julio/98	MICROEMPRESARIO DE PLANTAS MINERAS	Eduardo Vega

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TENTATIVE PROGRAM SECOND SEMESTER YEAR 1998  
JULY - DICEMBER

COURSES	AREA	SPEAKERS	MONTH	ENTERPRISES-PARTICIPANTS	N PARTICIPANTS BY COURSE	HOURS BY COURSE	N COURSE	TOTAL PARTICIPANTS
ENVIRONMENTAL MANAGEMENT LAW ISO 14000	ENVIRONMENTAL AREA	ANDRES GOMEZ-LOBO	JULY	CIA. MINERA HUASCO - CMH SUPERVISORS AND WORKERS	20	16	2	40
ENVIRONMENTAL MANAGEMENT LAW ISO 14000 - WORKSHOP	ENVIRONMENTAL AREA	ANDRES GOMEZ-LOBO	JULY	CIA. MINERA HUASCO - CMH SUPERVISORS AND WORKERS	40	08	1	40
ENVIRONMENTAL LAW AND MINING	ENVIRONMENTAL AREA	ANDRES GOMEZ-LOBO	JULY	CIA. MINERA HUASCO - CMH SUPERVISORS AND WORKERS	20	08	2	40
AUDITORS ISO 14000	ENVIRONMENTAL AREA	ANDRES GOMEZ-LOBO	AUGUST	CIA. MINERA MANTOS BLANCOS SUPERVISORS AND WORKERS	20	16	1	20
AUDITORS ISO 14000	ENVIRONMENTAL AREA	ANDRES GOMEZ-LOBO	OCTOBER	CIA. MINERA MANTOVERDE SUPERVISORS AND WORKERS	20	16	1	20
CERTIFICATE AUDITORS ISO 14000	ENVIRONMENTAL AREA	ANDRES GOMEZ-LOBO	OCTOBER	CIA. MINERA MANTOVERDE SUPERVISORS AND WORKERS	20	20	2	20
CREATING OF MONITOR FOR MINING SAFETY	MINING SAFETY	NIBALDO GONZALEZ N. CARLOS FLORES L.	AUGUST	CIA. MINERA CANDELARIA SUPERVISORS AND WORKERS	25	30	2	50



ACTIVIDAD	AREA	SPEAKERS	MONT	ENTERPRISE PARTICIPANTS	N° PARTICIPANTS BY COURSE	HOURS BY COURSE	N° COURSE	TOTAL PARTICIPANTS
MINING SAFETY FOR LEADER WORKERS	MINING SAFETY	NIBALDO GONZALEZ CARLOS FLORES	AUGUST	CODELCO CHILE-DIV. ANDINA SUPERVISORS AND WORKERS	30	30	2	60
RISK PREVENTION IN THE USE OF EXPLOSIVES	MINING SAFETY	NIBALDO GONZALEZ CARLOS FLORES	OCTOBER	OPEN COURSE	20	24	2	40
INVESTIGATION OF ACCIDENTS	MINING SAFETY	NIBALDO GONZALEZ CARLOS FLORES	SEPTEMBER	CIA. MINERA HUASCO - CMH SUPERVISORS AND WORKERS	25	16	2	50
MAINTENANCE AND OPERATION OF MINING EQUIPMENTS	MINING SAFETY	CARLOS FLORES	OCTOBER	WORKERS OF SMALL MINING	15	16	2	30
SEMINAR: TECHNOLOGY FOR ABANDONED COAL MINE	ENVIRONMENTAL AREA	EXPERTS JAPAN ANDRES GOMEZ-LOBO	NOVEMBER	OPEN CONCEPCION	100	08	1	100
CURSO: TECHNOLOGY FOR ABANDONED COAL MINE	ENVIRONMENTAL AREA	EXPERTS JAPAN ANDRES GOMEZ-LOBO	NOVEMBER	OPEN CONCEPCION	60	08	1	60
TOTAL ACTIVITIES						376	21	570

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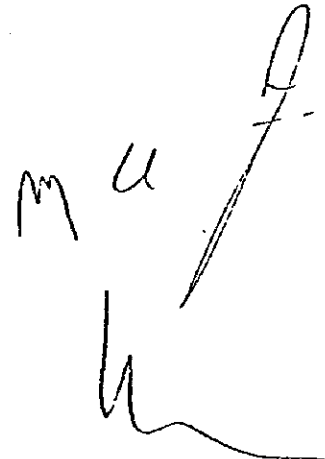
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## TENTATIVE PROGRAM OF COURSE FOR 1999

COURSES	N° COURSES HOURS BY COURSE	PARTICIPANTS	SPEAKERS
ENVIROMENTAL LAW AND MINING	5 16	SUPERVISORES	ENVIROMENTAL AREA - ANDRES GOMEZ- LOBO R. - EDUARDO VEGA DONOSO.
ENVIROMENTAL MANAGEMENT LAW ISO 14000	5 16	SUPERVISORS	ENVIROMENTAL AREA - ANDRES GOMEZ- LOBO R. - LEONEL CATALDO MUÑOZ
CREATING OF MONITORS FOR MINING SAFETY	2 30	MINING WORKERS	SAFETY MINING - NIBALDO GONZALES - CARLOS FLORES L.
MINING SAFETY FOR LEADER WORKERS	2 30	MINING WORKERS	SAFETY MINING - NIBALDO GONZALEZ N. - DICK SAA P.
INTEGRAL MANAGEMENT OF ENTERPRISE	2 36	MINING WORKERS	SAFETY MINING - CARLOS FLORES LICUIME
WAST HANDLING	2 16	MINING WORKERS	ENVIROMENTAL AREA - EDUARDO VEGA D.  CHEMICAL ANALYSIS LABORATORIO MOVIL - GUIDO MONTJUSCHI - VINKA RAKELA
ENVIROMENTALS AUDITORS	2 40	PROFESSIONALS	EXTERNAL SPEAKERS

COURSES	N° COURSES HOURS BY COURSE	PARTICIPANTS	SPEAKERS
INVESTIGATION OF ACCIDENTS	$\frac{2}{16}$	SUPERVISORS	SAFETY MINING - NIBALDO GONZALEZ N.
PREVENTION OF RISK IN THE USE OF EXPLOSIVES	$\frac{2}{24}$	MINING WORKERS	SAFETY MINING - CARLOS FLORES LICUIME
PREVENTION OF RISK BY DOWN OF DIFERENT LEVEL	$\frac{2}{16}$	MINING WORKERS	SAFETY MINING - NIBALDO GONZALEZ N. - CARLOS FLORES LICUIME
PREVENTION OF RISK FOR MOVEMENT OF ROCKS	$\frac{2}{16}$	MINING WORKERS	SAFETY MINING - NIBALDO GONZALEZ N. - CARLOS FLORES LICUIME
PREVENTION OF RISK FOR HAULAGE INN MINING	$\frac{2}{24}$	MINING WORKERS	SAFETY MINING - NIBALDO GONZALEZ N. - CARLOS FLORES LICUIME

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## The Regional Technical Cooperation Promotion Program (RTCPP)

### I Purpose

The purpose of the Regional Technical Cooperation Promotion Program (RTCPP) is to provide mining personnel from the Latin American countries with an opportunity to improve their knowledge and techniques in the field of mine safety and mine pollution control.

### II Contents of the RTCPP

As a part of the Project, the Government of Japan and the Government of the Republic of Chile will cooperate in implementing the RTCPP which includes the following:

- 1 Technical training based at the Project (hereinafter referred to as "the Training") ;
- 2 Dispatch of the JICA experts stationed at the Project to the requesting countries for technical guidance and follow-up of the Training ; and
- 3 Provision of equipment and machinery necessary for technical cooperation (hereinafter referred to as "the Equipment") in response to a request from the respective Governments of the requesting countries

### 1 The Training at the Mine Safety and Environmental Training Center

#### 1-1 Fields of Training

The Training will be offered in the following fields:

- (1) Mine Safety
- (2) Mine Pollution Control

#### 1-2 Invited Countries

The Training is open to mining personnel in the Latin American countries. However, considering the capacity of the facilities and the efficiency of the Training, the number of participants shall be limited as stipulated in 1-5 below.

#### 1-3 Facilities and Institutions

The Training will be offered at the Mine Safety and Environmental Training Center, National Service of Geology and Mining, Ministry of Mining.

#### 1-4 Duration

The duration of the Training will be approximately one (1) week. However, the duration is subject to change due to the contents of the Training and the JICA budget available.

#### 1-5 Number of Participants

The number of participants to be trained will not exceed two (2) participants for each country. However, the number is subject to change due to the contents of of the Training and the JICA budget available.

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## 1-6 Qualifications for Applicants for the Training

Applicants for the Training are:

- (1) to be nominated by their respective Governments in accordance with the procedure stipulated in 1-7 below;
  - (2) to be presently engaged, or expected to be engaged in the future in the field of mine safety or mine pollution control;
  - (3) to have practical experience of more than two (2) years in the field of mine safety or mine pollution control;
  - (4) to be under forty (40) years of age; and
  - (5) to be in good health, both physically and mentally, in order to complete the Training.
- However, the item No. (4) above is subject to change due to the contents of the Training.

## 1-7 Procedure

- (1) The Project will make the general information booklet for the Training and distribute to the Latin American countries through the JICA Chile Office for promoting the applications.
- (2) A Government applying for the Training on behalf of its nominee(s) shall forward one (1) original and three (3) copies of Form A2-A3 for each nominee to the Government of Japan not later than sixty (60) days before the commencement of the Project.
- (3) The Government of Japan will inform the applying Government, whether or not the applicant(s) is accepted to the Training not later than thirty days before the commencement of the Training.

## 2 Dispatch of the JICA experts

The dispatch of the JICA experts to the countries of the ex-participants of the Training for the purpose of technical guidance and follow-up of the Training, is considered to conduct in the first quarter of 1999, only if the necessary budget is allocated in Chilean fiscal year 1999 for the Chilean counterpart personnel to accompany with the JICA experts.

### 2-1 Duration

The duration of dispatch of the JICA experts will be approximately one (1) to two (2) weeks totally. However, the duration is subject to change due to the activities of the Project and the JICA budget available.

### 2-2 Procedure

- (1) A Government requesting the JICA experts stationed at the Project shall forward one (1) original and three (3) copies of Form A1 to the Government of Japan.
- (2) The Government of Japan will consult with the Government of the Republic of Chile as to when and how long the JICA experts are to be dispatched to the requesting Governments.
- (3) The Government of Japan will inform the requesting Governments with Form B1 as to when and how long the JICA experts are to be dispatched to the requesting Governments.

### 3 Provision of Equipment

The Equipment necessary for the follow-up of the Training will be provided to the countries of ex-participants of the Training, upon the request of the respective Governments. The items of the Equipment to be requested shall be determined through the discussions between the requesting Governments and the Project, within the JICA budget available. The cost and responsibility necessary for domestic transport, installation, adjustment, maintenance and repair of the Equipment should be borne by the respective Governments.

#### 3-1 Procedure

- (1) A Government requesting the Equipment shall forward one (1) original and three (3) copies of Form A4 to the Government of Japan.
- (2) The Government of Japan will purchase the Equipment through JICA whether in Japan or in the respective countries.

### III Measures to be taken by the Government of Japan and the Government of the Republic of Chile

In organizing and implementing the RTCPP, both Governments will take necessary measures in accordance with the relevant laws and regulations in force in each country. There will be mutual consultation between both Governments on any major issues arising from, or in connection with the RTCPP.

#### 1 The Government of Japan

##### 1-1 The Training

- (1) To bear the expenses relevant to participants from the invited countries such as international economy-class flight fare, domestic economy-class flight fare in the Republic of Chile, accommodation, per-diem and medical insurance premiums.

##### 1-2 Dispatch of the JICA experts

- (1) To dispatch the JICA experts stationed at the Project to the requesting countries in accordance with the normal procedures of its technical cooperation scheme with such expenses borne by JICA.


##### 1-3 Provision of Equipment through JICA

- (1) To procure the Equipment; and
- (2) To deliver the Equipment C.I.F. to the requesting country authorities concerned at the ports and / or airports of disembarkation.

2 The Government of the Republic of Chile

- (1) To provide its training facilities and equipment for participants;
- (2) To assign the counterpart personnel of the Project to conduct the Training together with the Japanese experts;
- (3) To arrange accommodation for participants;
- (4) To take budgetary measures to cover the cost of conducting the Training including the expenses for training materials;
- (5) To coordinate any activities related to the Training; and
- (6) To issue a written consent per trip of the JICA experts to the requesting countries.

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ANNEX 21 List of Attendance of the Discussions

The Japanese Side

(1) The Japanese Management Consultation Team

Dr. Takeshi Usami	Leader
Mr. Takahiro Matsubuchi	Member
Mr. Yasuhiko Wada	Member

(2) The JICA Project Team

Mr. Minoru Fujita	Chief Advisor
Mr. Yoshikane Harada	Expert on Mine Safety
Mr. Suzuo Yamaguchi	Expert on Mine Pollution Control
Mr. Michihiro Ando	Expert on Chemical Analysis
Mr. Takeshi Saito	Project Coordinator

(3) The JICA Chile Office

Mr. Kazuo Ishii	Resident Representative
Mr. Kiyotaka Otsuki	Assistant Resident Representative
Ms. Mami Yamada	Assistant Resident Representative

(4) JICA Expert in AGCI

Mr. Mitsuo Oba	JICA expert in AGCI
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(5) The Embassy of Japan in the Republic of Chile

Mr. Sakae Yoshida	First Secretary
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The Chilean Side

(1) The Ministry of Mining

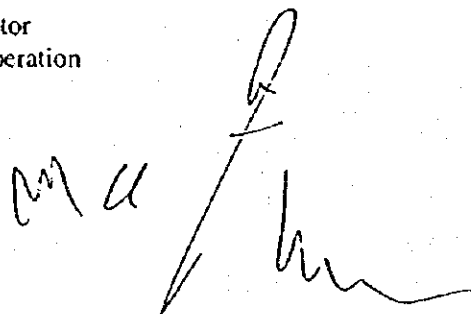
Mr. Germán Contreras	Advisor
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(2) SERNAGEOMIN

Mr. Ricardo Troncoso San Martín	National Director
Mr. Manuel Bernal León	National Vice Director of Mining
Ms. Cecilia Varderas Ch.	Chief of Planning Office
Mr. José Bruna Uribe	Chief of Administration and Finance Department
Mr. Daniel Alcayaga Esquivel	Chief of Mine Safety Department
Mr. Gonzalo Astoroquiza	Chief of Legal Department
Mr. Jaime de la Hoz	Staff of Public Relations Office
Mr. Anton Hraste Carrasco	Regional Director in III Region
Mr. Jorge Guerra Casanova	Director of Mine Safety and Environmental Training Center

(3) AGCI

Mr. Pedro Ramírez	Coordinator of Mining Sector
Ms. Adriana Lagos	Coordinator of Japan Cooperation











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