No. 9

メキシコ合衆国石油精製安全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

メキシコ合衆国
石油精製安全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

平成10年11月
(1998年11月)

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国際協力事業団

平成10年11月

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メキシコ合衆国
石油精製安全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

平成10年11月
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1149838 (3)

序　　文

メキシコの石油産業は、国営公社 PEMEX が独占的に支配しており、同公社は国税収入の30%、GDP の約6%（いずれも1993年度実績）を占める国家経済の大黒柱である。

しかしながら同公社製油所は、先進各国の製油所と比べ事故発生件数が高く、事故防止に関する訓練が行われてはいるものの、実効が上がっておらず、同公社の安全性の確保は、メキシコ経済全体に係る問題として、政府のみならず国民の一大関心事となっている。

かかる状況下、メキシコ国政府は、1995年に日本政府に対し、日常業務としての保全、メンテナンスの取組みまでを包含する日本の安全管理技術の移転を要請した。

同要請を受け、1996年4月の事前調査団、また同年7月の長期調査員の派遣を経て、同年9月に実施協議調査団を派遣し、討議議事録（R/D）の署名を行った。

以来、本プロジェクトは同討議議事録に基づき、1996年12月1日から協力を実施中であるが、プロジェクト開始後約1年10か月を経過した現時点において、プロジェクト活動の進捗状況を確認すると共に、今後のプロジェクトの活動計画を確認し、併せて今後のプロジェクト運営についてメキシコ側関係機関と協議を行うことを目的として、1998年10月22日から10月31日まで、プロジェクト運営指導チームを派遣した。

本報告書は、同運営指導チームの調査結果を取りまとめたものである。

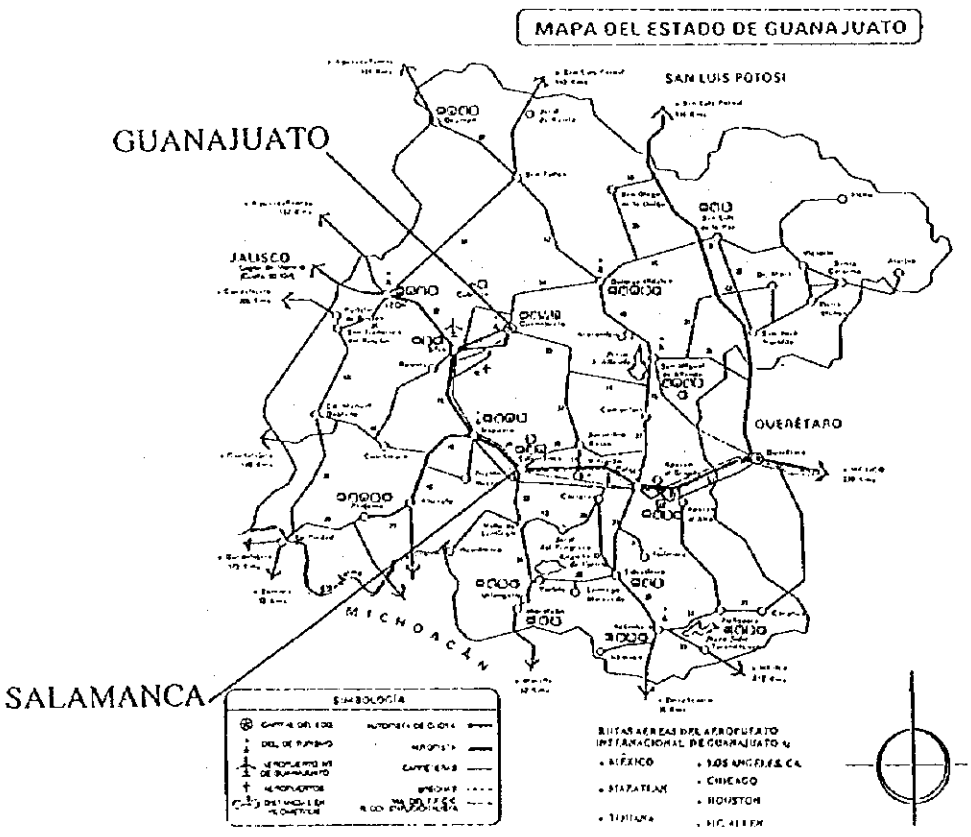
ここに、本運営指導チームの派遣に関し、ご協力いただいた日本・メキシコ両国の関係各位に対し、深甚の謝意を表すると共に、併せて今後のご支援をお願いする次第である。

平成10年11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


1. BAJA CALIFORNIA NORTE
3. SONORA
4. CHIHUAHUA
5. COAHUILA
6. NUEVO LEON
7. TAMAULIPAS
2. BAJA CALIFORNIA SUR
8. SINALOA
9. DURANGO
10. ZACATECAS
11. NAYARIT
12. AGUASCALIENTES
14. JALISCO
15. GUANAJUATO
18. COLIMA
13. SAN LUIS POTOSI
16. QUERETARO
17. HIDALGO
20. EDO. DE MEXICO
21. TLAXCALA
24. PUEBLA
25. VERACRUZ
28. TABASCO
30. CAMPECHE
31. YUCATAN
19. MICHOACAN
22. MORELOS
23. DISTRITO FEDERAL (MEXICO CITY)
26. GUERRERO
27. OAXACA
29. CHIAPAS
32. QUINTANA ROO


MAPA DEL ESTADO DE GUANAJUATO
GUANAJUATO
SAN LUIS POTOSI
JALISCO
QUERÉTARO
MICHOACAN
SALAMANCA
SIMBOLOGÍA

（協議風景）

（ミニッツ署名・交換）

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第1章　プロジェクト運営指導チームの派遣

1－1　運営指導チーム派遣の背景及び目的

本プロジェクトは協力開始後1年9か月あまりを経過しているが、これまで専門家による英文教材作成、メキシコ側による西語訳とテキスト作成、及び専門家からカウンターパートへの技術移転を経て、研修コースが開講された。今後は、研修コースを軌道に乗せるとともに、研修内容の現場展開を行っていく段階を迎える。

かかる時期をとらえ、専門家チーム及びメキシコ側関係者と、これまでのプロジェクト活動実績を確認するとともに、PDMの見直し及びPOの作成により、今後のプロジェクトの活動計画を確認し、併せて今後のプロジェクト運営についての意見交換を行うことを目的として、運営指導チームを派遣した。

1－2　運営指導チームの構成

分　野	氏　名	所　属
総括／技術協力計画	中村　良明	通商産業省　資源エネルギー庁 石油部　精製課　課長補佐
安全管理技術	今西　克己 (新チーフ・アドバイザー予定者)	コスモ石油株式会社　海外協力センター プロジェクト部長
教育効果測定	野沢　俊博 (新業務調整員予定者)	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　特別嘱託
プロジェクト運営管理	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

1－3　運営指導日程

日順	月日（曜日）	日　　程
1	10月22日（木）	移動　成田→メキシコ・シティ（JL-012）
2	23日（金）	JICA事務所打合せ、PEMEX-Refining表敬 移動　メキシコ・シティ→レオン・グアナファト（AM-134） レオン・グアナファト→サラマンカ（陸路）
3	24日（土）	専門家チームとの打合せ
4	25日（日）	資料整理、生活環境調査
5	26日（月）	サラマンカ製油所表敬、サラマンカ製油所視察 安全研修センター視察 専門家チームとの打合せ
6	27日（火）	メキシコ側との協議
7	28日（水）	ケレタロ州産業技術開発センタープロジェクト視察（和田を除く） 移動　サラマンカ→レオン・グアナファト（陸路） レオン・グアナファト→メキシコ・シティ（AM-135） 合同調整委員会開催、ミニッツ署名
8	29日（木）	JICA事務所報告、日本国大使館報告
9	30日（金）	移動　メキシコ・シティ（JL-011）
10	31日（土）	移動　→成田

1－4　主要面談者リスト

〈メキシコ側〉

(PEMEX-Refining)

Ing. Francisco Delgado Cortes	Production Subdirector
Ing. Roberto Andrade Cruz	Auditor, Industrial Safety and Environmental Protection
Ing. Jose Manuel Olivarez Paez	Production Control Manager of Assistant Manager of Production
Ing. Fermin Narvaes Camacho	Environmental Protection and Safety Manager
Ing. Emilio Diaz Frances	Safety and Occupational Sub-Manager
Ing. Gerardo Acevedo Sobrado	Technical Inspection and Safety General Manager
Ing. Miguel Mendoza Gutierrez	Technical Inspection and Safety Coordinator

(SALAMANCA Refinery)

Ing. Miguel Tame Dominguez	Manager
Ing. Antonio Alvarez Moreno	Technical Inspection & Safety Superintendent
Ing. Jesus Manuel Almanza Torres	Manager of Safety Training Center
Ing. Manuel Melo Lopez	Manager of Production Unit
Ing. Armando Marin Marin	Evaluation and Programming Unit Superintendent
Ing. Benjamin Guerrero Romero	Process Superintendent
Ing. Alvaro Muro Gonzalez	Maintenance Superintendent
Ing. Carlos Rafael Cuevas Zaldo	Instructor, Safety Administration, Safety Training Center
Ing. Isabel Alvarez Araujo	Instructor, Safety Administration, Safety Training Center
Sr. Teodoro Castro del Valle	Instructor, Safety Administration, Safety Training Center
Ing. Victor M. Munguia Zuniga	Instructor, Maintenance Safety, Safety Training Center
Ing. Fernando Martinez Fernandez	Instructor, Maintenance Safety, Safety Training Center
Sr. Francisco Castro	Instructor, Maintenance Safety, Safety Training Center
Ing. Sergio Gonzalez Beltran	Instructor, Process Safety, Safety Training Center
Sr. Enrique Salgado	Instructor, Process Safety, Safety Training Center
Sr. Jose Guadalupe Escalangte	Instructor, Process Safety, Safety Training Center
Ing. Candelario E. Cu Gutierrez	Instructor, Inspection, Safety Training Center

〈日本側〉

(在メキシコ日本国大使館)

渡 辺 卓 実	二等書記官

(JICA メキシコ事務所)

山 口 三 郎	所長
半 谷 良 三	次長
藤 井 敬太郎	所員

(メキシコ石油精製安全研修センタープロジェクト)

古川園 龍 藏	チーフ・アドバイザー
伊 崎 弘 志	業務調整
森 一	安全管理
上 垣 英 三	安全管理技術
岩 里 英 幸	メンテナンス・セーフティー
森 山 徹	プロセス・セーフティー

第2章　運営指導結果

2－1　運営指導項目ごとの調査・協議結果

運営指導項目	現状及び問題点	対処方針	調査・協議結果
第1　PDM	サラマンカ製油所の現状及びプロジェクト活動の現状を踏まえ、プロジェクトで見直し案を作成している。	プロジェクトで作成している見直し(案)について専門家チームから説明を受け、メキシコ側とも内容を検討のうえ見直しを行い、ミニッツに添付する。その際、プロジェクト目標に「安全研修センターの活動を通じて」という文言を追加するとともに、活動の外部条件に「サラマンカ製油所が日本的手法の適用に必要な予算を配布する」ことを追加する。 なお、Narrative Summaryの変更については、当部の他プロジェクトにおけるPDMの見直しの例にならい、Detailed Contents of Narrative Summaryとして、当初PDMと対比する形でPDMに記載する。 また、今後も引き続き見直しを行っていくことを確認し、その旨ミニッツに記載する。	対処方針どおり見直しを行い、ミニッツに添付するとともに、対処方針どおりミニッツに記載した。 なお、メキシコ側から、当初PDMの成果の一つである「検査・保守能力が向上する」について、引き続き成果に計上しておきたい旨要望があり、今後、継続検討することとした。
第2　プロジェクト活動実績と計画	上記PDMの見直しを踏まえ、プロジェクトでPO(案)及びAPO(案)を作成している。	プロジェクトで作成しているPO案及びAPO案について専門家チームから説明を受け、メキシコ側とも内容を検討のうえ作成し、ミニッツに添付する。そのうえで、今後も引き続き見直しを行っていくこととし、その旨ミニッツに記載する。 また、PO、APO及び投入実績等の資料を基に、これまでの技術移転活動の進捗状況、及び今後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。	対処方針どおり作成し、ミニッツに添付するとともに、対処方針どおりミニッツに記載した。 なお、PO及びAPOのTarget欄については、今回は活動の詳細を記載したが、今後その記載内容について検討が必要である。 また、検査分野の短期専門家については、専門家チームと打ち合わせた結果、腐食の専門家1名を今年度に派遣し、超音波探傷試験と安全解析の専門家各1名を来年度に派遣することとなった。

運営指導項目	現状及び問題点	対処方針	調査・協議結果
第3　プロジェクト運営上の課題			
(1)メキシコ側人員変更	(1)PEMEX-Refining 副社長(Project Director)、サラマンカ製油所長(Project Manager at the Project Site)、検査安全部長(Project Manager Assistant)、安全研修センター長ほか、メキシコ側プロジェクト関連人員が人事異動で変更となった。	(1)メキシコ側人員変更の状況を確認し、PDM を基にプロジェクトの目的、活動内容を再確認するとともに、人員変更にかかわらず、メキシコ側がこれまでどおり専門家とのコミュニケーションを保ち、プロジェクト活動を推進することを確認し、その旨ミニッツに記載する。 また、今後更に人員変更がある場合は、事前に専門家チームに情報提供するよう依頼し、その旨ミニッツに記載する。	(1)対処方針どおり確認し、ミニッツに記載した。これに関連し、メキシコ側から、関係者の交代によるプロジェクトへの支障はない旨発言があったほか、協議を通じ、各後任者がプロジェクトの内容をよく理解しているばかりでなく、その必要性を認識し、積極的に取り組む意欲をもっていることが確認できた。 なお、運営指導最終日にJICA メキシコ事務所への報告を行った際、山口所長から、今回変更となったメキシコ側人員を、今年度カウンターパート研修の追加分として日本に招へいすることを検討してはどうかとの提言があった。これについては、10月末のカウンターパート研修計画見直しにおいて、2名分の枠の追加を要望したが、うち1名分については、追加の可能性があるものと思われる。
(2)研修内容の現場展開	(2)5月から8月にかけ実施した研修コースの内容である KYK と指差呼称の現場展開が行われている。	(2)プロジェクト目標達成のため、メキシコ側がその責任の下に現場展開に必要な措置を行っていくことを確認し、その旨ミニッツに記載する。	(2)対処方針どおり確認し、ミニッツに記載した。なお、サラマンカ製油所長から、プロジェクトの成功のため無条件に日本側に協力する旨発言があった。
第4　合同調整委員会		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。	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。なお、Project Director である PEMEX-Refining 副社長は急用のため出席できなかった。
第5　その他 (1)機材の有効活用		(1)供与機材をプロジェクト期間中及び終了後も有効に活用するようメキシコ側に依頼し、その旨ミニッツに記載する。	(1)対処方針どおりミニッツに記載した。メキシコ側の説明によると、機材の活用計画案を作成しているということであった。

運営指導項目	現状及び問題点	対処方針	調査・協議結果
(2)広　報		(2)プロジェクトのパンフレットを作成するようメキシコ側に依頼し、その旨ミニッツに記載する。	(2)プロジェクト紹介の簡単なパンフレットが既に作成されていたことから、ミニッツへの記載は省略した。
(3) TCP	(3)これまでのTCPは技術移転項目の列挙であり、PDMの見直しとPOの作成に伴い、整理が必要と考えられる。	(3)専門家チームと意見交換を行い、今後見直しを行っていくことを確認する。(メキシコ側とは特に確認しない。)	(3)時間的制約から専門家チームとの意見交換ができなかったので、今後の継続検討が必要である。
(4)研修状況視察		(4)研修実施状況の視察を行う。	(4)メンテナンス・セーフティー・コース及びプロセス・セーフティー・コースの視察を行った。
(5)専門家の交代	(5)12月に調整員、来年1月にリーダーを含む3名、また来年7月に2名の長期専門家が交代する予定である。これについてはメキシコ事務所からメキシコ側に説明済みであり、延長する専門家分のB1フォームも取り付けられ、本部での任期延長手続き、派遣前研修受講手続き等を実施中であるが、メキシコ事務所からの情報では、今次運営指導チームのPEMEX表敬時に、先方から、複数の専門家について、可能であれば任期を延長してほしいとの要望があるかもしれないということである。	(5) PEMEX表敬時に先方から専門家の任期延長についての要望があった場合は、延長が望まれるほど専門家を評価していただいていることに感謝の意を表しつつ、しかしながら専門家の人事については、専門家所属先の人事上の都合や、本プロジェクトの日本国内の各支援先との関係等から、専門家本人の意向とは別に、日本国内の関係者が協議のうえ、既に決定していることである旨繰り返し説明し、理解を求めることとする。 また、専門家の後任者については、交代する専門家と相当の専門家を人選し派遣する旨説明する。	(5)協議の場でメキシコ側から、複数の専門家について可能であれば任期を延長してほしい旨の要望があった。また、安全グループのカウンターパートからも、個別に安全分野2名の専門家の任期延長要望があった。 これらに対し運営指導チームから、対処方針どおり説明し、理解を得た。 なお、メキシコ側から、技術移転の継続性を確保するため、メキシコ側が現在の専門家の任期延長を望んでいることを表明した旨、ミニッツに記載してほしいとの強い要望があったので、本部の了解を得たうえで、メキシコ側が任期延長要望を表明したという事実関係のみミニッツに記載した。 また、メキシコ側から、同要望についてはJICAメキシコ事務所にレターを提出しており、レターでの返事が欲しい旨要望があったので、追ってメキシコ事務所から返事をする旨回答した。(同協議の場にはメキシコ事務所の担当所員も同席。)
第6　ミニッツ及び報告書		メキシコ側との間でミニッツを締結することとし、報告書を印刷・製本することとする。	メキシコ側との間でミニッツを締結した。

2－2　プロジェクトの活動実績と今後の活動計画

(1)　活動実績

安全研修センターでは1998年５月より従業員全員を対象に指差呼称、危険予知活動の集中研修を実施するとともに（91％完了）一部では現場展開も図られている。

さらに、現在ではエンジニアクラスを対象にして通常研修コースと呼ばれる（"Safety Common Course, Process Safety Course, Maintenance Safety Course"）が実施されている。これらは、日本人専門家が作成した英文教材を基に西訳された教材で、カウンターパートが主体となってスケジュールどおり進められている。

研修用機材、非破壊検査器具も予定どおり入荷し、1998年３月から５月にかけて日本人短期専門家による取扱講習も行った。

また、1996年１名、1997年３名、1998年３名のカウンターパート研修も日本で行われた。

(2)　今後の研修センターの活動計画（1999年計画）

1999年には下記の活動が予定されている。

- 全従業員を対象にした通常研修コースの実施
- 指差呼称、危険予知活動、作業前ミーティングの現場展開
- ５Ｓ活動の教育と現場展開
- 作業許可基準の見直しと、現場への適用
- 安全作業基準の見直しと適用
- 現場防護設備の不安全箇所の抽出
- 安全活動に関する所内キャンペーン
- CIDESIによる検査員の講習とASNTレベル２資格取得への挑戦
- PEMEX安全衛生委員会組織設置と職場安全会議導入のための指導
- 日本人専門家とPEMEXマネージャークラスとの定期的な会議の開催
- カウンターパート研修（３名）
- H-OILプラントの定期修理時期に合わせた日本人短期専門家の派遣と研修

(3)　今後の課題

指差呼称、危険予知活動等が本格的に現場展開する活動段階に移ってきており、これが有効に機能するため製油所側との一層の緊密な協議が必要である。

また、人的原因による事故・けがを防止し従業員の安全レベルを高めるため、過去の事故原因の再分析を行い、今後の安全指導のための重点課題を見いだす必要がある。

2－3　PDMの見直し

運営指導調査団派遣に先立ち、専門家チームとカウンターパートの間で時間をかけてPDMを見直し合意に達していたことから、調査団は同案に沿って専門家チームとの間で協議し、若干の修正を加えた。

また、今回の見直しにおいては日本式安全手法の一つである4M手法（Man, Machine, Media, Management）を念頭に行ったものとの説明が専門家チームよりあった。

R/D署名時に作成されたPDMとの間の大きな違いは以下のとおりであるが、これは1年10か月間プロジェクトを実施してきたなかで、サラマンカ製油所の安全に関する現状を把握・分析し、かつ、今後のプロジェクトの展開を考慮して必要な部分を見直したものである。

しかしながら、プロジェクトは現在、研修コースを立ち上げ、ようやくコースが軌道に乗った段階であり、今後は製油所の現場へ日本式安全手法の展開を図っていく必要があり、PDMに関して、今後更にメキシコ側と協議し、より現実的な視点を踏まえPDMの更なる見直しが必要になってくるものと思われる。

■R/D署名時のPDMと見直し案の相違点

今回は、プロジェクトの成果を中心に見直し、それに伴い活動の見直しも行った。

(1) JICAの一般的プロジェクトのPDMに沿った形で、「0　安全研修センターの組織が確立される」を新しく入れた。

(2) R/D時PDMの2、3、4、5を4M手法のManの要素として1、2、3にまとめた。

(3) R/D時PDMの6、7をMachineの要素として4、5にまとめた。

(4) R/D時PDMには考慮されていなかった職場内コミュニケーションの改善が安全向上のために不可欠との観点から、コミュニケーションの改善と事故情報の開示を6として記載した。

(5) 安全活動を定着させるためにはその活動を推進する組織が必要との観点から、安全推進委員会のような組織を設立することとし、7に記載した。

(6) R/D時PDMの「8　検査、保守技術が向上する。」は成果からはずし、「1　従業員の安全知識が向上する。」に含めることとし、活動にその内容を明記することとした。

サラマンカ製油所でのメキシコ側との協議の場で、上記、「検査、保守技術の向上」をプロジェクトの成果からはずすことに対し疑義が出されたが、今回の見直しは最終的なものではなく、今後更に見直しを行っていく必要があるとの説明でメキシコ側は納得した。

PDM見直し案を正式なものとするためには、R/Dの変更が必要となることから、今後とも積極的にメキシコ側と協議し、よりスムーズにプロジェクトが実施され、かつ、具体的に成果を図るためにPDMを見直し、最終的に合意されたものについてR/D変更の手続きを踏むことになろう。

第3章　運営指導チーム所見

メキシコ側との協議に先立ち、日本側専門家との間で、開始後約1年10か月が経過した本プロジェクトのこれまでの活動実績並びに今後の活動計画についてPDM、PO及びAPOにより詳細な把握、検討を行った後、メキシコ石油精製公社（PEMEX-Refining）及びサラマンカ製油所との協議を行い、それら活動実績と計画を確認するとともに、プロジェクトの運営管理上の課題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、サラマンカ製油所及び安全研修センターの視察を行い、プロジェクト全体の状況を把握することができた。

これらを通じての運営指導チームの所見は以下のとおりである。

1　プロジェクト全体の印象

日本側専門家及びメキシコ側カウンターパートはプロジェクト活動に対する熱意に満ちており、日本側専門家はメキシコ側の絶大な信頼を得ていることに、まず触れておきたい。具体的なメキシコ側の対応も一部人員の交代を除き、大きな支障は認められない。

日本側専門家チーム内のコミュニケーションについては、議論は活発に行われているものの、必ずしも結論が出されていないところに課題があると見受けられる。

また、プロジェクトの進捗に必要な製油所の事故情報の入手が困難となっている点について、メキシコ側に改善を申し入れた。

今後、最終的な目標をプロジェクト内で議論のうえ、整理しておく必要も生じている。

2　プロジェクトの進捗状況

(1)　現　状

安全研修センターでは、1998年5月から8月にかけ実施した、サラマンカ製油所全従業員を対象とした集中研修コース（Safety Intensive Course）を受け、現在、エンジニアクラスを対象とした通常研修コース（Safety Common Course、Process Safety Course及びMaintenance Safety Course）が実施されている。これら研修コースは、日本側専門家から技術移転を受けたメキシコ側カウンターパートが講師となり、主体的な運営がなされていることから、研修コース実施については順調に進展しているものと思われる。

また、集中研修コースの研修内容であるKYK（危険予知活動）と指差呼称については、サラマンカ製油所の現場への導入も始められていることから、これまでのところ、プロジェクトは順調に進捗していると思われる。

(2) 今後の課題

研修コースの運営がほぼ軌道に乗り、今後は研修が行われた日本的安全管理手法の製油所への現場展開へと、プロジェクトの活動の重点が移っていくこととなる。現在、プロジェクトでは、現場展開の具体的方策を話し合うための、製油所上層部との検討の場を設けているが、今後、製油所側との情報交換、連携の一層の緊密化が必要である。

また、プロジェクトの目標である製油所の安全レベルを実際に改善するため、有効な現場展開の具体的実施計画を作成することが急務である。そのためには、まず事故情報の収集とその分析による方針の作成が必要であるとともに、日本側専門家チームとしての認識の統一が不可欠である。さらには、現場展開をフォローする体制づくりも行っていく必要がある。

(3) PDMの見直し、PO及びAPOの作成

今次運営指導を機に、プロジェクトのこれまでの活動状況を踏まえ、日本側専門家チームを中心にPDMの見直しと、それによるPO及びAPOの作成を行った。

これにより、プロジェクト目標を達成するために必要な今後の具体的活動とその時期が明確になるとともに、日本側、メキシコ側双方の役割分担が明確になったものと思われるが、今後、これらの内容についてメキシコ側と一層の共通理解を図るとともに、プロジェクト活動の進捗管理の共通のツールとしての活用が期待される。

3 プロジェクト関係者の交代

(1) メキシコ側関係者の交代

PEMEX-Refining副社長（Project Director）、サラマンカ製油所長（Project Manager）、サラマンカ製油所検査安全部長（Project Manager Assistant）、安全研修センター所長（Acting Project Manager Assistant）ほか、メキシコ側のプロジェクト主要関係者が人事異動により交代した。

これについては、PEMEX-Refiningの表敬を行った際、メキシコ側から、関係者の交代によるプロジェクトへの支障はないとの発言があったほか、メキシコ側との協議を通じ、各後任者がプロジェクトの内容をよく理解しているばかりでなく、その必要性を認識し、積極的に取り組む意欲をもっていることが確認でき、また、サラマンカ製油所表敬の際にも製油所長から、プロジェクト成功のため無条件に日本側に協力する旨の発言があるなど、メキシコ側のプロジェクト活動の継続性には問題ないものと思われる。

(2) 日本側専門家の交代

11月から順次日本側専門家の交代が予定されているが、協議のなかでメキシコ側から示さ

れた、専門家の交代は止むを得ないとしても、プロジェクト活動の継続性が損なわれないようにしてほしいとの要望を待つまでもなく、日本側としても、継続性を保つよう最大限の配慮が必要である。

これについては、既に後任者派遣のタイミングの調整を行うなどしているが、運営指導チームから現任専門家に対し、後任者への引継ぎを十分に行うよう指導するとともに、引継書を作成し、後任者の派遣前にあらかじめ本邦へ送付するよう指導した。

(3) メキシコ側人員の変動

研修コース実施及び現場展開に必要なメキシコ側カウンターパートの人員配置について、日本側専門家とメキシコ側とのコミュニケーションの不足からか、1998年9月に人員減があった旨、専門家から報告を受けた点に関してメキシコ側に確認したところ、メキシコ側人員には余人があるとの情報をメキシコ側人事担当者が得たので減員となったということであった。今後、必要な人員の確保については、メキシコ側を十分説得しうる材料をもって協議、説明を行っていく必要がある。

4 コミュニケーションの緊密化

日本側専門家との打合せ、及びメキシコ側との協議を通じ、日本側専門家チーム内のコミュニケーションとメキシコ側から得た情報の共有化が十分でない点が見受けられた。

今後、前述のとおりプロジェクトの活動が現場展開へとシフトしていくこと、及び日本側専門家が交代していくことから、日本側専門家チーム内、及びメキシコ側とのコミュニケーションの緊密化と関連情報の共有化がますます重要となる。

そのためには、まず、日本側専門家チーム内での方針、意思決定のシステムづくりが必要であるとともに、各種情報の周知を図るシステムづくりが必要である。(これについてはJICAメキシコ事務所のフォローが必要と思われる。)

また、合同調整委員会においてメキシコ側出席者から、今後とも相互協調が必要である旨指摘されたが、このためにも、メキシコ側と協議を行う際の日本側専門家チームとしての意見の事前の整理と全体の把握、及びメキシコ側との協議とそのフィードバックが求められる。

5 総　　括

今次運営指導を通じ、メキシコ側のプロジェクトに対する意欲と期待の高さ、及び日本側専門家に寄せる信頼の厚さを確認することができた。

本プロジェクトは他のプロジェクトに比し、人的にも財政的にも相手側に恵まれているとは言え、日本側専門家が、プロジェクト開始後2年足らずで研修コースを軌道に乗せ、現場への

展開を始めるに至り、メキシコ側との厚い信頼関係の礎を築いたことは、高く評価されるべきである。

今後、この信頼関係を維持し、日本側としてもプロジェクト目標達成に向け最大限に努力していくことが、メキシコ側の期待に応え、ひいては日本とメキシコ両国の友好関係の増進に寄与するものと思われる。

付　属　資　料

資料1　ミニッツ(Minutes of Discussions)

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 UNITED MEXICAN STATES ON THE JAPANESE TECHNICAL COOPERATION FOR THE REFINERY SAFETY TRAINING CENTER PROJECT

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 Mr. Yoshiaki Nakamura, visited the United Mexican States from October 22 to 30, 1998, for the purpose of reviewing the activities of the Refinery Safety Training Center Project (hereinafter referred to as "the Project").

During its stay in the United Mexican States, the Team had a series of discussions and exchanged views with the Mexican 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.

Mexico City, October 28, 1998

Yoshiaki Nakamura
Leader
Management Consultation Team
Japan International Cooperation Agency (JICA)
Japan

Francisco Delgado Cortes
Production Subdirector
PEMEX Refining
The United Mexican States

THE ATTACHED DOCUMENT

1 Project Design Matrix

The Japanese experts and the Mexican counterpart personnel jointly reviewed the contents of the Project Design Matrix (hereinafter referred to as "PDM") for the Project, which was attached to the Minutes of Discussions signed by both the Japanese and the Mexican sides on September 25, 1996, after carefully studying the progress of the activities of the Project and the actual situation of the safety level of the Salamanca Refinery, then they drafted up the revised version of the PDM.

Based upon the draft, both the Japanese and the Mexican sides discussed how the draft could be made clearer for defining the structure of the Project logically as well as for monitoring the progress of the activities and the level of achievements of the Project.

Then both sides reached a mutual understanding on the contents of the revised PDM as shown in ANNEX 1 after reconfirmation of the master plan of the Project described in the revised PDM as "detailed contents of Narrative Summary", and both sides confirmed that the revised PDM would be further discussed and reviewed between the Japanese experts and the Mexican counterpart personnel.

In this concern, both sides confirmed the tendency of indicators in the PDM as shown in ANNEX 2.

Moreover, regarding the PDM, the Team explained to the Mexican side the five (5) basic evaluation components as shown in ANNEX 3 and that any evaluation activities of the Project done by both sides would be conducted based upon the PDM and in terms of the five (5) basic evaluation components.

2 Review and Plan of the Activities of the Project

Based upon the revised PDM, both sides jointly made the Plan of Operations for the Whole Period (hereinafter referred to as "PO") as shown in ANNEX 4 and the Annual Plan of Operations (hereinafter referred to as "APO") as shown in ANNEX 5 which are the detailed and concrete activity plans of the Project.

Then both sides reviewed the results of and confirmed the plan of activities of the Project in line with the PO, the APO and the following documents.

(1) Inputs to the Project by both sides

a. List of Japanese experts as shown in ANNEX 6.

b. List of Mexican counterpart personnel trained in Japan as shown in ANNEX 7.

c. Priority list for Japanese short-term experts and counterpart training in Japan in Japanese Fiscal Year 1999 as shown in ANNEX 8.

d. List of machinery, equipment and materials provided by the Japanese side as shown in ANNEX 9-1.

e. Tentative list of equipment and materials requested by the Mexican side for provision in Japanese Fiscal Year 1999 as shown in ANNEX 9-2.
f. Layout of the Refinery Safety Training Center as shown in ANNEX 10.
g. List of Mexican counterpart personnel and administrative staff as shown in ANNEX 11-1.
h. Allocation of Mexican counterpart personnel as shown in ANNEX 11-2.
i. Promotional organization of Japanese safety activities as shown in ANNEX 12.
j. Schedule of budget allocation by the Mexican side in Mexican Fiscal Years 1996 - 2001 as shown in ANNEX 13.
k. Organization chart for the administration of the Project as shown in ANNEX 14.
l. Tentative Schedule of Implementation (hereinafter referred to as "TSI") for the Project as shown in ANNEX 15.

(2) Technology transfer activities
a. Progress of technology transfer as shown in ANNEX 16.
b. List of materials related to the technology transfer as shown in ANNEX 17.
c. List of consultation meetings and introduction meetings as shown in ANNEX 18.

(3) Training courses at the training center
a. Outline of training course schedule as shown in ANNEX 19.
b. Result of intensive course as shown in ANNEX 20.
c. Contents of training course for engineers (Phase 1～4) as shown in ANNEX 21.
d. Contents of training course for workers (Phase 1～4) as shown in ANNEX 22.

Both sides recognized that the technology transfer from the Japanese experts to the Mexican counterpart personnel for conducting training courses was well done and that the training courses were well operated by the Mexican side.

Furthermore, both sides confirmed that both the Japanese experts and the Mexican counterpart personnel would implement and monitor the activities of the Project in accordance with the PO and the APO.

In addition, regarding ANNEXES 8 and 9-2, the Team stated that actual input would be considered according to the budget appropriation.

3 Issues on the Project Management

3-1 Change of the Related Personnel to the Project on the Mexican Side

Both sides reviewed the change of the related personnel to the Project on the Mexican side as described in ANNEX 11-2.

In this connection, the Team requested to the Mexican side and the latter agreed that the change would not affect the activities of the Project and that all of the related personnel on the Mexican side would continue to promote the activities of the Project as well as maintain close communication between the Japanese experts as before.

Moreover, for the effective and continuous implementation of the Project, the Team requested to the Mexican side and the latter agreed not to further change the related personnel without any prior notice to the Japanese experts as well as to make Mexican counterpart personnel concentrate on the activities of the Project.

On the other hand, the Mexican side expressed their wish to extend the assignment period of the present Japanese experts in order to facilitate the continuity of technology transfer.

3-2 Application of the Training Results to the Working Site

Both sides confirmed that in order to achieve the project purpose, application of the training results to the working site at the Salamanca Refinery was indispensable and that the Mexican side would take all of the necessary measures to implement the application at its own responsibility under close cooperation extensively among all the related departments in the refinery in parallel with conducting training courses.

3-3 Prompt Provision of related information and Documents

As agreed upon in the Minutes of Discussions signed by both sides on November 12, 1997, the Team requested to the Mexican side and the latter agreed to provide any related information, data and documents necessary for the effective and smooth implementation of the Project promptly to the Japanese experts upon their request.

4 Other Issues

4-1 Effective Utilization of the Machinery and Equipment Provided by the Japanese Side

The Team requested to the Mexican side and the latter agreed to effectively utilize the machinery and equipment provided by the Japanese side during and after the technical cooperation term of the Project.

5 Joint Coordinating Committee for the Project

The Joint Coordinating Committee for the Project was held on October 28, 1998 and the contents of these Minutes of Discussions were reviewed.

6 Attendance of the Discussions

The attendance of the discussions is as shown in ANNEX 23.

LIST OF ANNEXES

ANNEX 1 REVISED PROJECT DESIGN MATRIX (Draft) 1/2

Refinery Safety Training Center Project

Narrative Summary	Detailed contents of Narrative Summary	Indicators	Means of Verification	Important Assumptions
(Overall Goal) Improvements on safety levels contribute to the productivity on Salamanca Refinery.	(Overall Goal) Improvements on safety levels contribute to the productivity on Salamanca Refinery.	Unplanned unit-shut-down frequency due to incidents originated by human error decreases.	Daily reports of refinery operation and/or operation records for each processing unit	· There will be no serious changes in the social and economic situation affecting operations of the refinery. · The policy of PEMEX's top management will not change.
(Project Purpose) The Present safety level of Salamanca Refinery improves due to the application of Japanese Methods.	(Project Purpose) The Present safety level of Salamanca Refinery improves due to the application of Japanese Methods through the activities of the Safety Training Center.	Decrease of injury frequency rate. Decrease of injury severity rate.	Record of injury frequency rate Record of injury severity rate	· Regulations on the environmental and energy saving enforcement will not deteriorate productivity.
(Outputs) 1. Workers' knowledge of Safety is improved. 2. Labor behavior (culture) is improved. 3. Engineers elaborate appropriate work permission systems. 4. All the workers take preventive measures at the beginning of work, after analyzing possible hazards. 5. Workers observe safety standards (to eliminate unsafe behavior and conditions). 6. Personal protection equipment is being used in accordance with regulations. 7. Facilities are improved. 8. Capability of inspection and maintenance is improved. 9. Salamanca Refinery is kept clean and in order at all times.	(Outputs) 0. The organization and management system of the Refinery Safety Training Center is established. 1. Employees' knowledge of Safety is improved. 2. Labor behavior is improved. 3. All the employees take prevencive measures by analyzing potential hazards at the work. 4. Unsafe condition of protection facilities is decreased. 5. Adequate personal protective equipment and tools are being provided at all times in all working fields. 6. Communication is improved in the organization and information is disclosed. 7. PDCA management cycle of the safety activities is functioned.	0-1. The number of counterparts allocation is to be based upon the Minutes of Discussions in principal. (confirmed by every year) 0-2. The authority and responsibility of the project organization are clearly defined. 1-1. Completion ratio of safety training courses for all employees should be over 90%(vs.Plan) 1-2. Test passing (over 60 points) ratio after safety training should be over 80%.(Sampling at random) 1-3. Completion ratio of education on inspection should be over 90%.(vs Plan) 1-4. Qualified inspectors ratio of certification ASNTlevel 2 is over 60%.(vs. Plan) 2-1. Completion ratio of education on behavior should be over 90%.(vs. Plan) 2-2. Absence without notice should be reduced. (vs. 1996) 2-3. Completion ratio of education on 5S should be over 90%. (vs. Plan) 3-1. K.Y.K. Daily Implementation Rate of each working group should be over 80%.(average) 3-2. The number of times of safety meeting concerning accident reports in each area should be once a month. 3-3. Number of Hiyari-Hatto (near miss experience) reported by employees increase every year. 1 per person in 2001. 3-4. Completion ratio of education on guarantee to carry out safety standards should be over 90%. (vs. Plan) 3-5. Completion ratio of education on maintenance safety should be over 90%.(vs. Plan) 4-1. The number of unsafe condition of protection facilities pointed out is decreased. 4-2. Daily checking based on checking table (list) is 100%. 5-1. Provided personal protective equipment should be corresponded to the list when checked periodically. 5-2. Provided tools should be corresponded to the list when checked periodically. 6-1. The number of times of safety meeting in each working area should be held once a month. 6-2. Stationing ratio of safety standards in each control room and each work shop should be 100%. 6-3. The holding ratio of morning assembly, turnover meeting and meeting before starting work in each area should be held over 80%. 7-1. Ratio of issuing safety activity plan and its evaluation report from each line should be over 90%.	0-1. Allocation record of counterparts 0-2. Record of STC 1-1. Training records of STC 1-2. Result of achievement on training 1-3. Training record of STC 1-4. List of certification on inspection and Training Plan 2-1. Training record of STC 2-2. Attendance book 2-3. Training record of STC 3-1. Implementation record 3-2. Minutes of safety meeting 3-3. Report of Hiyari-Hatto 3-4. Training record of STC 3-5. Training record of STC 4-1. Checklist and Repair record 4-2. Checklist 5-1. Personal protective equipment list / Checklist 5-2. Tool list / Checklist 6-1. Minutes of safety meeting 6-2. Checklist 6-3. Patrol 7-1. Safety activity plan / Evaluation report	· Accidents due to causes other than human error do not affect the safety level. · Maintenance and repair works keep the present job level.

ANNEX 1 REVISED PROJECT DESIGN MATRIX (Draft) 2/2

Refinery Safety Training Center Project

Narrative Summary	Detailed contents of Narrative Summary	Inputs		Important Assumptions
		Japanese Side	Mexican Side	· Mexican instructors continue to work for the Project. · The number of trainees does not decrease due to insufficient number of workers. · Salamanca Refinery allocate appropriate budget necessary for application of Japanese Methods to the Refinery.
(Activities) 1-1. Improve contents of safety training. 1-2. Conduct training on safety for all the workers. 1-3. Hold meetings between chiefs and workers to improve communication. 2-1. Conduct seminars on labor behavior. 3-1. Review/revise work permission system and their applications. 3-2. Make safety training plans for engineers. 3-3. Conduct safety education for engineers.. 4-1. Conduct training on K.Y. (Kiken Yochi, i.e., potential hazards analysis). 4-2. Establish system to inform workers of accidents and incidents. 4-3. Implement K.Y. 4-4. Establish system for monitoring K.Y. 5-1. Make appropriate working procedure forms. 5-2. Have engineers participate in revision of working procedure forms. 5-3. Distribute safety standards appropriately. 5-4. Improve system to check/monitor observance of working procedures. 6-1. Use adequate personal protection equipment for each work. 6-2. Check system (Creation, Execution, Feedback). 7-1. Survey to identify unsafe areas of facilities. 7-2. Make routine inspection plan. 7-3. Conduct routine inspection according to the plan. 7-4. Install and complement protection facilities according to the plan. 8-1. Conduct training of maintenance safety. 8-2. Conduct training of technical inspection. 9-1. Make training plans on order and cleanness. 9-2. Conduct seminars on order and cleanness to workers. 9-3. Establish system to check/monitor order and cleanness.	(Activities) 0-1. Allocate counterparts and administrative staff. 0-2. Stipulate duties of functions. 0-3. Install the organization for the decision and the meeting. 1-1. Improve existing safety training system and its contents. 1-2. Conduct training on safety for all the employees. 1-3. Conduct training on technical inspection for inspectors. 2-1. Conduct seminars on labor behavior. 2-2. Conduct seminars on 5S. 2-3. Implement 5S in work places. 3-1. Implement and consolidate KYK (Danger Prediction Activity) in work places. 3-2. Implement and consolidate Hiyari-Hatto (Near miss experience) in work places. 3-3. Implement and consolidate Calling with a Pointed Finger (HAD)in work places. 3-4. Confirm safety based on work permission (work application). 3-5. Attain safety based on the strength of keeping to safety regulations. 3-6. Instruct workers to do correctly maintenance and repair works by understanding work procedure correctly. 3-7. Improve accident analysis system (method and procedure). 3-8. Instruct operators to do certainly daily routine check in line with the daily check table (list). 4-1. Survey unsafe condition (parts) of protection facilities. 4-2. Improve unsafe condition (parts) of protection facilities pointed out. 5-1. Improve management system of tools and personal protective equipment. 5-2. Improve personal protective equipment and tools like non-slip equipment of ladders, chin strap of helmets and safety belts. 6-1. Hold safety meetings in each work place. 6-2. Implement morning assembly in work place, turnover meeting in the shift working area and meeting before starting work. 6-3. Establish new information system about contents of accident and serious Hiyari-Hatto to employees. 6-4. Station safety standards to all the work place. 6-5. Re-introduce and promote Bottom-Up (Small group) activity. 7-1. Establish promotional organization of Japanese safety activities. 7-2. Establish safety promotional meetings. 7-3. Let make annual safety activity plan in each line. 7-4. Monitor and evaluate implementation of the annual safety activity plan.	Dispatch of Experts · Long Term Chief Advisor Project Coordinator Safety Administration Maintenance Safety Process Safety · Short Term Technical Inspection and others Acceptance of C/Ps Training in Japan Provision of Equipment	Space, Building and Facilities Assignment of Counterpart Personnel Equipment and materials Local Costs	Pre-conditions · The Mexican Government supports this Project. · PEMEX recognizes the importance of safety training programs. · Salamanca Refinery cooperates extensively with this project.

ANNEX 2 TENDENCY OF INDICATORS IN REVISED PROJECT DESIGN MATRIX (Draft)

Refinery Safety Training Center Project

Narrative Summary	Detailed contents of Narrative Summary	Indicators	Tendency Index (The number of 1996 are the baseline data.)					
			1996	1997	1998	1999	2000	2001
(Overall Goal) Improvements on safety levels contribute to the productivity on Salamanca Refinery.	(Overall Goal) Improvements on safety levels contribute to the productivity on Salamanca Refinery.	Unplanned unit-shut-down frequency due to incidents originated by human error decreases. ( ) of "Unplanned unit-shut-down frequency" is the total unplanned unit-shut-down frequency.	(44) 16	(29) 10				
(Project Purpose) The Present safety level of Salamanca Refinery improves due to the application of Japanese Methods.	(Project Purpose) The Present safety level of Salamanca Refinery improves due to the application of Japanese Methods through the activities of the Safety Training Center.	Decrease of injury frequency rate. Decrease of injury severity rate.	1.4 64	1.07 66				
(Outputs) 1. Workers' knowledge of Safety is improved. 2. Labor behavior (culture) is improved. 3. Engineers elaborate appropriate work permission systems. 4. All the workers take preventive measures at the beginning of work, after analyzing possible hazards. 5. Workers observe safety standards (to eliminate unsafe behavior and conditions). 6. Personal protection equipment is being used in accordanc with regulations. 7. Facilities are improved. 8. Capability of inspection and maintenance is improved. 9. Salamanca Refinery is kept clean and in order at all times.	(Outputs) 0. The organization and management system of the Refinery Safety Training Center is established. 1. Employees' knowledge of Safety is improved. 2. Labor behavior is improved. 3. All the employees take preventive measures by analyzing potential hazards at the work. 4. Unsafe condition of protection facilities is decreased. 5. Adequate personal protective equipment and tools are being provided at all times in all working fields. 6. Communication is improved in the organization and information is disclosed. 7. PDCA management cycle of the safety activities is functioned.	0-1. The number of counterparts allocation is to be based upon the Minutes of Discussions in principal. (confirmed by every year) 0-2. The authority and responsibility of the project organization are clearly defined. 1-1. Completion ratio of safety training courses for all employees should be over 90%(vs.Plan) *1…Safety Intensive Course 1-2. Test passing (over 60 points) ratio after safety training should be over 80%.(Sampling at random) 1-3. Completion ratio of education on inspection should be over 90%.(vs Plan) 1-4. Qualified inspectors ratio of certification ASNTlevel 2 is over 60%.(vs. Plan) 2-1. Completion ratio of education on behavior should be over 90%.(vs. Plan) 2-2. Absence without notice should be reduced.(vs. 1996) 2-3. Completion ratio of education on 5S should be over 90%. (vs. Plan) 3-1. K.Y.K. Daily Implementation Rate of each working group should be over 80%.(average) 3-2. The number of times of safety meeting concerning accident reports in each area should be once a month. 3-3. Number of Hiyari-Hatto (near miss experience) reported by employees increase every year. 1 per person in 2001. 3-4. Completion ratio of education on guarantee to carry out safety standards should be over 90%. (vs. Plan) 3-5. Completion ratio of education on maintenance safety should be over 90%.(vs. Plan) 4-1. The number of unsafe condition of protection facilities pointed out is decreased. 4-2. Daily checking based on checking table (list) is 100%. 5-1. Provided personal protective equipment should be corresponded to the list when checked periodically. 5-2. Provided tools should be corresponded to the list when checked periodically. 6-1. The number of times of safety meeting in each working area should be held once a month. 6-2. Stationing ratio of safety standards in each control room and each work shop should be 100%. 6-3. The holding ratio of morning assembly, turnover meeting and meeting before starting work in each area should be held over 80%. 7-1. Ratio of issuing safety activity plan and its evaluation report from each line should be over 90%.	check check 0 0 0 0 0 1.82% 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	check check 0 0 0 0 0 2.27% 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	check check 91% *1 (4,712)			

ANNEX 3 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.

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.

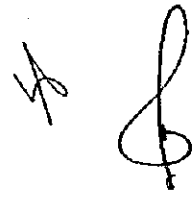
The parameter "Impact" is a foreseeable or unforeseeable, and a favorable or adverse effect of the project upon society. To evaluate impact, both the goal and project purpose should be referred to in the beginning of the evaluation. Evaluation with this components could lead to more than the confirmation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

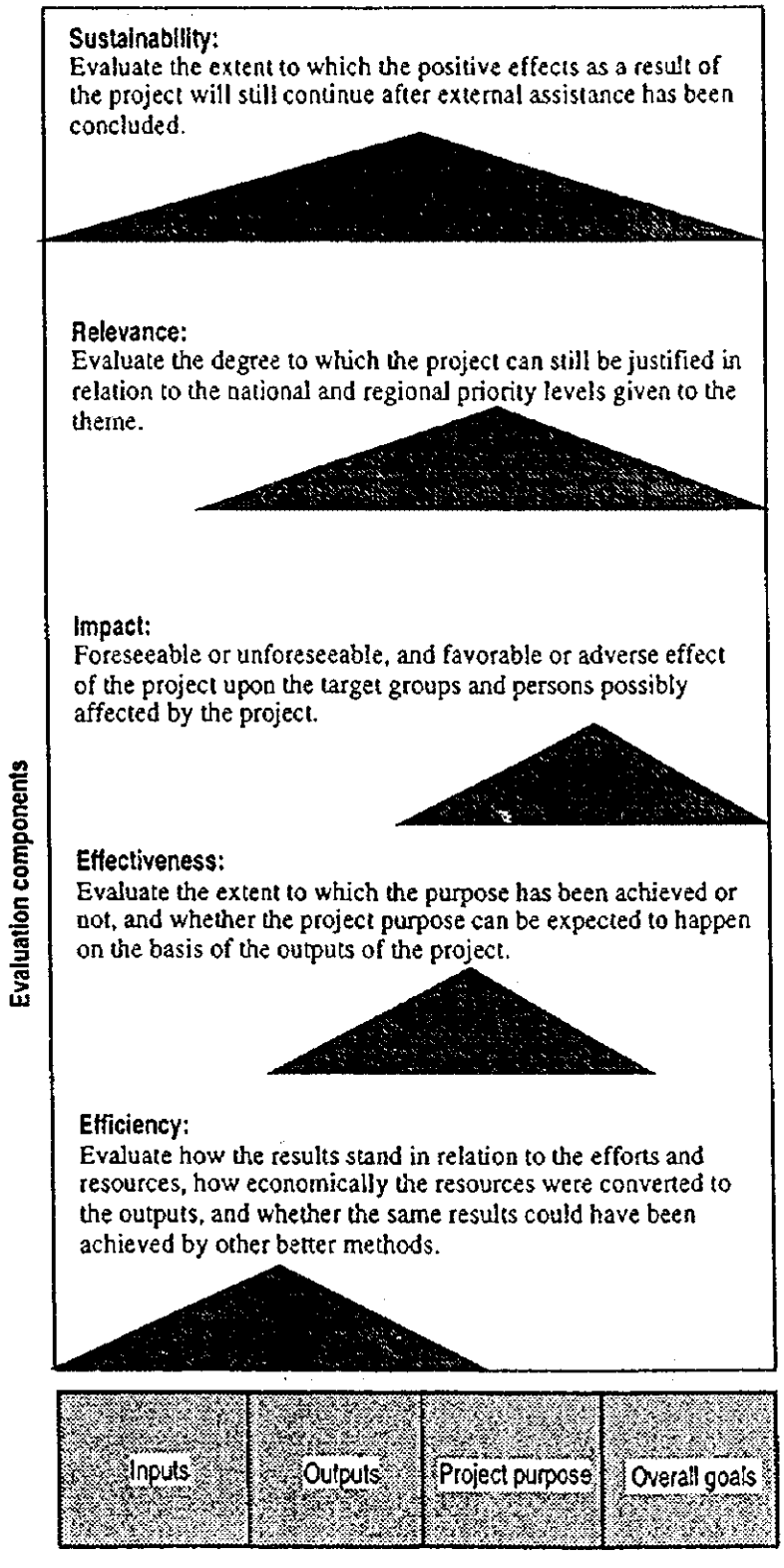
The parameter "Relevance" is to comprehensively evaluate whether or not the project meets the overall goals, politics of both the donor and recipient, local needs and given priority levels, in order to decide whether the project should be continued, reformulated or terminated.

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.





Five Components vs. Goal Hierarchy

ANNEX 4

Plan of Operations for Whole Period (1/9)

Refinery Safety Training Center Project

Outputs	Activities	Target (Breakdown of activities)	← Technical Cooperation Period →																			
			Schedule (Japanese Fiscal Year)																			
			1996		1997				1998				1999				2000				2001		
			III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
0. The organization and the management system of the Refinery Safety Training Center is established.	0-1. Allocate counterpart and administrative personnel.																					
	0-2. Stipulate duties of functions.																					
	0-3. Install the organization for the decision and the meetings.																					

ANNEX 4

Plan of Operations for Whole Period (2/9)

Refinery Safety Training Center Project

Outputs	Activities	Target (Breakdown of activities)	Technical Cooperation Period → Schedule (Japanese Fiscal Year)
			1996 III IV | 1997 I II III IV | 1998 I II III IV | 1999 I II III IV | 2000 I II III IV | 2001 I II III
1. Employees Knowledge of safety is improved.	1-1. Improve existing safety training system and its contents.	1. Preparation	
		2. Implementation and evaluation	
	1-2. Conduct training on safety for all the employees.	1. Elaboration of technology transfer material	
		2. Translation to Spanish	
		3. Technology transfer	
		4. Elaboration of textbooks for training courses by instructors	
		5. Conduct of training courses for all the employees	
		6. Management Skill-up Course	
		7. Safety Advanced Course	
	1-3. Conduct training on technical inspection for inspectors.	1. Investigation	
		2. Purchase of equipment	
		3. Utilization of equipment	
		4. Re-fresh training course	
		5. Certification of ASNT level-2	
		6. Special course of UT	
2. Labor behavior is improved.	2-1. Conduct seminars on labor behavior.	1. Elaboration of technology transfer material	
		2. Translation to Spanish	
		3. Technology transfer	
		4. Elaboration of textbooks for training courses by instructors	
		5. Conduct of training courses for all the employees	

ANNEX 4

Plan of Operations for Whole Period (3/9)

Refinery Safety Training Center Project

Outputs	Activities	Target (Breakdown of activities)	Technical Cooperation Period / Schedule (Japanese Fiscal Year)
	2-2. Conduct seminars on 5S.	1. Elaboration of technology transfer material 2. Translation to Spanish 3. Technology transfer 4. Elaboration of textbooks for training courses by instructors 5. Conduct of training courses for all the employees	
	2-3. Implement 5S in work places.	1. Preparation 2. Implementation and evaluation	
3. All the employees take preventive measures by analyzing potential hazard at the work.	3-1. Implement and consolidate KYK (Danger prediction activity) in work places.	1. Safety Intensive Course of KYK and HAD 2.Introduction, implementation and evaluation	
	3-2. Implement and consolidate Hiyari-Hatto (Near miss experience) in work places.	1. Safety Common Course 2. Introduction, implementation and evaluation	
	3-3. Implement and consolidate Calling with a pointed finger (HAD) in work places.	1. Safety Intensive Course of KYK and HAD 2. Introduction, implementation and evaluation	
	3-4. Confirm safety based on work permission (work application). (1) Review of operation standards (Process safety Group) ・Review of work permission system	1. Elaboration of technology transfer material 2. Translation to Spanish 3. Technology transfer 4. Preparation 5. Implementation and evaluation	

ANNEX 4

Plan of Operations for Whole Period (4/9)

Refinery Safety Training Center Project

Outputs	Activities	Target (Breakdown of activities)	Technical Cooperation Period → Schedule (Japanese Fiscal Year)
	(2) Making sure whether safety is guaranteed before issuing permission (Process safety Group) (3) Introducing guidance, making sure safety based on work permission sheets (Maintenance Safety Group)		
	3-5.Attain safety on the strength of keeping safety regulations. (1) Enforcement and creation of work place that everybody observe the rules (Safety Group) (2) Introducing guidance of observing safety standards (Maintenance Safety Group) (3) Review of operation standards (Process Safety Group) ・ Permission system for using fire temporarily ・ Permission system for working inside towerds and vessels ・ Permission system for working inside furnaces	1. Elaboration of technology transfer material 2. Translation to Spanish 3. Technology transfer 4. Elaboration of textbooks for training courses by instructors 5. Conduct of training courses for all the employees 6. Campaign for keeping safety regulations	

1996: III IV | 1997: I II III IV | 1998: I II III IV | 1999: I II III IV | 2000: I II III IV | 2001: I II III

ANNEX 4

Plan of Operations for Whole Period (5/9)

Refinery Safety Training Center Project

Outputs	Activities	Target (Breakdown of activities)	← Technical Cooperation Period → Schedule (Japanese Fiscal Year)
			1996: III IV / 1997: I II III IV / 1998: I II III IV / 1999: I II III IV / 2000: I II III IV / 2001: I II III
	(4) Review of operation standards (Process Safety Group) · How to make a countermeasure on operation procedures when products quality changes to off-specification · The following operation procedure which were found by checking operation standard of the unit HDS-RR-1 - Safety device test of a centrifugal compressor before starting warming up procedure of a centrifugal compressor · Operation standards of unit operations - Operation standard of a furnace - Operation standard of a centrifugal pump - Operation standard of a centrifugal compressor		

ANNEX 4

Plan of Operations for Whole Period (6/9)

Refinery Safety Training Center Project

Outputs	Activities	Target (Breakdown of activities)	Technical Cooperation Period / Schedule (Japanese Fiscal Year)
			1996: III IV | 1997: I II III IV | 1998: I II III IV | 1999: I II III IV | 2000: I II III IV | 2001: I II III
	3-6. Instruct workers to do correctly maintenance and repair works by understanding work procedure correctly. (1) Introducing guidance to understand the working method correctly and to do the work correctly (Maintenance Safety Group)	1. Elaboration of technology transfer material 2. Translation to Spanish 3. Technology transfer 4. Elaboration of textbooks for training courses by instructors 5. Conduct of training courses for all the employs 6. Preparation for application 7. Implementation and evaluation	
	3-7. Improve accident analysis system. (method and procedure)	1. Elaboration of technology transfer material 2. Translation to Spanish 3. Technology transfer 4. Preparation for application 5. Implementation and evaluation	
	3-8. Instruct operators to do certainly daily routine check in line with the daily check table (list). (1) Daily watching based on checklist	1. Preparation 2. Implementation and evaluation	
4. Unsafe conditions of protection facilities is decreased.	4-1. Survey unsafe condition (parts) of protection facilities.	1. Preparation 2. Implementation and evaluation	

ANNEX 4

Plan of Operations for Whole Period (7/9)

Refinery Safety Training Center Project

Outputs	Activities	Target (Breakdown of activities)	Technical Cooperation Period → Schedule (Japanese Fiscal Year)
	4-2. Improve unsafe condition (parts) of protection facilities pointed out.	1. Preparation 2. Implementation and evaluation	
5. Adequate personal protective equipment and tools are being allocated at al times in the working fields.	5-1. Improve management system of tools and personal protective equipment. (1) Improvement of the management system for personal protective equipment. (Safety Group) (2) Supply tool bags, etc. ・ Tool bags and sacks for tools ・ Wheel keys (Process Safety Group) (3) The management and charge system of tools and protectors (Maintenance Safety Group)	1. Investigation 2. Implementation and evaluation	
	5-2. Improve personal protective equipment and tools like non-slip equipment of ladders, chin strap of helmets and safety belts. (1) Improvement of the safety helmets and safety belts (Safety Group) (2)Improvement of tools and Protectors (Maintenance Safety Group)	1. Investigation 2. Implementation and evaluation	

1996 III IV | 1997 I II III IV | 1998 I II III IV | 1999 I II III IV | 2000 I II III IV | 2001 I II III

ANNEX 4

Plan of Operations for Whole Period (8/9)

Refinery Safety Training Center Project

Outputs	Activities	Target (Breakdown of activities)	Technical Cooperation Period → Schedule (Japanese Fiscal Year)																			
			1996		1997				1998				1999				2000				2001		
			III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
6. Communication is improved in the organization and information is disclosed.	6-1. Hold safety meetings in each work place.	1. Preparation 2. Implementation and evaluation																					
	6-2. Implement morning meeting in work place, turnover meeting in the shift working area and meeting before starting work. (1) Tool box meeting (Safety Group) (2) Turnover meeting (Process Safety Group) (3) Morning meeting, Toolbox meeting and Joint meeting (Maintenance Safety Group)	1. Preparation 2. Implementation and evaluation																					
	6-3. Establish new information system about contents of accident and serious Hiyari-Hatto to employees.	1. Preparation 2. Implementation and evaluation																					
	6-4. Station safety standards to all the work places. (1) Put of operation standards in all the work places	1. Preparation 2. Implementation and evaluation																					
	6-5. Re-introduce and promote Bottom-Up (Small Group) activity.	1. Preparation 2. Re-introduction and evaluation																					

ANNEX 4

Plan of Operations for Whole Period (9/9)

Refinery Safety Training Center Project

Outputs	Activities	Target (Breakdown of activities)	← Technical Cooperation Period → Schedule (Japanese Fiscal Year)																			
			1996		1997				1998				1999				2000				2001		
			III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
7. PDCA management cycle of the safety activities is functioned.	7-1. Establish promotional organization of safety activities.	1. Preparation																					
		2. Establishment and operation																					
	7-2. Establish safety promotional meetings.	1. Preparation																					
		2. Establishment and operation																					
	7-3. Let make annual safety activity plan in each line.	1. Preparation																					
		2. Implementation																					
	7-4. Monitor and evaluate implementation of the annual safety activity plan.	1. Preparation																					
		2. Implementation																					

ANNEX 5

Annual Plan of Operations (1/11)

Refinery Safety Training Center Project

Outputs	Activities	Target (Breakdown of activities)	Schedule 1998 9	10	11	12	1999 1	2	3	4	5	6	7	8	9	10	11	12	Responsible Person in Project	Input	Remarks
0. The organization and the management system of the Refinery Safety Training Center is established.	0-1. Allocate counterpart and administrative personnel.	1. Confirmation by the Joint Coordinating Committee		◎												◎			Pro. Mgr. Pro. Mgr.Assi. Mgr. of STC C.A.	C/P	
	0-2. Stipulate duties of functions.	1. Review		◎												◎			Pro. Cor.		
	0-3. Install the organization for the decision and the meetings.	1. Review		◎												◎					

(Remarks) Pro. Mgr.: Project Manager Pro. Mgr. Assi.: Project Manager Assistant Mgr. of STC: Manager of Safety Training Center C.A.: Chief Advisor Pro. Cor: Project Coordinator

ANNEX 5

Annual Plan of Operations (2/11)

Refinery Safety Training Center Project

Outputs	Activities	Target (Breakdown of activities)	Schedule 1998: 9	10	11	12	1999: 1	2	3	4	5	6	7	8	9	10	11	12	Responsible Person in Project	Input	Remarks
1. Employees Knowledge of safety is improved.	1-1. Improve existing safety training system and its contents.	1. Consensus with counter-parts 2. Explannation to SITSI 3. Consultation meeting 4. Implementation						◎											1.-3. Sa.Ex Sa.C/P SITSI 4. RIAMA	Sa.Ex Sa.C/P SITSI	
	1-2. Conduct training on safety for all the employees.	1. Safety Intensive Course of KYK & HAD (Finished) 2. Ordinary Course for engineers 3. Ordinary Course for workers 4. Management skill-up Course for engineers 5. Safety Advanced Course for safety engineers																	All Experts All C/P	All Expets All C/P STC Equipment	
	1-3. Conduct training on technical inspection for inspectors.	1. Utilization of equipment 2. Re-fresh Training Course (Finished) 2. CIDESI course for getting ASNT level-2 3. Special Training Course (UT)																	Inspection Sh.Ex Inspection C/P SITSI	Inspection Sh.Ex Inspection C/P SITSI Equipment	
2. Labor behavior is improved.	2-1. Conduct seminars on labor behavior.	1. Safety Intensive Course of KYK & HAD (Finished) 2. Safety Common Course 3. Creating workplace where observe rules																	Sa.Ex Sa.C/P	Sa.Ex Sa.C/P	

(Remarks) Sa.Ex: Safety Administration Expert Sa.C/P: Safety Group Counterpart Inspection Sh. Ex: Inspection Short-term Expert STC: Safety Training Center

ANNEX 5

Annual Plan of Operations (3/11)

Refinery Safety Training Center Project

Outputs	Activities	Target (Breakdown of activities)	Schedule 1998 9	10	11	12	1999 1	2	3	4	5	6	7	8	9	10	11	12	Responsible Person in Project	Input	Remarks
	2-2. Conduct seminars on 5S.	1. Safety common course for engineers (Phase 2) 2. Safety common course for workers (Phase 1) 3. Follow-up training for promoters	—				- -	- -	- -	- -	- -	- -	- -	- -		- -			Sa.Ex Sa. C/P	Sa.Ex Sa.C/P	
	2-3. Implement 5S in work places. (1) Common of 5S (Safety Common)	(1)-1. Fix the concept of 5S activity (1)-2. Fix the formulating and implementing basic plans (1)-3. Preparation of introduction 5S (1)-4. Implementation of 5S	—				- -	- -					- -	- -	- -	- -	- -	- -	RIAMA C/P	RIAMA C/P	
	(2) Implementation of 5S in work places (Process Safety-Maintenance (#3))	(2)-1. Planning (2)-2. Cost estimation (2)-3. Explanation to GM (2)-4. Implementation	—	—	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	(2)-1.-3. Pr.Ex Pr.C/P (2)-4. RIAMA	Pr.Ex Pr.C/P RIAMA Budget	
3. All the employees take preventive measures by analyzing potential hazard at the work.	3-1. Implement and consolidate KYK (Danger prediction activity) in work places.	1. Safety Intensive Course of KYK and HAD(Finished) 2.Introduction of KYK 3. Implementation of KYK 4. Aiming consolidation of KYK	—	—	- -		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	Sa.Ex Sa.C/P RIAMA	Sa.Ex Sa.C/P RIAMA	

(Remarks) Pr.Ex: Process Safety Expert Pr.C/P: Process Safety Group Counterpart

ANNEX 5

Annual Plan of Operations(4/11)

Refinery Safety Training Center Project

Outputs	Activities	Target (Breakdown of activities)	Schedule 1998 9	10	11	12	1999 1	2	3	4	5	6	7	8	9	10	11	12	Responsible Person in Project	Input	Remarks
	3-2. Implement and consolidate Hiyari-Hatto (Near miss experience) in work places.	1. Introduction of Hiyari-Hatto (Near miss experience)											-	-	-	-			Sa.Ex Sa.C/P RIAMA	Sa.Ex Sa.C/P RIAMA	
		2. Implementation														-	-	-			
	3-3. Implement and consolidate Calling with a pointed finger (HAD) in work places.	1.Introduction(from Aug.)			—	-													Sa.Ex Sa.C/P	Sa.Ex Sa.C/P	
		2. Implementation					-	-	-	-	-	-	-	-	-	-	-	-			
		3. Consolidation																	RIAMA	RIAMA	
	3-4. Confirm safety based on work permission (Work application).	(1)-1. Draft up idea					-	-	-	-	-	-							Pr.Ex Pr.C/P	Pr.Ex Pr.C/P	
	(1) Review of operation standards (Process safety Group)	(1)-2.Discussion with GM of SITSI and Operation Dept.									-	-							RIAMA	RIAMA	
	· Review of work permission system	(1)-3. Approval by CDD										◎									
		(1)-4. Implementation											-	-	-	-	-	-			
	(2) Making sure whether safety is guaranteed before issuing permission (Process safety Group)	(2)-1. Making an additional checklist					-	-	-	-	-	-							Pr.Ex Pr.C/P	Pr.Ex Pr.C/P	
		(2)-2. Start to apply											-	-	-				RIAMA	RIAMA	
		(2)-3. Spread this procedure to all the refineries														-	-	-			
	(3) Introducing guidance, making sure safety based on work permission sheets (Maintenance Safety Group)	(3)-1. Guidance					-	-	-	-	-	-	-	-	-	-			Ma.Ex Ma.C/P RIAMA	Ma.Ex Ma.C/P RIAMA	
		(3)-2. Start to apply					-	-	-	-											
		(3)-3. Check and review										-	-								

(Remarks) Ma.Ex: Maintenance Safety Expert Ma.C/P: Maintenance Safety Group Counterpart

ANNEX 5

Annual Plan of Operations (5/11)

Refinery Safety Training Center Project

Outputs	Activities	Target (Breakdown of activities)	Schedule 1998 9	10	11	12	1999 1	2	3	4	5	6	7	8	9	10	11	12	Responsible Person in Project	Input	Remarks
	3-5. Attain safety on the strength of keeping safety regulations. (1) Enforcement and creation of work place that everybody observe the rules (Safety Group)	(1)-1. Safety Common Course																	Sa.Ex Sa.C/P RIAMA	Sa.Ex Sa.C/P RIAMA	
		(1)-2. Campaign for keeping safety regulation (Safety Group)																			
		(1)-3. Review of the rules and manuals in order to be observed by everybody																			
	(2) Introducing guidance of observing safety standards (Maintenance Safety Group)	(2)-1. Guidance to the managers																	Ma.Ex Ma.C/P RIAMA	Ma.Ex Ma.C/P RIAMA	
		(2)-2. Review of existing standards																			
		(2)-3. Education to workers																			
	(3) Review of operation standards (Process Safety Group) · Permission system for using fire temporarily · Permission system for working inside towers or vessels · Permission system for working inside furnaces	(3)-1. Investigation																	Pr.Ex Pr.C/P RIAMA	Pr.Ex Pr.C/P RIAMA	
		(3)-2. Discussion with GM of SITSI																			
		(3)-3. Draft up																			
		(3)-4. Approval by CDD																◎			

ANNEX 5

Annual Plan of Operations (6/11)

Refinery Safety Training Center Project

Outputs	Activities	Target (Breakdown of activities)	Schedule 1998 9	10	11	12	1999 1	2	3	4	5	6	7	8	9	10	11	12	Responsible Person in Project	Input	Remarks
	(4) Review of operation standards (Process Safety Group) · How to make a countermeasure on operation procedures when products quality changes to off-specification · The following operation procedure which were found by checking operation standard of the unit HDS-RR-1 - Safety device test of a centrifugal compressor before starting warming up procedure of a centrifugal compressor · Operation standards of unit operations - Operation standard of a furnace - Operation standard of a centrifugal pump - Operation standard of a centrifugal compressor	(4)-1. Discussion with GM of Operation and Investigation (4)-2. Revision of operation standard concerning off-specification (4)-3. Study of possibility to revise the following - safety device test of compressor - warming up procedure of compressor																	Pr.Ex Pr.C/P RIAMA	Pr.Ex Pr.C/P RIAMA	
	3-6. Instruct workers to do correctly maintenance and repair works by understanding work procedure correctly. (1) Introducing guidance to understand the working method correctly and to do the work correctly (Maintenance Safety Group)	1. Introducing guidance to Cabos 2. Introducing guidance to managers																	Ma.Ex Ma.C/P RIAMA	Ma.Ex Ma.C/P RIAMA	

ANNEX 5

Annual Plan of Operations(7/11)

Refinery Safety Training Center Project

Outputs	Activities	Target (Breakdown of activities)	Schedule 1998 9	10	11	12	1999 1	2	3	4	5	6	7	8	9	10	11	12	Responsible Person in Project	Input	Remarks
	3-7. Improve accident analysis system. (method and procedure)	1. Consultation meeting 2. Implementation			◎														Sa.Ex Sa.C/P RIAMA	Sa.Ex Sa.C/P RIAMA	
	3-8. Instruct operators to do certainly daily routine check in line with the daily check table (list). (1) Daily watching based on checklist	1. Approval by CDD 2. Making equipment list and checklist(Operation standards for daily watching) 3. Start to implement				◎													Pr.Ex Pr.C/P RIAMA	Pr.Ex Pr.C/P RIAMA	
4. Unsafe conditions of facilities is decreased.	4-1.Survey unsafe condition (parts) of protection facilities.	1. Finding out 2. Explanation to the GM of operation and maintenance 3. Approval by CDD and budgeting													◎				Sa.Ex Sa.C/P RIAMA	Sa.Ex Sa.C/P RIAMA	
	4-2. Improve unsafe condition(parts) of protection facilities pointed out.	1-1. Preparation 1-2. Implementation																	Sa.Ex Sa.C/P RIAMA	Sa.Ex Sa.C/P RIAMA	

ANNEX 5

Annual Plan of Operations(8/11)

Refinery Safety Training Center Project

Outputs	Activities	Target (Breakdown of activities)	Schedule 1998 9	10	11	12	1999 1	2	3	4	5	6	7	8	9	10	11	12	Responsible Person in Project	Input	Remarks
5. Adequate personal protective equipment and tools are being allocated at all times in the working fields.	5-1. Improve management system of tools and personal protective equipment. (1) Improvement of the management system for personal protective equipment (Safety Group)	(1)-1. Discussion with counterparts (1)-2 .Investigation of the problems (1)-3. Interview at each workplace	———	———	- - -	- - -													Sa.Ex Sa.C/P SITSI	Sa.Ex Sa.C/P SITSI	
	(2) Supply tool bags, etc. · Tool bags and sacks for tools · Wheel keys (Process Safety Group)	(2)-1.Discussion with GM of Operation about tool bags (2)-2. Supply of tool bags (2)-3. Findind out of the real causes of accidents about wheel keys	———	———	———	- - -	- - -	- - -	- - -	- - -	- - -	- - -							Pr.Ex Pr.C/P RIAMA	Pr.Ex Pr.C/P RIAMA	
	(3) The management and charge system of tools and protectors (Maintenance Safety Group)	(2)-4.Study of the countermeasures (2)-5. Approval by CDD					- - -								◎						
		(3)-1. Proposal (3)-2. Suggestion to RIAMA					- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	Ma.Ex Ma.C/P RIAMA	Ma.Ex Ma.C/P RIAMA	
	5-2. Improve personal protective equipment and tools like non-slip equipment of ladders, chin strap of helmets and safety belts. (1) Improvement of the safety helmets and safety belts (Safety Group)	(1)-1. Discussion with counterparts (1)-2. Proposal to RIAMA (1)-3. Change of the type of helmet or safety belt		◎	———		- - -	- - -	- - -	- - -	- - -	- - -	- - -						Sa.Ex Sa.C/P SITSI	Sa.Ex Sa.C/P SITSI	
	(2)Improvement of tools and Protectors (Maintenance Safety Group)	(2-)1. Suggestion to RIAMA					- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	Ma.Ex Ma.C/P RIAMA	Ma.Ex Ma.C/P RIAMA	

ANNEX 5

Annual Plan of Operations(9/11)

Refinery Safety Training Center Project

Outputs	Activities	Target (Breakdown of activities)	Schedule 1998 9	10	11	12	1999 1	2	3	4	5	6	7	8	9	10	11	12	Responsible Person in Project	Input	Remarks
6. Communication is improved in the organization and information is disclosed.	6-1.Hold safety meeting in each work place.	1. Discussion about how to proceed safety meeting with counterparts 2. Discussion with SITSI manager 3. Proposal to CDD 4. Introduction of safety meeting		◎									- - - - - - - - - - - -						1.-3. Sa.Ex Sa.C/P SITSI 4. SITSI	Sa.Ex Sa.C/P SITSI	
	6-2. Implement morning meeting in work place, turnover meeting in the shift working area and meeting before starting work. (1) Tool box meeting (Safety Group) (2) Turnover meeting (Process Safety Group) (3) Morning meeting, Toolbox meeting and Joint meeting (Maintenance Safety Group)	(1)-1. Proposal of introduction of TBM (1)-2. Approval of TBM by CDD (1)-3. Implementation of TBM	◎				◎						- - - - - - - - - - - -						(1)-1.,2. Sa.Ex Sa.C/P SITSI (1)-3. SITSI	Sa.Ex Sa.C/P SITSI	
		(2)-1. Explaination to GM of Operation (2)-2. Approval by CDD (2)-3. Implementation	◎			◎							- - - - - - - - - - - -						(2)-1.,2. Pr.Ex Pr.C/P RIAMA (2)-3. RIAMA	Pr.Ex Pr.C/P RIAMA	
		(3)-1. Implementation					- - - - - - - - - - - -						- - - - - - - - - - - -								
	6-3. Establish new information system about contents of accident and serious Hiyari-Hatto to employees.	1. Discussion with RIAMA 2. Approval by CDD 3. Change of the existing system						◎	- - - - - - - - - - - -										1.,2. Sa.Ex Sa.C/P RIAMA 3. RIAMA	Sa.Ex Sa.C/P RIAMA	

ANNEX 5

Annual Plan of Operations (10/11)

Refinery Safety Training Center Project

Outputs	Activities	Target (Breakdown of activities)	Schedule 1998 9	10	11	12	1999 1	2	3	4	5	6	7	8	9	10	11	12	Responsible Person in Project	Input	Remarks
	6-4. Station safety standards to all the work place. (1) Put of operation standards in all the work places	1. Investigation 2. Planning 3.Proposal to CDD 4. Put of operation standards in all the work places								◎									1.~3. Sa.Ex Sa.Ex Sa.C/P Sa.C/P STC STC RIAMA 4. RIAMA	Sa.Ex Sa.C/P STC RIAMA	
	6-5. Re-introduce promote Bottom-Up (Small Group) activity.	1. Study of the re-start of small group activity 2. Fix of the concept of small group activity 3. Fix of the basic plan of activity 4. Preparation for re-start of activity 5. Re-start of activity																	1.~4. Sa.Ex Sa.Ex Sa.C/P Sa.C/P RIAMA RIAMA 5. RIAMA	Sa.Ex Sa.C/P RIAMA	
7. PDCA management cycle of the safety activities is functioned.	7-1. Establish promotional organization of safety activities.	1. Proposal to CDD (Finished) 2. Manager meeting 3. Promoter meeting 4. Supervisors and Cabos meeting		◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	C.A. Mgr.of SITSI Sa.Ex C/P SITSI	C.A. Mgr.of SITSI Sa.Ex C/P SITSI	
	7-2. Establish safety promotional meetings.	1. Discussion with counter-parts 2. Discussion with SITSI 3. Fix of the promotional safety meeting							◎										Sa.Ex Sa.C/P SITSI RIAMA	Sa.Ex Sa.C/P SITSI RIAMA	

(Remarks) Mgr.of SITSI: Manager of SITSI

ANNEX 5

Annual Plan of Operations (11/11)

Refinery Safety Training Center Project

Outputs	Activities	Target (Breakdown of activities)	Schedule 1998 9	10	11	12	1999 1	2	3	4	5	6	7	8	9	10	11	12	Responsible Person in Project	Input	Remarks
	7-3. Let make of annual safety activity plan in each line.	1. Discussion with counter-parts	—																Sa.Ex Sa.C/P	Sa.Ex Sa.C/P	
		2. Discussion with SITSI		—															SITSI	SITSI	
		3. Study of Policy Control System in detail							- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	RIAMA	RIAMA	
	7-4. Monitor and evaluate implementation of the annual safety activity plan.	1. Discussion with counter-parts	—																Sa.Ex Sa.C/P	Sa.Ex Sa.C/P	
		2. Discussion with SITSI		—															SITSI	SITSI	
		3. Study of Monitoring and Evaluation System in detail							- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	RIAMA	RIAMA	

ANNEX 6

LIST OF JAPANESE EXPERTS

1. LONG-TERM EXPERTS

Chief Advisor

Ing. Ryuzo Furukawazono	5 December, 1996 to 4 December, 1998

Coordinator

Ing. Hiroshi Isaki	5 December, 1996 to 4 December, 1998

Safety Administration

Ing. Hajime Mori	16 January, 1997 to 15 January, 1999
Ing. Eizo Uegaki	16 January, 1997 to 15 January, 1999

Maintenance Safety

Ing. Hideyuki Iwasato	16 January, 1997 to 15 January, 1999

Process Safety

Ing. Toru Moriyama	16 January, 1997 to 15 January, 1999

SHORT-TERM EXPERTS

Maintenance and Inspection Management

Ing. Utaro Kakiura	10 July, 1997 to 8 October, 1997

Non Destructive Inspection Technology

Ing. Sanshiro Kimoto	12 March, 1998 to 9 May, 1998

Inspection Technology for Corrosion

One expert	(Scheduled in Japanese Fiscal Year 1998)

ANNEX 7

LIST OF MEXICAN COUNTERPARTS TRAINED IN JAPAN

1. TRAINED IN JAPANESE FISCAL YEAR 1996

Safety Administration and Maintenance

Ing. Guillermo Camacho Uriarte	3 October, 1996 to 17 October, 1996

2. TRAINED IN JAPANESE FISCAL YEAR 1997

Safety Administration

Ing. José Renteria Soto	24 September, 1997 to 20 October, 1997

Safety Management Technology

Ing. Rafael Alvarez Martínez	24 September, 1997 to 27 October, 1997

Maintenance Safety

Ing. Victor Manuel Munguía Zúñiga	24 September, 1997 to 27 October, 1997

3. TRAINED IN JAPANESE FISCAL YEAR 1998

Safety Administration

Ing. Jesús Manuel Almanza Torres	1 April, 1998 to 2 May, 1998
Ing. Carlos Rafael Cuevas Zaldo	1 April, 1998 to 2 May, 1998
Ing. Candelario E. Cú Gutíerrez	1 April, 1998 to 2 May, 1998

ANNEX 8

PRIORITY LIST FOR JAPANESE SHORT-TERM EXPERTS AND COUNTERPARTS TRAINING IN JAPAN IN JAPANESE FY 1999

1. SHORT-TERM EXPERTS

PRIORITY	AREA	JUSTIFICATION
A	Inspection	Ultrasonic Inspection Technique for High Temperature and Pressure Vessels.
A	Safety	HAZOP and Fault Tree Analysis

2. MEXICAN COUNTERPARTS TRAINING IN JAPAN

PRIORITY	AREA	NAME OF CANDIDATES
A	Process Safety	Ing. Sergio González Beltrán
A	Maintenance Safety	Ing. Fernando Martínez Fernández
A	Inspection	Sr. J. Guadalupe Escalante Salazar

ANNEX 9-1

LIST OF MACHINERY, EQUIPMENT AND MATERIALS PROVIDED BY THE JAPANESE SIDE(1/3)

1. LIST OF JAPANESE FY 1996

Name of equipment		Number of unit
1.-	Digital Video Disk	1
2.-	TV-Sets	6
3.-	Video-Sets	6
4.-	Video Editor	1
5.-	Personal Computers	8
6.-	Note-type personal computer	1
7.-	Laser printers (black and white)	3
8.-	Color printer (Ink-jet type)	1
9.-	Copy machines	2
10.-	Facsimile	1
11.-	Vehicle	1
12.-	Electric White board	1
13.-	OHPs	7
14.-	Multimedia Projector	1
15.-	Video cameras	2
16.-	Screens for OHP	7
17.-	Laser pointers	14

LIST OF MACHINERY, EQUIPMENT AND MATERIALS PROVIDED BY JAPANESE SIDE(2/3)

2. LIST OF JAPANESE FY 1997

Safety:

1.- Chromatograf for environmental Measurements with complementary equipment (Five Pump Gilair-5" Programmable)

2.- Sonometer

3.- Fire Laboratory Kit

Inspection:

4.- Ultrasonic equipment for flaw detection with complementary equipment (Kraut-Kramer Branson Model USN-52)

5.- Equipment for flaw detection in steel pipelines (Model Steel-Test 1000)

6.- "ZETEC" Equipment for Electromagnetic Inspection(Model MIZ 40-RFT)

7.- Ultrasonic equipment for thickness measurement with complementary equipment
(Kraut-Kramer Branson Model USN-52)

8.- Magnaflux equipment for magnetic particles inspection

9.- Ultrasonic equipment for flaw detection. (Kraut-Kramer Branson Model USN-52)

10.- Texas nuclear equipment for alloy analyzer (TEXAS nuclear model 9277)

11.- "ZETEC" equipment for Electromagnetic Inspection (Model MIZ 40-A)

Others:

12.- Books(safety, process, inspection and maintenance)

13.- Videotapes (safety, process, inspection and maintenance)

LIST OF MACHINERY, EQUIPMENT AND MATERIALS PROVIDED BY JAPANESE SIDE(3/3)

3. LIST OF JAPANESE FY 1998

1. - Books (safety, process, inspection and maintenance)
*1 Videotapes set contained books(Textbooks)

2. - Videotapes (safety, process, inspection and maintenance)

- Safety rules(in English)
- Personal Safety(in English)
- Daily routine works(in English)
- Preparation for Maintenance(in English)
- A typical day of the plant operators(in English)
- Hazards of flammables(in English)
- Valve operation(in English)
- Personal protective equipment (in Spanish)
- Static electricity(in English)
- Oxygen deficiency(in English)
- Controllers and control mode(in English) *1
- Valves : Operation and Design(in English) *1
- Fired heater(in English) *1
- Centrifugal pumps(in English) *1
- Centrifugal compressors(in English) *1

ANNEX 9-2

TENTATIVE LIST OF EQUIPMENT AND MATERIALS REQUESTED BY THE MEXICAN SIDE FOR THE PROVISION IN JAPANESE FY 1999

Safety:

1. - Gas Dispersion and Fire Simulation(Software)
(Dupont Safer Systems- Trace)
(Including Fire and Explosion, Release rate Estimation, Infiltration and Tool Kit Capabilities)

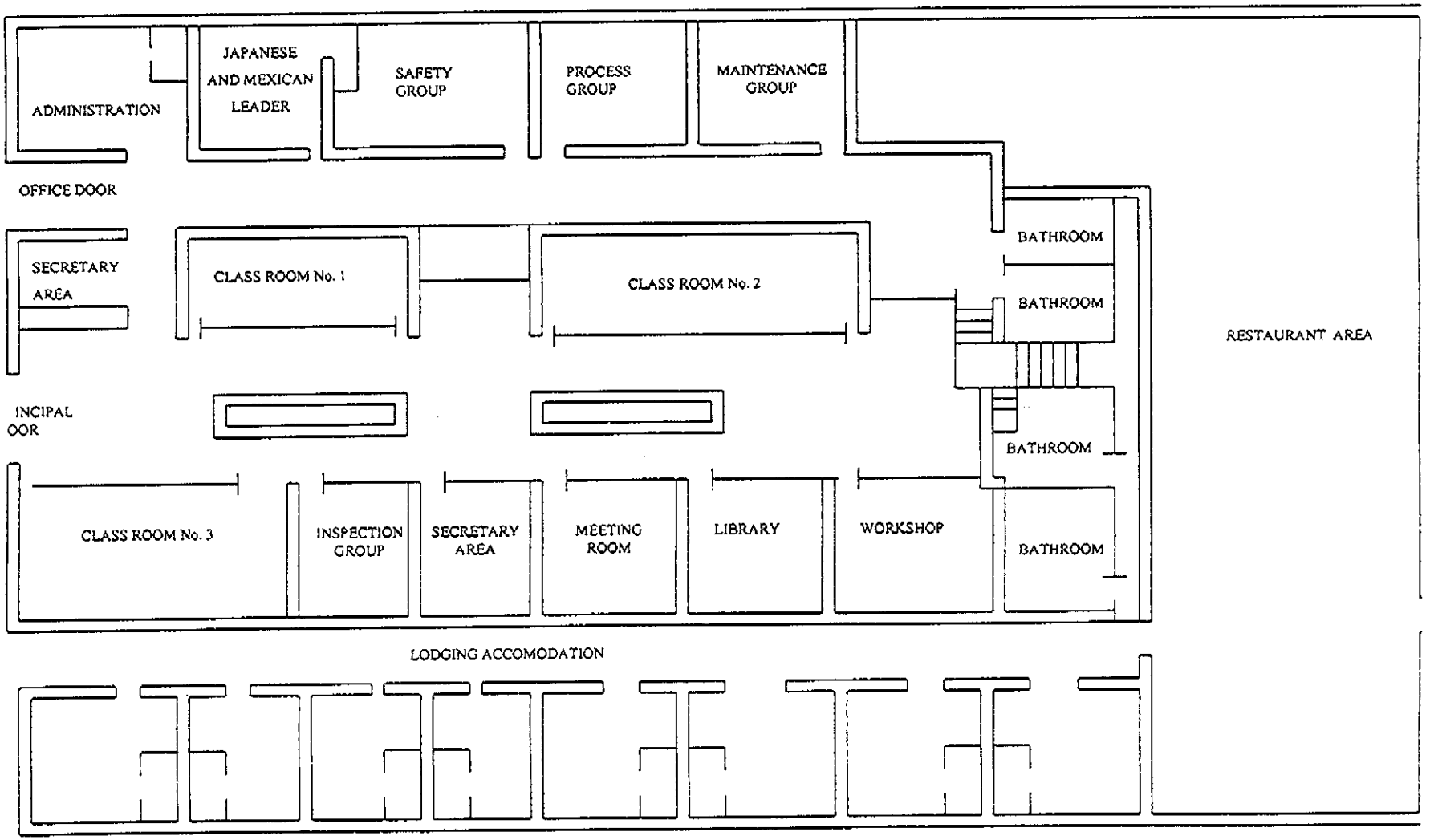
Inspection:

1. - Standard Test Pieces	Number
• For UT	
JIS- A1	1
JIS- A2	1
JIS- A3	1
JIS- RB-D	1
JIS- RB-4 No.1	1
JIS- RB-4 No.2	1
• For MT	
JIS- A1 15/100-Round Type (Consumables)	2
JIS- A1 30/100-Round Type (Consumables)	2
JIS- A2 15/100-Linear Type (Consumables)	2
JIS- A2 30/100-Linear Type (Consumables)	2
• For Liquid Penetration	
Aluminum Comparison (ASME Type) (Consumables)	4

ANNEX 10

LAYOUT OF THE REFINERY SAFETY TRAINING CENTER

ARCHITECTURE PLAN

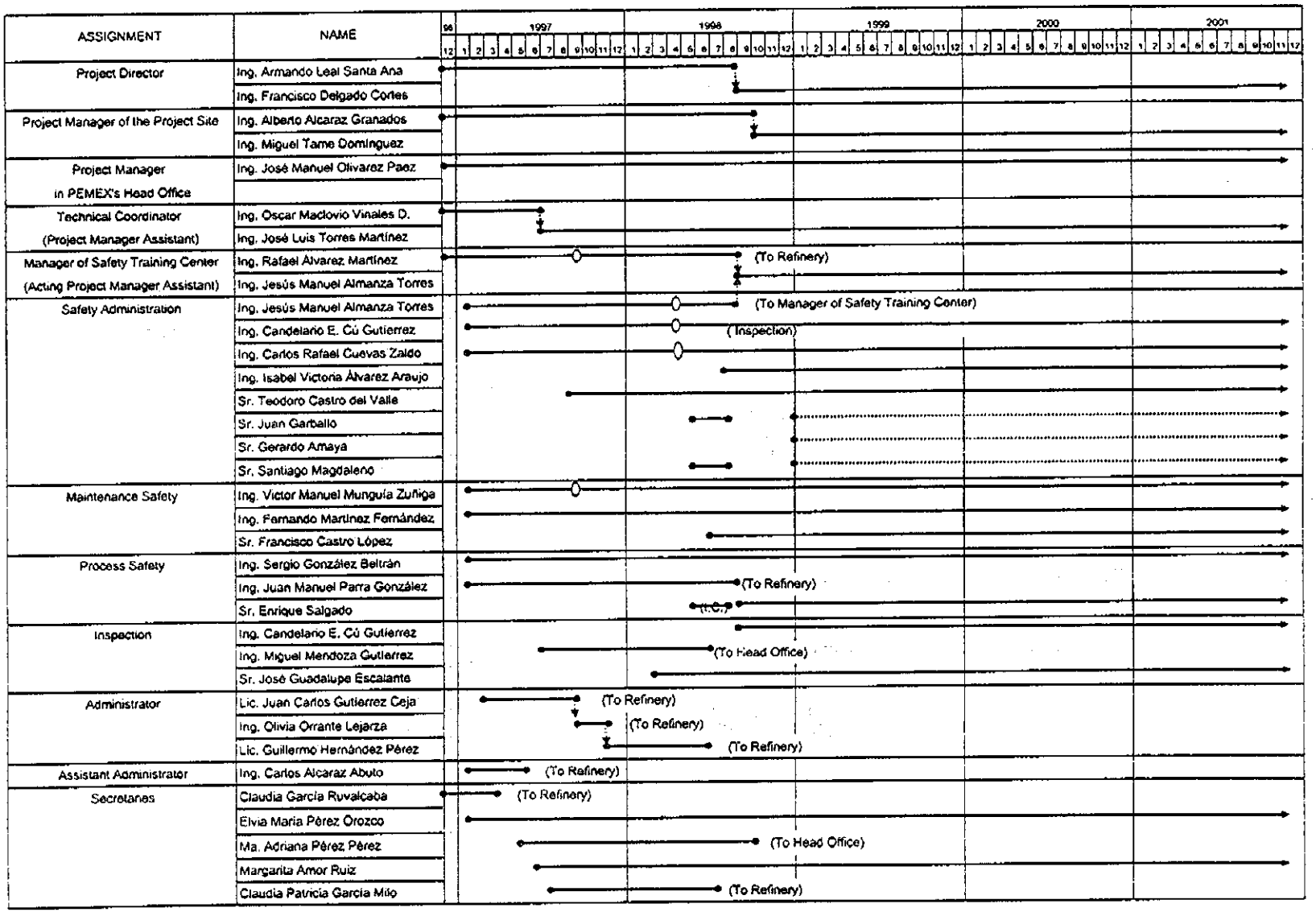


ANNEX 11-1

LIST OF MEXICAN COUNTERPART PERSONNEL AND ADMINISTRATIVE STAFF

ASSIGNMENT	NUMBER OF C/Ps	NAME
Project Director	1	Ing. Francisco Delgado Cortes
Project Manager of the Project Site	1	Ing. Miguel Tame Domínguez
Project Manager in PEMEX's Head Office	1	Ing. José Manuel Olivarez Paez
Technical Coordinator (Project Manager Assistant)	1	Ing. José Luis Torres Martínez
Manager of Safety Training Center (Acting Project Manager Assistant)	1	Ing. Jesús Manuel Almanza Torres
Safety Administration	6	Ing. Carlos Rafael Cuevas Zaldo Ing. Isabel Alvarez Araujo Sr. Teodoro Castro del Valle Sr. Juan Garballo (from the next January) Sr. Gerardo Amaya(from the next January) Sr. Santiago Magdaleno(from the next January)
Maintenance Safety	4	Ing. Victor M. Munguía Zúñiga Ing. Fernando Martínez Fernández Sr. Francisco Castro Lopez Pending (from the next January)
Process Safety	2	Ing. Sergio González Beltrán Sr. Enrique Salgado
Inspection	2	Ing. Candelario E. Cú Gutierrez Sr. Jose Guadalupe Escalante
Secretaries	2	List up of names is not necessary
Driver	1	List up of name is not necessary
House Keeper	1	List up of name is not necessary

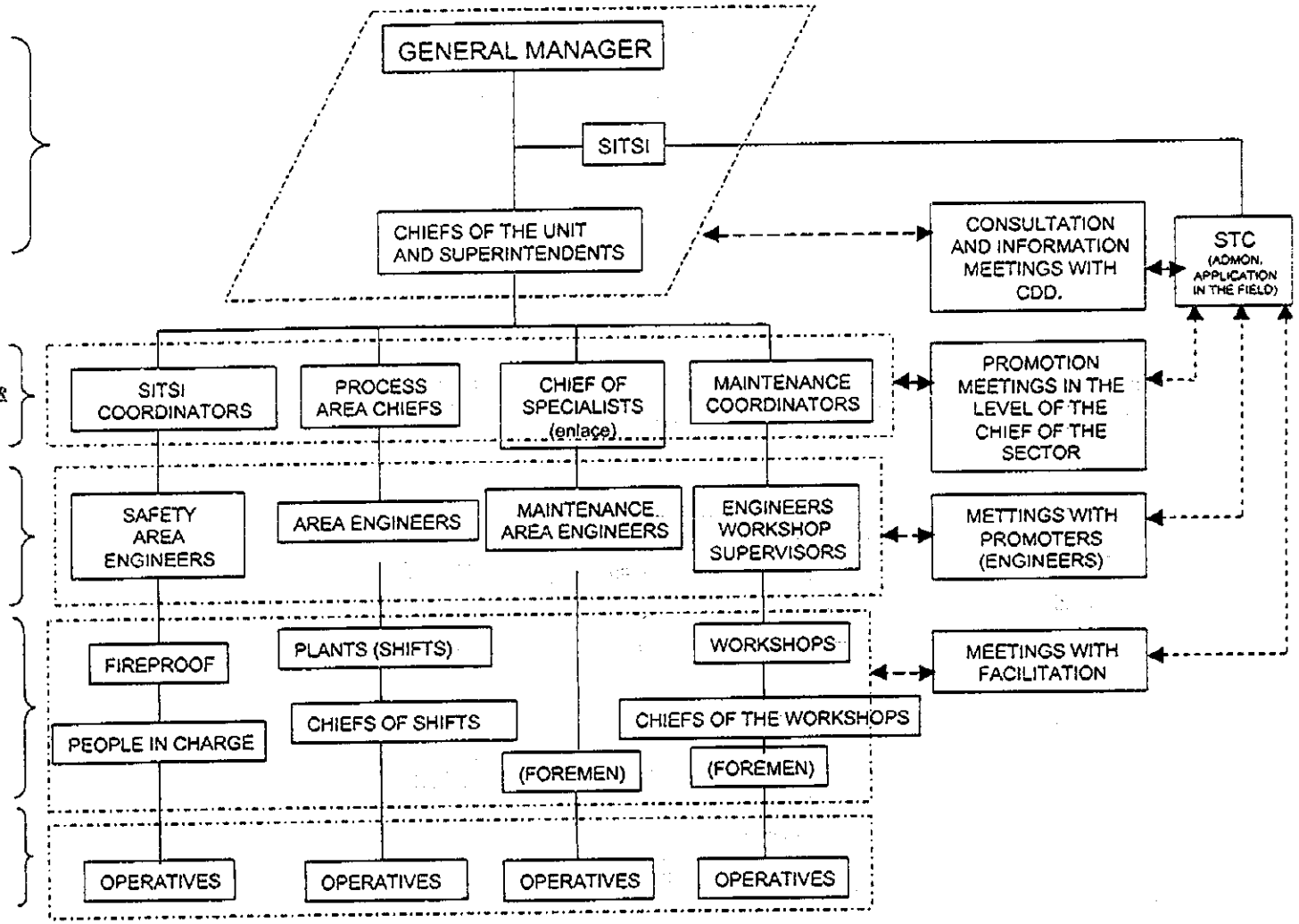
ANNEX 11-2 ALLOCATION OF MEXICAN COUNTERPART PERSONNEL



○ C/P Training in Japan

ANNEX 12

PROMOTION ORGANIZATION OF JAPANESE SAFETY ACTIVITIES



SITSI: SUPERINTENDENCE OF TECNICAL INSPECTION AND INDUSTRIAL SAFETY.
CDD: MANAGEMENT DECISION COMMITTEE.
STC: SAFETY TRAINING CENTER.

ANNEX 13

SCHEDULE OF PEMEX BUDGET ALLOCATION
(PEMEX FY 1996-2001)

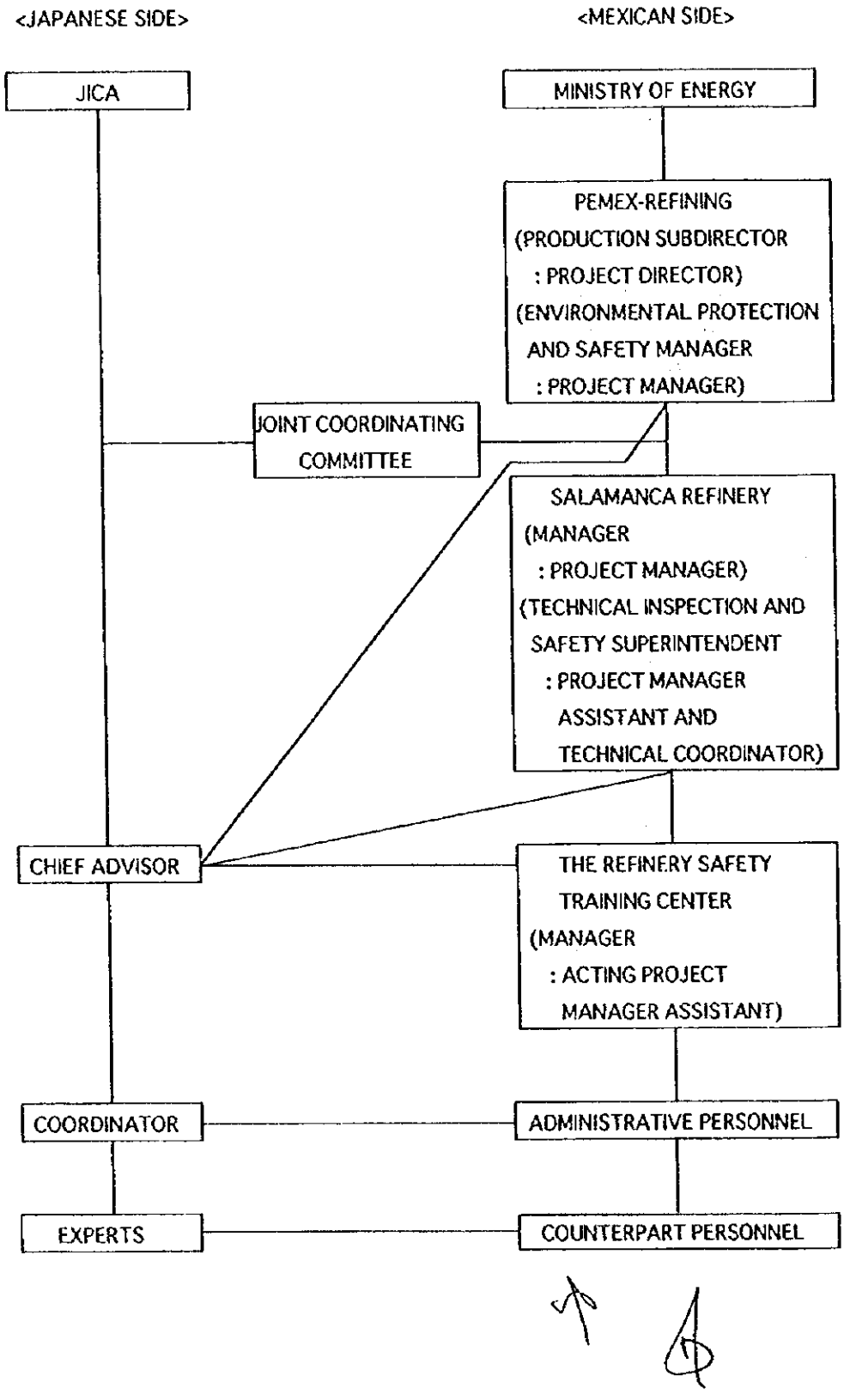
UNIT: US DOLLAR

	1996	1997	1998	1999	2000	2001
CONSTRUCTION						
1.- BUILDING	375,990.00		40,000.00			
2.- FURNITURES	24,010.00					
3.- PERSONAL COMPUTER		7,895.00				
SUBTOTAL	400,000.00	7,895.00				

	1996	1997	1998	1999	2000	2001
OPERATION						
1.- WAGES		317,368.00	317,368.00	317,368.00	317,368.00	317,368.00
2.- SERVICES		11,737.00	11,737.00	11,737.00	11,737.00	11,737.00
3.- CONSUMABLES		6,690.00	6,690.00	6,690.00	6,690.00	6,690.00
4.- MAINTENANCE			26,300.00	3,280.00	3,280.00	3,280.00
5.- SEVERAL EXPENSES		10,526.00	10,526.00	10,526.00	10,526.00	10,526.00
SUBTOTAL		346,321.00	372,621.00	349,601.00	349,601.00	349,601.00

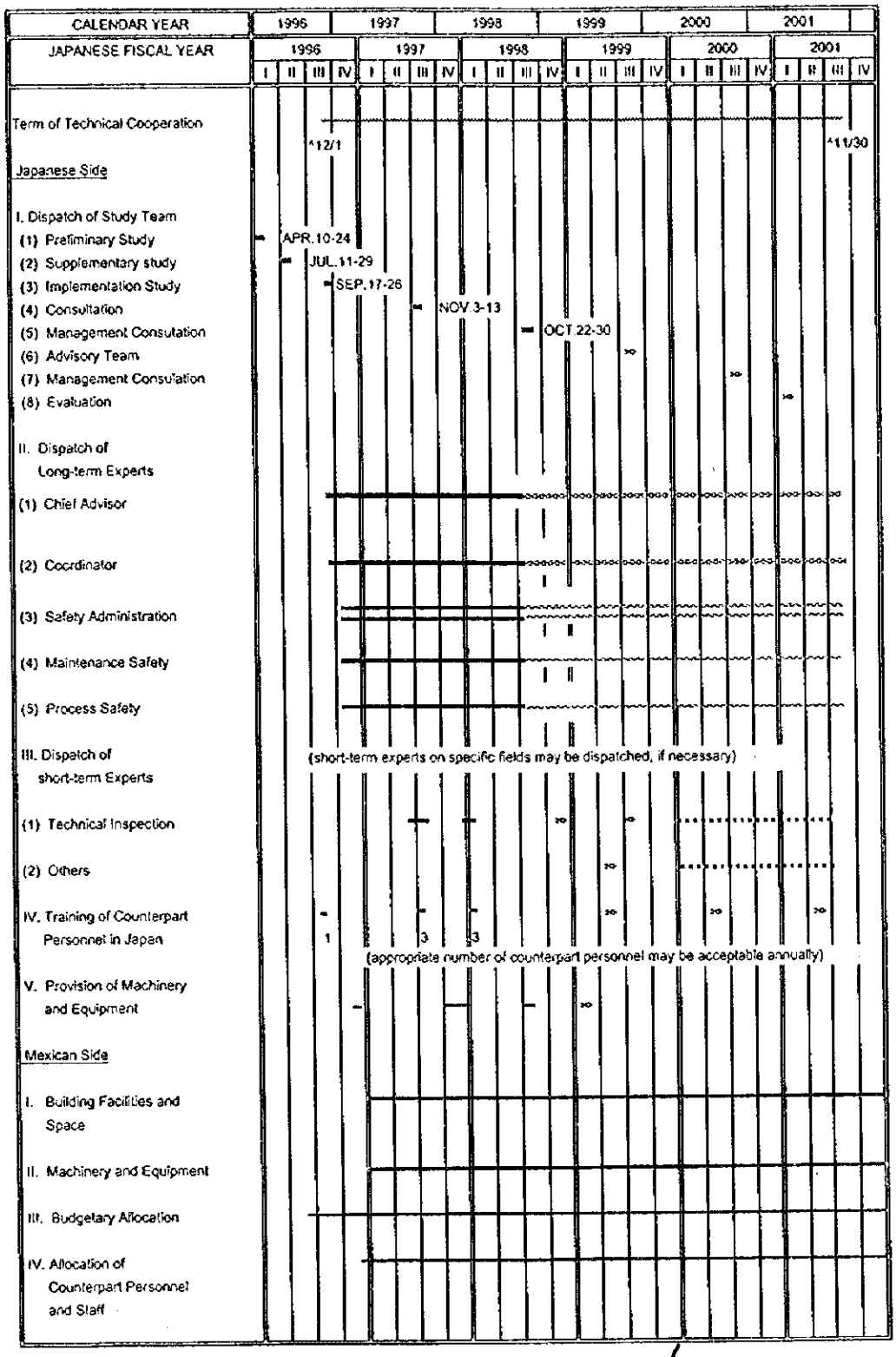
NOTE: THE MEXICAN FISCAL YEAR STARTS IN JANUARY AND ENDS IN DECEMBER

ANNEX14 ORGANIZATION CHART FOR THE ADMINISTRATION OF THE PROJECT



ANNEX 15

TENTATIVE SCHEDULE OF IMPLEMENTATION FOR THE PROJECT



Note. 1. The Japanese fiscal year starts in April and ends in March.
2. This schedule is subjected to change in accordance with the progress of the Project.
3. * : Experts may take turns during the cooperation period.

ANNEX 16

Progress of Technology Transfer (1/15)

Safety Administration Group A (1/4) (Uegaki Expert)

Educational Training Items	Textbook (English)	Textbook (Spanish)	Teaching	Textbook for safety common course
1. Basic Knowledge on Safety				
1.1.Fundamentals of safety management				
1.1.1. Characteristics of Japanese management(Brief outline)	● (Apr/97)	● (June/97)	● (July/97)	●
1.1.2. Characteristics of Japanese management(Outline)	● (Feb/97)	● (June/97)	● (Dec/97)	●
1.1.3. Japanese safety management in oil refineries(Outline)	● (Mar/97)	● (May/97)	● (June/97)	● included to 1.1.4.
1.1.4. Japanese safety management in oil refineries	● (Feb/97)	● (Oct/97)	● (Dec/97)	●
1.1.5. Safety management system I	● (May/97)	● (Aug/97)	● (Aug/97)	●
1.1.6. Safety management system II	● (Aug/97)	● (Mar/97)	● (Mar/97)	●
1.1.7. Safety management system III	● (Dec/97)	● (Dec/97)	● (Mar/98)	● included to 1.1.5. and 1.1.6.
1.1.8. Incident & accident investigation and information system	● (May/97)	● (July/97)	● (Oct/97)	●
1.1.9. Japanese law and standard on safety	● (Feb/97)	● (Nov/97)	● (Dec/97)	● included to 1.1.4.
1.1.10. Keys to safety management	● (July/97)	● (Oct/97)	● (Dec/97)	●
1.1.11. Disaster preventive measures	● (Apr/97)	● (Oct/97)	● (Feb/98)	● included to 1.3.2.

ANNEX 16

Progress of Technology Transfer (2/15)

Safety Administration A (2/4) (Uegaki Expert)

Educational Training Items	Textbook (English)	Textbook (Spanish)	Teaching	Textbook for safety common course
1.3.Various kinds of hazards and preventive measures				
1.3.1. Hazardous materials	● (June/97)	● (Oct/97)	● (Jan/98)	● included to 1.3.2.
1.3.2. Handling of hazardous substances Combustion , Explosion , Dangerous substances , Static electricity , Safety against electric disasters	● (June/97)	● (Oct/97)	● (Jan/98)	●
1.3.3.Japanese MSDA	● (May/97)	● (Oct/97)	● (Jan/98)	● included to 1.3.2.
1.3.4.Basic theory on fires and explosions	● (Aug/97)	● (Feb/98)	● (Feb/98)	● included to 1.3.2.
1.3.5.Fire-protection measures	● (July/97)	● (Feb/98)	● (Feb/98)	● included to 1.3.2.
1.3.6.Facility measures to keep safety	● (Sep/97)	● (Dec/97)	● (Feb/98)	● included to 1.3.2.
1.3.7.Measures against static electricity	● (July/97)	● (Oct/97)	● (Feb/98)	● included to 1.3.2.
1.3.8.Anoxia	● (Oct/97)	● (Oct/97)	● (Jan/98)	● included to 1.3.2.
1.7.Safety activities at work				
1.7.1.Policy control for safety activities Plan , Do , Check , Action	● (Aug/97)	● (Oct/97)	● (Oct/97)	●
1.7.2.Safety meeting	● (Aug/97)	● (Oct/97)	● (Oct/97)	● included to 1.1.5.
1.7.3.Safety patrol	● (Aug/97)	● (Oct/97)	● (Oct/97)	● included to 1.1.5.
1.7.4.Tool Box Meeting	● (June/97)	● (July/97)	● (Aug/97)	●

ANNEX 16

Progress of Technology Transfer (3/15)

Safety Administration A (3/4) (Uegaki Expert)

Educational Training Items	Textbook (English)	Textbook (Spanish)	Teaching	Textbook for safety common course
1.11. Personal protection equipment				
1.11.1.Standard of personal protection equipment management	● (Oct/97)	● (Oct/97)	● (Dec/97)	● included to 1.3.2.
1.11.2.Standard of wearing personal protection equipment	● (Oct/97)	● (Oct/97)	● (Dec/97)	● included to 1.3.2.
1.11.3.List of personal protection equipment	● (Oct/97)	● (Oct/97)	● (Dec/97)	● included to 1.3.2.
2.Japanese safety activities				
2.1.Concept and significance of Japanese safety activities				
2.1.1. Japanese safety activities(Outline)	● (Apr/97)	● (June/97)	● (June/97)	● included to 2.1.2.
2.1.2. The history of Japanese safety Activities	● (Dec/97)	● (Jan/98)	● (Jan/98)	●
2.1.3. The purpose of Japanese safety activities	● (Dec/97)	● (Jan/98)	● (Jan/98)	● included to 2.1.2.
2.3. 5S(Seiri,Seiton,Seisou,Seiketsu, Shitsuke)				
2.3.1. Background of 5S	● (Nov/97)	● (Nov/97)	● (Dec/97)	● included to 2.3.2.
2.3.2. Basic concept of 5S	●(Feb/98)	● (Mar/98)	● (Mar/98)	●
2.3.3. 5S Five Steps (Video)		● (Dec/97)	● (Dec/97)	●

ANNEX 16

Progress of Technology Transfer (4/15)

Safety Administration A (4/4) (Uegaki Expert)

Educational Training Items	Textbook (English)	Textbook (Spanish)	Teaching	Textbook for safety common course
2.3.4. In-Depth 5S (Video)	● (Dec/97)	× (Mar/98)	● (Mar/98)	× This video is English
2.3.5. 5S Visual Control Systems (Video)	● (Dec/97)	● (Dec/97)	● (Dec/97)	●
2.4. Hyari Hatto(Near-miss experiences)				
2.4.1.Background of near-miss experiences	● (Feb/97)	● (Nov/97)	● (Dec/97)	● included to 2.4.2.
2.4.2.Basic concept of near-miss experiences	● (Nov/97)	● (Nov/97)	● (Dec/97)	●
2.4.3.How to make good use of near-miss experiences ?	● (Nov/97)	● (Nov/97)	● (Dec/97)	● included to 2.4.2.
2.5. Calling with a pointed finger				
2.5.1.Background of calling with a pointed finger	● (Mar/97)	● (May/97)	● (July/97)	● included to 2.5.2.
2.5.2.Basic concept of calling with a pointed finger	● (Aug/97)	● (Oct/97)	● (Nov/97)	●
5.3.How to carry out calling with a pointed finger ?	● (Aug/97)	● (Oct/97)	● (Dec/97)	● included to 2.5.2.
2.9. Small group activities				
2.9.1.Background of small group activities	● (Feb/97)	● (Mar/98)	● (Feb/98)	● included to 2.9.2.
2.9.2.Basic concept of small group activities	● (Feb/97)	● (Jan/98)	● (Jan/98)	●
2.9.3.How to solve the problems ?	● (Feb/97)	● (Feb/98)	● (Mar/98)	● included to 2.9.2.
2.9.4.Examples of small group activities	● (Feb/97)	● (Feb/98)	● (Jan/98)	● included to 2.9.2.

ANNEX 16

Progress of Technology Transfer (5/15)

Safety Administration B (1/4) (Mori Expert)

Educational Training Items	Textbook (English)	Textbook (Spanish)	Teaching	Textbook for safety common course
1. Basic Knowledge on Safety				
1.2.Preventive measures against accident and incident recurrence				● 1.2.2. + 1.2.3.
1.2.1. Trend in accident record and history of safety control in Japan.	● (Mar/98)	● (Apr/98)	● (May/98)	(How to analyze causes and accident)
1.2.2. How to analyze and cause and accident	●(Jan/98)	●(Mar/98)	●(May/98)	
1.2.3. Utilization of case of incident and accident	●(Jan/98)	●(Mar/98)	● (May/98)	
1.4. Prevention of behavioral accident				● 1.4.1. + 1.4.2.+1.4.3
1.4.1. What is human errors	●(Jan98)	●(Feb/98)	●(Feb/98)	(For preventing accident due to
1.4.2. Preventing accident due to human errors	●(Aug/97)	●(Sep/97)	●(Jan/98)	human errors)
1.4.3. Human characteristics	●(Jan/98)	●(Feb/98)	●(Jan/98)	
1.5 Safety measures for operation and works				● 1.5.2+1.5.3
1.5.2. Example of standard operation procedure in Japan	●(Jan/98)	●(Feb/98)	●(Mar/98)	(Standard operation procedure)
1.5.3. Safety measures at workplace in Japan	●(Feb/98)	●(Mar/98)	●(Mar/98)	

ANNEX 16

Progress of Technology Transfer (6/15)

Safety Administration B (2/4) (Mori Expert)

Educational Training Items	Textbook (English)	Textbook (Spanish)	Teaching	Textbook for safety common course
1.6. Working regulation				
1.6.1. Japanese style personal management	●(Dec/97)	●(Feb/98)	●(Mar/98)	
1.6.2. Safety management regulation	●(Feb/98)	●(Mar/98)	●(Mar/98)	
1.8. Safety manuals that everyone should know				
1.8.1.How to make and diffuse manuals and information	●(Jan/98)	●(Feb/98)	●(Feb/98)	
1.9. Measures for observing the safety standard	●(Jan/98)	●(Feb/98)	●(Feb/98)	
1.10. Procedure to revise the safety manuals	●(Feb/98)	●(Feb/98)	●(Feb/98)	

ANNEX 16

Progress of Technology Transfer (7/15)

Safety Administration B (3/4) (Mori Expert)

Educational Training Items	Textbook (English)	Textbook (Spanish)	Teaching	Textbook for safety common course
2. Japanese Safety activities				● 2.2.1—2.2.14
2.2. KY-activity(Danger prediction activity)				("KY activity" for intensive
2.2.1. "Danger prediction training(KYT)"	●(Oct/97)	●(Nov/97)	●(Nov/97)	course)
2.2.2. Quick learning "Introduction to KYK"	●(Sep/97)	●(Sep/97)	●(Nov/97)	("KYK")
2.2.3. How to promote practical techniques	●(Sep/97)	●(Oct/97)	●(Dec/97)	("HAD" for intensive course)
2.2.4. How to take advantage of danger prediction training	●(Feb/98)	●(Feb/98)	●(Feb/98)	("Illustration book" for operation) ("Illustration book" for maintenance)
2.2.5. Practical KY-activity	●(Feb/98)	●(Mar/98)	●(Mar/98)	("Illustration book" for laboratory)
2.2.6. Example of KY-activity in Japanese refinery	●(Dec/97)	●(Feb/98)	●(Jan/98)	
2.2.7. Illustration sheet for KYT(vol.1)	●(Sep/97)	●(Nov/97)	●(Nov/97)	● 2.2.7+2.2.8
2.2.8. Illustration sheet for KYT(vol.2)	●(Sep/97)	●(Nov/97)	●(Nov/97)	("Illustration book" for Operation)
2.2.9. Quick learning "Finger pointing and calling"	●(July/97)	●(Sep/97)	●(Sep/97)	("Illustration book" for Laboratory)
2.2.10. Quick learning "5S Activity"				("Illustration book" for Maintenance)
2.2.11. Question and answer about new KY	●(Dec/97)	●(Jan/98)	●(Jan/98)	
2.2.12. New KY	●(Aug/97)	●(Feb/98)	●(Feb/98)	
2.2.13. How to promote basic four-round method	●(Sep/97)	●(Oct/97)	●(Feb/98)	
2.2.14. For starting danger prediction training	●(Sep/97)	●(Sep/97)	●(Jan/98)	
	●(Dec/98)	●(Jan/98)	●(Feb/98)	

ANNEX 16

Progress of Technology Transfer (8/15)

Safety Administration Group B (4/4) (Mori Expert)

Educational Training Items	Textbook (English)	Textbook (Spanish)	Teaching	Textbook for safety common course
2.6. Zero accident activities				● 2.6.1. + 2.6.2. + 2.6.3.
2.6.1. Principle on "Zero accident movement"	●(June/97)	●(Sep/97)	●(Mar/98)	(Zero accident movement)
2.6.2. Introduction to zero-accident campaign	●(July/97)	●(Oct/97)	●(Oct/98)	
2.6.3. A guide for formulation plan for zero-accident campaign	●(July/97)	●(Feb/98)	●(Feb/98)	
2.6.4. Quick learning Zero accident campaign	●(Aug/97)	●(Sep/97)	●(Nov/97)	
2.7. Daily safety activities				
2.7.1. Daily safety activities in Japanese refinery.	●(Feb/98)	●(Mar/98)	●(Mar/98)	● Safety activities in the Work.
2.8. Safety audit				
2.8.1. Safety audit system in Japanese refinery(Example of Japanese refinery)	●(Jan/98)	●(Feb/98)	●(Feb/98)	
3.Education to improve working behavior				
3.1. Education and training system				
3.1.1. Education and training system in Japanese refinery	●(Dec/97)	●(May/98)	●(May/98)	
3.2. Japanese labor management	●(Jan/98)	●(May/98)	●(Mar/98)	
5. Others				
5.1. Point of safety and health	●(Jan/98)	●(Apr/98)	●(May/98)	● 5.1. + 5.2. + 5.3.
5.2. The story of New-KYT	●(Sep/97)	●(Jan/98)	●(Jan/98)	(Point of safety and health)
5.3.Introduction to KYT/KYK activity	●(Jan/98)	●(Mar/98)	●(Mar/98)	

ANNEX 16

Progress of Technology Transfer (9/15)

Process Safety (1/3) (Moriyama Expert)

Educational Training Items	Textbook (English)	Textbook (Spanish)	Teaching	Textbook for safety common course
1. Process Characteristics 1.1. Operation Condition ● Outline of Process ● Properties of feed stock ● Operating variables ● Catalyst etc.				RIAMA will make this material by reference of the material sent by Japanese. This item is out of the class.
1.2 Characteristics of handling materials ● Properties and handling of hazardous Material	●	●	● (Mar/'98)	●
● Review and / or draft up a manual to handle toxic material	●	●	● (Mar/'98)	●
● Recommendation of improving unsafe / inappropriate facilities or system	●	●	● (Mar/'98)	●
2. Precaution during operation 2.1 Safety measure performed by the process side				

ANNEX 16

Progress of Technology Transfer (10/15)

Process Safety (2/3) (Moriyama Expert)

Educational Training Items	Textbook (English)	Textbook (Spanish)	Teaching	Textbook for safety common course
● Introduce safety measure in Japan	●	●	● (Feb/'98)	●
● How to maintain a plant safe in a daily watching	●	●	● (Feb/'98)	●
● Review the operation manuals relating to the safety matters	●	●	● (Mar/'98)	●
● Prepare the delivery of a plant for maintenance work	●	●	● (Mar/'98)	●
2.2 Items to be considered when issuing work permission	●	●	● (Jan/'98)	●
● Work permission during operation	●	●	● (Feb/'98)	●
● Work permission during a general maintenance				
3. Example of process accidents and troubles 3.1 Introduce what happened in refineries in Japan and how the countermeasures were made	●	●	● (Jan/'98)	●

ANNEX 16

Progress of Technology Transfer (11/15)

Process Safety (3/3) (Moriyama Expert)

Educational Training Items	Textbook (English)	Textbook (Spanish)	Teaching	Textbook for safety common course
4. Additional items 4.1 Improving the basic knowledge level concerning the refinery operation				This item is out of the class
4.2 Raise the reliability of process plants	●	●	● (Jan/'98)	●
4.3 Small maintenance by operators	●	●	● (Mar/'98)	●
4.4 TPM(autonomous maintenance)				● This item is included by the request from RIAMA.

ANNEX 16

Progress of Technology Transfer (12/15)

Maintenance Safety (1/4) (Iwasato Expert)

Educational Training Items	Textbook (English)	Textbook (Spanish)	Teaching	Textbook for safety common course
1. Improvement of Maintenance Management	● (July/97)	● (Aug/97)	● (Dec/97)	●
1. Introduction of Japanese Maintenance Management Technology	● (July/97)	● (Aug/97)	● (Dec/97)	●
1.1Characteristics of Japanese Management	● (July/97)	● (July/97)	● (Dec/97)	●
1.2Japanese Maintenance Management	● (July/97)	● (Aug/97)	● (Dec/97)	●
1.2.1 Maintenance Organization	●	●	●	●
1.2.2. Maintenance Policy	●	●	●	●
1.2.3. Maintenance Scientific Management	●	●	●	●
1.2.4. Maintenance Work Management	●	●	●	●
1.2.5 Maintenance Work Procedure Management	●	●	●	●
1.2.6 Productive of Personnel	●	●	●	●
1.2.7.Introducing Related Knowledge	●	●	●	●

ANNEX 16

Progress of Technology Transfer (13/15)

Maintenance Safety (2/4) (Iwasato Expert)

Educational Training Items	Textbook (English)	Textbook (Spanish)	Teaching	Textbook for safety common course
II Confirmation of Perfect Diffusion of Maintenance Safety Manuals	● (Dec/97)	● (Jan/98)	● (Feb/98)	●
1. Preparation of Maintenance Safety Manuals which everyone should knows	● (Nov/97)	● (Jan/98)	● (Feb/98)	●
1. Typical Japanese Safety Standard	● (Nov/97)	●	●	●
Working with Fire				
Working in the High Places				
Works Handling Heavy Articles				
Assembling and Dismantling Scaffolds				
Safety Standard for General working				
1.2. Safety Requirements of Behavior	● (Oct/97)	●	●	●
1.2.1 General Items	●	●	●	●
1.2.2.Safety Planning of construction work	●	●	●	●
1.2.3. Working Specification of Construction	●	●	●	●
1.2.4. Prior Discussion for Planning	●	●	●	●
1.2.5. Typical Japanese Safety Management of Maintenance department	●	●	●	●

ANNEX 16

Progress of Technology Transfer (14/15)

Maintenance Safety (3/4) (Iwasato Expert)

Educational Training Items	Textbook (English)	Textbook (Spanish)	Teaching	Textbook for safety common course
Measure Against Recurrence of Defective Repairs	●	● (Dec/97)	● (Feb/98)	●
2.1Introduction Typical Japanese Method	●	●	●	●
Design Modification Control	● (Aug/97)	● (Oct/97)	● (Dec/97)	●
3.1Introduction Typical Japanese Method	●	●	●	●
Qualification and Certification System for Welding Technician	● (Nov/97)	● (Dec/97)	● (Jan/98)	●
4.1Introduction Japanese System	●	●	●	●
ⅢSafety Measures	● (Aug/97)	● (Aug/97)	● (Feb/98)	●
1,Safety Procedure for Maintenance Work	● (July/97)	● (Aug/97)	● (Feb/98)	●
1.1Safety Procedure for maintenance	● (Aug/97)	● (Aug/97)	● (Feb/98)	●
1.2Work Flow and Assignment of daily Maintenance	●	●	●	●
1.3Work Permit System During Operation	●	●	●	●
1.4Work Permit System During Shutdown	●	●	●	●
1.5Work Order for Subcontractor	●	●	●	●
1.6Safety Review System Before and After Turnaround Maintenance	● (July/97)	● (Aug/97)	● (Feb/98)	●
1.7Contracting Maintenance work and Control of Subcontractors	●	●	●	●
1.8Order the Educational Contents on the Safety of Maintenance Works	●	●	●	●

ANNEX 16

Progress of Technology Transfer (15/15)

Maintenance Safety (4/4) (Iwasato Expert)

Educational Training Items	Textbook (English)	Textbook (Spanish)	Teaching	Textbook for safety common course
IV Communication Between Departments	● (July/97)	● (Sep/97)	● (Nov/97)	●
1 Typical Japanese Activities	● (July/97)	● (Sep/97)	● (Nov/97)	●
1.1 Internal Communication within Each Specialties	●	●	●	●
2 Communication between Departments	● (Aug/97)	● (Sep/97)	● (Nov/97)	●
2.1 Information on Normal Operations Shutdowns	●	●	●	●
2.2 Information at the Time of Trouble	●	●	●	●
2.3 Total Gathering of Turnaround Maintenance	●	●	●	●
2.4 Subcontractor Meeting and Education	●	●	●	●
V Reference Book	● (Sep/97)	● (Dec/97)	● (Mar/98)	●
1 Practical Repair Technology in Refineries	●	●	●	
2 Japanese Law and Standard on Safety	●	●	●	
3 Refinery Maintenance Planning and Control in Japan	●	●	●	

ANNEX 17 List of Materials Related to the Technology Transfer(1/12)

1-1. SAFETY ADMINISTRATION GROUP A (1/2)

TEXTBOOKS for COURSES (Spanish)	TECHNOLOGY TRANSFER ITEMS (English & Spanish)
1. Basic concept of Japanese safety management 2. Characteristics of Japanese management 3. Japanese safety management in oil refineries 4. Safety management system I 5. Safety management system II 6. Incident & accident investigation and information system 7. Keys to safety management	1.1.1 Characteristics of Japanese management (Brief outline) 1.1.2 Characteristics of Japanese management (Outline) 1.1.3 Japanese safety management in oil refineries (Outline) 1.1.4 Japanese safety management in oil refineries 1.1.5 Safety management system I 1.1.6 Safety management system II 1.1.7 Safety management system III 1.1.8 Incident & accident investigation and Information system 1.1.9 Japanese law and standard on safety 1.1.10 Keys to safety management 1.1.11 Disaster preventive measures
8. Various kinds of hazards and preventive measures	1.3.1 Hazardous materials 1.3.2 Handling of hazardous substances: Combustion, explosion, dangerous substances, static electricity, safety against electric disaster. 1.3.3 Japanese MSDA 1.3.4 Basic theory on fires and explosions 1.3.5 Fire-protection measures 1.3.6 Facility measures to keep safety 1.3.7 Measures against static electricity 1.3.8 Anoxia

ANNEX 17 List of Materials Related to the Technology Transfer(2/12)

1-1. SAFETY ADMINISTRATION GROUP A (2/2)

TEXTBOOKS for COURSES (Spanish)	TECHNOLOGY TRANSFER ITEMS (English & Spanish)
9. Safety activities at work 10. Tool Box Meeting	1.7.1 Policy control for safety activities: Plan, Do, Check, Action. 1.7.2 Safety meeting. 1.7.3 Safety patrol 1.7.4 Tool Box Meeting
8. Various kinds of hazards and preventive measures(same No.8)	1.11.1 Standard of personal protective equipment management. 1.11.2 Standard of wearing personal protective equipment 1.11.3 List of personal protective equipment
11. Reason why the level of the Japanese safety performance has been improved	2.1.1 Japanese safety activities (Outline) 2.1.2. The history of Japanese safety activities. 2.2.3. The purpose of Japanese safety activities
12. 5S activities	2.3.1 Background of 5S 2.3.2 Basic concept of 5S 2.3.3 5S Five Steps 2.3.4 In-depth 5S 2.3.5 5S Visual Control Systems
13. Near-miss experiences	2.4.1 Background of near-miss experiences 2.4.2 Basic concept of near-miss experiences 2.4.3 How to make good use of near-miss experiences
14. Calling with a pointed finger	2.5.1 Background of calling with a pointed finger 2.5.2 Basic concept of calling with a pointed finger 2.5.3 How to carry out calling with a pointed finger
15. Small group activities	2.9.1 Background of small group activities 2.9.2 Basic concept of small group activities 2.9.3 How to solve the problems 2.9.4 Examples of small group activities

ANNEX 17 List of Materials Related to the Technology Transfer(3/12)

1-2. SAFETY ADMINISTRATION GROUP B (1/2)

TEXTBOOKS for COURSES (Spanish)	TECHNOLOGY TRANSFER ITEM (English & Spanish)
1. How to analyze causes and accident. (Content includes item 1.2.3)	1.2.1 Trend in accident record and history of safety control in Japan 1.2.2 How to analyze cause and accident 1.2.3 Utilization of case of incident and accident
2. Preventing accident due to human errors. (Content includes item 1.4.1/1.4.2 /1.4.3)	1.4.1 What is human error? 1.4.2 Preventing accident due to human errors 1.4.3 Human characteristics
3. Standard operation procedure. (Content includes item 1.8.1/1.9/1.10)	1.5.2 Example of standard operation procedure in Japan 1.5.3 Safety measures at workplace in Japan
	1.6.1 Japanese style personal management 1.6.2 Safety management regulations
	1.8.1 Procedure for establishment, revision and abolition of safety regulation /1.10 and how to know to everybody. 1.9 Measures for observing the safety manuals
4. KY activity (Intensive course) 5. Calling with pointed finger. (Intensive course) 6. KYK (Common course)	2.2.1 "Danger prediction atraining (KYT)" 2.2.2 Quick learning "Introduction to KY-Activity" 2.2.3 How to promote prectical techinics (card) 2.2.4 How to take adventage of danger prediction training 2.2.5 Practical KY-Activity

ANNEX 17 List of Materials Related to the Technology Transfer(4/12)

1-2. SAFETY ADMINISTRATION GROUP B (2/2)

7. Illustration book. (For operation group) 8. Illustration book. (For maintenance group) 9. Illustration book. (For laboratory group)	2.2.6	Example of KY-Activity in Japanese refinery
	2.2.7	Illustlation sheet for KTY (vol.1)
	2.2.8	Illustlation sheet for KTY (vol.2)
	2.2.9	Quick learning "Finger pointing and calling"
	2.2.10	Quick learning "5S-Activity"
	2.2.11	Question and answer about new KY
	2.2.12	New KYT
	2.2.13	How to promote basic four-round method
	2.2.14	For starting danger prediction training
10. Zero accident movement	2.6.1	Principle on the "Zero accident movement"
	2.6.2	Introduction to zero-accident campaign
	2.6.3	A guide for formulating plan for zero-accident campaing
	2.6.4	Quick lerning "Zero accident campaign"
11. * H/H experience.	2.7.1	Daily safety activities in Japanese refinery (One example)
	2.8.1	Safety audit system in Japanese refinery (example of a Japanese refinery)
	3.1.1	Education and trainig system in Japanese refinery
	3.2	Japanese labor management
12. Point of safety and health.	5.1	Point of safety and health.
	5.2	The story of New-KYT
	5.3	Introduction to KYK/KYT activity.

ANNEX 17 List of Materials Related to the Technology Transfer(5/12)

2. MAINTENANCE SAFETY (1/3)

TEXTBOOKS for COURSES (Spanish)	TECHNOLOGY TRANSFER ITEMS (English & Spanish)
1 Maintenance management	I. IMPROVEMENT OF MAINTENANCE MANAGEMENT 1. Introduction of Japanese maintenance management technology 1.1 Characteristics of Japanese Managements 1 .2 Japanese Maintenance Management 1 .2.1 Maintenance Organization 1 .2.2 Maintenance Policy 1 .2.3 Maintenance Scientific Management 1 .2.4 Maintenance Work Management 1 .2.5 Maintenance Work Procedure Management 1 .2.6 Productivities of pers onnel 1 .2.7 Introducing Related Knowledge
	II. CONFIRMATION OF PERFECT DIFFUSION OF MAINTENANCE SAFETY MANUAL 1. Preparation of Maintenance Safety manuals which everyone should know 1 .1 Typical Japanese Safety Standards 1.1.1 Working with fire 1.1.2 Working in the high places 1.1.3 Works handling heavy articles 1.1.4 Assembling and dismantling scaffolds 1.1.5 Safety Standard for General Working 1.2. Safety requirement of behavior 1.2.1 General Items 1.2.2 Safety planning of construction work 1.2.3 Typical Japanese safety management of maintenance department

ANNEX 17 List of Materials Related to the Technology Transfer(6/12)

2. MAINTENANCE SAFETY (2/3)

	2. Measure against recurrence of Defective repairs 2.1. Introduction typical Japanese method 3. Design modifications control 3.1. Introduction Typical Japanese method 4. Qualification and Certification system for welding technician **4.1 Introduction Japanese system**
2 Safety through daily maintenance	III. **SAFETY MEASURES** 1. Safety procedures for maintenance work 1.1. Safety procedures for maintenance 1.2. Work flow and assignment of daily maintenance 1.3. Work permit system during operations 1.4. Work permit system during shutdowns 1.5. Work order for subcontractors 1.6. Safety review system before and after turnaround maintenance 1.7. Contrating maintenance work and control of subcontractors 1.8. Order the educational contents on the safety of maintenance works
	IV. **COMMUNICATION BETWEEN DEPARTMENTS** 1. Typical Japanese Activities 1.1.1 Morning gathering for safety 1.1.2 Monthly gathering for safety 1.1.3 Meeting for trouble shooting 2.1. Information on normal operations, shutdowns 2.2. Information at the time of trouble 2.3. Total gathering of turnaround maintenance 2.4. Subcontractor Meeting & Education

ANNEX 17 List of Materials Related to the Technology Transfer(7/12)

2. MAINTENANCE SAFETY (3/3)

REFERENCE BOOK	V. REFERENCE BOOK
1. Practical Repair technology in refineries	1. Practical Repair technology in refineries 2. Japanese Law and Standard on Safety **3. Refinery Maintenance Planning and control in Japan**
1. Introduction of TPM 2. Small group activity in TPM 3. Planned maintenance in TPM 4. Autonomous maintenance in TPM 5. Focussed improvement in TPM 6. Operation and maintenance skill training in TPM 7. Safety and TPM 8. Basic concept of TPM method (for workers)	(TPM textbooks was developed by Mexican side because the introdution of TPM was instructed from the general manager and the project manager, Ing. Alberto Alcaraz Granados)

ANNEX 17 List of Materials Related to the Technology Transfer(8/12)

3. PROCESS SAFETY (1/2)

TEXTBOOK (Spanish)	TECHNOLOGY TRANSFER ITEM (English & Spanish)
1. Properties and handling of hazardous material 2. Review and/or draft up a manual to handle toxic materials 3. Recommendation of improving unsafe/inappropriate facility	1. Properties and handling of hazardous material 2. Review and/or draft up a manual to handle toxic materials 3. Recommendation ofimproving unsafe/inappropriate facility
4. Introduce safety measures in Japan 5. How to maintain a plant safe in a daily watching 6. Review the operation manuals relating to the safety 7. Prepare the delivery of a plant for maintenance work	4. Introduce safety measures in Japan 5. How to maintain a plant safe in a daily watching 6. Review the operation manuals relating to the safety 7. Prepare the delivery of a plant for maintenance work
8. Work permission during operation 9. Work permission during a general maintenance	8. Work permission during operation 9. Work permission during a general maintenance
10. Introduce what happened in refineries in Japan and how the countermeasures were made.	11. Introduce what happened in refineries in Japan and how the countermeasures were made.
11. Raise the reliability of process plants.	11. Raise the reliability of process plants.
12. Small maintenance by operators	12. Small maintenance by operators

ANNEX 17 List of Materials Related to the Technology Transfer(9/12)

3. PROCESS SAFETY (1/2)

12. Introdution of TPM	(TPM textbooks was developed by Mexican side because the introdution of TPM was instructed from the general manager and the project manager, Ing. Alberto Alcaraz Granados)

ANNEX 17 List of Materials Related to the Technology Transfer(10/12)

4. VIDEO TAPES for SAFETY GROUP

VIDEO TAPES for COURSES	PROVIDED BY JICA
1. 5 S Five Steps (Spanish)	1. 5 S Five Steps (Spanish & English)
2. 5 S Visual Control Systems (Spanish)	2. 5 S Visual Control Systems (Spanish & English)
3. Personal protective equipment (Spanish)	3. Personal protective equipment (Spanish)
	(Video tapes for reference)
	1. In-Depth 5S (English)
	2. Static electricity (English)
	3. Hazards of flammables (English)
	4. Oxygen deficiency (English)
	5. Improvement of operation method (English)
	6. Methods of instruction (English)
	7. House-Keeping of the workshop (English)
	8. Safety of new workers (English)
	9. Desire for safety (English)
	10. Invisible vapor (English)
	11. Ten basics in safety and health for newcomers (English)
	12. A safety guide for new employees (English)
	13. TPM outline (English)
	14. This is TPM (English)
	15. Safety rules (English)
	16. Personal safety (English)
	17. Daily routine work (English)
	18. Preparation for maintenance (English)
	19. A typical day of the plant operators (English)
	20. Valve operation (English)

ANNEX 17 List of Materials Related to the Technology Transfer(11/12)

5. VIDEO TAPES for PROCESS SAFETY

VIDEO TAPES for COURSES	PROVIDED BY JICA
1. TPM introduction (Spanish)	1. TPM introduction (Spanish) (Video tapes for reference) 2. Controllers and Control modes (English) 3. Valves (English) 4. Fired heaters (English) 5. Centrifugal pumps (English) 6. Centrihugal compressors (English)
VIDEO TAPES for COURSES	PROVIDED BY OTHETS
1.A day of an operator in a refinery Morning assembly Daily patrol	1. A day of an operator in a refinery (No narration)
2.Petroluem and Fire (Spanish)	2. Petroleum and Fire (Japanese)
3.Static electricity (Spanish)	3. Static electricity (Japanese)

ANNEX 17 List of Materials Related to the Technology Transfer(12/12)

6. VIDEO TAPES for MAINTENANCE SAFETY

VIDEO TAPES for COURSES	PROVIDED BY JICA (Japanese or English or Spanish)
1. Abunai (aplastamiento prensado)	1. Abunai (Japanese)
2. Abunai (caida)	2. Abunai (Japanese)
3. Sagyo-tejyun (accidentes relativos a procedimientos)	3. Sagyo-tejun (Japanese)
4. Asiba-kumitate (trabajo de alture)	4. Asiba-kumitate (Japanese)
5. 5 S	5. 5 S
6. Visual Control	6. Visual Control
7. Introdution of TPM	7. Introduction of TPM
VIDEO TAPES for COURSES	PRODUCED BY EXPERT
1.Conscious of Some Condition of RIAMA	1.Conscious of Some Condition of RIAMA
2.Furnes	2.Furnes
3.Process Line	3.Process Line
4.Pumps	4.Pumps
5.Heat Exchanger	5.Heat Exchanger
6.Cabitation	6.Cabitation
7 Guide for non-defective inspection	7. Guide for non-defective inspection

ANNEX 18

List of Consultation Meetings and Introduction Meetings (1/2)

DATE (1998) Time	Kind of Meeting	Items
January 6 (Tues.) 13:00-14:00	Consultation	1. Basic development plan of the refinery safety training center
January 13 (Tues.) 13:00-15:00	Introduction	1. Japanese Management 2. Incident and accident investigation and information system in the Japanese refineries.
January 20 (Tues.) 13:00-14:00	Consultation	1. Reconfirmation of Project's Purpose 2. Mutual Recognition of each party's role and responsibility
January 27 (Tues.) 13:00-15:00	Introduction	1. Japanese safety management in the refineries. (Safety Organization, safety top management, Safety activities, Safety audit, Line responsibility, Japanese law and standard on safety etc.)
February 3 (Tues.) 13:00-14:00	Introduction	1. Reason why the level of the Japanese safety performance has been improved is. (ZERO Accident Philosophy.) .
February 10 (Tues.) 13:00-15:00	Introduction	1. Outline of Japanese safety activities (5S,Near-miss experience, Calling with a pointed finger, Safety meeting, Tool box meeting, etc.)
February 17 (Tues.) 13:00-14:00	Introduction	1. Frequency Index 2. Activities 5S, Tool box meeting.
February 24 (Tues.) 13:00-14:00	Consultation	1. Educational safety training Program.
March 3 (Tues.) 13:00-15:00	Consultation	1. Recognition base on the analysis of RIAMA present situation by Japanese Safety experts and Process safety expert.

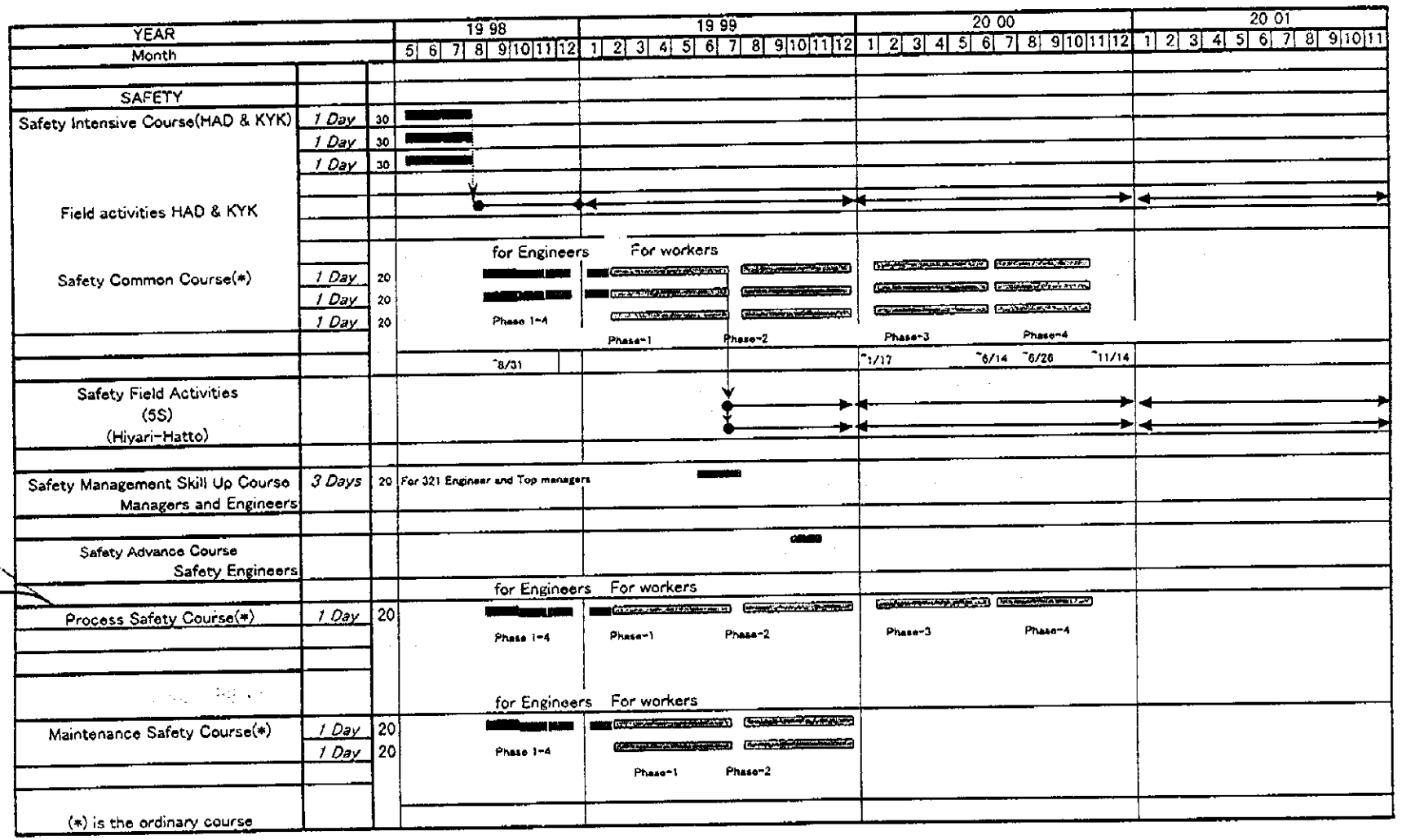
ANNEX 18

List of Consultation Meetings and Introduction Meetings (2/2)

March 10 (Tues.) 13:00-15:00	Introduction	1. Recognition based on analysis of RIAMA present situation by Japanese Maintenance Safety expert. 2. Raise the reliability of process plant (Mitsubishi case).
March 17 (Tues.) 13:00-15:00	Introduction	1. Outline of TPM 2. Outline of QC activity.
March 24 (Tues.) 13:00-15:00	Introduction	1. Outline of Japanese safety activities (K Y K.)
March 31(Tues.) 13:00-14:00	Consultation	1. Field activities program (How to introduce Japanese Safety Activities)
April 6 (Tues.) 13:00-14:00	Consultation	1. Promotion Organization for Japanese Safety Activities (KYK etc) – Proposal. 2. Safety administration management improvement program (proposal)
August 11 (Tues.) 13:00-14:00	Consultation	1. Report of the Intensive Course 2. Promotion Organization of Japanese Safety Activities 3. Implementation Plan of KYK and HAD 4. Long-Term Plan of Training Course 5. Training Course for Engineers

ANNEX 19

OUTLINE OF TRAINING COURSE SCHEDULE



ANNEX 20

RESULT OF INTENSIVE COURE
for
KYK & HAD

1. Term
   Start: 18, May (Monday)
   Finish: 7, August (Friday)
   Total 60 days
2. Courses
   30 person 3 Class (90 person) a day
   180 Classes
3. Result

	Programming for training *May, 1	Result of Trained employees *August, 7	%
Employees	3,968	3,714	94
Engineers(*1)	317	286	90
Workers(*2)	3,651	3,428	94
Transitorio	1,107	912	82
Engineers	44.	48	109
Workers (*3)	1,063	864	81
TOTAL EMPLOYEES	5,075	4,626	91
Other Organization	86	86	100
TOTAL	5,151	4,712	91

(*1) Without CDD top members (10)

(*2) Without Secretaries and Office workers (208)

(*3) Without Secretaries and Office workers (33)

ANNEX 21

TRAINING CONTENTS OF COURSE FOR ENGINEERS (1/4)

1st PHASE FOR ENGINEERS

SAFETY COMMON		PROCESS SAFETY		MAINTENANCE SAFETY	
Course	Time	Course	Time	Course	Time
Characteristic of Japanese management	7:15 ~ 8:15	Introduction of safety measures in Japan	7:20 ~ 9:30	Maintenance management (Part-1)	7:15 ~ 9:15
How Japanese companies work?	8:15 ~ 9:15	Video: a day of operators in the refinery	9:40 ~ 10:30	Maintenance management (Part-2)	9:30 ~ 11:30
Near-miss experience	9:30 ~ 11:30	How to maintain a plant safe in daily watching	10:30 ~ 12:00	Video: Introduction of TPM	11:30 ~ 12:00
Reason why the level of the Japanese safety performance has been improved	12:00 ~ 13:00	Introduction of TPM	12:30~ 13:30	Introduction of TPM	12:30~ 13:15
KYK activity	13:00 ~ 14:30	Video: Introduction of TPM	13:45~ 14:30	Video: Preventive and predictive maintenance	13:15~ 14:00
				Small group activity in TPM	14:00~ 14:30

ANNEX 21

TRAINING CONTENTS OF COURSE FOR ENGINEERS (2/4)

2nd PHASE FOR ENGINEERS

SAFETY COMMON		PROCESS SAFETY		MAINTENANCE SAFETY	
Course	Time	Course	Time	Course	Time
Basic concept of Japanese safety management	7:15 ^ 7:45	Properties and handling hazardous material	7:20 ~ 10:30	Planned maintenance in TPM (Part-1)	7:15 ~ 9:15
Japanese safety management in oil refineries	7:45 ~ 8:15	Video: Static electricity	10:30 ~ 11:00	Planned maintenance in TPM (Part-2)	9:30 ~ 11:30
Safety management system-I&II	8:30 ~ 10:00	Review the manuals relating to the safety	11:00 ~ 12:00	Video: 5S(Visual Control-General view)	11:30 ~ 12:00
Incident and accident investigation and information system	10:15 ~ 11:00	Something to pay attention before issuing work permission	12:30 ~ 13:30	Autonomous maintenance in TPM	12:30~ 14:00
Keys to safety management	11:00 ~ 11:30	Unsafe facilities and equipment	13:30 ~ 14:30	Video: 5S(Visual Control-Storage)	14:00~ 14:30
5S activities	12:00 ~ 13:00				
5S Five steps (Video)	13:00 ^ 14:30				

ANNEX 21

TRAINING CONTENTS OF COURSE FOR ENGINEERS (3/4)

3rd PHASE FOR ENGINEERS

SAFETY COMMON		PROCESS SAFETY		MAINTENANCE SAFETY	
Course	Time	Course	Time	Course	Time
Preventive measure against accident and incident recurrence	7:15 ~ 9:15	Permission during operation	7:20 ~ 9:00	Focused improvement (TPM) Part-1	7:15 ~ 9:15
Various kinds of hazards and preventive measures	9:30 ~ 11:30	Work permission during a general maintenance work	9:15 ~ 10:30	Video: 5S(Visual control-Supervision)	9:30 ~ 10:00
Zero accident activities	12:00 ~ 14:30	Video: 5S(Basic)	10:30 ~ 11:30	Focused improvement (TPM) Part-2	10:00 ~ 11:00
		Small maintenance work by operators	11:30 ~ 13:30	Video: 5S(Visual control-Equipment and Quality)	11:00 ~ 11:40
		Video: Small maintenance work by operators	14:10 ~ 14:40	Operation and Maintenance Skills Training (TPM)-(Part-1)	11:40~ 12:00
				Operation and Maintenance Skills Training (TPM)-(Part-2)	12:30~ 13:30
				Video: Accidents related to procedures (provided by JICA)	13:30 ~ 14:30

ANNEX 21

TRAINING CONTENTS OF COURSE FOR ENGINEERS (4/4)

4th PHASE FOR ENGINEERS

SAFETY COMMON		PROCESS SAFETY		MAINTENANCE SAFETY	
Course	Time	Course	Time	Course	Time
Prevention of behavioral accidents	7:15 ~ 9:15	Raise the reliability of process plants(Part-1)	7:20 ~ 9:30	Safety and total productive maintenance (TPM)-(Part-1)	7:15 ~ 8:15
Points of safety and health	9:30 ~ 11:30	Examples of accidents in Japan	9:40 ~ 11:00	Video: 5S(Visual control and Safety)	8:15 ~ 8:45
Safety activity at work	12:00 ~ 12:45	Video: 5S(Application)	11:00 ~ 12:00	Safety and total productive maintenance (TPM) -(Part-2)	8:45 ~ 9:15
Tool box meeting	12:45 ~ 13:15	Raise the reliability of process plants(Part-2)	12:30 ~ 14:00	Safety through daily maintenance(Part-1)	10:00~ 11:00
Small group activity	13:30 ~ 14:30			Video:(ABUNAI-1) (provided by JICA)	11:00 ~ 11:15
				Safety through daily maintenance(Part-2)	11:150 ~ 12:00
				Video:(ABUNAI-2) (provided by JICA)	12:30~ 13:00
				Video: Procedure to make scaffold	13:00~ 14:30

ANNEX 22

TRAINING CONTENT OF COURSE FOR WORKERS (1/4)

1st PHASE FOR WORKERS

SAFETY COMMON		PROCESS SAFETY		MAINTENANCE SAFETY	
Course	Time	Course	Time	Course	Time
Characteristics of Japanese management	7:15 ~ 7:45	Introduction of Safety Measures in Japan. (short video – Shift turn-over)	7:15 ~ 9:30	Evolution of maintenance in Japan.	7:15 ~ 8:15
How Japanese companies work ?	7:45 ~ 8:15	How to maintain a process plant in a daily watching Video.	9:45 ~ 12:00	Basic concept of TPM method. Video: Introduction of TPM	8:15 ~ 9:00
Near-miss experiences	8:30 ~ 10:30	Autonomous Maintenance Video (Minor jobs by operators)	12:30 ~ 15:00	Introduction to the one point lesson sheet. Introduction to the focused improvement.	9:10 ~ 10:30
5S activities (Seiri , Seiton , Seisou , Seiketsu , Shitsuke)	10:45 ~ 12:00			Introduction to the autonomous maintenance	10:30 ~ 11:00
Video for 5S Five Steps (Seiri , Seiton , Seisou , Seiketsu , Shitsuke)	12:30 ~ 15:00			Visual control program	11:00 ~ 13:00
				The TPM and the safety	13:00 ~ 15:00

ANNEX 22

TRAINING CONTENT OF COURSE FOR WORKERS (2/4)

2nd PHASE FOR WORKERS

SAFETY COMMON		PROCESS SAFETY		MAINTENANCE SAFETY	
Course	Time	Course	Time	Course	Time
Basic concept of Japanese safety management	7:15 ~ 8:00	Introduction of Safety Measures in Japan. (short video – Shift turn-over)	7:15 ~ 9:30	Safety requirements of behavior. Video: [ABUNAI-1]	7:15 ~ 8:50
Japanese safety management in oil refineries	8:00 ~ 8:35	How to maintain a process plant in a daily watching Video.	9:45 ~ 12:00	Working in the high places. Video: [ABUNAI-2]	9:00 ~ 10:30
Reason why the level of the Japanese safety Performance has been improved?	8:45 ~ 9:45	Autonomous Maintenance Video (Minor jobs by operators)	12:30 ~ 15:00	Fire using work standard. Video: Procedure and the safety	10:40 ~ 12:00
KYK activity	10:00 ~ 12:00			Video: Safety standard of assembling work of scaffold.	12:30 ~ 13:45
Incident & accident investigation and Information system	12:30 ~ 13:15			KYT activities using photograph.	13:45 ~ 14:20
Small group activities	13:30 ~ 15:00			Video: Introduction to the static electricity	14:30 ~ 15:00

ANNEX 22

TRAINING CONTENT OF COURSE FOR WORKERS (3/4)

3rd PHASE FOR WORKERS

SAFETY COMMON		PROCESS SAFETY		MAINTENANCE SAFETY	
Course	Time	Course	Time	Course	Time
Preventive measures against accident and incident recurrence	7:15 ~ 9:15	Points on what to pay attention before emitting work permission	7: 15 ~ 10:00	Underdevelopping by Mexican counterparts	
Safety activities at work	9:30 ~ 10:30	Work permission during operation	10:15 ~ 12:00		
Tool Box Meeting	10:40 ~ 11:30	Work permission during a general maintenance Video (Basic 5´S)	12:30 ~ 15:00		
Zero accident activities	12:00 ~ 15:00				

ANNEX 22

TRAINING CONTENT OF COURSE FOR WORKERS (4/4)

4th PHASE FOR WORKERS

SAFETY COMMON		PROCESS SAFETY		MAINTENANCE SAFETY	
Course	Time	Course	Time	Course	Time
Prevention of behavioral accidents	7:15 ~ 9:15	Raise the reliability of process plant. Part I	7:15 ~ 9:30	Underdevelopping by Mexican counterparts	
Points of safety and health	9:30 ~ 11:30	Raise the reliability of process plant. Part II	9:45 ~ 12:00		
Various kinds of hazards and preventive measures	12:00 ~ 13:45	Examples of accidents and incidents in Japan Video (5'S activities).	12:30 ~ 15:00		
Review of Japanese safety activities (HAD , APP , ESP , 5S's)	14:00 ~ 15:00				

ANNEX 23

ATTENDANCE IN THE DISCUSSIONS (1/3)

JAPANESE PART

CONSULTATION TEAM:

Yoshiaki Nakamura (Leader and Technical Cooperation Planning)	Sub director, Refining Division Petroleum Department, Agency of Natural resources and Energy, Ministry of International Trade and Industry
Katsumi Imanishi (Safety Administration Technology)	Project manager International Cooperation Center Cosmo Oil Co. Ltd.
Toshihiro Nozawa (Evaluation of Training Effects)	Staff, Second Technical Cooperation Division Mining and Industrial Development Cooperation Dept. JICA
Yasuhiko Wada (Project Managing)	Staff, Second Technical Cooperation Division Mining and Industrial Development Cooperation Dept. JICA

JICA MEXICO:

Saburo Yamaguchi	General Director
Ryozo Hanya	Director
Keitaro Fujii	Sub director
Daniel Gonzalez Gonzalez	Technical Secretary

JICA EXPERTS:

Ryuzo Furukawazono	Chief Advisor
Hiroshi Isaki	Coordinator
Hajime Mori	Safety Administration
Eizo Uegaki	Safety Administration
Hideyuki Iwasato	Maintenance safety
Toru Moriyama	Process Safety

ANNEX 23

ATTENDANCE IN THE DISCUSSIONS (2/3)

MEXICAN PART

PEMEX HEAD OFFICES :

Ing. Francisco Delgado Cortes	Production Subdirector of Pemex-Refination
Ing. Roberto Andrade Cruz	Auditor Industrial Safety and Environmental Protection
Ing. José Manuel Olivares Paez	Production Control Manager of Assistant Manager of Production
Ing. Fermin Narvaes Camacho	Environmental Protection and Safety Manager
Ing. Emilio Díaz Francés	Safety and Occupational Sub-Manager
Ing. Gerardo Acevedo Sobrado	Technical Inspection and Safety General Manager
Ing. Miguel Mendoza Gutierrez	Technical Inspection and Safety Coordinator

ANNEX 23

ATTENDANCE IN THE DISCUSSIONS (3/3)

MEXICAN PART

PEMEX REFINERIA SALAMANCA, GTO.

Ing. Miguel Tame Domínguez	Salamanca Refinery Manager (Project Manager)
Ing. Antonio Alvarez Moreno	Salamanca Technical Inspection and Safety Superintendent (Project Manager Assistant and Technical Coordinator)
Ing. Jesús Manuel Almanza Torres	Safety Training Center Manager (Acting Project Manager Assistant)
Ing. Manuel Melo Lopez	Production Unit, Manager
Ing. Armando Marin Marin	Evaluation and Programming Unit
Ing. Benjamin Guerrero Romero	Process Superintendent
Ing. Alvaro Muro Gonzalez	Maintenance Superintendent

(Instructors attended depending on the classes)

Ing. Carlos Rafael Cuevas Zaldo	Safety Administration
Ing. Isabel Alvarez Araujo	Safety Administration
Sr. Teodoro Castro del Valle	Safety Administration
Ing. Victor M. Munguía Zúñiga	Maintenance Safety
Ing. Fernando Martínez Fernández	Maintenance Safety
Sr. Francisco Castro	Maintenance Safety
Ing. Sergio González Beltrán	Process Safety
Sr. Enrique Salgado	Process Safety
Ing Candelario E. Cú Gutíerrez	Inspection
Sr. Jose Guadalupe Escalante	Process Safety